



**AGENDA
PARKS & RECREATION COMMITTEE
MEETING
CITY HALL BOARDROOM
TUESDAY, JANUARY 23, 2024**

- 1. CALL TO ORDER**
- 2. ATTENDANCE AND INSTRUCTIONS**
- 3. APPROVAL OF MINUTES**
 - A) October 24, 2023 Minutes**
- 4. OLD BUSINESS**
- 5. NEW BUSINESS**
 - A) Pickleball Courts – 30% Schematic Design**
 - B) Tarpon Beach Parking- 100% Design Plans**
- 6. COMMITTEE MEMBER COMMENTS/QUESTIONS**
- 7. STAFF REPORTS** Park Updates
- 8. COMMENTS FROM THE AUDIENCE**
- 9. NEXT MEETING DATE: February 27, 2024**
- 10. PUBLIC COMMENTS** (Comments from the public on any matters considered at the meeting, or on any matters not on the agenda)

If a person decides to appeal any decision made by the City Council, committee, board, panel, or agency with respect to any matter considered at such meeting or hearing, he or she will need a record of the proceedings, and that, for such purpose, he or she will may need to ensure that a record of the verbatim record of the proceedings is made, which record includes the testimony and evidence upon the appeal is to be based.

"Persons with disabilities who require assistance to participate in this meeting are requested to notify the Public Services Office 850/837-4242 at least 48 hours in advance".

**MINUTES OF THE
PARKS & RECREATION COMMITTEE
MEETING DESTIN CITY HALL BOARDROOM
OCTOBER 24, 2023 MEETING - 4:00 PM**

1. CALL TO ORDER:

Chairwoman Trammell called the Parks & Recreation meeting to order at 4:00 p.m. on Tuesday, October 24, 2023, in the Destin City Hall Annex Chambers with the Pledge of Allegiance immediately following.

2. ROLL CALL:

<u>Members Present</u>	<u>Members Absent</u>	<u>Staff Present</u>
Sandy Trammell	Isaac Birch	Kim Montgomery Deputy City Clerk
Nikki Johnson	Leslie Schmidt	Lisa Firth Recreation Director
Daniella Piper		Ryan Reed Dep. Recreation Director
Lisa Mason		Michael Baird Parks & Rec Supervisor
L'Rena Anderson		

3. AGENDA APPROVAL:

Motion to change the order of the day was made by Chairwoman Trammell with Committee member Piper providing the second. The motion passed 5-0. The following items were added:

- **Meeting Notifications – Add to New Business**
- **Work Plan Review – Add to Chairwoman's discussion**

4. PRESENTATION:

➤ **1 Harbor Blvd. Presentation – John Stephens**

Mr. Stephens briefly explained to the members that his wife, who previously worked as a graphic designer, created designs for the property of what could potentially be built, and added that what is will present is just a conceptual design to help with the implementation of ideas. He spoke of the heritage magnolia tree on the property, its significance, and how the design of a stadium type theme's purpose is to showcase the tree, making sure that what is built won't harm it. In the presentation, Mr. Stephens spoke of the different types of events that could take place on the property for the locals and tourists alike. He spoke of how he would like to see a Harbor Master position created with an office onsite for that position. He also spoke of how he would like to see the harbor designated as a mooring harbor which would give Code jurisdiction on the waterway as well as the Harbor Master, provide mooring balls, which would bring income to the city, provide transient slips and a pump-out station.

Chairwoman Trammell thanked Mr. Stephens for his time and the presentation.

5. APPROVAL OF MINUTES: SEPTEMBER 26, 2023

Motion to approve the September 26, 2023, was made by Committee member Piper with Committee member Johnson providing the second. The motion passed 5-0.

6. OLD BUSINESS:

➤ **Annual Report and Work Plans**

Chairwoman Trammell reported to the members that she would be presenting this to City Council at their December 11, 2023, meeting.

7. MEMBER & STAFF COMMENTS:

➤ **Committee member Piper** – Suggested to the members to drive by the Main Street Park and see how great it looks and, provided Kudos to the Recreation staff for the great job they did on cleaning it up.

- **Murals** – She briefly discussed murals in the city.
- **Distribution of Native Trees for National Arbor Day** – Committee member Piper explained she invited Janet Hays to attend to discuss with the various native trees that should be planted to support the local ecology.

Ms. Hays spoke of the importance of planting native trees and plants for wildlife and the environment. She also mentioned the need to decide on which type of tree they would like to see planted so that they can get them ordered in time and named off three parks that they pick from to have the native tree planted to replace ones that have died. In discussion, the general consensus from the members was the Leonard Destin Park.

Motion by Chairwoman Trammell, seconded by Committee member Piper to plant a Buckeye Tree with a memorial plaque installed at the base in the Leonard Destin Park, to replace the orange tree that didn't survive. The motion passed 5-0. Mrs. Firth reminded the members that they would plant the Red Buckeye on January 19, 2024.

➤ **Chairwoman Trammell:**

- **Converting Softball fields to Baseball** – This item was briefly discussed and how they would be for middle school players.
- **Mobility Priorities** need to be turned in to Mr. Joe Bodi
- **By Laws for the Destin Parks Foundation** – Provided a draft copy for the members to review.

- **Parks & Recreation Committee Handbook** – Handed out the three codes for the members to add to their copy of their handbook that pertain to the purview of this committee.
- **Paddle Smash** – Provided the information for the members to think over.
- **Kell Aire Parks** – Suggests inviting the owners to a meeting to see if they want to talk about their neighborhood parks and what they'd like to have installed or improved.

➤ **Staff Comments** – Staff provided the members with the upcoming events taking place in the city for the months of November and December and the opportunities for the members to volunteer, if interested.

➤ **Next Committee meeting is January 23, 2023**

8. ADJOURNMENT:

Having no further discussions, the meeting adjourned at 5:40 PM.

Adopted and approved this _____ day of _____ 2023.

Sandy Trammell, Chairwoman

Kim Montgomery, Deputy City Clerk

CITY OF DESTIN – COMMUNITY DEVELOPMENT



AGENDA ITEM

MEETING DATE: January 23, 2024

BOARD/COMMITTEE: Parks & Recreation Committee

TYPE OF AGENDA ITEM: Action Item

OUTLINE NUMBER: 5.A.

TO: Parks & Recreation Committee

THRU: Louis Zunguze, Interim City Manager
Kimberly Kopp, City Attorney

FROM: Lisa Firth, Parks & Rec Director

DATE: December 11, 2023

SUBJECT: Pickleball Courts – 30% Schematic Design

I. BACKGROUND: At the August 21, 2023, City Council meeting, Council directed Staff to engage Jenkins Engineering, Inc. (JEI) to design a pickleball area located on Indian Bayou Trail between the City Hall Annexation Building and the Public Works Buildings. It was determined to have JEI design/permit a complete buildout for the pickleball recreational area, but the Phase 1 buildout would include approximately four pickleball courts with at least one covered with a budget not to exceed \$400,000. The engineering, design, and permitting fees were \$51,400 leaving \$348,600 left for the construction of the project.

II. DISCUSSION: Staff and JEI are providing the 30% Schematic Design plans for your review/comment and recommended motions to City Council. Upon further review of the Florida Building Code requirements, at least one unisex bathroom is required as part of the project (FBC403.3 – Required public toilet facilities). With the required bathroom and associated utility work, there is not enough funds remaining in the budget to have four courts with one being covered as previously directed.

The two attached cost estimates show the following:

- OPTION 1 - \$349,531.29 = One set of bathrooms and two uncovered courts
- OPTION 2 - \$613,663.13 = One set of bathrooms and four covered courts

The option that best follows the City Council direction would be the following and require an increase in the budget by approximately \$86,000:

- OPTION 3 - \$433,663.13 = One set of bathrooms, four courts with one of the courts covered

A. Link to Strategic Goals / Objectives: II. Enhance quality of life and safety for families.

III. Economic development and revitalization

IV. Effective, efficient, and aesthetically pleasing infrastructure.

B. Effect on Budget (EOB): Project approved for FY24 Budget

C. Level of Service (LOS): Level of service is increased

D. Legislative Sponsor:

III. CONCLUSION: Staff and JEI are ultimately looking for feedback and direction before moving forward to the 60% Construction Documents.

STAFF RECOMMENDATION: Staff is looking for direction as to what Phase 1 of the project should encompass. Either leave phase 1 “as-is” or recommend to City Council that the budget be increased to include the four courts and some or all the courts to be covered.

IV. RECOMMENDED MOTION: I move to recommend that the City Council approve _____ (Option 1, 2, or 3)

Attachments:

1. 23-58 Cost Estimate - Phase 1
2. 23-58 Design - COMBINED SET - Alternate Plan
3. 23-58 Cost Estimate - Alternate Plan

Engineer's Preliminary Estimated Cost of Civil Construction

City of Destin Pickleball Courts - Phase 1

1/11/2024

SECTION 1 - GRADING

ITEM No.	DESCRIPTION	ENG. EST.	UNIT	UNIT PRICE	AMOUNT
1.1	Mobilization / Demobilization	1	LS	\$5,000.00	\$5,000.00
1.2	Clearing	0.54	AC	\$12,000.00	\$6,427.82
1.3	Construction Staking	1.00	LS	\$6,500.00	\$6,500.00
Total Earthwork =				\$17,927.82	

SECTION 2 - SITE IMPROVEMENTS

ITEM No.	DESCRIPTION	ENG. EST.	UNIT	UNIT PRICE	AMOUNT
2.1	2" Layer Type Sp 12.5 Asph. Conc.	933	SY	\$32.00	\$29,852.44
2.2	8" Graded Aggregate Base	933	SY	\$31.00	\$28,919.56
2.3	12" Compacted Subbase	933	SY	\$4.00	\$3,731.56
2.4	Sidewalk (width varies)	300	SY	\$64.00	\$19,173.69
2.5	Prefabricated Bathroom	1	LS	\$100,000.00	\$100,000.00
2.6	Fencing	600	LF	\$35.00	\$21,000.00
2.7	Court Coverings	4	LF	\$60,000.00	\$240,000.00
2.8	Court Lighting / Electrical	1	LS	\$26,000.00	\$26,000.00
2.9	Finish Grading	2600	SY	\$6.00	\$15,600.00
2.10	Striping & Signage	229	SF	\$20.00	\$4,580.00
2.11	Maintenance of Traffic	1	LS	\$3,500.00	\$3,500.00
Total Roadways =				\$492,357.24	

SECTION 3 - STORM DRAINAGE SYSTEM

ITEM No.	DESCRIPTION	ENG. EST.	UNIT	UNIT PRICE	AMOUNT
3.1	Silt Fence	1160	LF	\$3.50	\$4,060.00
3.2	Type 9 Curb Inlet	0	EA	\$5,800.00	\$0.00
3.3	Type C Inlet	0	EA	\$4,500.00	\$0.00
3.4	12" ADS Storm Pipe	96	LF	\$26.00	\$2,496.00
3.2	Sod	1360	SY	\$6.00	\$8,160.47
Total Storm Drainage System =				\$14,716.47	

SECTION 4 - WATER & SEWER SYSTEMS

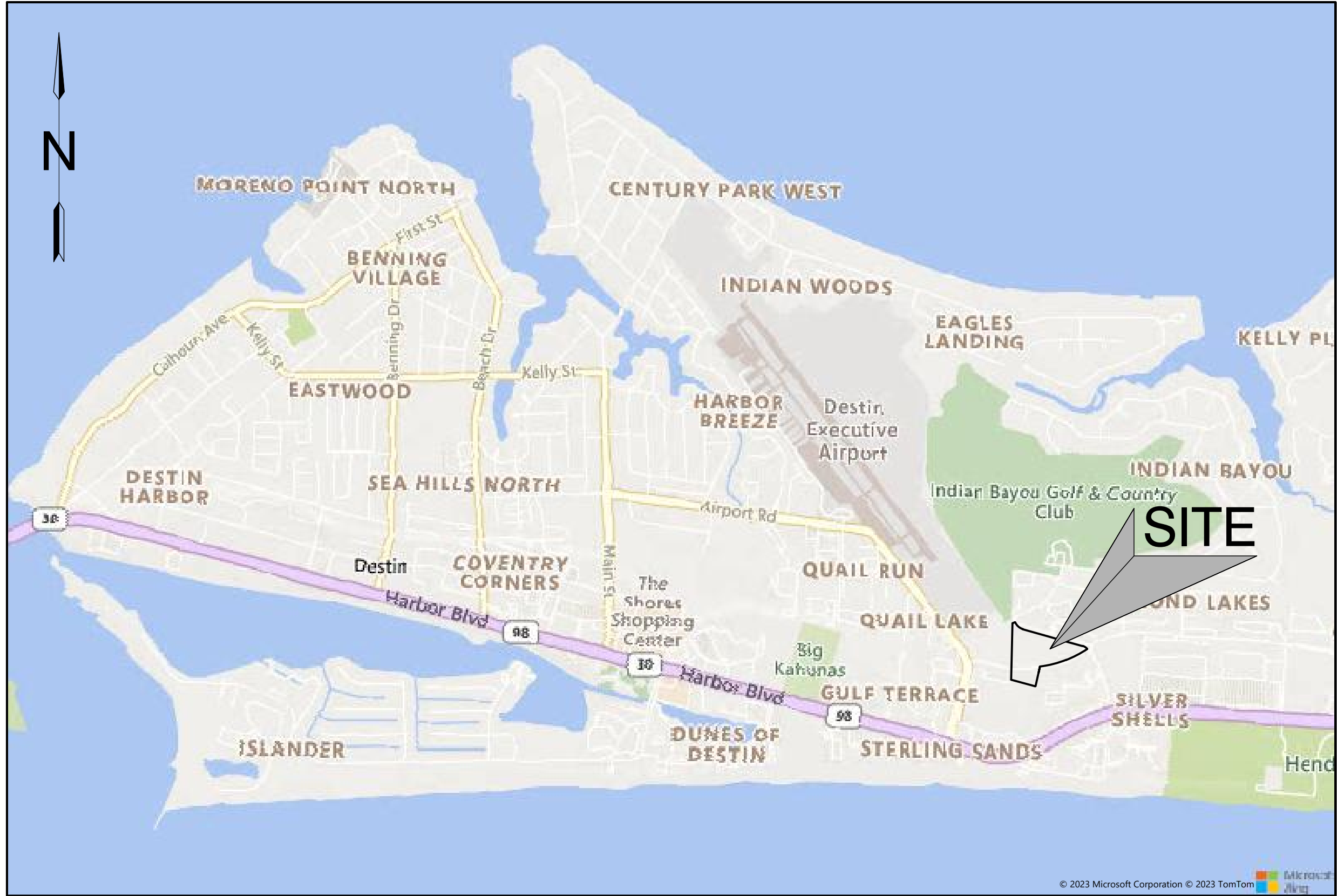
ITEM No.	DESCRIPTION	ENG. EST.	UNIT	UNIT PRICE	AMOUNT
4.1	2" Water Main	206	LF	\$32.00	\$6,592.00
4.2	Tapping Sleeve & Valve	2	EA	\$4,500.00	\$9,000.00
4.3	Miscellaneous Fittings	1	EA	\$1,500.00	\$1,500.00
4.3	Manhole	4	EA	\$5,600.00	\$22,400.00
4.4	8" Gravity Sewer	453	LF	\$24.00	\$10,869.60
4.5	6" Service	160	LF	\$15.00	\$2,400.00
Total Storm Drainage System =				\$52,761.60	

SECTION 5 - MISCELLANEOUS

ITEM No.	DESCRIPTION	ENG. EST.	UNIT	UNIT PRICE	AMOUNT
5.1	8' Bench with Canopy	2	EA	\$3,100.00	\$6,200.00
5.2	Pickleball Net System	4	EA	\$1,800.00	\$7,200.00
5.3	Court paint (Acrylic / Non slip)	4	EA	\$2,500.00	\$10,000.00
5.4	Landscaping	1	LS	\$7,500.00	\$7,500.00
5.5	Irrigation	1	LS	\$5,000.00	\$5,000.00
Total Miscellaneous =				\$35,900.00	
TOTAL =				\$613,663.13	

CITY OF DESTIN PICKLEBALL COURTS

DESTIN, FLORIDA



VICINITY MAP
NOT TO SCALE

UTILITY PROVIDERS

(WATER/SEWER)
DESTIN WATER USERS
218 MAIN STREET
DESTIN, FL 32541
(850) 837-4930

(TELEPHONE)
CENTURYLINK
411 MARY ESTHER CUTOFF
FT. WALTON BEACH, FL 32548
(850) 244-1150

(ELECTRIC)
FLORIDA POWER & LIGHT
140 HOLLYWOOD BLVD SW
FT. WALTON BEACH, FL 32548
(800) 225-5797

(GAS)
OKALOOSA GAS DISTRICT
20 HUGHES STREET NE
FT. WALTON BEACH, FL 32548
(850) 729-4700

CLIENT INFORMATION

CITY OF DESTIN
POC: RYAN SCOTT, P.E. - CITY ENGINEER
DESTIN CITY HALL ANNEX
4100 INDIAN BAYOU TRAIL
DESTIN, FL 32541
PHONE: (850) 654-1119
EMAIL: RSCOTT@CITYOFDESTIN.COM

DUTY TO INDEMNIFY

THE CONTRACTOR SHALL DEFEND, INDEMNIFY, KEEP AND SAVE HARMLESS THE OWNER AND ENGINEER AND THEIR RESPECTIVE MEMBERS, REPRESENTATIVES, AGENTS AND EMPLOYEES, IN BOTH INDIVIDUAL AND OFFICIAL CAPACITIES, AGAINST ALL SUITS, CLAIMS, DAMAGES, LOSSES AND EXPENSES, INCLUDING ATTORNEY'S FEES, CAUSED BY, GROWING OUT OF, OR INCIDENTAL TO THE PERFORMANCE OF THE WORK UNDER THE CONTRACT BY THE CONTRACTOR OR ITS SUBCONTRACTORS TO THE FULL EXTENT AS ALLOWED BY THE LAWS OF THE STATE OF FLORIDA AND NOT BEYOND ANY EXTENT WHICH WOULD RENDER THESE PROVISIONS VOID OR UNENFORCEABLE. IN THE EVENT OF ANY SUCH INJURY (INCLUDING DEATH) OR LOSS OR DAMAGE, OR CLAIMS THEREFORE, THE CONTRACTOR SHALL GIVE PROMPT NOTICE TO THE OWNER.

ALTERNATE PLAN

LEGAL DESCRIPTION

PARCEL I (AS RECORDED IN OR BK 2252 PG 3230)

A parcel of land in unsectionalized Township 2 South, Range 22 West, Okaloosa County, Florida described as commencing at the Southeast corner of Lot 4, Block 6, Silver Beach Subdivision, as recorded in Plat Book 1, Page 16 ½ of the Official Records; thence North 03°58'04" East along a projection of the East line of said Lot 4, a distance of 1277.03 feet to a point on the Northerly right of way line of State Road 30 (U.S. 98 bypass, R/W varies) and the Southerly right of way line of a 100 foot Gulf Power easement; thence North 86°02'36" West (North 86°02'07" West measured) along said Northerly and Southerly lines, a distance of 435.96 feet; thence North 83°19'06" West along said Northerly and Southerly lines, a distance of 176.83 feet; thence departing said Northerly right of way line and continuing along said Southerly line of Gulf Power easement North 83°19'06" West, 373.07 feet to a concrete monument #3724 on the Easterly right of way line of Two Trees Road (100' R/W); thence continue North 83°19'0611 West along said Southerly line, a distance of 407.82 feet to a concrete monument #3724 along the South line of Destin City Hall parcel; thence continuing along said South line of Destin City Hall parcel and power easement, North 77°53'4611 West, 947.63 feet (North 77°53'0211 West, 947.59 feet measured) to a concrete monument #3724 and the point of beginning; thence continuing along the last described course, 10.72 feet; thence continuing along said South line of Gulf Power easement, North 75°09'4711 West, 413.87 feet; thence departing said South line, North 01°17'2111 East, 953.11 feet to the Southerly right of way line of Indian Bayou Trail (100' R/W); thence North 67°29'3211 East along said Southerly line, a distance of 42.67 feet to the Southerly right of way line of Two Trees Road (80' R/W); thence Southeasterly along said right of way of Two Trees Road, 180.13 feet along the arc of a curve, concave Northeasterly, having a radius of 200.00 feet, a central angle of 51°36'1011 and a chord bearing South 48°24'5311 East, 174.10 feet; thence continuing along said right of way of Two Trees Road, South 74°13'0411 East, 433.23 feet; thence departing said right of way line, South 15°46'5611 West, 363.00 feet; thence South 74°13'0411 East, 300.00 feet; thence North 15°46'56" East 363.00 feet to said Southerly right of way line of Two Trees Road; thence South 74°13'04" East along said Southerly line, a distance of 312.37 feet; thence continuing along said right of way line, 93.41 feet along the arc of a curve, concave Southwesterly, having a radius of 149.08 feet, a central angle of 35°54'03", and a chord bearing South 56°14'5311 East, 91.89 feet to a concrete monument #3724 marking the Northerly line of Destin City Hall site, said line also being the Northerly right of way line of future extension of Comprehensive Plan Road (100' R/W); thence along said Northerly line, 398.06 feet along the arc of a curve, concave Northwesterly, having a radius of 1902.87 feet, a central angle of 11°59'02", and a chord bearing South 62°31'39" West, 397.33 feet to a concrete monument #3724; thence continuing along said Northerly line, 454.76 feet along the arc of a curve, concave Northwesterly, having a radius of 1804.18 feet, a central angle of 14°26'31", and a chord bearing South 75°41'03" West, 453.56 feet to a concrete monument #3724, thence departing said Northerly line and continuing along the West line of said Destin City Hall Site, South 12°07'3711 West, 338.55 feet to the point of beginning, containing 12.99 acres, more or less, all in Okaloosa County, Florida.

PARCEL (AS RECORDED IN OR BK 2627 PG 1618)

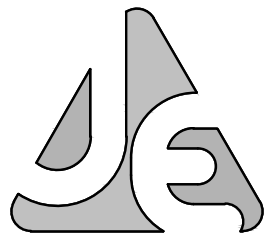
A parcel of land in undivided Township 2 South, Range 22 West, Okaloosa County, Florida, described as commencing at the Southeast corner of Lot 4, Block 6, Silver Beach Subdivision, as recorded in Plat Book 1, Page 16 ½ of the Official Records; thence North 03°58'52" East, 1277.09 feet to the North right-of-way line of State Road 30 and the Southerly right-of-way line of a 100 foot wide Gulf Power Easement; thence North 86°02'07" West (reference bearing) along said North right-of-way line, 434.71 feet to a point of divergence of said right-of-way lines; thence North 83°18'37" West along said Southerly Gulf Power Easement right-of-way line, 657.81 feet to the West right-of-way line of Comprehensive Road a 100 foot right-of-way; thence North 13°56'03" West, 346.03 feet; to a point of curvature, thence 339.42 feet along the arc of a curve, concave southwesterly having a radius of 993.92 feet, a central angle of 19°33'58", and a chord bearing North 23°43'02" West, 337.77 feet; thence North 33°30'00" West, 245.99 feet to a point of curvature; thence 105.95 feet along the arc of a curve concave Southwesterly, having a radius of 149.08 feet, a central angle of 40°43'09", and a chord bearing North 53°51'32" West, 103.73 feet to a point of tangency; thence North 74°13'04" West, 312.54 feet to the point of beginning, thence South 15°46'56" West, 363.00 feet, then North 74°13'04" West, 300.00 feet, thence North 15°46'56" East, 363.00 feet to the South right-of-way line of Two Trees Road and 80 foot right-of-way, thence South 74°13'04" East, 300.00 feet to the point of beginning; all in undivided Township 2 South, Range 22 West, Okaloosa County, Florida.

Together with a non-exclusive easement for ingress and egress across the following described property:

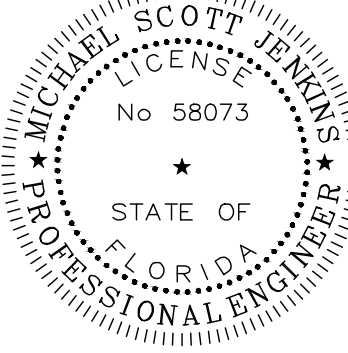
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SHEET INDEX

#	TITLE
01	COVER SHEET
02	EXISTING CONDITIONS
03	MASTER SITE PLAN
04	PHASE 1 SITE & UTILITY PLAN
05	PHASE 1 GRADING & DRAINAGE PLAN
06	SPECIFICATIONS I
07	SPECIFICATIONS II



JENKINS ENGINEERING, INC.
73 EGLIN PARKWAY NE, SUITE 203
FORT WALTON BEACH, FLORIDA 32548
PHONE 850.837.2448
FAX 850.837.2450
JEICVIL.COM



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

BY	DATE	REV	DESCRIPTION
..	..	..	..

CITY OF DESTIN
CITY OF DESTIN PICKLEBALL COURTS
DESTIN, FLORIDA
COVER SHEET
NOT VALID UNLESS BEARING ENGINEERS ORIGINAL SIGNATURE

JOB: 23-58
DATE: 10-2023
DESIGNED: MSJ
DRAWN: MPF

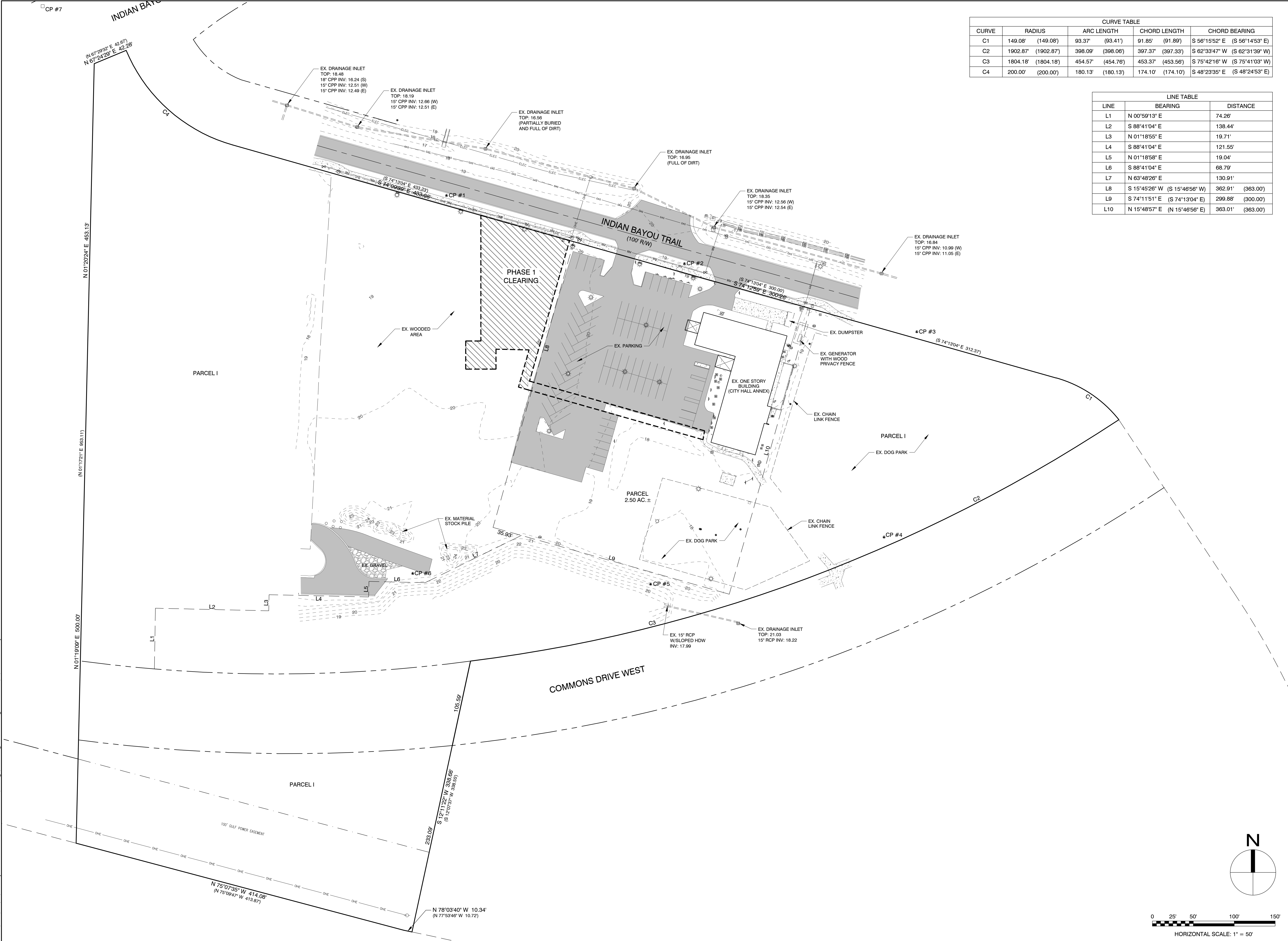
BAR IS ONE INCH ON ORIGINAL
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IF NOT ONE INCH ON THIS SHEET
ADJUST SCALES ACCORDINGLY

DRAWING NUMBER
01 OF 07

SHEET NUMBER
C01

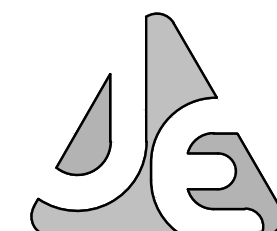
FOR PERMITTING ONLY - NOT FOR CONSTRUCTION

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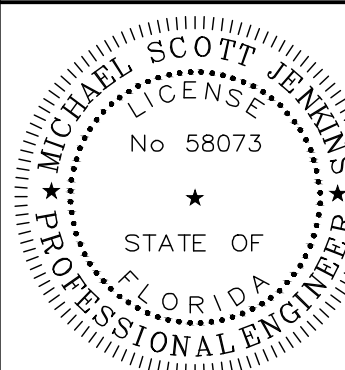


CURVE TABLE							
CURVE	RADIUS		ARC LENGTH		CHORD LENGTH		CHORD BEARING
C1	149.08'	(149.08')	93.37'	(93.41')	91.85'	(91.89')	S 56°15'52" E (S 56°14'53" E)
C2	1902.87'	(1902.87')	398.09'	(398.06')	397.37'	(397.33')	S 62°33'47" W (S 62°31'39" W)
C3	1804.18'	(1804.18')	454.57'	(454.76')	453.37'	(453.56')	S 75°42'16" W (S 75°41'03" W)
C4	200.00'	(200.00')	180.13'	(180.13')	174.10'	(174.10')	S 48°23'35" E (S 48°24'53" E)

LINE TABLE		
LINE	BEARING	DISTANCE
L1	N 00°59'13" E	74.26'
L2	S 88°41'04" E	138.44'
L3	N 01°18'55" E	19.71'
L4	S 88°41'04" E	121.55'
L5	N 01°18'58" E	19.04'
L6	S 88°41'04" E	68.79'
L7	N 63°48'28" E	130.91'
L8	S 15°45'26" W (S 15°46'56" W)	362.91' (363.00')
L9	S 74°11'51" E (S 74°13'04" E)	299.88' (300.00')
L10	N 15°48'57" E (N 15°46'56" E)	363.01' (363.00')



JENKINS ENGINEERING, INC.
73 EGLIN PARKWAY NE, SUITE 203
FORT WALTON BEACH, FLORIDA 32548
PHONE 850.837.2448
FAX 850.837.2450
JECIVIL.COM



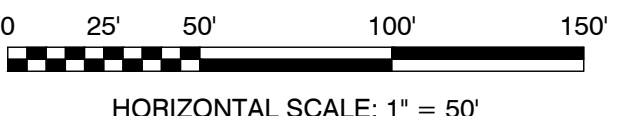
M. SCOTT JENKINS, P.E.
FL REGISTRATION NO. 58073

BY	DATE	DESCRIPTION
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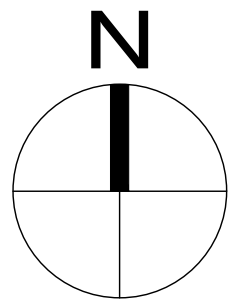
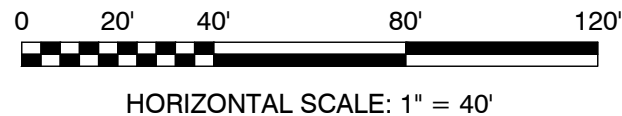
CITY OF DESTIN	JOB: 23-58
CITY OF DESTIN PICKLEBALL COURTS DESTIN, FLORIDA	DATE: 10-2023
EXISTING CONDITIONS	DESIGNED: MSJ
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	DRAWING NUMBER 02 OF 07
	SHEET NUMBER C02

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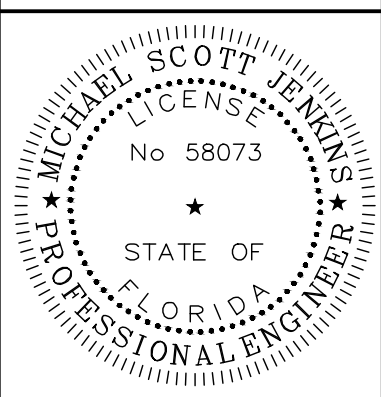
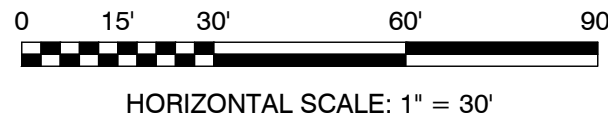


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JENKINS ENGINEERING, INC.			
73 EGLIN PARKWAY NE, SUITE 203 FORT WALTON BEACH, FLORIDA 32548 PHONE 850.837.2448 FAX 850.837.2450			
JEICIVIL.COM			
M. SCOTT JENKINS, P.E. FL REGISTRATION NO. 58073			
BY	***		
DESCRIPTION	***		
REV	DATE	***	
CITY OF DESTIN			
CITY OF DESTIN PICKLEBALL COURTS			
DESTIN, FLORIDA			
MASTER SITE PLAN			
NOT VALID UNLESS BEARING ENGINEER'S ORIGINAL SIGNATURE			
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M. SCOTT JENKINS, P.E.
FL. REGISTRATION NO. 58073

[illegible]

CITY OF DESTIN

CITY OF DESTIN PICKLEBALL COURTS
DESTIN, FLORIDA

PHASE 1 SITE & UTILITY PLAN

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DATE: 10-2023
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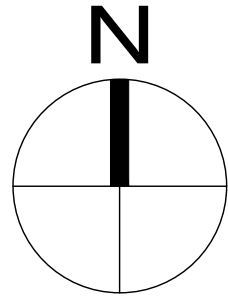
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SHEET NUMBER
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CONTINUED ON NEXT COLUMN

Engineer's Preliminary Estimated Cost of Civil Construction

City of Destin Pickleball Courts - Phase 1 - Alternate Plan

1/11/2024

SECTION 1 - GRADING

ITEM No.	DESCRIPTION	ENG. EST.	UNIT	UNIT PRICE	AMOUNT
1.1	Mobilization / Demobilization	1	LS	\$5,000.00	\$5,000.00
1.2	Clearing	0.35	AC	\$12,000.00	\$4,200.00
1.3	Construction Staking	1.00	LS	\$4,500.00	\$4,500.00
Total Earthwork =				\$13,700.00	

SECTION 2 - SITE IMPROVEMENTS

ITEM No.	DESCRIPTION	ENG. EST.	UNIT	UNIT PRICE	AMOUNT
2.1	2" Layer Type Sp 12.5 Asph. Conc.	470	SY	\$32.00	\$15,040.00
2.2	8" Graded Aggregate Base	470	SY	\$31.00	\$14,570.00
2.3	12" Compacted Subbase	470	SY	\$4.00	\$1,880.00
2.4	Sidewalk (width varies)	300	SY	\$64.00	\$19,173.69
2.5	Prefabricated Bathroom	1	LS	\$100,000.00	\$100,000.00
2.6	Fencing	320	LF	\$35.00	\$11,200.00
2.7	Court Coverings	1	LF	\$60,000.00	\$60,000.00
2.8	Court Lighting / Electrical	1	LS	\$13,000.00	\$13,000.00
2.9	Finish Grading	1300	SY	\$6.00	\$7,800.00
2.10	Striping & Signage	229	SF	\$20.00	\$4,580.00
2.11	Maintenance of Traffic	1	LS	\$3,500.00	\$3,500.00
Total Roadways =				\$250,743.69	

SECTION 3 - STORM DRAINAGE SYSTEM

ITEM No.	DESCRIPTION	ENG. EST.	UNIT	UNIT PRICE	AMOUNT
3.1	Silt Fence	580	LF	\$3.50	\$2,030.00
3.2	Type 9 Curb Inlet	0	EA	\$5,800.00	\$0.00
3.3	Type C Inlet	0	EA	\$4,500.00	\$0.00
3.4	12" ADS Storm Pipe	96	LF	\$26.00	\$2,496.00
3.2	Sod	1000	SY	\$6.00	\$6,000.00
Total Storm Drainage System =				\$10,526.00	

SECTION 4 - WATER & SEWER SYSTEMS

ITEM No.	DESCRIPTION	ENG. EST.	UNIT	UNIT PRICE	AMOUNT
4.1	2" Water Main	206	LF	\$32.00	\$6,592.00
4.2	Tapping Sleeve & Valve	2	EA	\$4,500.00	\$9,000.00
4.3	Miscellaneous Fittings	1	EA	\$1,500.00	\$1,500.00
4.3	Manhole	4	EA	\$5,600.00	\$22,400.00
4.4	8" Gravity Sewer	453	LF	\$24.00	\$10,869.60
4.5	6" Service	160	LF	\$15.00	\$2,400.00
Total Storm Drainage System =				\$52,761.60	

SECTION 5 - MISCELLANEOUS

ITEM No.	DESCRIPTION	ENG. EST.	UNIT	UNIT PRICE	AMOUNT
5.1	8' Bench with Canopy	2	EA	\$3,100.00	\$6,200.00
5.2	Pickleball Net System	2	EA	\$1,800.00	\$3,600.00
5.3	Court paint (Acrylic / Non slip)	2	EA	\$2,500.00	\$5,000.00
5.4	Landscaping	1	LS	\$4,500.00	\$4,500.00
5.5	Irrigation	1	LS	\$2,500.00	\$2,500.00
Total Miscellaneous =				\$21,800.00	
TOTAL =				\$349,531.29	

CITY OF DESTIN – COMMUNITY DEVELOPMENT



AGENDA ITEM

MEETING DATE: January 23, 2024

BOARD/COMMITTEE: Parks & Recreation Committee

TYPE OF AGENDA ITEM: Presentation

OUTLINE NUMBER: 5.B.

TO: Parks & Recreation Committee

THRU: Louis Zunguze, Interim City Manager
Lisa Firth, Parks & Rec Director
Kimberly Kopp, City Attorney
Krystal Strickland, Finance Director

FROM: Ryan Scott, City Engineer

DATE: January 3, 2024

SUBJECT: Tarpon Beach Parking- 100% Design Plans

I. BACKGROUND:

The County and Tourist Development District (TDD) has been working with City staff and City Council to acquire properties along the beach to provide more parking within Crystal Beach and to help alleviate traffic flow and congestion.

At the February 28, 2023, Parks & Recreation Committee Meeting, Staff provided the Committee the 30% design plans for the beach access at Tarpon Street, explaining the details of the parking spaces for both cars and low speed vehicles, and pavilion designs, as well as the plans for the view corridors.

II. DISCUSSION:

City staff have been in communication with the County and the County's Engineering Team to get the site laid out in accordance with the Land Development Code. The Tarpon Beach Parking 100% Design Plans meet the minimum Code requirements.

The attached design is estimated to cost \$2,168,832 to construct. The Interlocal Agreement with Okaloosa County states the City and the County would split the cost of construction 50/50.

A. Link to Strategic Goals / Objectives:

- II. Enhanced quality of life and safety for families
- IV. Effective, efficient, and aesthetically pleasing infrastructure

V. Improve mobility and connectivity

B. Effect on Budget (EOB): The interlocal agreement between the Okaloosa Board of County Commissioners (BOCC) and the City of Destin agrees to split the cost of design and construction of Tarpon Beach park 50/50. The City's portion of the funding is coming from our allocation of Tourism Development Tax (TDT) distributed to us in the form of grants from Okaloosa County. There are currently adequate funds budgeted and granted to cover the estimated cost of construction proposed by this design. Unspent funds from this project will default to the design and construction of the neighboring Crystal Shores park project.

	30557212-565000-		CM002	
	30557237-565000-		TDC 12.5%-CIP-	
	CM002		Tarpon	TOTAL
	BOCC-CIP-Tarpon			
	\$ 1,167,761	\$ 1,167,761	\$ 2,335,522	
FY 24 Adopted Budget*	1,167,761	1,167,761	2,335,522	
Previous Expenses/Encumbrances	-	(49,238)	(49,238)	
Available Program Budget	1,167,761	1,118,523	2,286,284	
This Agreement +(-)	(1,084,416)	(1,084,416)	(2,168,832)	
FY 24 Remaining Program Budget	\$ 83,345	\$ 34,107	\$ 117,452	

*FY 24 Adopted Budget includes Budget for Prior Year Encumbrances

C. Level of Service (LOS): Improved mobility and connectivity.

D. Legislative Sponsor:

III. CONCLUSION: City Staff plan to present the Tarpon Beach Parking 100% Design Plans to City Council and then will begin the permitting process.

IV. RECOMMENDED MOTION: I move to recommend that City Council approve the Tarpon Beach Parking 100% Design Plans.

Attachments:

1. Tarpon Beach - Complete 100pct PDF Submittal Set - Half Size 11x17
2. Tarpon Beach - Destin FL SWMP
3. Tarpon Beach 100% OPCC - 08 Dec 2023
4. Tarpon Beach 100% Specs

CONSTRUCTION PLANS FOR SHORES AT TARPON BEACH

DECEMBER 2023

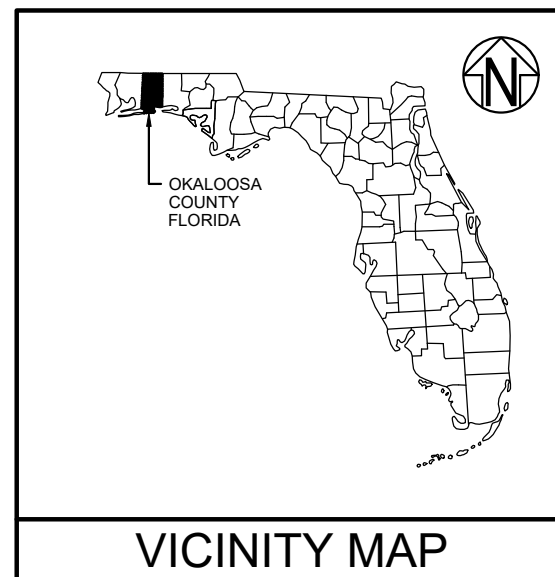
PREPARED FOR:
OKALOOSA COUNTY



OKALOOSA COUNTY
COMMISSIONERS

PAUL MIXON
CAROLYN KETCHEL
NATHAN BOYLES (VICE CHAIRMAN)
TREY GOODWIN
MEL PONDER (CHAIRMAN)

COMMISSIONER DISTRICT 1
COMMISSIONER DISTRICT 2
COMMISSIONER DISTRICT 3
COMMISSIONER DISTRICT 4
COMMISSIONER DISTRICT 5



VICINITY MAP



LOCATION MAP

PREPARED BY:

 **BASKERVILLE-DONOVAN, INC.**
ENGINEERING THE SOUTH SINCE 1927

14101 PANAMA CITY BEACH PARKWAY, SUITE 110,
PANAMA CITY BEACH, FL 32413 (850) 230-6150
ENGINEERING BUSINESS: EB-0000340
PENSACOLA - PANAMA CITY BEACH - TALLAHASSEE - MOBILE

ENGINEER'S PROJECT NO. 12107.01



48 HOURS BEFORE YOU DIG
CALL SUNSHINE
1-800-432-4770
IT'S THE LAW IN FLORIDA
FL STATUTE 553.851 (1979) REQUIRES
MIN. OF 2 DAYS AND MAX. OF 5 DAYS
NOTICE BEFORE YOU EXCAVATE.

A vertical number line with tick marks labeled A, B, C, D, E, F, and G from bottom to top.

- A

- ### UTILITY NOTES:

1. CONTRACTOR SHALL OBTAIN

REVISION / ACTION TAKEN

ppr.		
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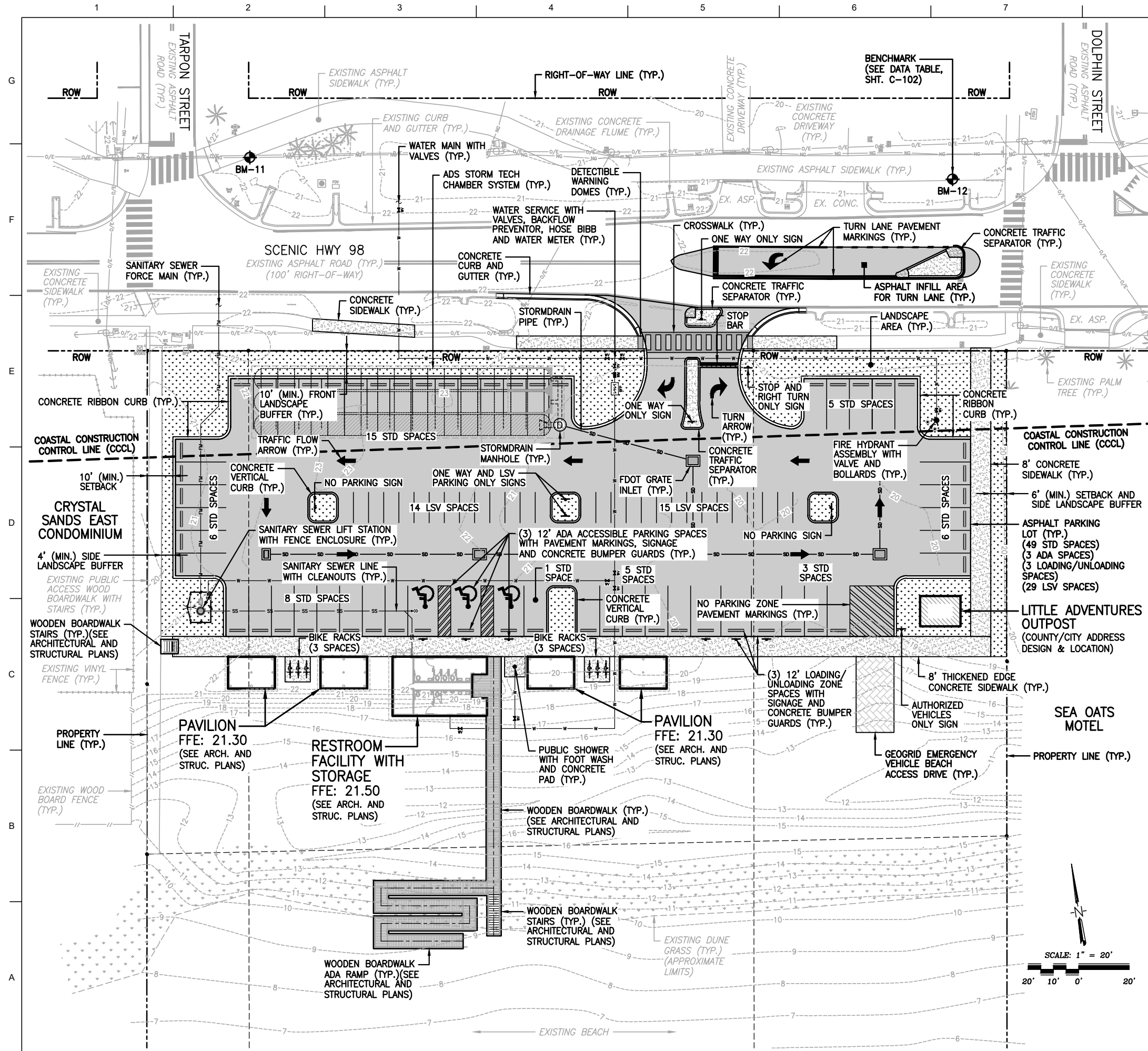
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LEGEND

	ASPHALT PAVEMENT		LANDSCAPED AREA
	CONCRETE PAVEMENT		WOODEN BOARDWALK
	GEOGRID		ADS STORM TECH CHAMBER SYSTEM

SITE DATA TABLE

PARCEL ID:
00-2S-22-0390-0000-001C, 00-2S-22-0580-000A-0090, 00-2S-22-0580-000A-0100, 00-2S-22-0580-000A-0110

LAND USE:

MIXED USE: (CURRENT)
MIXED USE: (FUTURE)
ZONING: RECREATIONAL (REC)

FLOOD ZONE: X * & ZONE VE 16

BUILDING SETBACKS REQUIRED:

FRONT = NONE
SIDE = NONE
REAR = NONE
(DESTIN LAND DEVELOPMENT CODE SECTION 7.12.08 DIMENSIONAL REQUIREMENTS, TABLE 7-3 FOR REC ZONE.)

BUILDING SETBACKS PROVIDED:

ROW TO NORTH SIDE OF BLDG = 121.00± FEET
EAST PROPERTY LINE TO EAST SIDE OF BLDG = 134.62± FEET
WEST PROPERTY LINE TO WEST SIDE OF BLDG = 36.81± FEET

BUILDING INFORMATION: PROPOSED NEW RESTROOM FACILITY

BUILDING HEIGHT:

ALLOWED: 35'

PROPOSED: 15'

BUILDING STORIES:

ALLOWED: 3

PROPOSED: 1

BUILDING INFORMATION: PROPOSED NEW PAVILIONS

BUILDING HEIGHT:

ALLOWED: 35'

PROPOSED: 15'

BUILDING STORIES:

ALLOWED: 3

PROPOSED: 1

GROSS FLOOR AREA: RESTROOM 826.70± SQ. FT.
PAVILIONS 235.37± SQ. FT. EACH X 4 = 941.48± SQ. FT. TOTAL

TOTAL SITE AREA: 134333.38 SQ. FT. OR 3.08 AC.

MAX. FLOOR AREA RATIO: 20%

FLOOR AREA RATIO PROPOSED: 1.32%

IMPERVIOUS AREA ALLOWED: 100750.04 SQ. FT. OR 75%

IMPERVIOUS AREA PROPOSED: 35719.20 SQ. FT. OR 27%

OPEN SPACE PROVIDED: 98614.18 SQ. FT. OR 73%

PARKING

PARKING REQUIRED:

1 SPACE PER 150 SQ. FT. OF GROSS FLOOR AREA = 12 SPACES

PARKING PROVIDED:

REGULAR SPACES: 49 SPACES

ADA SPACES: 3 SPACES

LSV SPACES: 29 SPACES

LOADING/UNLOADING ZONE SPACES: 3 SPACES

BICYCLE PARKING SPACES: 6 SPACES

* THIS PARCEL APPEARS TO LIE IN FLOOD ZONE X (NO MINIMUM FLOOD ELEVATION REQUIRED) AS DETERMINED FROM FEMA FLOOD INSURANCE RATE MAP COMMUNITY PANEL NUMBER 12091C0493J, REVISED MARCH 9, 2021.

SIGNS

SIGNS PROVIDED:

(CUSTOM) LOW SPEED VEHICLE (LSV) PARKING ONLY SIGNS: 2 SIGNS

(R1-01) STOP SIGNS: 1 SIGN

(R3-05R) RIGHT TURN ONLY SIGNS: 1 SIGN

(R5-11) AUTHORIZED VEHICLES ONLY SIGNS: 1 SIGN

(R6-02) ONE WAY SIGNS: 4 SIGNS

(R7-01) NO PARKING ANY TIME SIGNS: 2 SIGNS

(R7-06) NO PARKING LOADING ZONE SIGNS: 3 SIGNS

(R7-08) ADA HANDICAPPED PARKING SIGNS: 3 SIGNS

BASKERVILLE-DONOVAN, INC.
ENGINEERING THE SOUTH SINCE 1927
14101 PANAMA CITY BEACH PARKWAY, SUITE 110,
PANAMA CITY BEACH, FL 32413 (850) 230-6190
ENGINEERING BUSINESS: EC-0000360
PENINSULA-PANAMA CITY BEACH - PALM SPRING - MOBILE

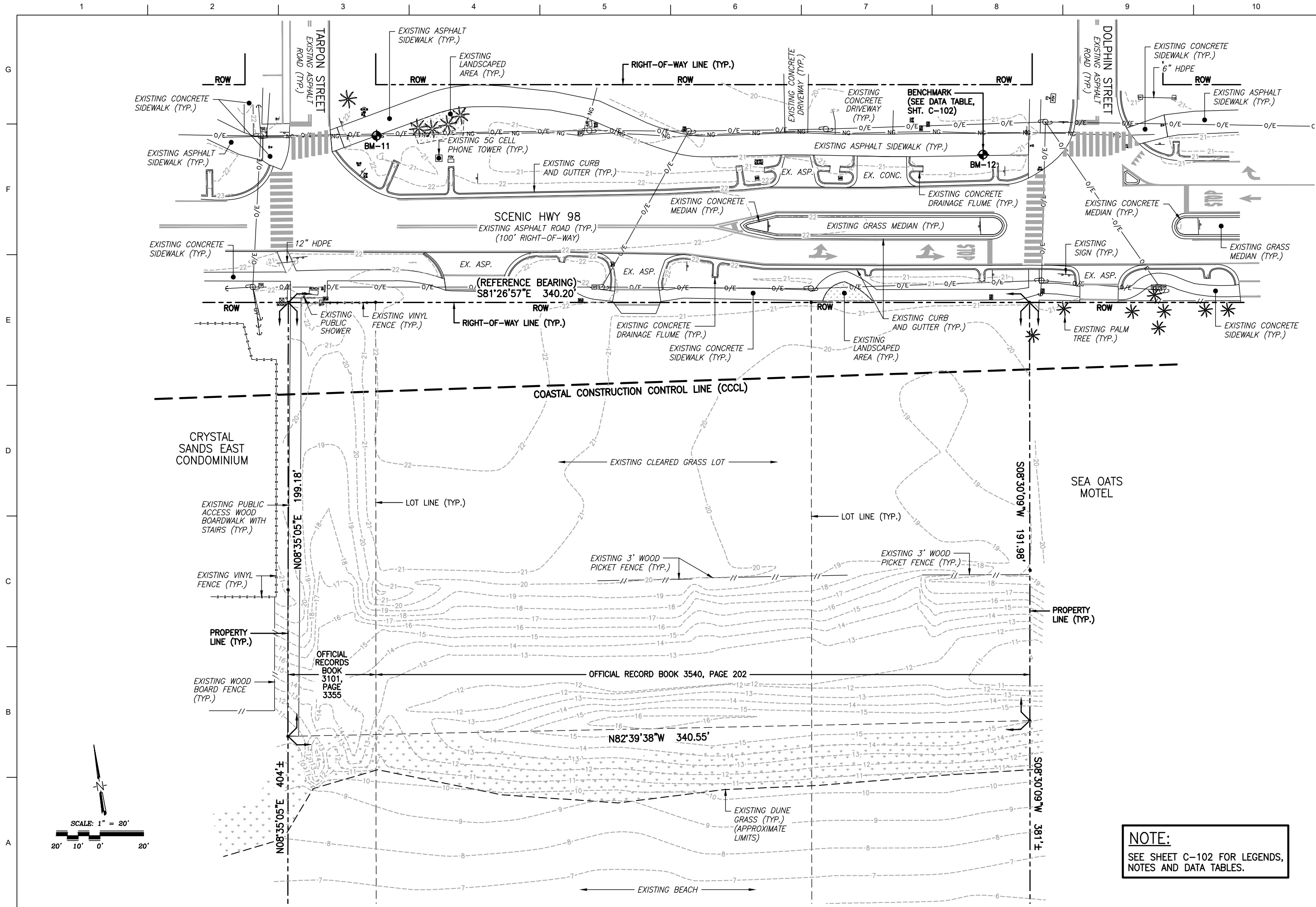
SHORE AT
TARPON BEACH

NO.	DATE	APPR.	REVISION / ACTION TAKEN

PROJECT NO:	12107.01
DESIGNED BY: RAS	
DRAWN BY: JJ	
CHKD BY: RLW	
PROJ. MGR: JCP	
DATE: DECEMBER 2023	

PROJECT OVERVIEW

C-100



BASKERVILLE-DONOVAN, INC.
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PANAMA CITY BEACH, FL 32413 (850) 230-6150
ENGINEERING BUSINESS: EB-0000360
PENINSULA-PANAMA CITY BEACH - PALM SPRING - MOBILE

SEAL

**SHORE AT
TARPON BEACH**

NO.	DATE	APPR.	REVISION / ACTION TAKEN

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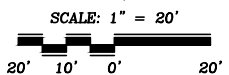
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CONSTRUCTION**
BY: JCP DATE: 12/20/23

PROJECT NO:	12107.01
DESIGNED BY: RAS	
DRAWN BY: JJ	
CHKD BY: RLW	
PROJ. MGR: JCP	
DATE: DECEMBER 2023	

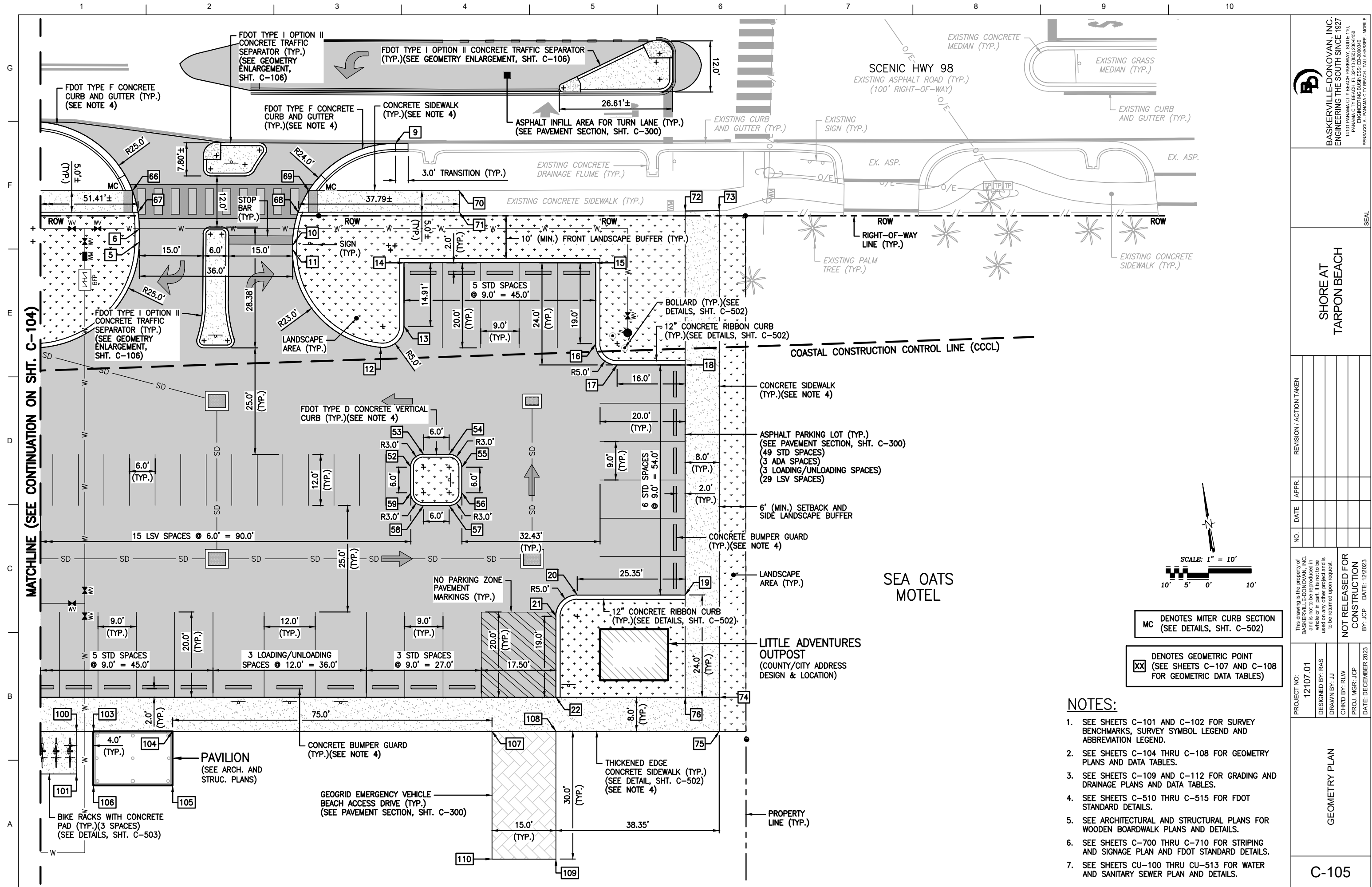
**EXISTING CONDITIONS AND
SURVEY CONTROL PLAN**

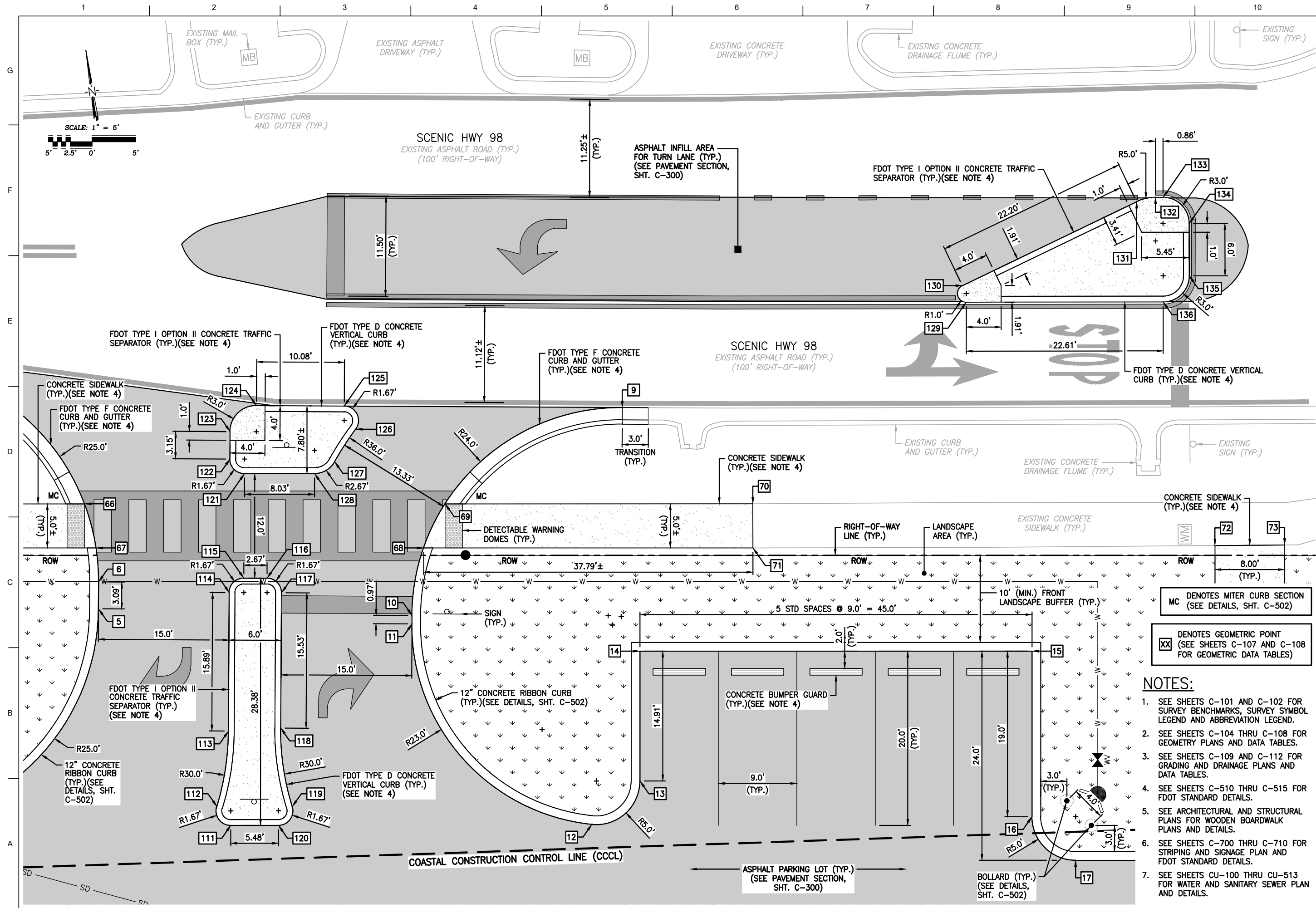
C-101

1. SEE SHEETS C-101 AND C-102 FOR SURVEY BENCHMARKS, SURVEY SYMBOL LEGEND AND ABBREVIATION LEGEND.
2. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO VERIFY THE ACCURACY OF THE EXISTING SITE INFORMATION SHOWN HERE IN. ANY CHANGED OR ALTERED SITE CONDITION SHALL BE BROUGHT TO THE ATTENTION OF THE COUNTY AND CITY IMMEDIATELY.
3. ALL EXISTING DEBRIS AND DEBRIS FROM CONSTRUCTION OPERATIONS SHALL BE DISPOSED OF OFF-SITE AT THE CONTRACTOR'S EXPENSE.
4. TOPSOIL SUITABLE FOR REUSE SHALL BE STOCKPILED ON-SITE IN AN APPROVED LOCATION AND REDISTRIBUTED OVER ALL DISTURBED AREAS IN ONE 4" LAYER, (LOOSE THICKNESS).
5. ALL WORK ADJACENT TO OR ON EXISTING ROADWAYS SHALL COMPLY WITH CURRENT FLORIDA DEPARTMENT OF TRANSPORTATION STANDARDS FOR TRAFFIC CONTROL AND SAFETY. THE CONTRACTOR SHALL HOLD THE COUNTY AND CITY HARMLESS FOR ANY INCIDENT OCCURRING ON OR ADJACENT TO THE PROJECT SITE.
6. EXISTING TREES SHOWN OUTSIDE THE LIMITS OF CLEARING AND GRUBBING ARE TO REMAIN. PRIOR TO SITE CONSTRUCTION OPERATIONS, THE CONTRACTOR SHALL CLEARLY IDENTIFY THE CLEARING LIMITS.
7. CLEARING AND GRUBBING OF TREES AND SHRUBS NOT OTHERWISE IDENTIFIED SHALL BE LIMITED TO THAT WHICH IS ABSOLUTELY REQUIRED FOR NEW CONSTRUCTION. ANY ADDITIONAL CLEARING AND/OR GRUBBING OF TREES SHALL BE COMPLETED AS APPROVED BY THE COUNTY AND CITY.
8. PRIOR TO CONSTRUCTION THE CONTRACTOR SHALL LOCATE ALL UTILITIES. ANY UTILITY ADJUSTMENTS, EXISTING OR PROPOSED, REQUIRED TO COMPLETE CONSTRUCTION UNDER THIS CONTRACT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR. THIS ITEM INCLUDES, BUT IS NOT LIMITED TO, THE TEMPORARY RELOCATION OF EXISTING OVERHEAD POWER LINES. ALL WORK IN THE VICINITY OF OVERHEAD POWER LINES SHALL CONFORM TO APPLICABLE (LOCAL) SAFETY REQUIREMENTS. THE CONTRACTOR IS TO REPAIR DAMAGES TO EXISTING UTILITIES THAT ARE TO REMAIN IN SERVICE IMMEDIATELY AT NO ADDITIONAL COSTS OR EXPENSE TO THE COUNTY AND CITY.
9. REFER TO ELECTRICAL, COMMUNICATIONS AND OTHER DISCIPLINES FOR UTILITIES REQUIRING REMOVAL, COORDINATION AND/OR RELOCATION.
10. THE CONSTRUCTION CONTRACTOR SHALL INVESTIGATE, MARK, AND PROTECT IN PLACE, AS NEEDED, ALL APPLICABLE EXISTING UNDERGROUND UTILITIES THAT ARE TO REMAIN IN PLACE/SERVICE DURING CONSTRUCTION OPERATIONS THAT MAY BE SUBJECT TO DAMAGE DUE TO THE ONGOING CONSTRUCTION OPERATIONS.
11. CONTRACTOR SHALL SAW CUT THE LIMITS OF ASPHALT PAVEMENT TO BE REMOVED AND PROTECT EDGE OF ASPHALT FROM DAMAGE. ANY DAMAGE TO THE SAW CUT LINE SHALL REQUIRE THE CONTRACTOR TO RE-SAW CUT A NEW LINE BEFORE PLACEMENT OF NEW ASPHALT PAVEMENT.
12. ACTUAL AMOUNT OF ASPHALT PAVEMENT REMOVAL WILL VARY DEPENDING ON THE TYPE OF EQUIPMENT AND CONSTRUCTION TECHNIQUE USED BY THE CONTRACTOR FOR INSTALLATION OF THE NEW SITE LAYOUT.
13. THERE ARE STRUCTURES THAT HAVE BEEN PREVIOUSLY DEMOLISHED AS SHOWN ON THE CRITERIA DOCUMENT. IT IS NOT KNOWN TO WHAT EXTENT THAT DEMOLITION OCCURRED. REMAINING PORTIONS OF THOSE STRUCTURES MAY INTERFERE WITH THE CONSTRUCTION OF THE NEW LAYOUT AND MUST BE REMOVED TO THE EXTENT NECESSARY TO ACCOMPLISH THE NEW WORK.
14. CONTRACTOR SHALL RELOCATE ALL PALM TREES WHICH IS ABSOLUTELY REQUIRED FOR NEW CONSTRUCTION. PALM TREES SHALL BE RELOCATED AND APPROVED BY THE COUNTY AND CITY.



C-103





MC DENOTES MITER CURB SECTION
(SEE DETAILS, SHT. C-502)

XX DENOTES GEOMETRIC POINT
(SEE SHEETS C-107 AND C-108
FOR GEOMETRIC DATA TABLES)

- NOTES:**
- SEE SHEETS C-101 AND C-102 FOR SURVEY BENCHMARKS, SURVEY SYMBOL LEGEND AND ABBREVIATION LEGEND.
 - SEE SHEETS C-104 THRU C-108 FOR GEOMETRY PLANS AND DATA TABLES.
 - SEE SHEETS C-109 AND C-112 FOR GRADING AND DRAINAGE PLANS AND DATA TABLES.
 - SEE SHEETS C-510 THRU C-515 FOR FDOT STANDARD DETAILS.
 - SEE ARCHITECTURAL AND STRUCTURAL PLANS FOR WOODEN BOARDWALK PLANS AND DETAILS.
 - SEE SHEETS C-700 THRU C-710 FOR STRIPING AND SIGNAGE PLAN AND FDOT STANDARD DETAILS.
 - SEE SHEETS CU-100 THRU CU-513 FOR WATER AND SANITARY SEWER PLAN AND DETAILS.

**BASKERVILLE-DONOVAN, INC.**
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ENGINEERING BUSINESS: EC-0000360
PENSACOLA - PANAMA CITY BEACH - PALM SPRING - MOBILE

SEAL

SHORE AT
TARPON BEACH

REVISION / ACTION TAKEN

APPR.

DATE

NO.

PROJECT NO: 12107.01

DESIGNED BY: RAS

DRAWN BY: JJ

CHKD BY: RLW

PROJ. MGR: JCP

DATE: DECEMBER 2023

GEOMETRY
ENLARGEMENT PLAN

C-106

NOT RELEASED FOR
CONSTRUCTION

BY: JCP DATE: 12/20/23

G										
F										
E										
D										
C										
B										
	A									

GEOMETRIC POINT DATA TABLE			
SYMBOL NO. ☒	NORTHING	EASTING	DESCRIPTION
103	507422.61	1364149.59	PAVILION AND THICKENED EDGE CONCRETE SIDEWALK
104	507419.85	1364167.97	PAVILION AND THICKENED EDGE CONCRETE SIDEWALK
105	507407.32	1364166.09	PAVILION
106	507410.08	1364147.71	PAVILION
107	507408.70	1364242.13	GEOGRID EMERGENCY VEHICLE BEACH ACCESS DRIVE AND THICKENED EDGE CONCRETE SIDEWALK
108	507406.46	1364256.96	GEOGRID EMERGENCY VEHICLE BEACH ACCESS DRIVE AND THICKENED EDGE CONCRETE SIDEWALK
109	507376.80	1364252.50	GEOGRID EMERGENCY VEHICLE BEACH ACCESS DRIVE
110	507379.03	1364237.67	GEOGRID EMERGENCY VEHICLE BEACH ACCESS DRIVE
111	507507.75	1364188.65	PC/PT OF 1.67' RADIUS FOR EDGE OF ASPHALT PARKING LOT AND FACE OF CONCRETE TRAFFIC SEPARATOR
112	507510.12	1364187.39	PCC OF 1.67' RADIUS AND 30' RADIUS FOR EDGE OF ASPHALT PARKING LOT AND FACE OF CONCRETE TRAFFIC SEPARATOR
113	507518.50	1364190.00	PC/PT OF 30' RADIUS FOR EDGE OF ASPHALT PARKING LOT AND FACE OF CONCRETE TRAFFIC SEPARATOR
114	507534.20	1364192.45	PC/PT OF 1.67' RADIUS FOR EDGE OF ASPHALT PARKING LOT AND FACE OF CONCRETE TRAFFIC SEPARATOR
115	507535.59	1364194.35	PC/PT OF 1.67' RADIUS FOR EDGE OF ASPHALT PARKING LOT AND FACE OF CONCRETE TRAFFIC SEPARATOR
116	507535.19	1364196.98	PC/PT OF 1.67' RADIUS FOR EDGE OF ASPHALT PARKING LOT AND FACE OF CONCRETE TRAFFIC SEPARATOR
117	507533.29	1364198.38	PC/PT OF 1.67' RADIUS FOR EDGE OF ASPHALT PARKING LOT AND FACE OF CONCRETE TRAFFIC SEPARATOR
118	507517.94	1364195.99	PC/PT OF 30' RADIUS FOR EDGE OF ASPHALT PARKING LOT AND FACE OF CONCRETE TRAFFIC SEPARATOR
119	507508.83	1364195.96	PCC OF 30' RADIUS AND 1.67' RADIUS FOR EDGE OF ASPHALT PARKING LOT AND FACE OF CONCRETE TRAFFIC SEPARATOR
120	507506.93	1364194.06	PC/PT OF 1.67' RADIUS FOR EDGE OF ASPHALT PARKING LOT AND FACE OF CONCRETE TRAFFIC SEPARATOR
121	507547.44	1364196.22	PC/PT OF 1.67' RADIUS FOR EDGE OF ASPHALT PARKING LOT AND FACE OF CONCRETE TRAFFIC SEPARATOR
122	507549.35	1364194.82	PC/PT OF 1.67' RADIUS FOR EDGE OF ASPHALT PARKING LOT AND FACE OF CONCRETE TRAFFIC SEPARATOR
123	507552.46	1364195.30	PC/PT OF 3' RADIUS FOR EDGE OF ASPHALT PARKING LOT AND FACE OF CONCRETE TRAFFIC SEPARATOR

GEOMETRIC POINT DATA TABLE			
SYMBOL NO. ☒	NORTHING	EASTING	DESCRIPTION
124	507554.96	1364198.73	PC/PT OF 3' RADIUS FOR EDGE OF ASPHALT PARKING LOT AND FACE OF CONCRETE TRAFFIC SEPARATOR
125	507553.41	1364208.68	PC/PT OF 1.67' RADIUS FOR EDGE OF ASPHALT PARKING LOT AND FACE OF CONCRETE TRAFFIC SEPARATOR, TIE TO EXISTING SCENIC HWY 98 ASPHALT ROAD
126	507550.58	1364209.61	PCC OF 1.67' RADIUS AND 36' RADIUS FOR EDGE OF ASPHALT PARKING LOT AND FACE OF CONCRETE TRAFFIC SEPARATOR
127	507547.25	1364206.66	PCC OF 36' RADIUS AND 2.67' RADIUS FOR EDGE OF ASPHALT PARKING LOT AND FACE OF CONCRETE TRAFFIC SEPARATOR
128	507546.25	1364204.16	PC/PT OF 2.67' RADIUS FOR EDGE OF ASPHALT PARKING LOT AND FACE OF CONCRETE TRAFFIC SEPARATOR
129	507554.58	1364281.05	PC/PT OF 1' RADIUS FOR FACE OF CONCRETE TRAFFIC SEPARATOR, TIE TO EXISTING SCENIC HWY 98 ASPHALT ROAD
130	507556.53	1364280.91	PC/PT OF 1' RADIUS FOR FACE OF CONCRETE TRAFFIC SEPARATOR AND EDGE OF ASPHALT INFILL AREA
131	507563.08	1364302.12	PC/PT OF 5' RADIUS FOR FACE OF CONCRETE TRAFFIC SEPARATOR AND EDGE OF ASPHALT INFILL AREA
132	507563.25	1364304.33	PC/PT OF 5' RADIUS FOR FACE OF CONCRETE TRAFFIC SEPARATOR, TIE TO EXISTING SCENIC HWY 98 ASPHALT ROAD
133	507563.12	1364305.18	PC/PT OF 3' RADIUS FOR FACE OF CONCRETE TRAFFIC SEPARATOR, TIE TO EXISTING SCENIC HWY 98 ASPHALT ROAD
134	507559.71	1364307.71	PC/PT OF 3' RADIUS FOR FACE OF CONCRETE TRAFFIC SEPARATOR AND EDGE OF ASPHALT INFILL AREA
135	507553.78	1364306.82	PC/PT OF 3' RADIUS FOR FACE OF CONCRETE TRAFFIC SEPARATOR AND EDGE OF ASPHALT INFILL AREA
136	507551.25	1364303.41	PC/PT OF 3' RADIUS FOR FACE OF CONCRETE TRAFFIC SEPARATOR, TIE TO EXISTING SCENIC HWY 98 ASPHALT ROAD
137	507453.59	1363970.47	℄ OF WOODEN BOARDWALK STAIRS, TIE TO EXISTING PUBLIC ACCESS BOARDWALK
138	507452.56	1363977.30	℄ OF WOODEN BOARDWALK STAIRS AND CONCRETE SIDEWALK
139	507429.39	1364104.52	PUBLIC SHOWER CONCRETE PAD AND THICKENED EDGE CONCRETE SIDEWALK
140	507428.20	1364112.43	PUBLIC SHOWER CONCRETE PAD AND THICKENED EDGE CONCRETE SIDEWALK
141	507420.29	1364111.24	PUBLIC SHOWER CONCRETE PAD
142	507421.48	1364103.33	PUBLIC SHOWER CONCRETE PAD

NOTES:

1. SEE SHEET C-101 AND C-102 FOR SURVEY BENCHMARKS, SURVEY SYMBOL LEGEND AND ABBREVIATION LEGEND.

2. SEE SHEETS C-104 THRU C-108 FOR GEOMETRY PLANS AND DATA TABLES.

3. ALL NORTHING AND EASTING FOR GEOMETRIC DATA POINTS THAT TIE TO EXISTING STRUCTURES, SIDEWALKS AND ROADWAYS ARE PLUS OR MINUS (±). CONTRACTOR TO FIELD ADJUST IF NECESSARY.

4. SEE SHEETS C-109 AND C-112 FOR GRADING AND DRAINAGE PLANS AND DATA TABLES.

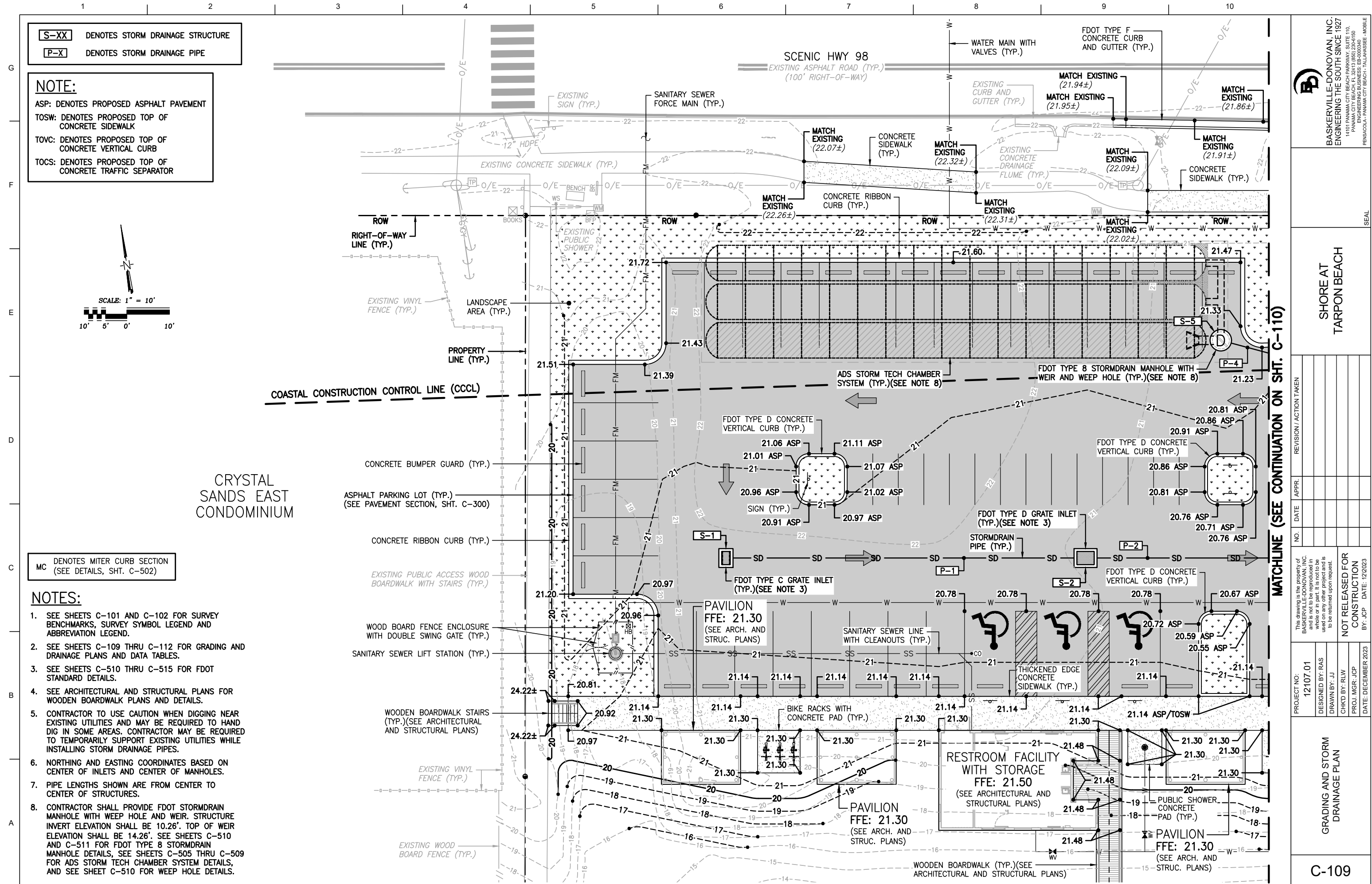
5. SEE SHEETS C-510 THRU C-515 FOR FDOT STANDARD DETAILS.

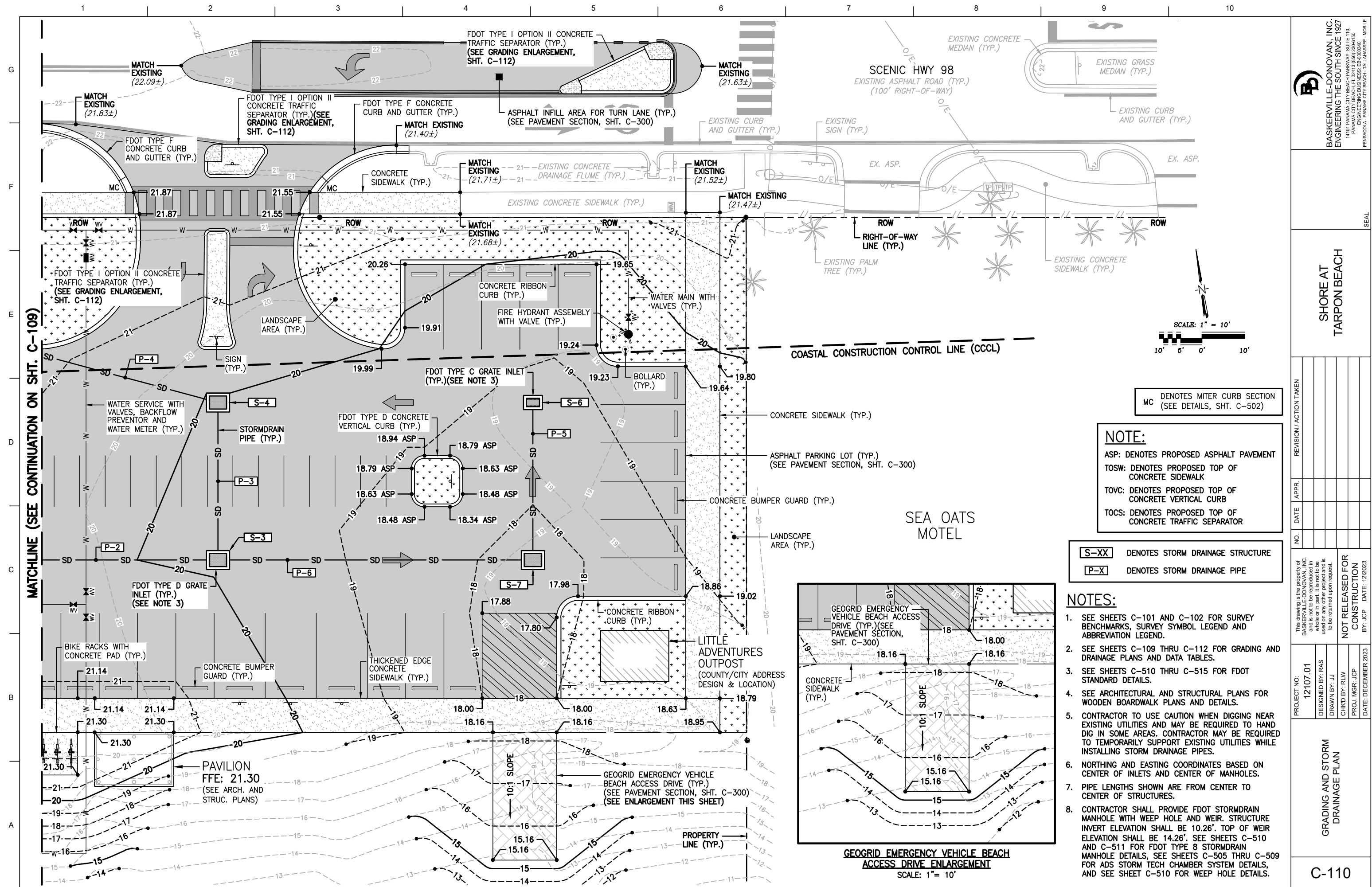
6. SEE ARCHITECTURAL AND STRUCTURAL PLANS FOR WOODEN BOARDWALK PLANS AND DETAILS.

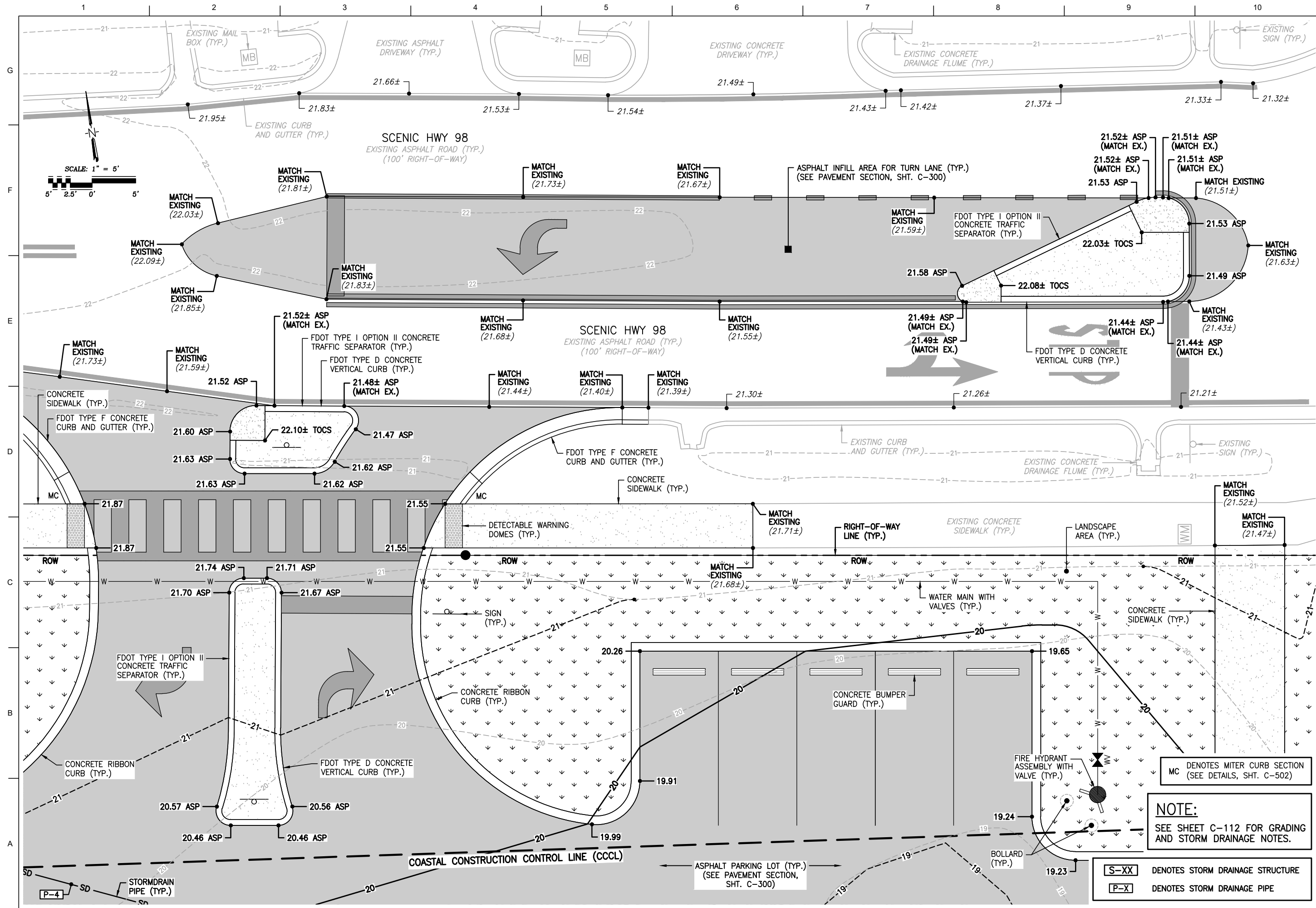
7. SEE SHEETS C-700 THRU C-710 FOR STRIPING AND SIGNAGE PLAN AND FDOT STANDARD DETAILS.

8. SEE SHEETS CU-100 THRU CU-513 FOR WATER AND SANITARY SEWER PLAN AND DETAILS.

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GEOMETRIC DATA TABLES AND GEOMETRY NOTES												C-108







**BASKERVILLE-DONOVAN, INC.**
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PENSCOLA-PANAMA CITY BEACH-TALLAHASSEE-MOBILE

SEAL

SHORE AT
TARPON BEACH

NO.	REVISION / ACTION TAKEN	DATE	APPR.

PROJECT NO:
12107.01

DESIGNED BY: RAS

DRAWN BY: JJ

CHKD BY: RLW

PROJ. MGR: JCP

DATE: DECEMBER 2023

NOT RELEASED FOR
CONSTRUCTION

BY: JCP DATE: 12/20/23

GRADING AND
STORM DRAINAGE
ENLARGEMENT PLAN

C-111

A
B
C
D
E
F
G

NOTES:

1. SEE SHEETS C-101 AND C-102 FOR SURVEY BENCHMARKS, SURVEY SYMBOL LEGEND AND ABBREVIATION LEGEND.
2. SEE SHEETS C-109 THRU C-112 FOR GRADING AND DRAINAGE PLANS AND DATA TABLES.
3. SEE SHEETS C-510 THRU C-515 FOR FDOT STANDARD DETAILS.
4. SEE ARCHITECTURAL AND STRUCTURAL PLANS FOR WOODEN BOARDWALK PLANS AND DETAILS.
5. CONTRACTOR TO USE CAUTION WHEN DIGGING NEAR EXISTING UTILITIES AND MAY BE REQUIRED TO HAND DIG IN SOME AREAS. CONTRACTOR MAY BE REQUIRED TO TEMPORARILY SUPPORT EXISTING UTILITIES WHILE INSTALLING STORM DRAINAGE PIPES.
6. NORTHING AND EASTING COORDINATES BASED ON CENTER OF INLETS AND CENTER OF MANHOLES.
7. PIPE LENGTHS SHOWN ARE FROM CENTER TO CENTER OF STRUCTURES.
8. CONTRACTOR SHALL PROVIDE FDOT STORMDRAIN MANHOLE WITH WEEP HOLE AND WEIR. STRUCTURE INVERT ELEVATION SHALL BE 10.26'. TOP OF WEIR ELEVATION SHALL BE 14.26'. SEE SHEETS C-510 AND C-511 FOR FDOT TYPE 8 STORMDRAIN MANHOLE DETAILS, SEE SHEETS C-505 THRU C-509 FOR ADS STORM TECH CHAMBER SYSTEM DETAILS, AND SEE SHEET C-510 FOR WEEP HOLE DETAILS.
9. TOVC - DENOTES PROPOSED TOP OF CONCRETE VERTICAL CURB.
10. TOSW - DENOTES PROPOSED TOP OF CONCRETE SIDEWALK.
11. TOCS - DENOTES PROPOSED TOP OF CONCRETE TRAFFIC SEPARATOR.
12. TOBW - DENOTES PROPOSED TOP OF WOODEN BOARDWALK.
13. ASP - DENOTES PROPOSED ASPHALT PAVEMENT.

S-XX	DENOTES STORM DRAINAGE STRUCTURE (SEE TABLE FOR TYPE AND LOCATION)
P-X	DENOTES STORM DRAINAGE PIPE (SEE TABLE FOR SIZE, TYPE AND LENGTH)

STORM DRAINAGE PIPE DATA TABLE							
PIPE NO. P-XX	SIZE (IN)	TYPE	LENGTH (FT)	SLOPE (%)	INV. US (FT)	INV. DS (FT)	PIPE CLASS
P-1	15	RCP	84.50	0.50	16.18	15.76	III
P-2	18	RCP	84.50	0.50	15.76	15.34	III
P-3	24	RCP	37.00	0.50	12.76	12.58	III
P-4	24	RCP	54.57	0.59	12.58	12.26	III
P-5	15	RCP	37.00	0.50	13.32	13.13	III
P-6	18	RCP	74.00	0.50	13.13	12.76	III

INV. US - DENOTES INVERT UP STREAM
INV. DS - DENOTES INVERT DOWN STREAM
RCP - DENOTES REINFORCED CONCRETE PIPE

STORM DRAINAGE STRUCTURE DATA TABLE								
STRUCTURE NO. [S-XX]	TYPE	NORTHING	EASTING	TOP (T); GRATE (G); (FT)	NORTH INV. (FT)	SOUTH INV. (FT)	WEST INV. (FT)	EAST INV. (FT)
S-1	FDOT TYPE C GRATE INLET	507483.47	1364017.17	(G) 20.68	-	-	-	16.18 (P-1)
S-2	FDOT TYPE D GRATE INLET	507470.91	1364100.73	(G) 20.31	-	-	15.76 (P-1)	15.76 (P-2)
S-3	FDOT TYPE D GRATE INLET	507458.35	1364184.29	(G) 19.91	12.76 (P-3)	-	15.34 (P-2)	12.76 (P-6)
S-4	FDOT TYPE D GRATE INLET	507494.94	1364189.80	(G) 19.99	-	12.58 (P-3)	12.58 (P-4)	-
S-5 (SEE NOTE 8)	FDOT TYPE 8 STORMDRAIN MANHOLE WITH WEEP HOLE AND WEIR	507516.78	1364139.79	(T) 21.33±	12.26 (ADS)	-	12.26 (ADS)	12.26 (P-4)
S-6	FDOT TYPE C GRATE INLET	507483.93	1364262.97	(G) 18.75	-	13.32 (P-5)	-	-
S-7	FDOT TYPE D GRATE INLET	507447.34	1364257.47	(G) 17.63	13.13 (P-5)	-	13.13 (P-6)	-

ADS - DENOTES ADVANCED DRAINAGE SYSTEM (ADS) PIPES FOR ADS STORM TECH CHAMBER SYSTEM. SEE DETAILS, SHTS. C-505 THRU C-509



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SEAL

SHORE AT TARPON BEACH

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PROJ. MGR: JCP					
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STORM DRAINAGE DATA TABLES AND NOTES

C-112

GENERAL NOTES:

1. ASPHALT (FLEXIBLE PAVEMENT) SHALL BE SP 12.5.

NOTES TO CONTRACTOR:

1. IN THE AREAS OF NEW PAVEMENTS WHERE THERE ARE NO EXISTING PAVEMENTS; CUT AND FILL MUST BE CONSIDERED. VOLUMES OF EARTHWORK MATERIAL TO BE CUT OR FILLED IN THESE AREAS ARE BASED ON NEW PAVEMENT, BASE COURSE AND COMPACTED SUBGRADE REQUIREMENTS. IF THE AREA IS IN CUT, ADDITIONAL EARTHWORK MATERIAL MUST BE REMOVED EQUAL TO THE NEW PAVEMENT STRUCTURE INCLUDING THE COMPACTED SUBGRADE. IF THE AREA IS IN FILL (BASED ON THE PROFILES AND FINISHED GRADES SHOWN) ADDITIONAL EXCAVATION MAYBE NECESSARY TO REACH THE REQUIRED DEPTH FOR THE NEW PAVEMENT STRUCTURE UNDERCUT REQUIREMENT(S).

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NOTES TO CONTRACTOR:

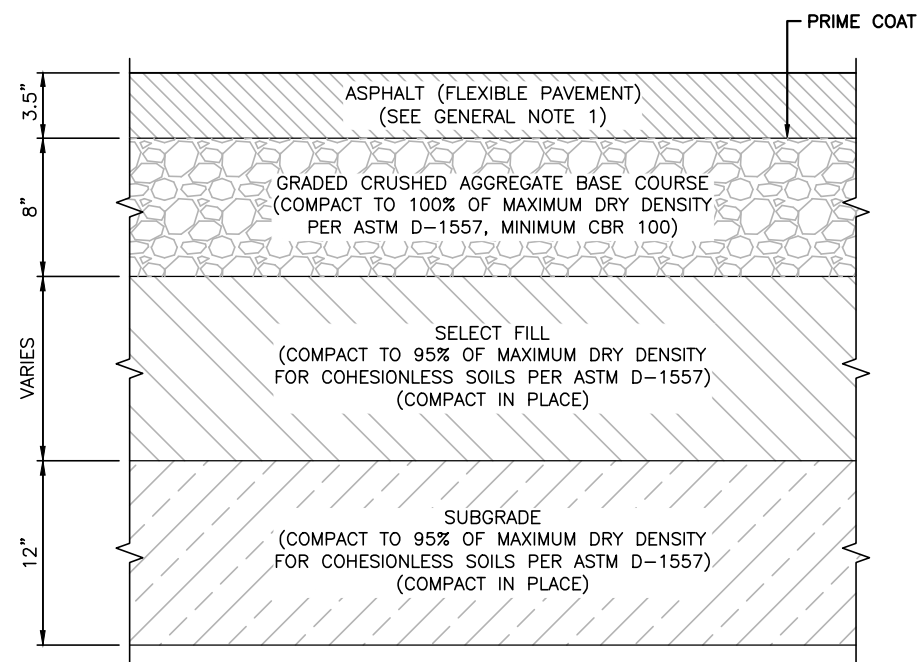
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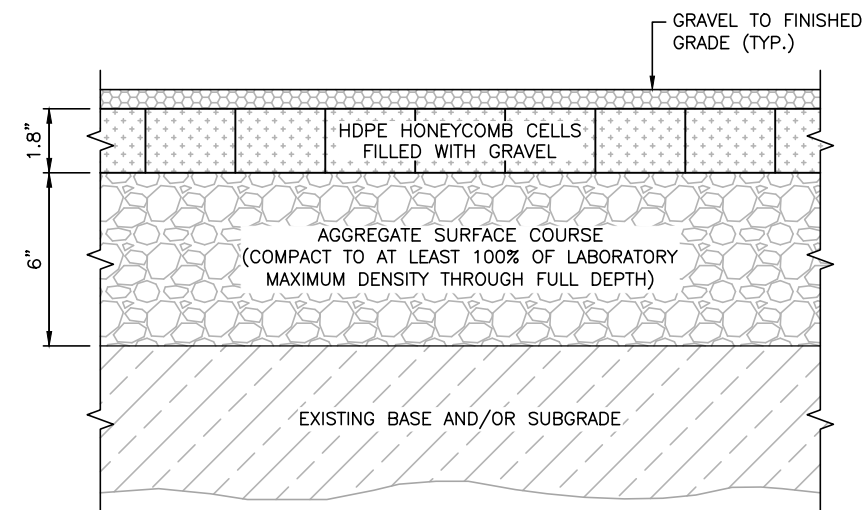
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ASPHALT PARKING LOT AND
ASPHALT TURN LANE INFILL
PAVEMENT SECTION

ASPHALT PARKING LOT AND
ASPHALT TURN LANE INFILL
PAVEMENT SECTION



GEOGRID EMERGENCY VEHICLE
BEACH ACCESS DRIVE
PAVEMENT SECTION

GEOGRID EMERGENCY VEHICLE
BEACH ACCESS DRIVE
PAVEMENT SECTION

NOTES:

NOTES:

1. SEE TRUEGRIDPAVER.COM FOR MATERIAL AND INSTALLATION GUIDELINES (TRUEGRID PAVERS BASIS OF DESIGN OR APPROVED EQUAL).

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PROJ. MGR: JCP	NOT RELEASED FOR CONSTRUCTION								
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	BY: JCP DATE: 12/20/23								

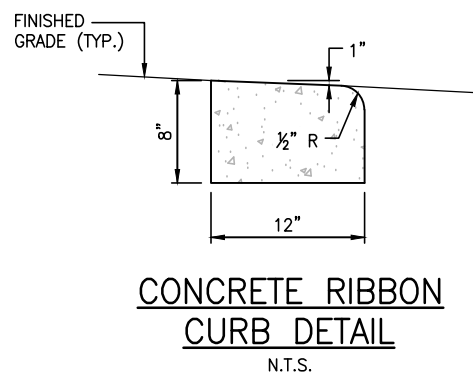
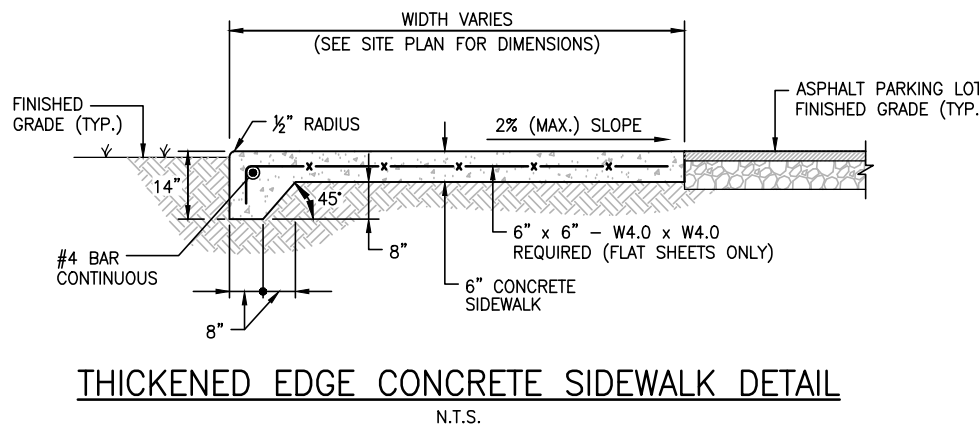
TYPICAL PAVEMENT SECTIONS

C-300

SHORE AT
TARPON BEACH

SEAL

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C-502	MISCELLANEOUS DETAILS
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THE BASIS OF DESIGN FOR THE UNDERGROUND STORMWATER DETENTION SYSTEM IS THE ADS MC-7200 STORMTECH CHAMBER SYSTEM. IF A DIFFERENT UNDERGROUND STORMWATER DETENTION SYSTEM IS SELECTED, IT WILL BE THE RESPONSIBILITY OF THE CONTRACTOR TO INSURE THE OVERALL FUNCTION OF THE SYSTEM.



MC-7200 STORMTECH CHAMBER SPECIFICATIONS

- ## **IMPORTANT - NOTES FOR THE BIDDING AND INSTALLATION OF MC-7200 CHAMBER SYSTEM**

- ## NOTES FOR CONSTRUCTION EQUIPMENT

- USE OF A DOZER TO PUSH EMBEDMENT STONE BETWEEN THE ROWS OF CHAMBERS MAY CAUSE DAMAGE TO CHAMBERS AND IS NOT AN ACCEPTABLE BACKFILL METHOD. ANY CHAMBERS DAMAGED BY USING THE "DUMP AND PUSH" METHOD ARE NOT COVERED UNDER THE STORMTECH STANDARD WARRANTY.



ADS

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TARPON BEACH

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DRAWN BY: JJ

ADS STORM TECH
CHAMBER SYSTEM NOTES

C-505

A vertical number line with tick marks labeled A, B, C, D, E, F, and G from bottom to top.

PLEASE NOTE:

1. THE LISTED AASHTO DESIGNATIONS ARE FOR GRADATIONS ONLY. THE STONE MUST ALSO BE CLEAN, CRUSHED, ANGULAR. FOR EXAMPLE, A SPECIFICATION FOR #4 STONE WOULD STATE: "CLEAN, CRUSHED, ANGULAR NO. 4 (AASHTO M43) STONE".
2. STORMTECH COMPACTION REQUIREMENTS ARE MET FOR 'A' LOCATION MATERIALS WHEN PLACED AND COMPACTED IN 9" (230 mm) (MAX) LIFTS USING TWO FULL COVERAGES WITH A VIBRATORY COMPACTOR.
3. WHERE INFILTRATION SURFACES MAY BE COMPROMISED BY COMPACTION, FOR STANDARD DESIGN LOAD CONDITIONS, A FLAT SURFACE MAY BE ACHIEVED BY RAKING OR DRAGGING WITHOUT COMPACTION EQUIPMENT. FOR SPECIAL LOAD DESIGNS, CONTACT STORMTECH FOR COMPACTION REQUIREMENTS.
4. ONCE LAYER 'C' IS PLACED, ANY SOIL/MATERIAL CAN BE PLACED IN LAYER 'D' UP TO THE FINISHED GRADE. MOST PAVEMENT SUBBASE SOILS CAN BE USED TO REPLACE THE MATERIAL REQUIREMENTS OF LAYER 'C' OR 'D' AT THE SITE DESIGN ENGINEER'S DISCRETION.



- ADS** 4640 TRUEMAN BLVD
HILLIARD, OH 43026
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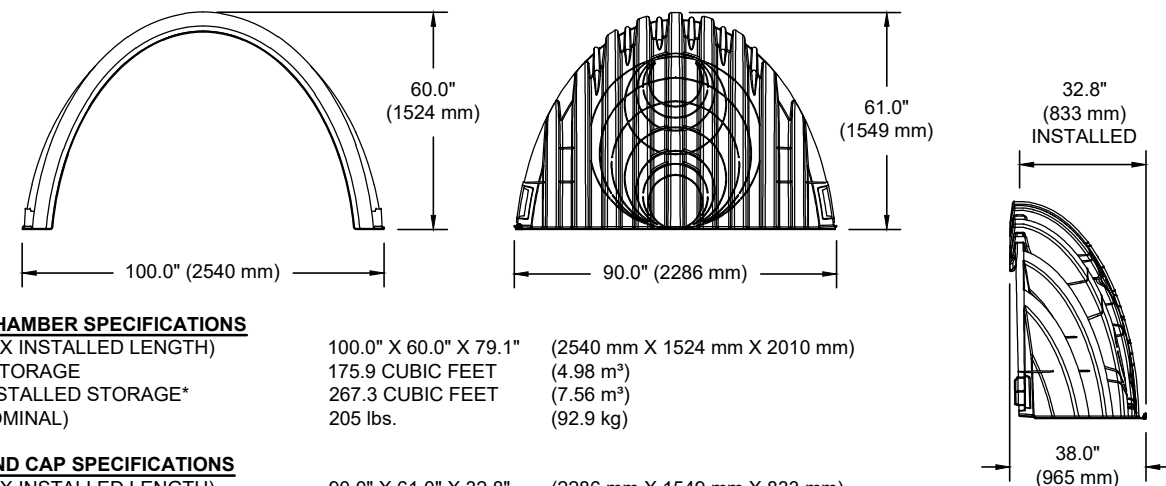
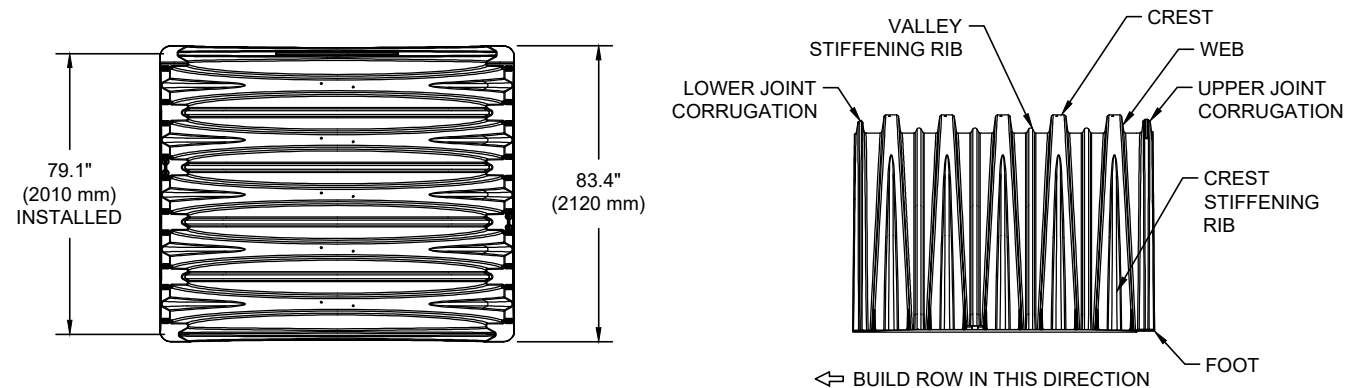
SEAL

SHORE AT TARPON BEACH

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PROJ. MGR: JCP					
DATE: DECEMBER 2023					

ADS STORM TECH CHAMBER SYSTEM DETAILS

C-507



SIZE (W X H X INSTALLED LENGTH)	100.0" X 60.0" X 79.1"	(2540 mm X 1524 mm X 2010 mm)
CHAMBER STORAGE	175.9 CUBIC FEET	(4.98 m³)
MINIMUM INSTALLED STORAGE*	267.3 CUBIC FEET	(7.56 m³)
WEIGHT (NOMINAL)	205 lbs.	(92.9 kg)

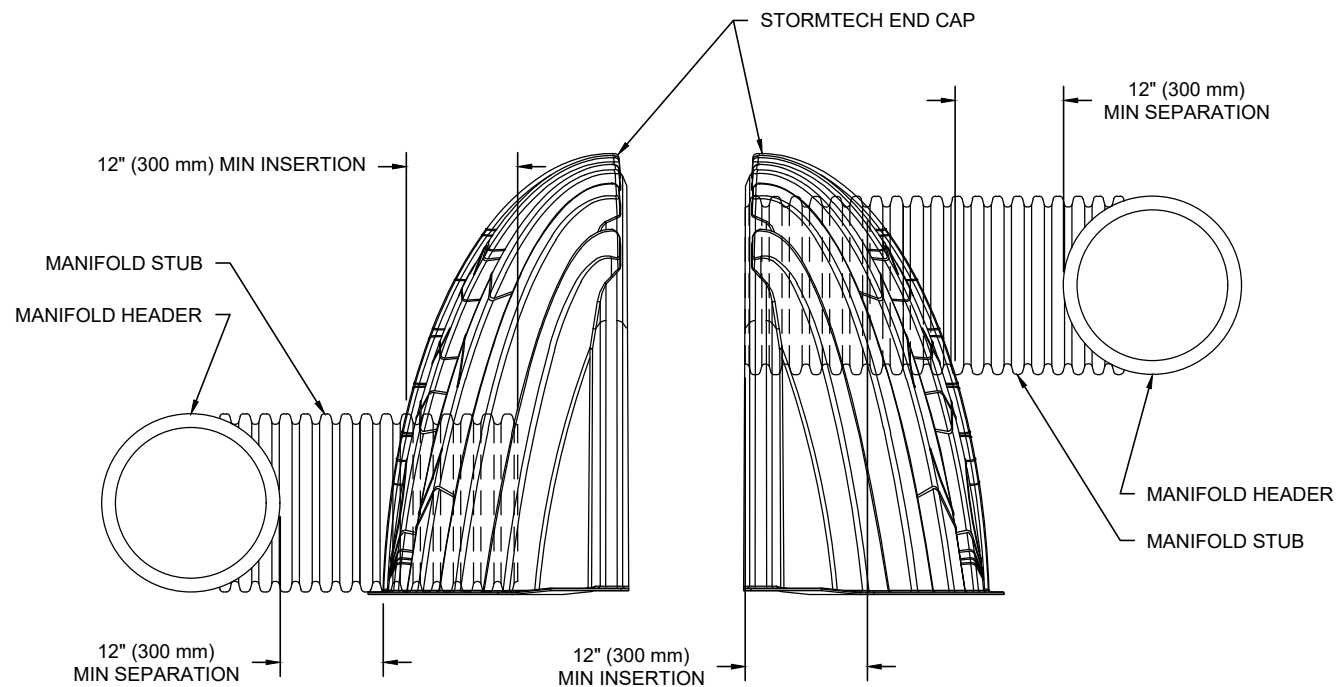
SIZE (W X H X INSTALLED LENGTH)	90.0" X 61.0" X 32.8"	(2286 mm X 1549 mm X 833 mm)
END CAP STORAGE	39.5 CUBIC FEET	(1.12 m³)
MINIMUM INSTALLED STORAGE*	115.3 CUBIC FEET	(3.26 m³)
WEIGHT (NOMINAL)	90 lbs.	(40.8 kg)

*ASSUMES 12" (305 mm) STONE ABOVE, 9" (229 mm) STONE FOUNDATION AND BETWEEN CHAMBERS, 12" (305 mm) STONE PERIMETER IN FRONT OF END CAPS AND 40% STONE POROSITY.

PARTIAL CUT HOLES AT BOTTOM OF END CAP FOR PART NUMBERS ENDING WITH "B"
 PARTIAL CUT HOLES AT TOP OF END CAP FOR PART NUMBERS ENDING WITH "T"
 END CAPS WITH A PREFABRICATED WELDED STUB END WITH "W"

PART #	STUB	B	C
MC7200IEPP06T	6" (150 mm)	42.54" (1081 mm)	---
MC7200IEPP06B		---	0.86" (22 mm)
MC7200IEPP08T	8" (200 mm)	40.50" (1029 mm)	---
MC7200IEPP08B		---	1.01" (26 mm)
MC7200IEPP10T	10" (250 mm)	38.37" (975 mm)	---
MC7200IEPP10B		---	1.33" (34 mm)
MC7200IEPP12T	12" (300 mm)	35.69" (907 mm)	---
MC7200IEPP12B		---	1.55" (39 mm)
MC7200IEPP15T	15" (375 mm)	32.72" (831 mm)	---
MC7200IEPP15B		---	1.70" (43 mm)
MC7200IEPP18T	18" (450 mm)	29.36" (746 mm)	---
MC7200IEPP18TW		---	1.97" (50 mm)
MC7200IEPP18B			
MC7200IEPP18BW			
MC7200IEPP24T	24" (600 mm)	23.05" (585 mm)	---
MC7200IEPP24TW		---	2.26" (57 mm)
MC7200IEPP24B			
MC7200IEPP24BW			
MC7200IEPP30BW	30" (750 mm)	---	2.95" (75 mm)
MC7200IEPP36BW	36" (900 mm)	---	3.25" (83 mm)
MC7200IEPP42BW	42" (1050 mm)	---	3.55" (90 mm)

NOTE: ALL DIMENSIONS ARE NOMINAL



NOTE: MANIFOLD STUB MUST BE LAID HORIZONTAL
FOR A PROPER FIT IN END CAP OPENING.

MC-SERIES END CAP INSERTION DETAIL

MC-7200 TECHNICAL SPECIFICATION



BASKERVILLE-DONOVAN, INC.
ENGINEERING THE SOUTH SINCE 1927

14101 PANAMA CITY BEACH PARKWAY, SUITE 110,
PANAMA CITY BEACH, FL 32413 (850) 230-6150
ENGINEERING BUSINESS: EB-0000340
PENSACOLA - PANAMA CITY BEACH - TALLAHASSEE - MOBILE

SHORE AT
TARPON BEACH

[illegible]

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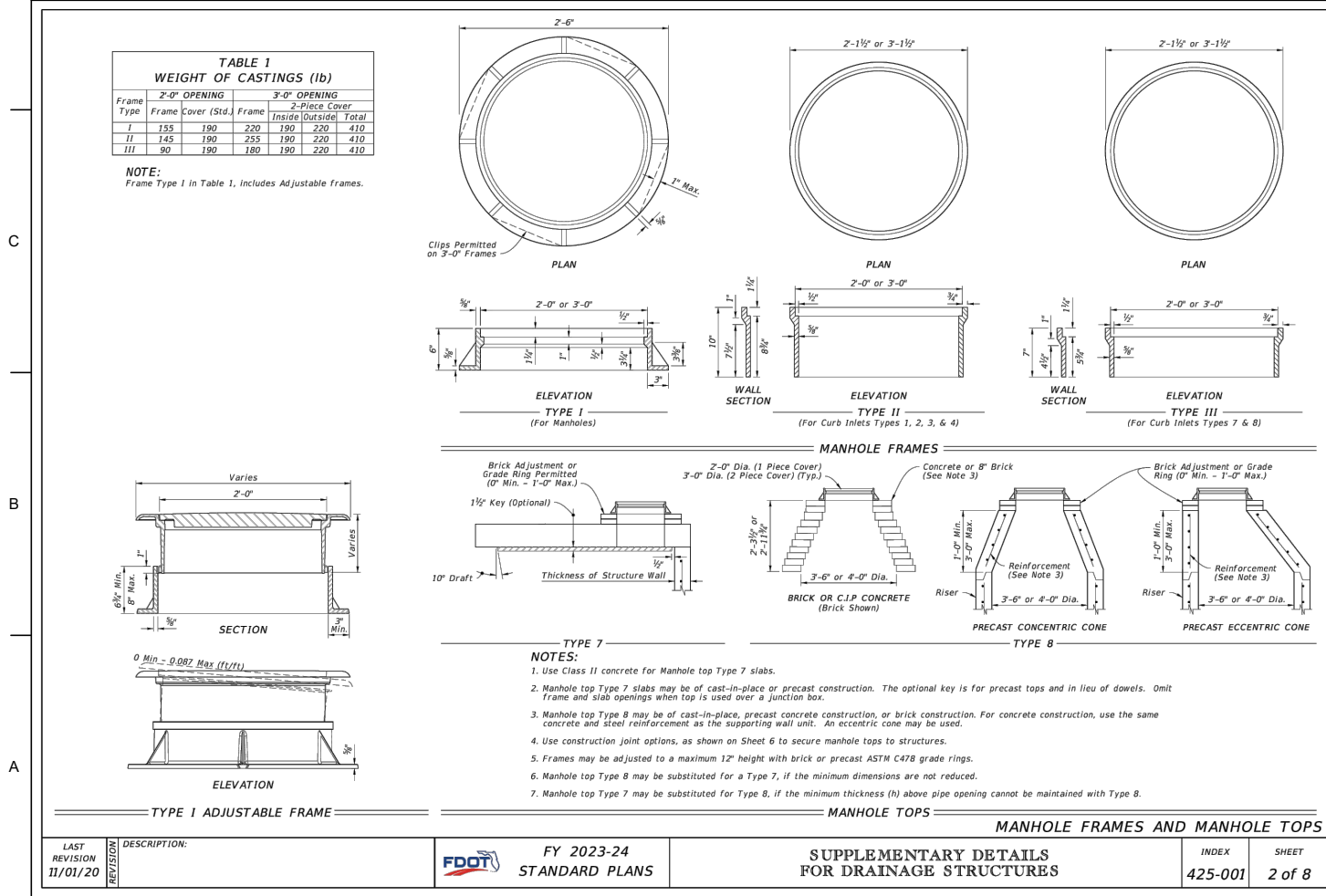
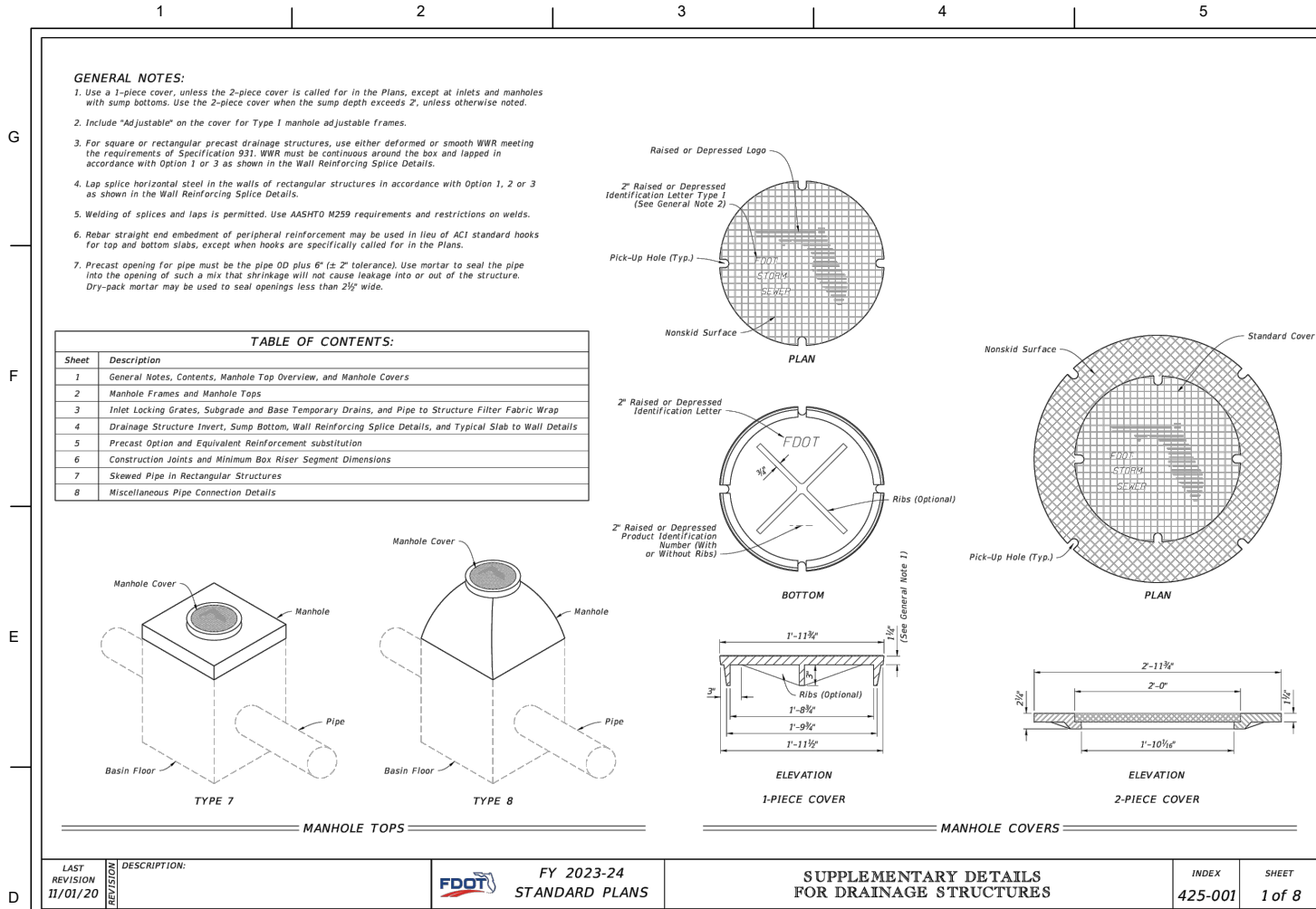
**NOT RELEASED FOR
CONSTRUCTION**

BY: JCP DATE: 12/2023

PROJECT NO:	12107.01
DESIGNED BY:	RAS
DRAWN BY:	JJ
CHKD BY:	RLW
PROJ. MGR:	JCP
DATE:	DECEMBER 2023

ADS STORM TECH
CHAMBER SYSTEM DETAILS

C-509



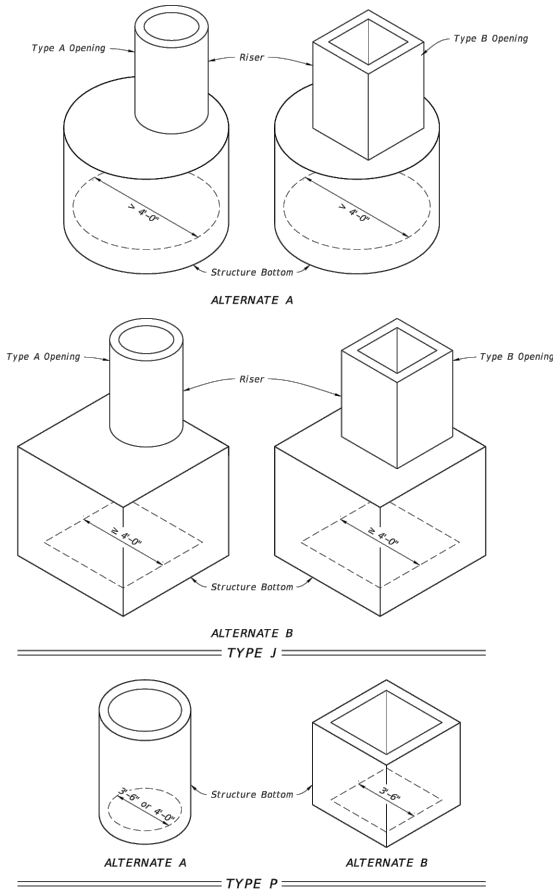
GENERAL NOTES:

2. Type P standard structure bottoms are 4'-0" diameter and smaller (Alt. A) and 3'-6" square (Alt. B). Larger standard structure bottoms are designated Type J. Risers are permitted for all structures.
3. Walls of circular structures (Alt. A) constructed in place may be of brick or reinforced concrete. Construct precast and rectangular structures (Alt. B) with reinforced concrete only.
4. Wall thickness and reinforcement are for either reinforced cast-in-place or precast concrete units except that precast circular units may be furnished with walls in accordance with ASTM C478 (See Table 1).
5. Top and bottom slab thickness and reinforcement are for precast and cast-in-place construction. Use Class II concrete, except when Class IV concrete is shown in the Plans.
6. Alt. A or Alt. B structure bottoms may be used in conjunction with curb inlet tops Types 1, 2, 3, 4, 5, 6, 9, and 10, and any manhole or junction box. Alt. B structure bottoms may be used in conjunction with curb inlet Types 7 & 8, or any ditch bottom inlet.
7. Rectangular structures may be rotated as directed by the Engineer in order to facilitate connections between the structure walls and pipes.
8. Use straight embedded reinforcement in top and bottom slabs, except when ACI hooks are specifically required.
9. Construct corner filllets as shown for rectangular structures used with circular risers and inlet throats, and when used on skew with rectangular risers, inlets, and inlet throats. Construct filllets in the top slab of the Alt. A structure bottoms when used with the Type B risers. Reinforce each filllet with two #5 bars.
10. Units larger than specified standards may be substituted at the contractor's option when these units will not cause or increase the severity of utility conflicts. Furnish such larger units at no additional cost to the Department. Larger Alt. A units cannot replace Alt. B units without approval of the Engineer. This Note applies to this Index only.

REINFORCEMENT NOTES:

1. Locate wall reinforcement in rectangular structures as shown in the WALL REINFORCEMENT SPlice DETAILS in Index 425-001.
2. Provide a minimum 2' clear cover for all reinforcement unless otherwise noted and except for 36" diameter ASTM C478 units.
3. Additional bars used to restrain hole formers for precast structures with grouted pipe connections may be left flush with the hole surface.
4. Cut or bend reinforcement at pipe openings to maintain cover.
5. Remove exposed ends of reinforcement at precast pipe openings and grouted joints to 1" below the concrete surface and seal with a Type F Epoxy meeting the requirements of Specification 926.
6. Equivalent area smooth or deformed welded wire reinforcement may be substituted in accordance with Index 425-001.

TABLE OF CONTENTS:	
Sheet	Description
1	General Notes and Contents
2	Dimensional and Reinforcing Details
3	Tables 1, 2, 3, and 4
4	Tables 5 and 6



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TABLE 1 - ALTERNATE A - STRUCTURES

TYPE	STRUCTURE/RISE DIAMETER (IN)	CAST-IN-PLACE ITEMS CLASS II CONCRETE		PRECAST ITEMS					
		RISE		CLASS II CONCRETE		ASTM C478			
		t_1 (in)	t_2 bottom (in)	t_1 (in)	t_2 bottom (in)	t_1 or t_2 (in)	$A_2^{2/3}$ (in ²)		
P	3'-6"	6	8	0.20	6	8	0.20	4**	0.105
P	4'-0"	6	8	0.20	6	8	0.20	5**	0.120
J	5'-0"	-	8	0.20	-	8	0.20	6**	0.135
J	6'-0"	-	8	0.20	-	8	0.20	6	0.180
J	7'-0"	-	8	0.20	-	8	0.20	7	0.210
J	8'-0"	-	8	0.20	-	8	0.20	8	0.240
J	10'-0"	-	10	0.40**	-	10	0.40**	10	0.360
J	12'-0"	-	10	0.40**	-	12	0.40**	12	0.390

t_1 and t_2 - Wall Thickness.
 A_g - Vertical and horizontal areas of reinforcement.
 ##Provide 0.20 eq. in./ft. at each face, 12" max. bar spacing.
 **Modified minimum wall thickness.
 ***Min. total circumferential reinforcement for continuous steel hoops:
 $A_c = 0.40$ sq. in. for riser section height equal or less than 2'-0" (2 hoop min.)
 $A_c = 0.60$ sq. in. for riser section height more than 2'-0" up to 4'-0" (3 hoop min.).
 Areas of reinforcing for precast items are based on Grade 60 reinforcing.
 No reduction in the area of reinforcement is allowed for welded wire fabric in Table 1.
 Area of vertical reinforcement may be reduced in accordance with ASTM C478.

TABLE 3 - REINFORCING SCHEDULE

SCHEDULE	GRADE 60 BARS OR 65 KSI & 70 KSI WELDED WIRE REINFORCING			
	GRADE 60 AREA (in ² /ft)	MAXIMUM SPACING		
		GR 60 BARS	WWR EQUIV. 65 KSI	AREA 70 KSI
A12	0.20	12	8	8
A6	0.20	6	5	4½
B10	0.24	10	8	7½
B5.5	0.24	5½	5	4
C6.5	0.37	6½	6	5
D7	0.53	7	3	2½
D4.5	0.53	4½	4	3
E5	0.73	5	4	4
E3	0.73	3	3	3
F5	1.06	5	4	4
F3.5	1.06	3½	3	3
G5	1.41	5	4	4
G3.5	1.41	3½	3	3
H4.5	1.75	4	3	3

TABLE 2 - ALTERNATE B
SQUARE AND RECTANGULAR STRUCTURES

SQUARE AND RECTANGULAR STRUCTURES				
TYPE	WALL LENGTH (FT)	MAX. DEPTH (FT)	WALL THICKNESS (t_3)	
			C-I-P (In.)	PRECAST (In.)
P	≤ 3 -6"	40	6 Riser 8 Bottom	6
J	4'-0"	40	8	6
J	5'-0"	22	-	6
J	6'-0"	15	-	6
J	5'-0" to 9'-0"	40	8	8
J	10'-0"	26	8	8
J	10'-0" to 12'-0"	40	10	9
J	16'-0"	35	-	9
J	16'-0"	40	10	10
J	20'-0"	25	-	9
J	20'-0"	30	10	10

See Table 4 for Reinforcing Schedule.

TABLE 4 - WALL DESIGNS - RECTANGULAR STRUCTURES

VERTICAL REINFORCING		HORIZONTAL REINFORCING		WALL THICKNESS	VERTICAL REINFORCING		HORIZONTAL REINFORCING		WALL THICKNESS
WALL DEPTH	SCHEDULE	WALL DEPTH	SCHEDULE		WALL DEPTH	SCHEDULE	WALL DEPTH	SCHEDULE	
SIZE: 3-6" & RISER					SIZE: 10-0" (Precast Only)				
≥1.17' - 40"	A12	≥1.17' < 10"	B10	6"/8"	Inside/Outside	Inside/Outside	Inside/Outside	Inside/Outside	
		10' < 18"	B5.5	6"/8"	26' - 40"	D7	D7	26' - 40"	F5 F5 F5 9"
		18' < 29"	C6.5	6"/8"	SIZE: 12-0"				
		29' - 40"	C3.5	6"/8"	Inside/Outside	Inside/Outside	Inside/Outside	Inside/Outside	
SIZE: 4-0"					≥1.17' < 14"	B10	B10	≥1.17' < 10"	C6.5 C6.5 10"
≥1.17' - 40"	A12	≥1.17' < 6"	B10	6"/8"	14' < 25"	C6.5	C6.5	10' < 17"	D7 D7 10"
		6' < 10"	B5.5	6"/8"	25' - 40"	D7	D7	17' < 24"	E5 E5 10"
		10' < 20"	C6.5	6"/8"				24' - 40"	F5 F5 10"
		20' < 28"	C3.5	6"/8"	SIZE: 12'-0" (Precast Only)				
		28' - 40"	D4.5	6"/8"	Inside/Outside	Inside/Outside	Inside/Outside	Inside/Outside	
SIZE: 5-0"					≥1.17' < 12"	B10	B10	≥1.17' < 10"	D7 D7 9"
≥1.17' - 40"	A12	≥1.17' < 5"	B5.5	6"/8"	12' < 24"	C6.5	C6.5	10' < 17"	D4.5 D4.5 9"
		5' < 9"	C6.5	6"/8"	24' - 40"	D7	D7	17' < 23"	E5 E5 9"
		9' < 15"	C3.5	6"/8"				23' < 32"	F5 F5 9"
		15' < 22"	D4.5	6"/8"				32' - 40"	G5 G5 9"
		22' - 40"	E	8"	SIZE: 16-0"				
SIZE: 6-0"					Inside/Outside	Inside/Outside	Inside/Outside	Inside/Outside	
≥1.17' < 26"	A12	≥1.17' < 9"	C3.5	6"/8"	≥1.17' < 11"	C6.5	C6.5	≥1.17' < 13"	D7 D7 10"
		9' < 15"	D4.5	6"/8"	11' < 20"	D7	D7	13' < 20"	E5 E5 10"
		15' < 26"	E5	8"	20' < 28"	E5	E5	20' < 28"	F5 F5 10"
		Inside/Outside	Inside/Outside	Inside/Outside	28' - 40"	F5	F5	28' - 40"	G5 G5 10"
26' - 40"	A12	A12	26' - 40"	D7 D7 8"	SIZE: 16'-0" (Precast Only)				
SIZE: 7-0"					Inside/Outside	Inside/Outside	Inside/Outside	Inside/Outside	
≥1.17' < 25"	A12	A12	≥1.17' < 7"	B10 B10 8"	≥1.17' < 10"	C6.5	C6.5	≥1.17' < 9"	D7 D7 9"
26' - 40"	B10	B10	7' < 10"	B5.5 B5.5 8"	10' < 18"	D7	D7	9' < 13"	D4.5 D4.5 9"
			10' < 20"	C6.5 C6.5 8"	18' < 25"	E5	E5	13' < 19"	E5 E5 9"
			20' < 30"	D7 D7 8"	25' < 35"	F5	F5	19' < 25"	F5 F5 9"
			30' < 40"	E5 E5 8"	SIZE: 20-0"				
SIZE: 8-0"					Inside/Outside	Inside/Outside	Inside/Outside	Inside/Outside	
≥1.17' < 20"	A12	A12	≥1.17' < 8"	B5.5 B5.5 8"	≥1.17' < 10"	C6.5	C6.5	≥1.17' < 8"	D7 D7 10"
20' - 40"	C6.5	C6.5	8' < 12"	C6.5 C6.5 8"	10' < 17"	D7	D7	8' < 12"	E5 E5 10"
			12' < 22"	D7 D7 8"	17' < 30"	E5	E5	12' < 25"	F5 F5 10"
			22' < 31"	E5 E5 8"				20' < 30"	G5 G5 10"
			31' < 40"	F5 F5 8"	SIZE: 20'-0" (Precast Only)				
SIZE: 9-0"					Inside/Outside	Inside/Outside	Inside/Outside	Inside/Outside	
≥1.17' < 12"	A12	A12	≥1.17' < 8"	B5.5 B5.5 8"	≥1.17' < 8"	C6.5	C6.5	≥1.17' < 8"	D4.5 D4.5 9"
12' < 28"	C6.5	C6.5	8' < 15"	D7 D7 8"	8' < 13"	E5	E5	8' < 15"	E5 E5 9"
			15' < 28"	E5 E5 8"	13' < 25"	F5	F5	15' < 25"	F5 F5 9"
			28' < 37"	F5 F5 8"				19' < 29"	G5 G5 9"

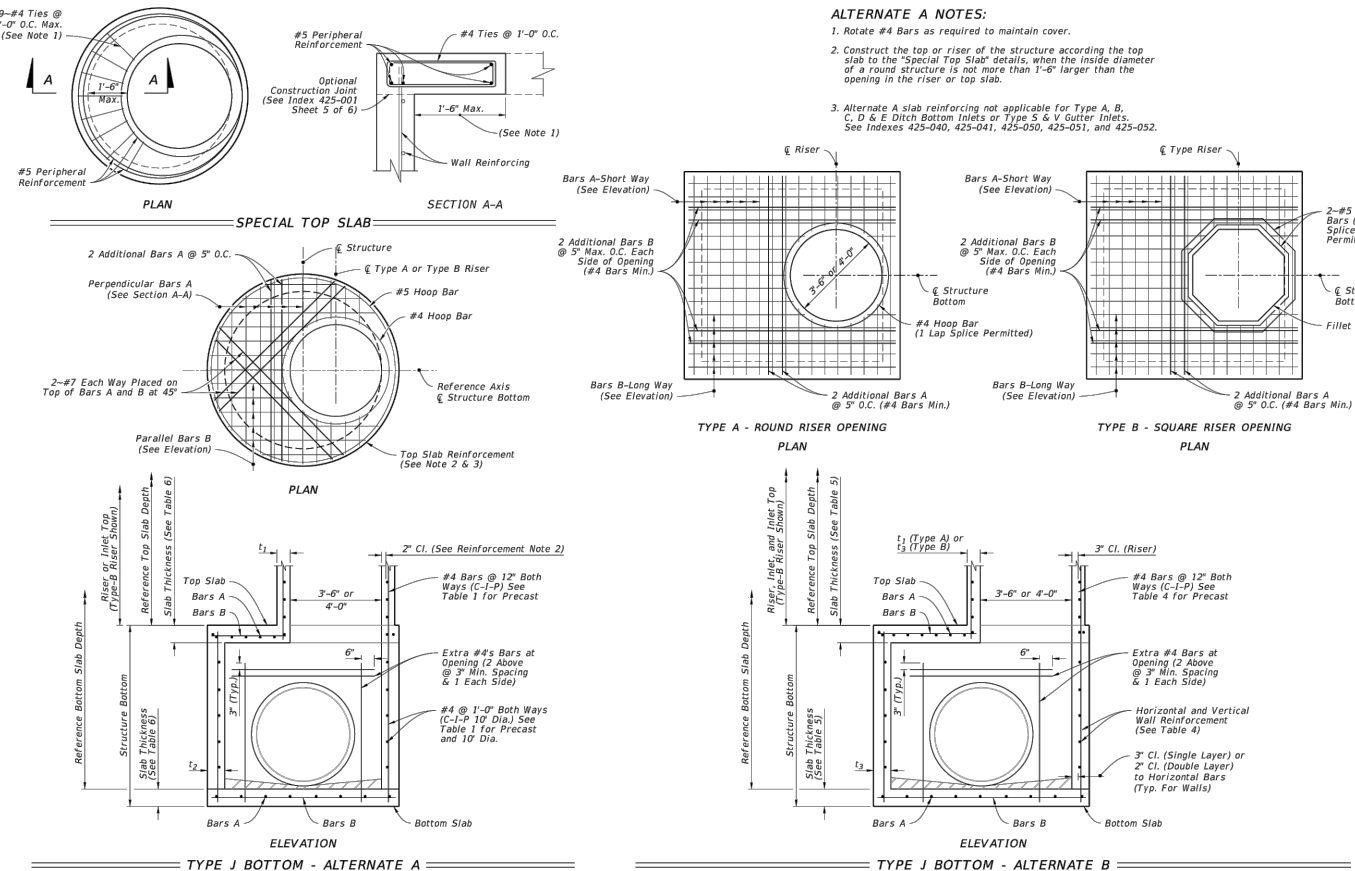
TABLE 4 NOTES:

1. Wall depth is measured to the top of the bottom slab for boxes and to the top of the intermediate slab for risers.
2. Wall height is the distance between top of lower slab to bottom of upper slab. Maximum wall height is 12' for wall lengths exceeding 5', or 10' for wall lengths exceeding 12'.
3. Wall lengths exceeding 6'-0" require two layers of reinforcing (See Table 4) with 2" of cover from the horizontal bars to the inside and outside faces for each layer.
4. Wall lengths exceeding the dimensions or depths shown in Table 4, or 12'-0" diameter require a special design.
5. Wall thickness and reinforcing for rectangular structures is based on the longer wall length.

TABLES 1, 2, 3, AND 4

LAST REVISION 1/01/20	DESCRIPTION:	 FY 2023-24 STANDARD PLANS	STRUCTURE BOTTOMS TYPE J AND P	INDEX 425-010	SHEET 3 of 4
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DIMENSIONAL AND REINFORCING DETAILS

LAST REVISION 11/01/20	DESCRIPTION:	 FY 2023-24 STANDARD PLANS	STRUCTURE BOTTOMS TYPE J AND P	INDEX 425-010	SHEET 2 of 4
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TABLE 5 - SLAB DESIGNS - SQUARE AND RECTANGULAR STRUCTURES

(ALL SLABS 8" THICK EXCEPT AS NOTED - REINFORCING PARALLEL TO SHORT WAY AND LONG WAY)

SHORT-WAY				LONG-WAY			
SLAB DEPTH	SCHEDULE (Bars A)	SLAB DEPTH	SCHEDULE (Bars B)	SLAB DEPTH	SCHEDULE (Bars A)	SLAB DEPTH	SCHEDULE (Bars B)
SIZE: 3' x 4' UNLIMITED							
10'-0" < B10	24'-0" < 24'	B10		10'-0" < 13	C6.5	10'-0" < 10	C3.5
8" < 13	B5.5	24'-0" < 40	B5.5	13" < 23	D7	10'-0" < 18	D4.5
13" < 31	C6.5			23'-0" < 40	E5	18" < 27	E5
31'-0"	D7					27" < 33	E3
						33'-0"	F5
SIZE: 4' x UNLIMITED							
10'-0" < 7	B5.5	10'-0" < 15	B10	SIZE: 6' x 8'			
7" < 19	C6.5	15" < 29	B5.5	10'-0" < 8	C6.5	10'-0" < 8	C6.5
19" < 31	D7	29'-0" < 40	C6.5	8" < 16	D7	8" < 12	C3.5
31'-0"	E5			16" < 28	E5	12" < 21	D4.5
SIZE: 5' x 5'				28'-0"	F5	21" < 28	E5
10'-0" < 3	C6.5	10'-0" < 3	C6.5			28" < 35	E3
3" < 7	B5.5	3" < 13	C6.5			35'-0"	F5
7" < 22	C6.5	13" < 22	D7	SIZE: 6' x 7'			
22" < 29	D7	22" < 29	D4.5	10'-0" < 6	C6.5	10'-0" < 6	B5.5
29'-0"	E5	29'-0" < 40	E5	6" < 11	D7	6" < 11	C6.5
SIZE: 5' x 6'				13" < 22	E5	11" < 17	C3.5
10'-0" < 12	C6.5	10'-0" < 3	C6.5	22" < 35	F5	17" < 22	D4.5
12" < 28	D7	3" < 9	B5.5	35'-0"	G5	22" < 32	E5
28'-0"	E5	9" < 23	C3.5			32'-0"	E3
		23" < 35	D4.5	SIZE: 6' x 9'			
		35'-0"	E5	10'-0" < 8	D7	10'-0" < 8	B5.5
SIZE: 5' x 7'				8" < 14	E5	8" < 14	C6.5
10'-0" < 10	C6.5	10'-0" < 10	B5.5	14" < 24	F5	14" < 21	D4.5
10" < 20	D7	10" < 31	C3.5	24'-34"	G5	21" < 25	D4.5
20" < 34	E5	31'-0" < 40	D4.5			25'-34"	E5
34'-0"	F5			SIZE: 6' x UNLIMITED			
SIZE: 5' x 8'				10'-0" < 8	D7	10'-0" < 8	B5.5
10'-0" < 7	C6.5	10'-0" < 8	B10	8" < 14	E5	8" < 14	C6.5
7" < 13	D7	8" < 17	B5.5	14" < 24	F5	14" < 21	C3.5
13" < 24	E5	17" < 25	C6.5	24'-34"	G5	21" < 25	D4.5
24'-0"	F5	25'-0" < 40	C3.5			25'-34"	E5
SIZE: 5' x 9'				SIZE: 7' x 7'			
10'-0" < 8	C6.5	10'-0" < 14	B10	10'-0" < 8	C6.5	10'-0" < 4	C6.5
8" < 14	D7	14" < 24	B5.5	8" < 15	D7	8" < 7	C3.5
14" < 25	E5	24" < 34	C6.5	15" < 26	F5	7" < 11	D4.5
25'-0"	F5	34'-0" < 40	C3.5			11" < 22	E5
SIZE: 5' x UNLIMITED						22" < 32	F3.5
10'-0" < 8	C6.5	10'-0" < 14	B10			32'-0"	G3.5
8" < 14	D7	14" < 24	B5.5	SIZE: 7' x 8'			
14" < 25	E5	24" < 34	C6.5	10'-0" < 5	C6.5	10'-0" < 5	C6.5
25'-0"	F5	34'-0" < 40	C3.5	5" < 11	D7	5" < 8	D4.5
				11" < 19	E5	8" < 13	D4.5
				19" < 30	F5	13" < 22	E3
				30'-40"	G5	22" < 30	F3.5
						30'-40"	G3.5
SIZE: 7' x 9'				SIZE: 8' x 8'			
10'-0" < 10	D7	10'-0" < 9	D4.5	10'-0" < 10	D7	10'-0" < 7	D7
10" < 19	E5	9" < 13	E5	8" < 14	E5	7" < 9	D4.5
19'-30"	F5	13" < 18	F5	14" < 23	F5	9" < 13	E3
		18" < 23	F3.5	23'-31"	G3.5	19" < 20	F5
		23'-30"	G3.5			20" < 23	F5
						23'-31"	G3.5
SIZE: 9' x 9' x 10' SLAB THICKNESS				SIZE: 9' x 9' x 10' SLAB THICKNESS			
22" < 38	F5	22" < 31"	F3.5	22" < 38	F5	22" < 31"	F3.5
38'-0"	G5	31'-0"	G3.5	38'-0"	G5	31'-0"	G3.5
SIZE: 10' x 10' x 10' SLAB THICKNESS				SIZE: 10' x 10' x 10' SLAB THICKNESS			
10'-0" < 7	C6.5	0.5" < 6	C6.5	10'-0" < 7	C6.5	0.5" < 6	C6.5
7" < 10	D7	6" < 9	D4.5	7" < 10	D7	6" < 9	D4.5
10" < 18	E5	9" < 15	E5	10" < 18	E5	9" < 15	E5
18" < 27	F5	13" < 22	F5	18" < 27	F5	13" < 22	F5
27'-32"	G5	22'-32"	G3.5	27'-32"	G5	22'-32"	G3.5
SIZE: 12' x 12' x 12' SLAB THICKNESS				SIZE: 12' x 12' x 12' SLAB THICKNESS			
10'-0" < 10	D7	10'-0" < 8	D7	10'-0" < 10	D7	10'-0" < 8	D7
10" < 16	E5	8" < 14	E5	10" < 16	E5	8" < 14	E5
16" < 25	F5	14" < 22	F5	16" < 25	F5	14" < 22	F5
25'-39"	G5	22'-30"	G5	25'-39"	G5	22'-30"	G5
		30'-33"	H4			30'-33"	H4

SLAB AND DESIGN TABLE

- Size is the inside dimension(s) of a structure.
- Slab reinforcement is appropriate for intermediate and bottom slabs.
- Bottom Slabs for precast 3'-6" & 3'-6" structures at 15' depth or less, may be reinforced with 15' depth or less, may be reinforced

TABLE 6 - SLAB DESIGN.

ROUND STRUCTURES

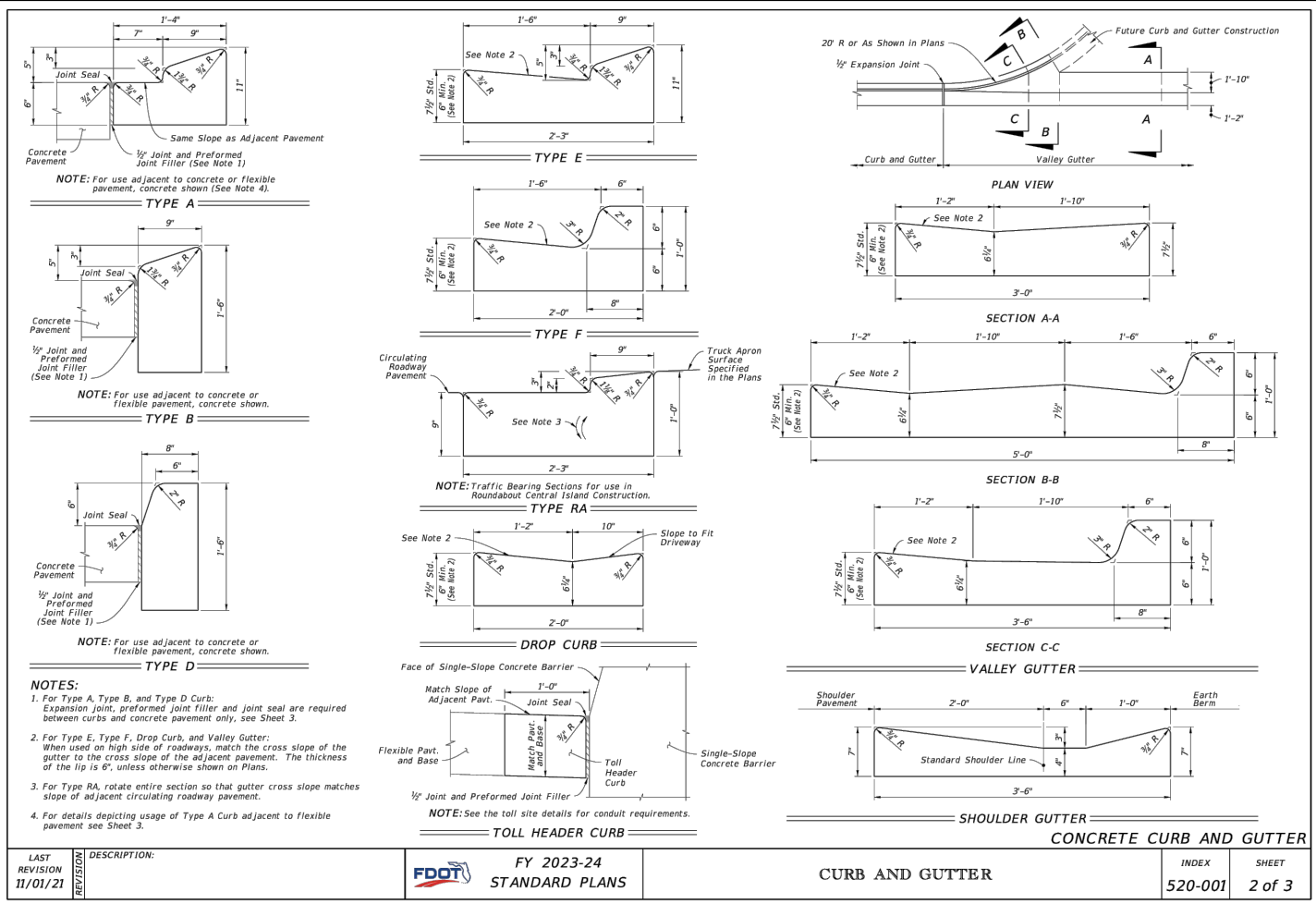
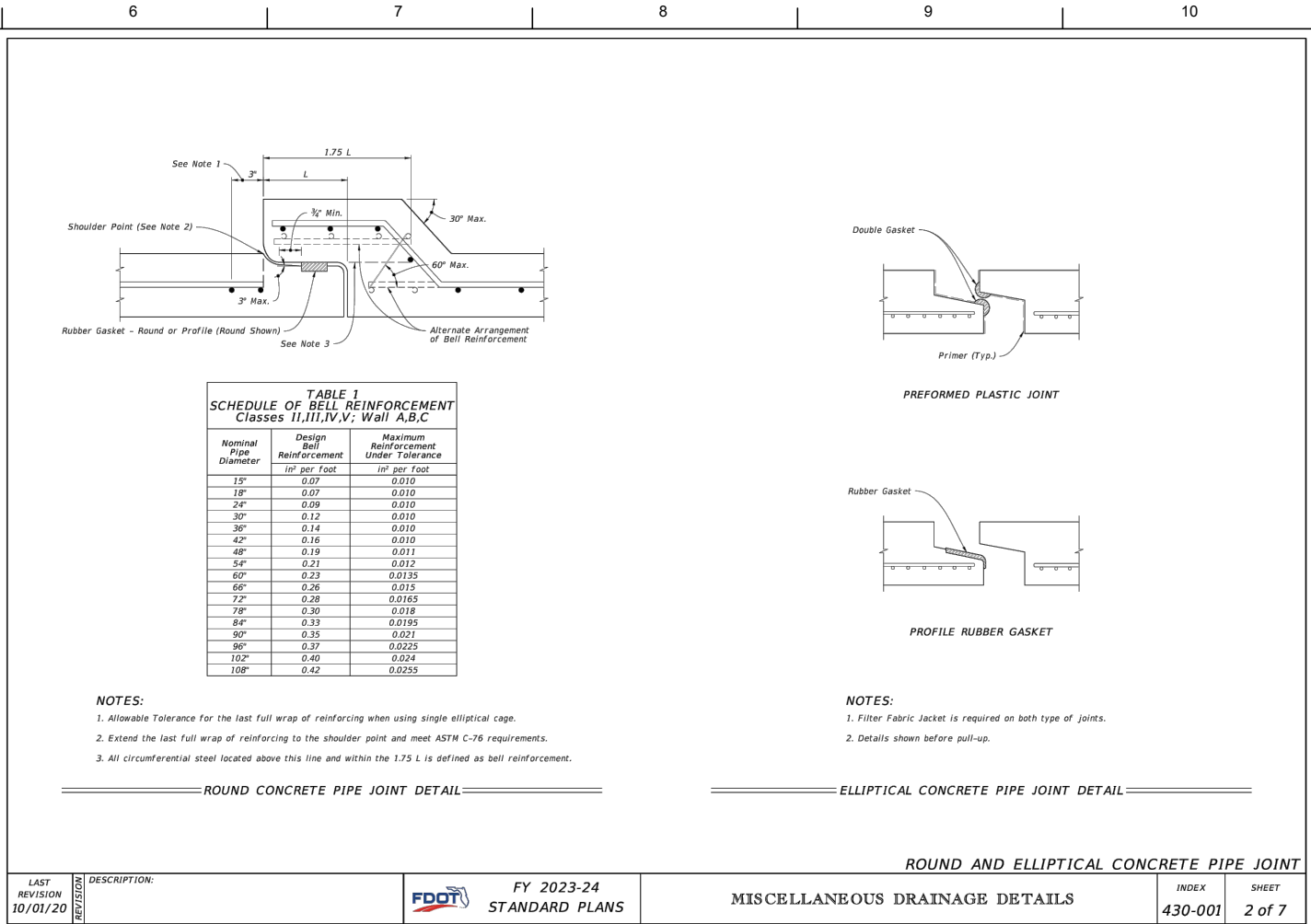
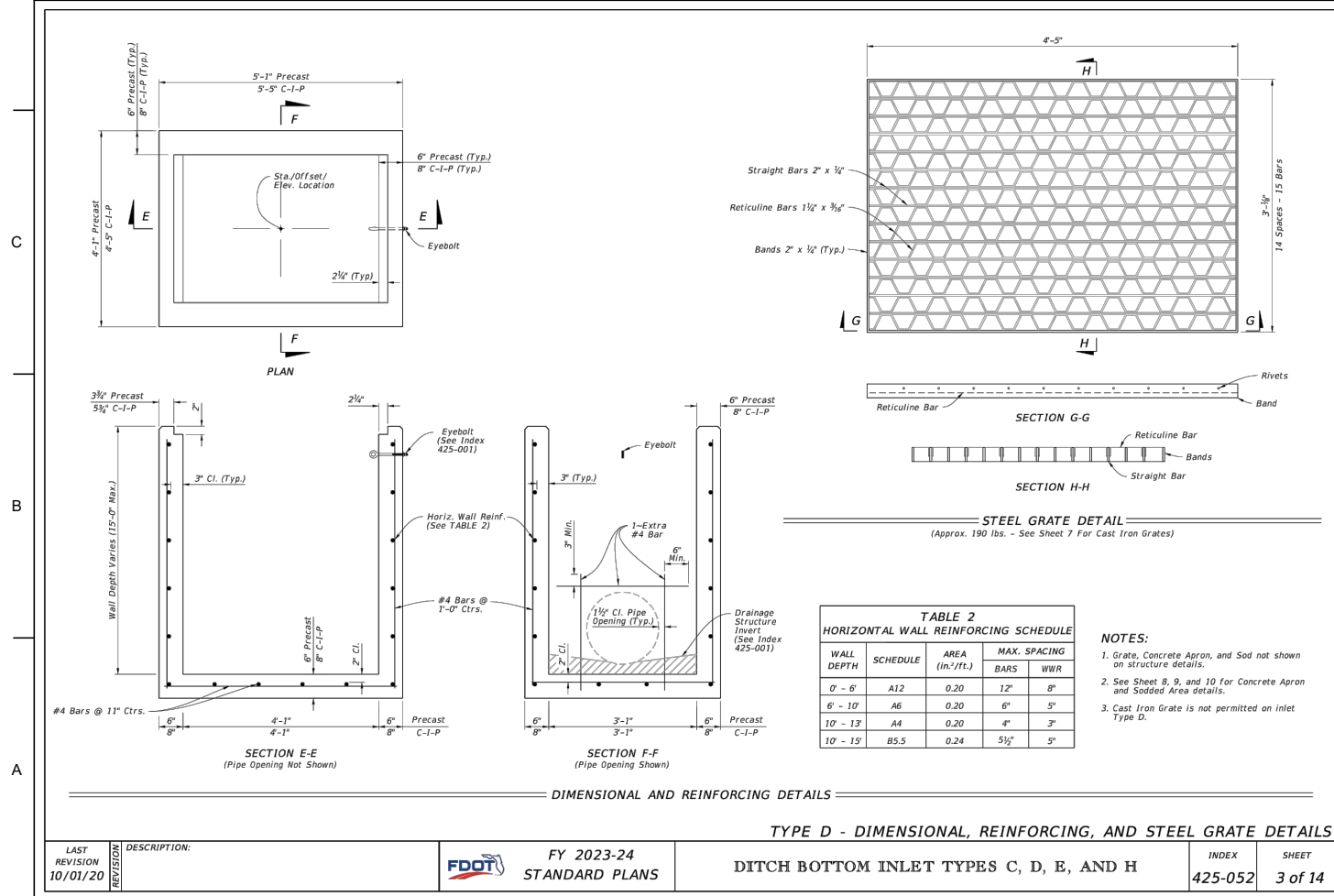
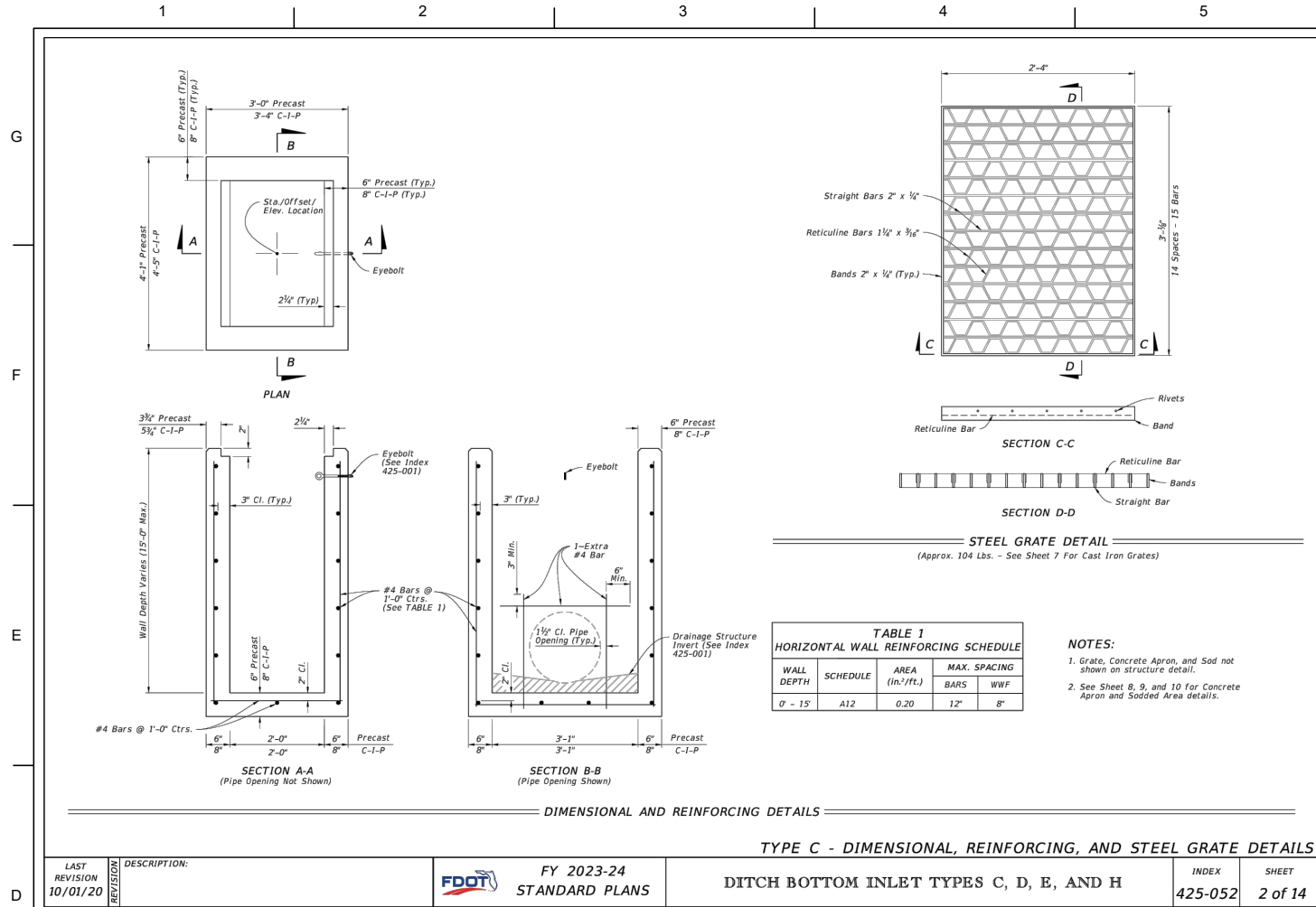
SLAB DEPTH	SLAB THICKNESS	REINF. (2-WAY) SCHEDULE
SIZE: 3'-6" DIAMETER		
2'-15"	6" Precast	C6.5
0.5'-30"	4"	A6
3'-0"	4"	B5.5
SIZE: 4'-0" DIAMETER		
≧0.5' < 1'9"	8"	A6
1'9" < 3'0"	8"	B5.5
3'-0"	8"	C6.5
SIZE: 5'-0" DIAMETER		
≧0.5' < 1'9"	8"	B5.5
1'9" < 2'6"	8"	C6.5
2'6" < 3'5"	8"	D7
3'-5"	8"	D7.5
SIZE: 6'-0" DIAMETER		
≧0.5' < 9'	8"	B5.5
9' < 15'	8"	C6.5
15' < 22'	8"	C3.5
22' < 30'	8"	D4.5
30'-40'	8"	E5
SIZE: 7'-0" DIAMETER		
≧0.5' < 8'	8"	C3.5
8' < 16'	8"	D4.5
16' < 23'	8"	E5
23' < 27'	8"	E3
27'-40'	8"	F3.5
SIZE: 8'-0" DIAMETER		
≧0.5' < 8'	8"	D4.5
8' < 16'	8"	E5
16' < 19'	8"	E3
19' < 29'	8"	F3.5
29'-40'	10"	F5
SIZE: 10'-0" DIAMETER		
≧0.5' < 12'	10"	D4.5
12' < 20'	10"	E5
20' < 28'	10"	F5
28'-40'	12"	G3.5
SIZE: 12'-0" DIAMETER		
≧0.5' < 8'	10"	D4.5
8' < 13'	10"	F5
13' < 18'	10"	F5
18' < 26'	10"	G3.5
26'-40'	12"	G3.5

SLAB AND WALL DESIGN TABLE NOTES

1. Size is the inside dimension(s) of a structure.
2. Slab reinforcement is appropriate for top, intermediate, and bottom slabs.
3. Bottom Slabs for precast 3'-6" x 3'-6" rectangular structures at 15' depth or less, may be 6" thick.
4. Slab depth is measured from finished grade to top of slab.
5. Reinforcing schedules with larger areas of steel may be substituted for schedules with smaller bar or wire spacing, except that Schedule B10 may not be substituted for Schedule A6. See Index 425-001 for allowable bar spacing adjustments when larger areas of reinforcing are substituted.

TABLES 5 AND 6

LAST REVISION 1/01/20	DESCRIPTION:	 FY 2023-24 STANDARD PLANS	STRUCTURE BOTTOMS TYPE J AND P INDEX 425-010	SHEET 4 of 4
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BASKERVILLE-DONOVAN, INC.
ENGINEERING THE SOUTH SINCE 1927
14101 PANAMA CITY BEACH PARKWAY, SUITE 110,
PANAMA CITY BEACH, FL 32413 (850) 230-6190
ENGINEERING BUSINESS: E00000360
PENSACOLA-PANAMA CITY BEACH - PALM SPRINGS - MOBILE

**SHORE AT
TARPON BEACH**

PROJECT NO: 12107.01
DESIGNED BY: RAS
DRAWN BY: JJ
CHKD BY: RLW
PROJ. MGR: JCP
DATE: DECEMBER 2023

**MISCELLANEOUS
STANDARD FDOT DETAILS**

LAST REVISION: 10/01/20
DESCRIPTION: FY 2023-24 STANDARD PLANS
DITCH BOTTOM INLET TYPES C, D, E, AND H

INDEX: 425-052
SHEET: 3 of 14

LAST REVISION: 11/01/21
DESCRIPTION: FY 2023-24 STANDARD PLANS
CURB AND GUTTER

INDEX: 520-001
SHEET: 2 of 3

LAST REVISION: 10/01/20
DESCRIPTION: FY 2023-24 STANDARD PLANS
DITCH BOTTOM INLET TYPES C, D, E, AND H

INDEX: 425-052
SHEET: 3 of 14

LAST REVISION: 10/01/20
DESCRIPTION: FY 2023-24 STANDARD PLANS
CURB AND GUTTER

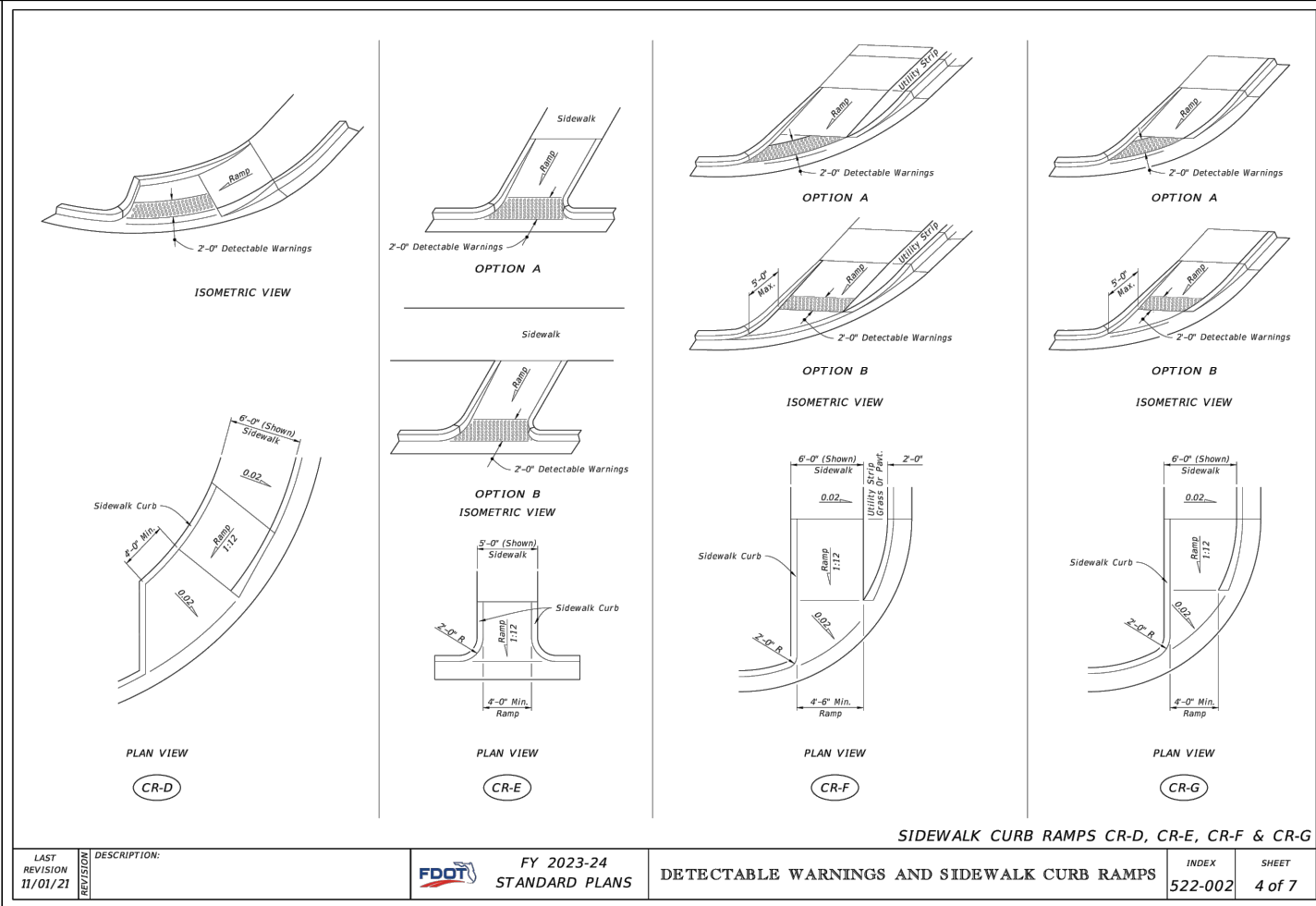
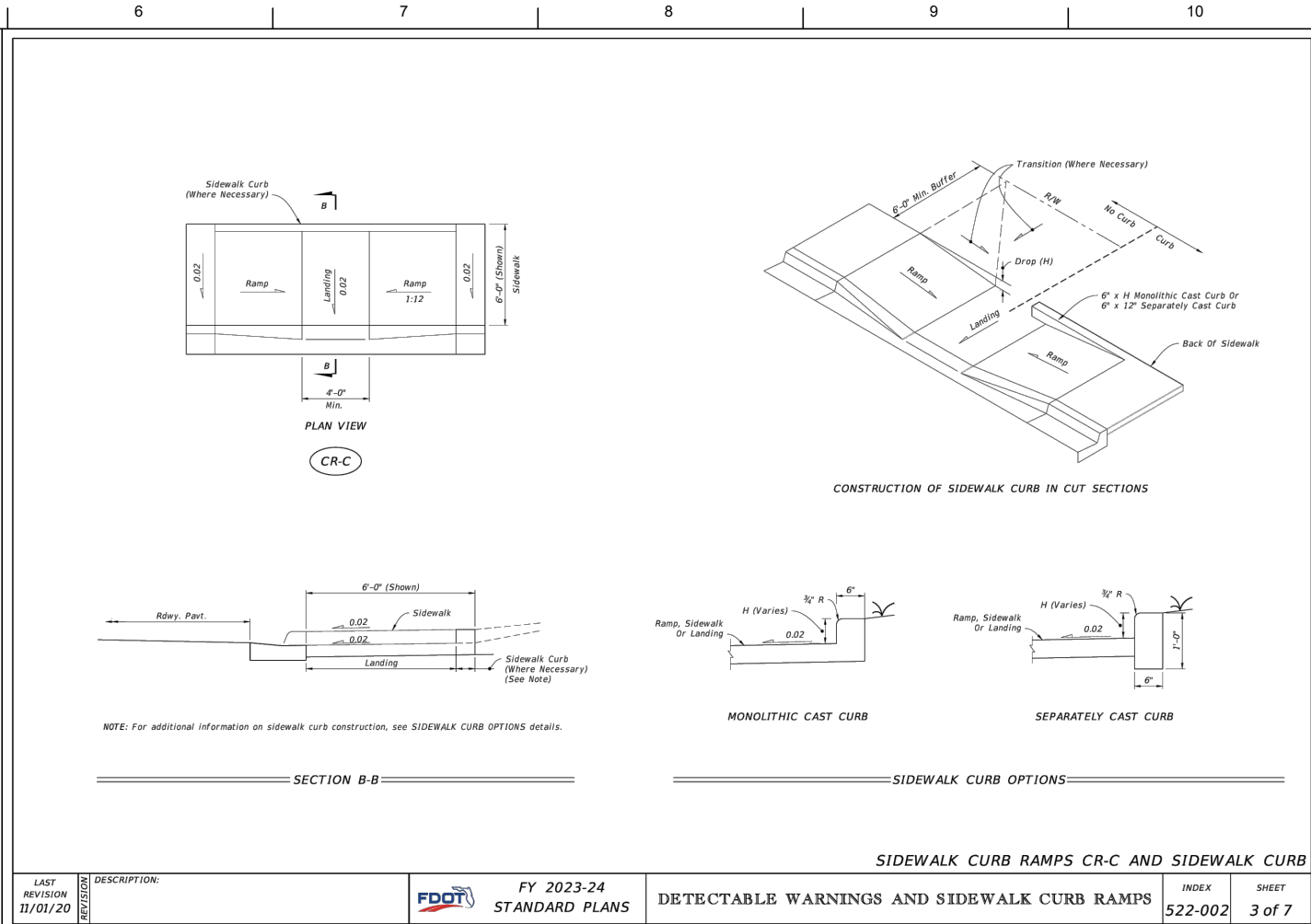
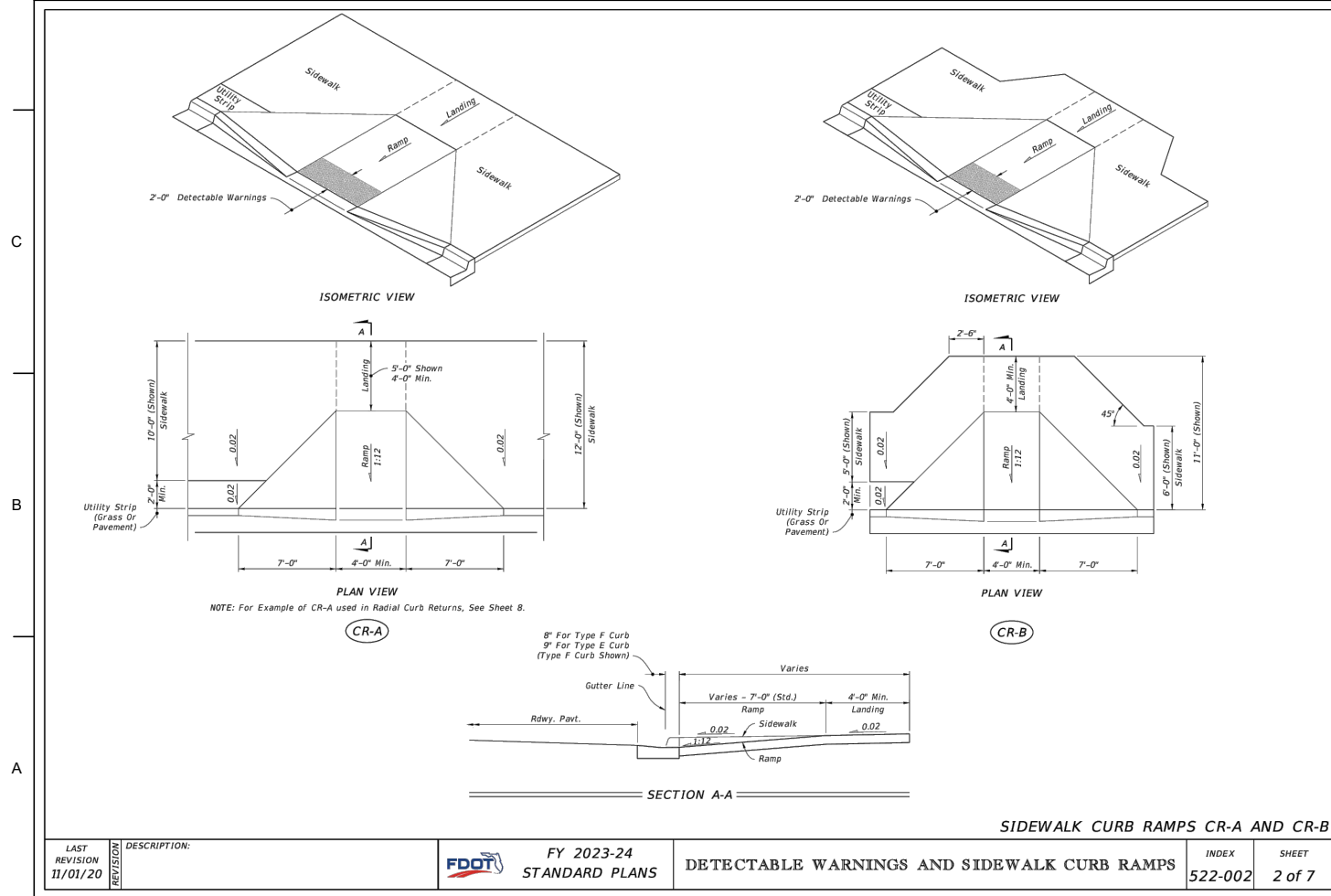
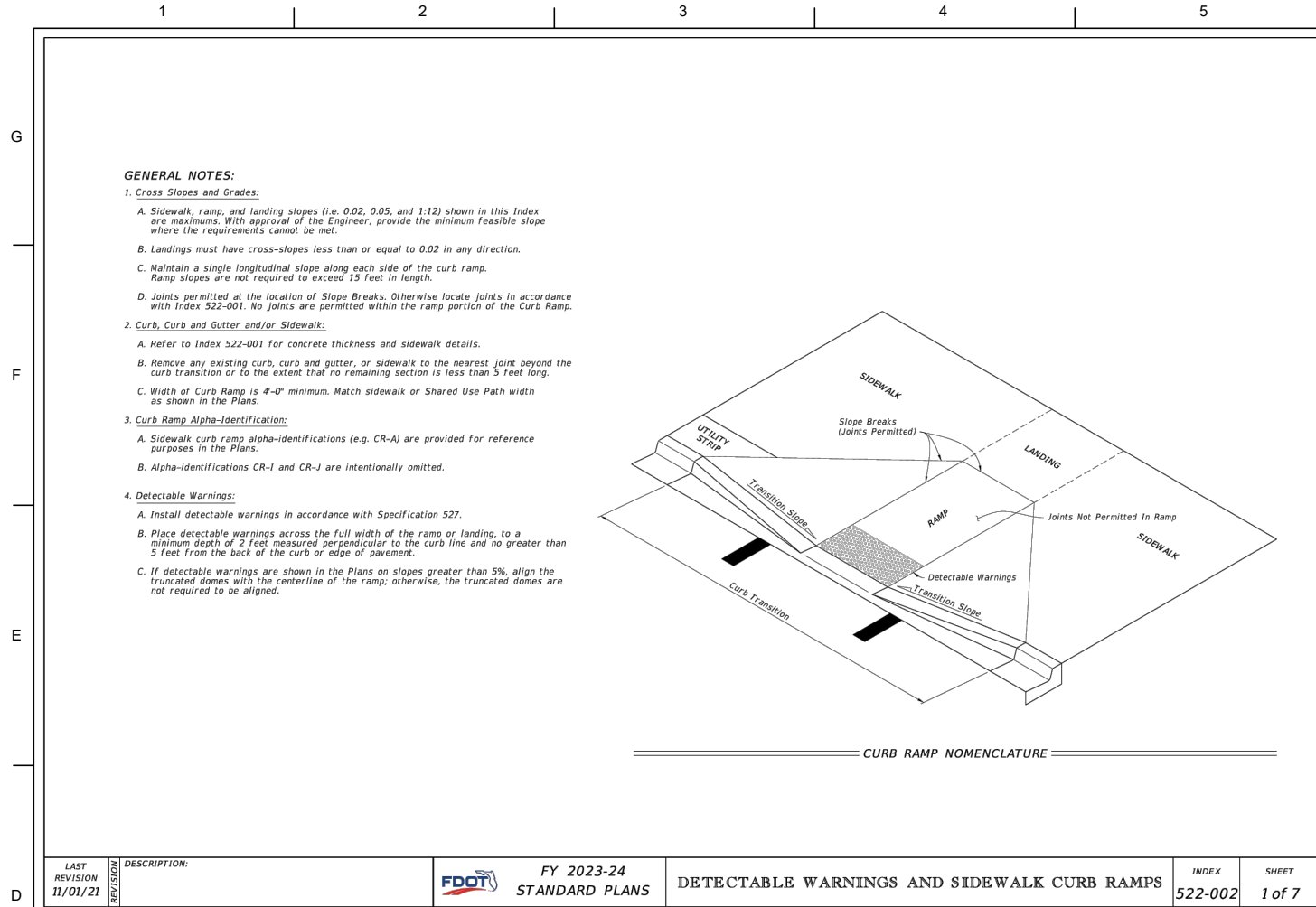
INDEX: 520-001
SHEET: 2 of 3

LAST REVISION: 10/01/20
DESCRIPTION: FY 2023-24 STANDARD PLANS
DITCH BOTTOM INLET TYPES C, D, E, AND H

INDEX: 425-052
SHEET: 3 of 14

LAST REVISION: 10/01/20
DESCRIPTION: FY 2023-24 STANDARD PLANS
CURB AND GUTTER

INDEX: 520-001
SHEET: 2 of 3



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SHORE AT
TARPON BEACH

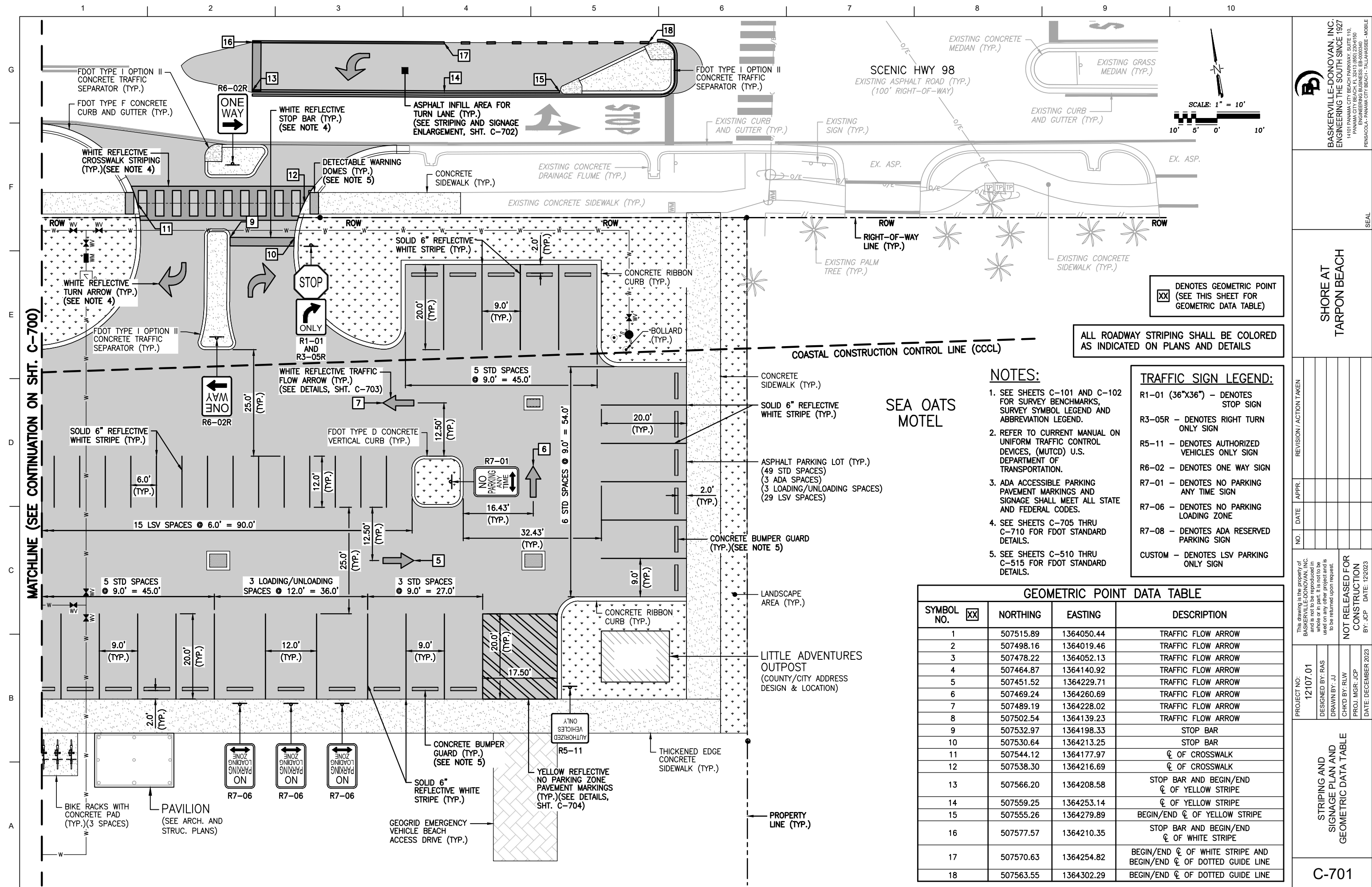
REVISION / ACTION TAKEN

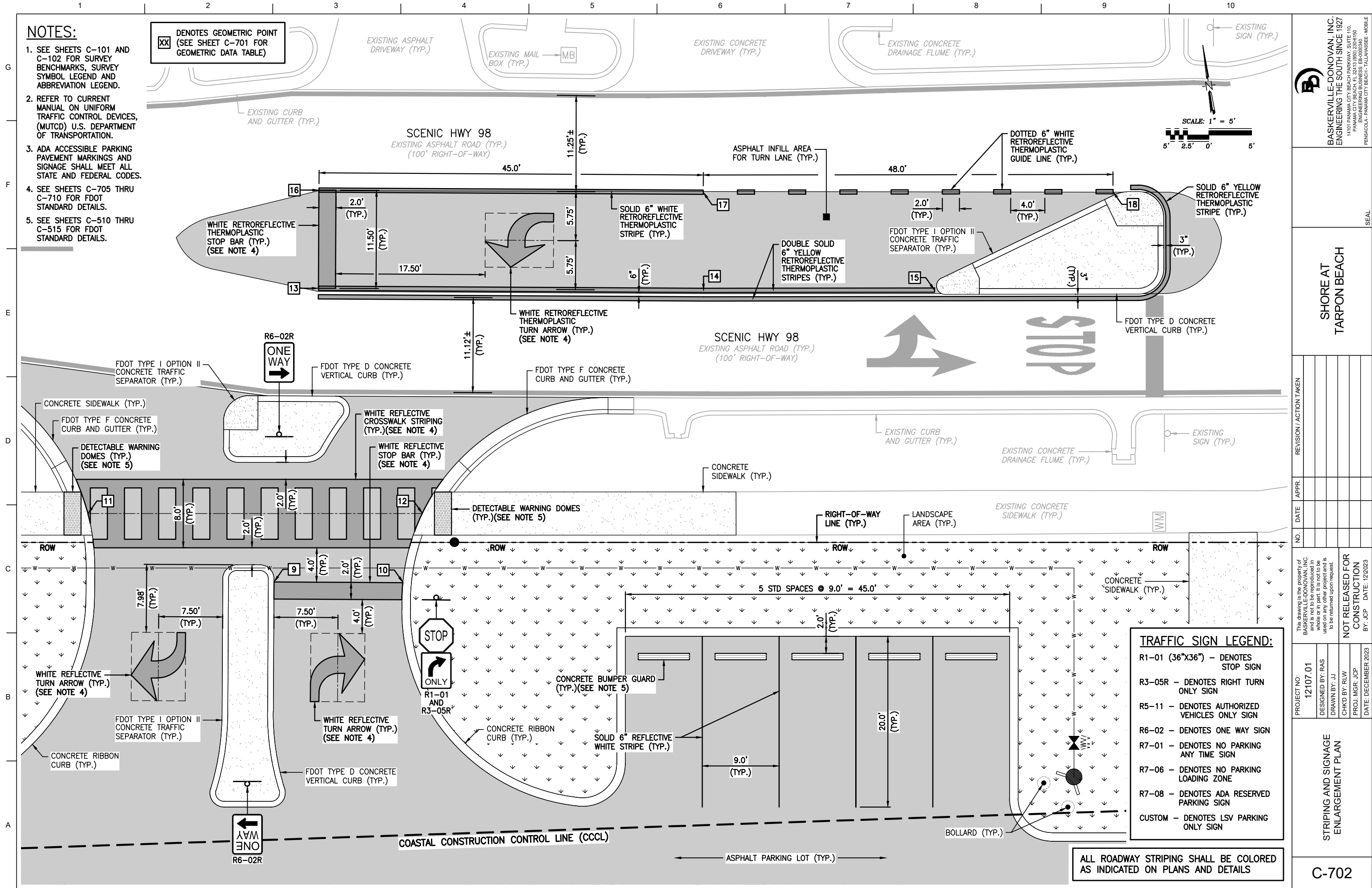
NO.	DATE	APPR.

PROJECT NO: 12107.01
DESIGNED BY: RAS
DRAWN BY: JJ
CHKD BY: RLW
PROJ. MGR: JCP
DATE: DECEMBER 2023

MISCELLANEOUS
STANDARD FDOT DETAILS

C-514





A
B
C
D
E
F
G



B

A

1. REFER TO CURRENT MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES, (MUTCD) U.S. DEPARTMENT OF TRANSPORTATION.
2. CONTRACTOR TO ADJUST PAVEMENT MARKING IF REQUIRED.

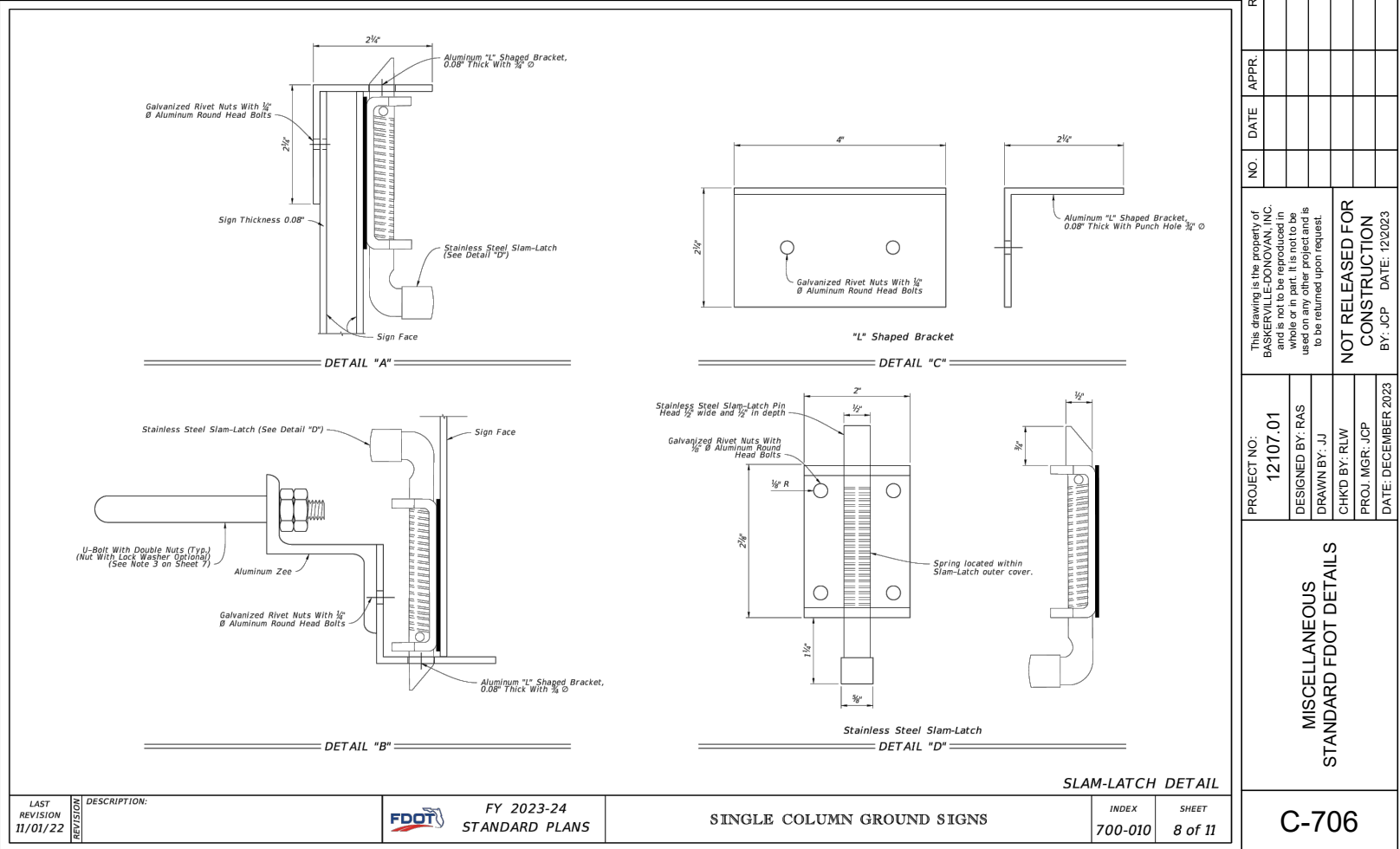
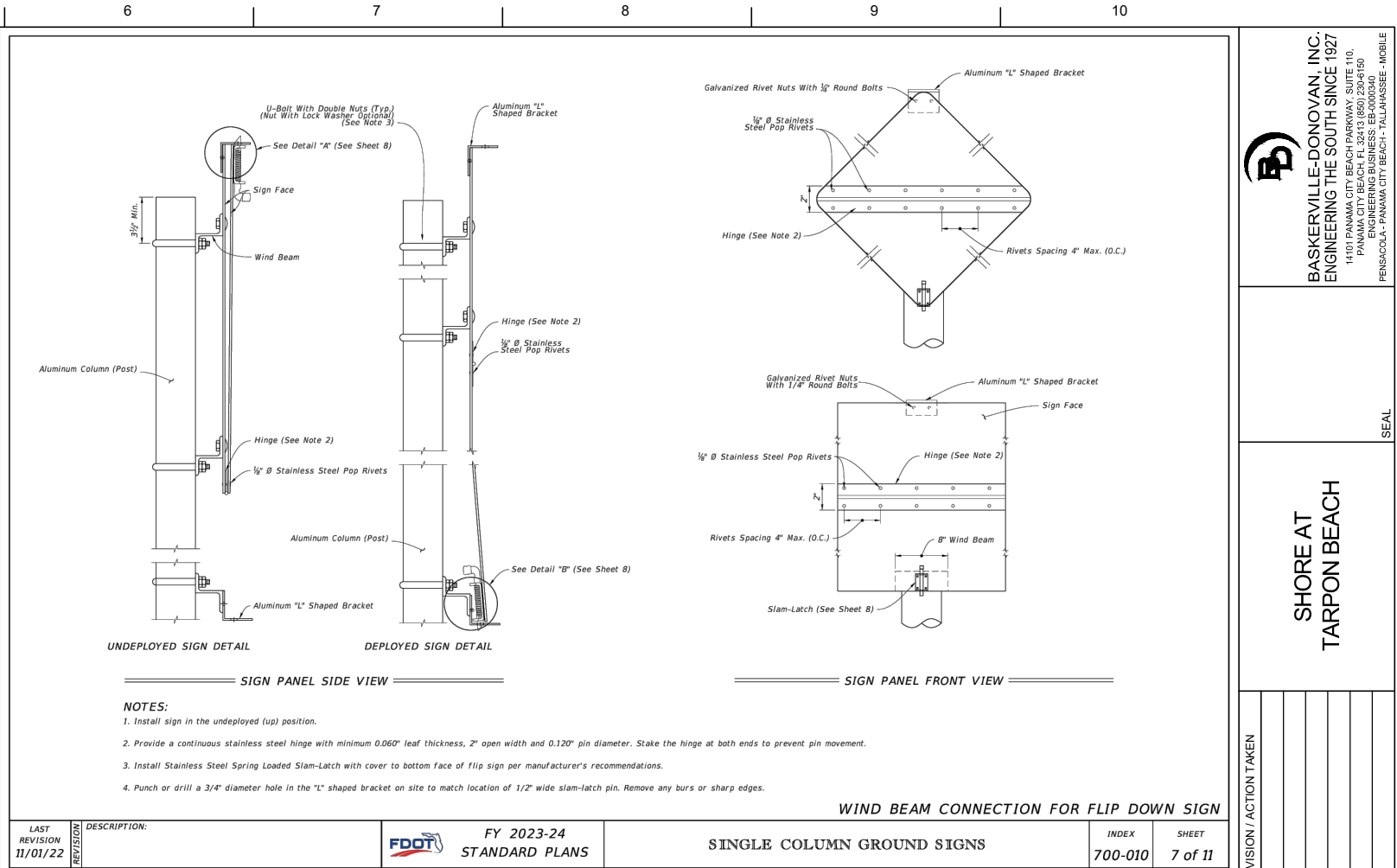
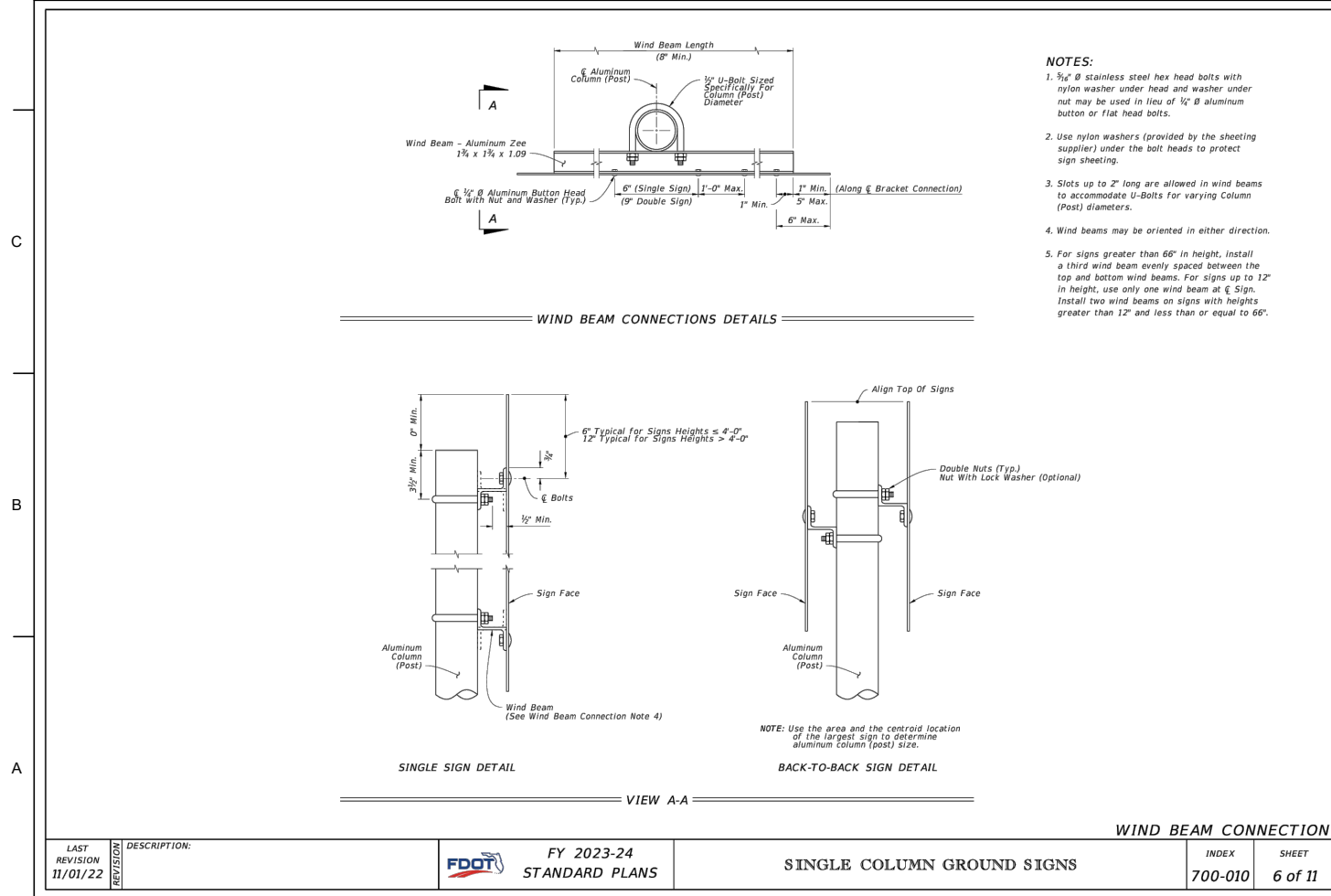
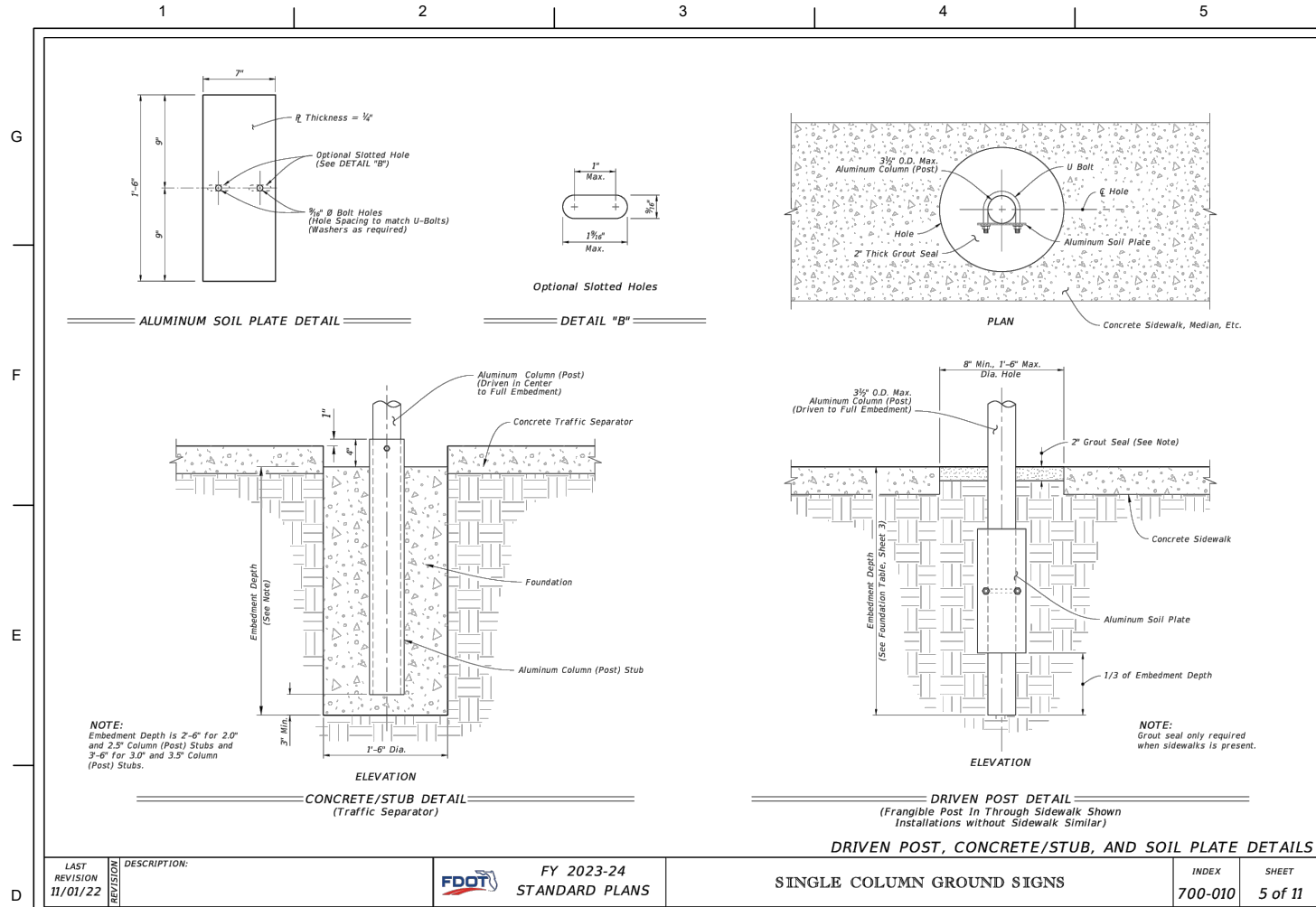
SEAL

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12107.01
DESIGNED BY: RAS
DRAWN BY: JJ
CHK'D BY: RLW
PROJ. MGR: JCP
DATE: DECEMBER 2023

C-703

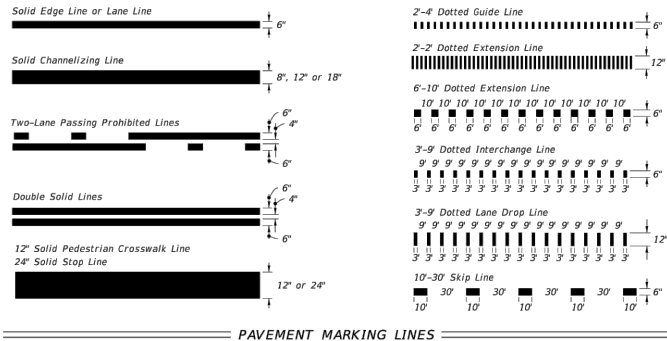




BASKERVILLE-DONOVAN, INC. ENGINEERING THE SOUTH SINCE 1927 14101 PANAMA CITY BEACH PARKWAY, SUITE 110, PANAMA CITY BEACH, FL 32413 (850) 230-6190 ENGINEERING BUSINESS: BD-0000360 PENINSULA - PANAMA CITY BEACH - PALM SPRING - MOBILE				SHORE AT TARPON BEACH				SEAL			
REVISION / ACTION TAKEN				REVISION / ACTION TAKEN				REVISION / ACTION TAKEN			
APPR.				APPR.				APPR.			
DATE				DATE				DATE			
NO.				NO.				NO.			
PROJECT NO: 12107.01				PROJECT NO: 12107.01				PROJECT NO: 12107.01			
DESIGNED BY: RAS				DESIGNED BY: RAS				DESIGNED BY: RAS			
DRAWN BY: JJ				DRAWN BY: JJ				DRAWN BY: JJ			
CHKD BY: RLW				CHKD BY: RLW				CHKD BY: RLW			
PROJ. MGR: JCP				PROJ. MGR: JCP				PROJ. MGR: JCP			
DATE: DECEMBER 2023				DATE: DECEMBER 2023				DATE: DECEMBER 2023			
MISCELLANEOUS STANDARD FDOT DETAILS				MISCELLANEOUS STANDARD FDOT DETAILS				MISCELLANEOUS STANDARD FDOT DETAILS			
C-706				C-706				C-706			

[illegible]

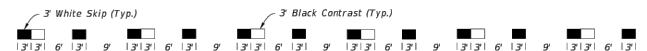
G
F
E
D
C
B
A



PAVEMENT MARKING LINES



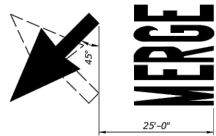
10'-30' SKIP LINE WITH CONTRAST MARKINGS



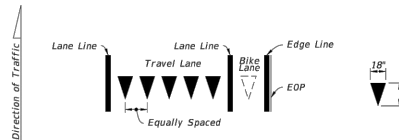
DOTTED LINE WITH ALTERNATING CONTRAST MARKINGS
(3'-9' Dotted Line Shown, Other Dotted Lines Similar)



LONGITUDINAL SOLID LANE LINE WITH CONTRAST MARKINGS
(Not For Use On Edge Lines)



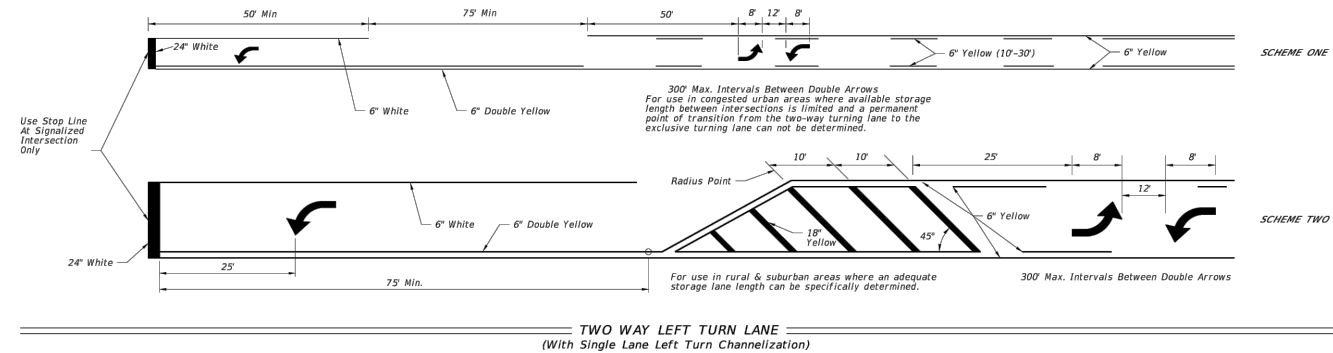
MARKINGS FOR MERGE



Yield Lines consist of five - 18" x 27" white triangles which face traffic. Equally space triangles within traffic lane. When a bike lane is present, add one additional triangle in the center of the bike lane.

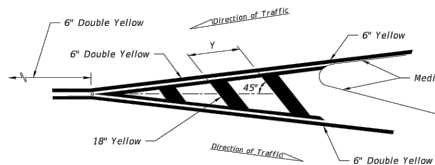
YIELD LINES

LAST REVISION	DESCRIPTION:	FDOT	FY 2023-24 STANDARD PLANS	PAVEMENT MARKINGS	INDEX	SHEET
11/01/22					711-001	2 of 13

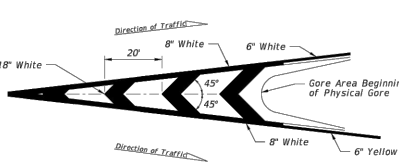


TWO WAY LEFT TURN LANE
(With Single Lane Left Turn Channelization)

POSTED SPEED LIMIT MPH	W (FT.)
30 OR LESS	10
35	20
40	20
45	30
50 OR MORE	40

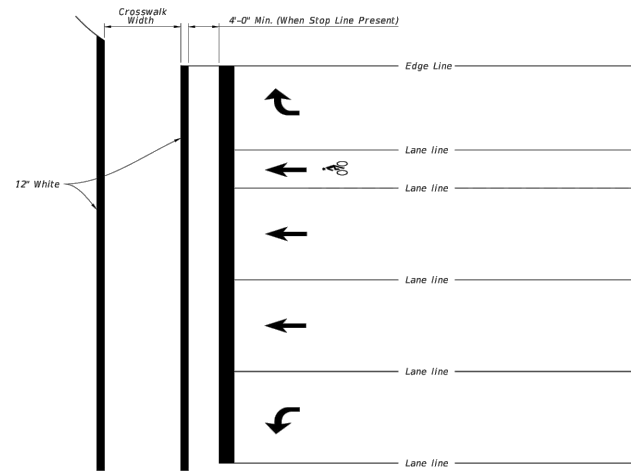


MARKINGS FOR TRAFFIC SEPARATION

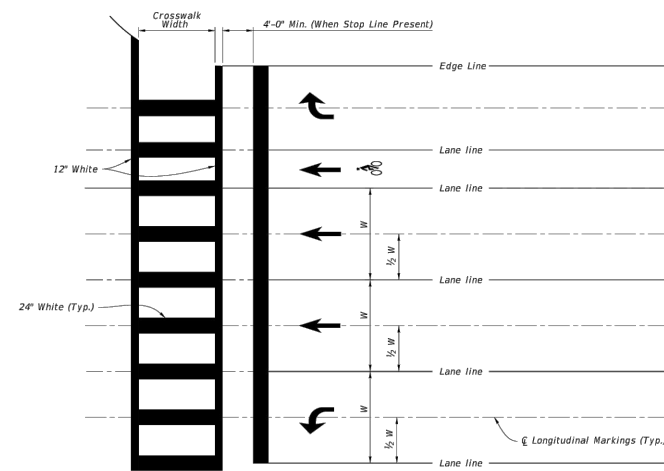


TRAFFIC CHANNELIZATION AT GORE

LAST REVISION	DESCRIPTION:	FDOT	FY 2023-24 STANDARD PLANS	PAVEMENT MARKINGS	INDEX	SHEET
11/01/21					711-001	8 of 13



STANDARD CROSSWALK DETAILS

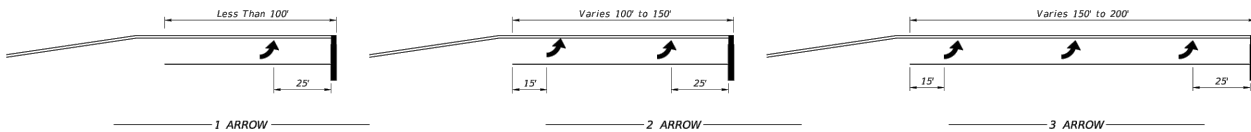


SPECIAL EMPHASIS CROSSWALK DETAILS

NOTES:

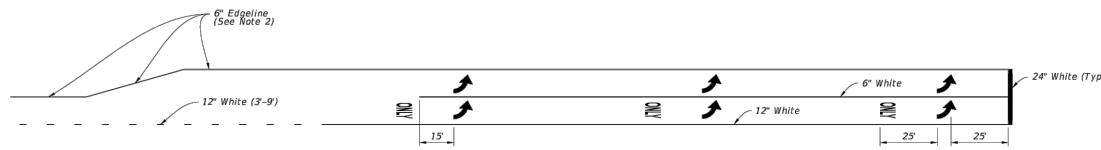
- For crosswalk width, exceed width of the adjacent sidewalk, but do not make width less than 6' for intersection crosswalks and 10' for midblock crosswalks. Measure width from the inside of the transverse crosswalk markings.
- When the Special Emphasis Crosswalk is not perpendicular to the lane lines, make the longitudinal markings parallel to the lane lines.
- Refer to Index 522-002 when Curb Ramps are present.

LAST REVISION	DESCRIPTION:	FDOT	FY 2023-24 STANDARD PLANS	PAVEMENT MARKINGS	INDEX	SHEET
11/01/21					711-001	9 of 13

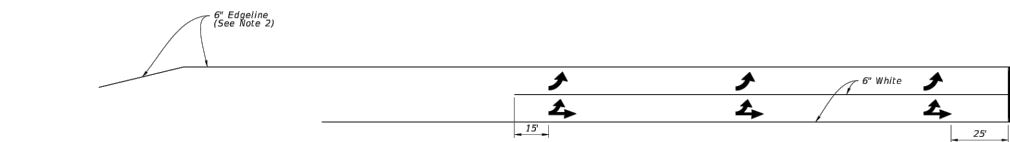


ARROW SPACING

Arrow should be evenly spaced between first and last arrow. Turn lanes longer than 200' add one arrow for each 100' additional length.



Through Lane Becomes Exclusive Left Turn (Drop Lane)



Through Lane Becomes Optional Left Turn

NOTES:

- This Index also applies to right turn lanes.
- Make Edgeline pavement markings yellow for left-turn lanes and white for right-turn lanes.

ARROW SPACING AND TURN LANE MARKINGS

LAST REVISION	DESCRIPTION:	FDOT	FY 2023-24 STANDARD PLANS	PAVEMENT MARKINGS	INDEX	SHEET
11/01/21					711-001	10 of 13

BASKERVILLE-DONOVAN, INC.
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PENSCOLA - PANAMA CITY BEACH - PALM SPRING - MOBILE

SHORE AT
TARPON BEACH

REVISION / ACTION TAKEN

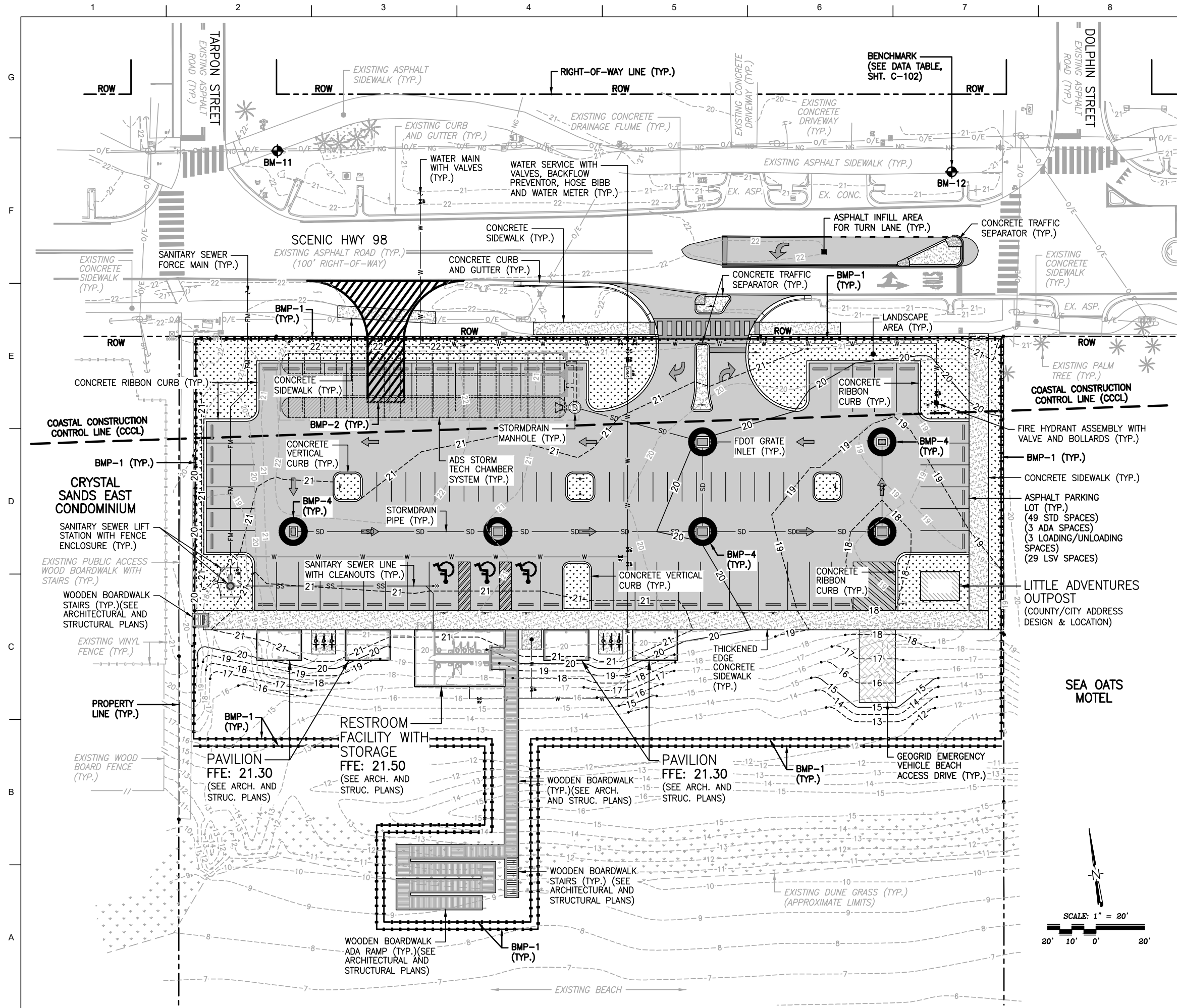
NO.	DATE	APPR.

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NOT RELEASED FOR CONSTRUCTION
BY: JCP DATE: 12/20/23

PROJECT NO:	12107.01
DESIGNED BY: RAS	
DRAWN BY: JJ	
CHKD BY: RLW	
PROJ. MGR: JCP	
DATE: DECEMBER 2023	

MISCELLANEOUS
STANDARD FDOT DETAILS

C-709



GENERAL NOTES:

- SEE SHEETS C-101 AND C-102 FOR SURVEY BENCHMARKS, SURVEY SYMBOL LEGEND AND ABBREVIATION LEGEND.
- SEE SHEETS C-109 AND C-112 FOR GRADING AND DRAINAGE PLANS AND DATA TABLES.
- CONTRACTOR TO USE CAUTION WHEN DIGGING NEAR EXISTING UTILITIES AND MAY BE REQUIRED TO HAND DIG IN SOME AREAS. CONTRACTOR MAY BE REQUIRED TO TEMPORARILY SUPPORT EXISTING UTILITIES WHILE INSTALLING STORM DRAINAGE PIPES.
- SEE SHEET C-112 FOR STORM DRAINAGE STRUCTURE AND PIPE DATA TABLES.

EROSION CONTROL NOTES:

- SEE SHEET G-001 FOR ADDITIONAL EROSION CONTROL NOTES.
- SEE SHEETS C-801 THRU C-802 FOR BEST MANAGEMENT PRACTICES DETAILS.
- EROSION CONTROL SYMBOLS ARE SHOWN EXAGGERATED FOR CLARITY.
- INSTALL TEMPORARY GRAVEL CONSTRUCTION ENTRANCE (BMP-2) MEASURES AS NECESSARY TO PREVENT TRACKING ONTO ROADWAY.
- THE EROSION AND SEDIMENT CONTROL PLAN SHOWN HEREIN ARE MINIMUM GUIDELINES. THE SEDIMENT AND EROSION CONTROL PLAN SHALL BE UPDATED AS NECESSARY TO COMPLY WITH BEST MANAGEMENT PRACTICES AND LOCAL, STATE AND FEDERAL RULES AND REGULATIONS AS CONSTRUCTION PROGRESSES AND IS THE RESPONSIBILITY OF THE CONTRACTOR.
- ALL CONSTRUCTION ZONES ADJACENT TO WETLANDS SHALL HAVE A MINIMUM DOUBLE ROW OF SILT FENCE BARRIER OR STAKED AND STAGGERED GEOTEXTILE WADDLES AT WETLAND/CLEARING LIMITS.
- CONTRACTOR IS FULLY RESPONSIBLE FOR OBTAINING ALL PERMITS REQUIRED FOR SEDIMENT AND EROSION CONTROL INCLUDING BUT NOT LIMITED TO NPDES PERMIT FOR DISCHARGES FROM LARGE AND SMALL CONSTRUCTION SITES.

EROSION CONTROL LEGEND

SILT FENCE (BMP-1)	—□—□—□—□—□—□—
TEMPORARY GRAVEL CONSTRUCTION ENTRANCE (BMP-2)	
STRAW BALE BARRIER (BMP-3)	
GEOTEXTILE WATTLES (BMP-4)	

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ENGINEERING BUSINESS: EC-0000360
PENINSULA-PANAMA CITY BEACH - PALM SPRING - MOBILE

**SHORE AT
TARPON BEACH**

NO.	DATE	APPR.	REVISION / ACTION TAKEN

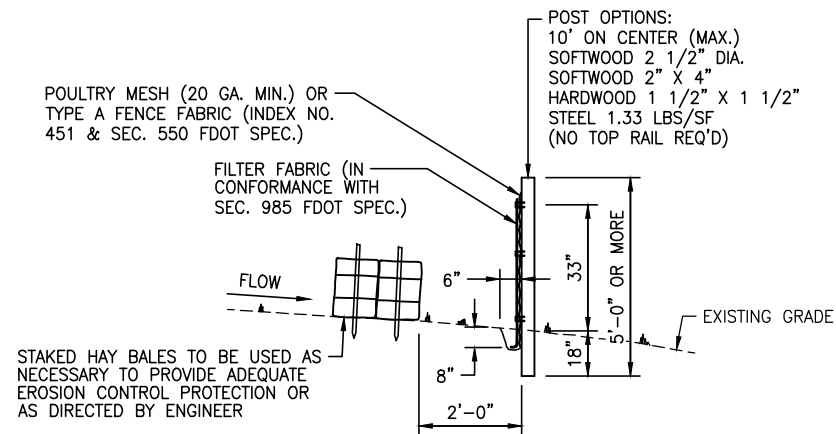
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BY: JCP DATE: 12/20/23

PROJECT NO:	12107.01
DESIGNED BY: RAS	
DRAWN BY: JJ	
CHKD BY: RLW	
PROJ. MGR: JCP	
DATE: DECEMBER 2023	

EROSION CONTROL PLAN

C-800



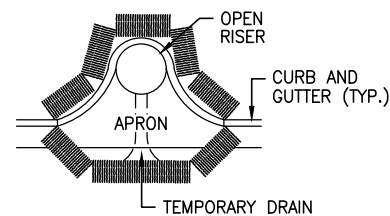
SILT FENCE NOTES:

1. FABRIC TO BE PLACED FACING DRAINAGE FLOW.
2. FABRIC TO BE PLACED IN A 6" WIDE X 8" DEEP CONTINUOUS TRENCH, THEN BACKFILLED.
3. ALL LUMBER TO BE PRESSURE/PRESERVATIVE TREATED.
4. SILT FENCE TO BE INSTALLED PRIOR TO COMMENCEMENT OF ANY CONSTRUCTION ACTIVITIES. SILT FENCE TO REMAIN UNTIL 100% PROJECT GRASSING (STABILIZATION) IS ACHIEVED.
5. PREFABRICATED SILT FENCES ARE PERMITTED AS LONG AS THEY MEET OR EXCEED FDOT SPECIFICATIONS.

TYPE IV SILT FENCE DETAIL

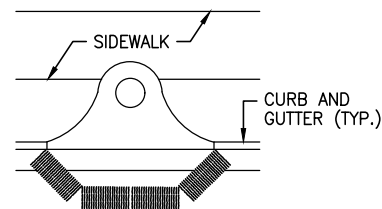
N.T.S.

BMP 1



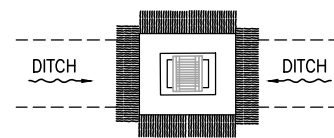
PARTIAL INLET

N.T.S.



COMPLETED INLET

N.T.S.



DITCH BOTTOM INLET

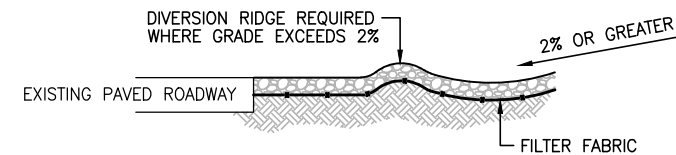
N.T.S.

ANCHOR BALES WITH 2 - 2"x2"x4' STAKES PER BALE

PROTECTION AROUND INLETS OR SIMILAR STRUCTURES

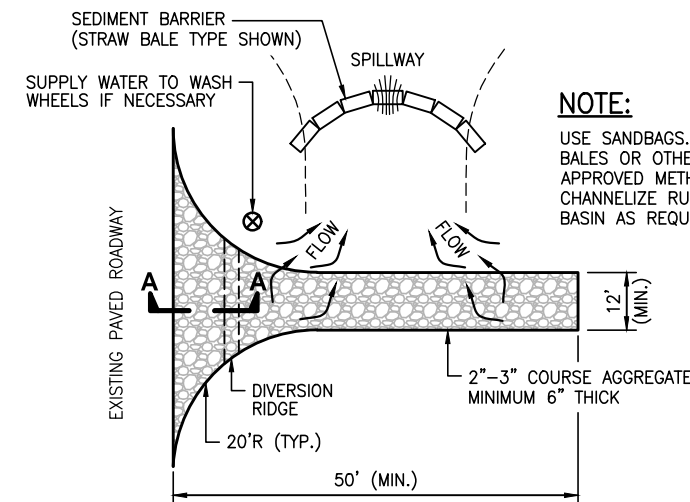
N.T.S.

BMP 3



SECTION A-A

N.T.S.



PLAN

N.T.S.

NOTES:

1. THE ENTRANCE SHALL BE MAINTAINED IN A CONDITION THAT WILL PREVENT TRACKING OR FLOWING OF SEDIMENT ONTO PUBLIC RIGHTS-OF-WAY. THIS MAY REQUIRE TOP DRESSING, REPAIR AND/OR CLEANOUT OF ANY MEASURES USED TO TRAP SEDIMENT.
2. WHEN NECESSARY, WHEELS SHALL BE CLEANED PRIOR TO ENTRANCE ONTO PUBLIC RIGHT-OF-WAY.
3. WHEN WASHING IS REQUIRED, IT SHALL BE DONE ON AN AREA STABILIZED WITH CRUSHED STONE THAT DRAINS INTO AN APPROVED SEDIMENT TRAP OR SEDIMENT BASIN.

TEMPORARY GRAVEL CONSTRUCTION ENTRANCE DETAIL

N.T.S.

BMP 2

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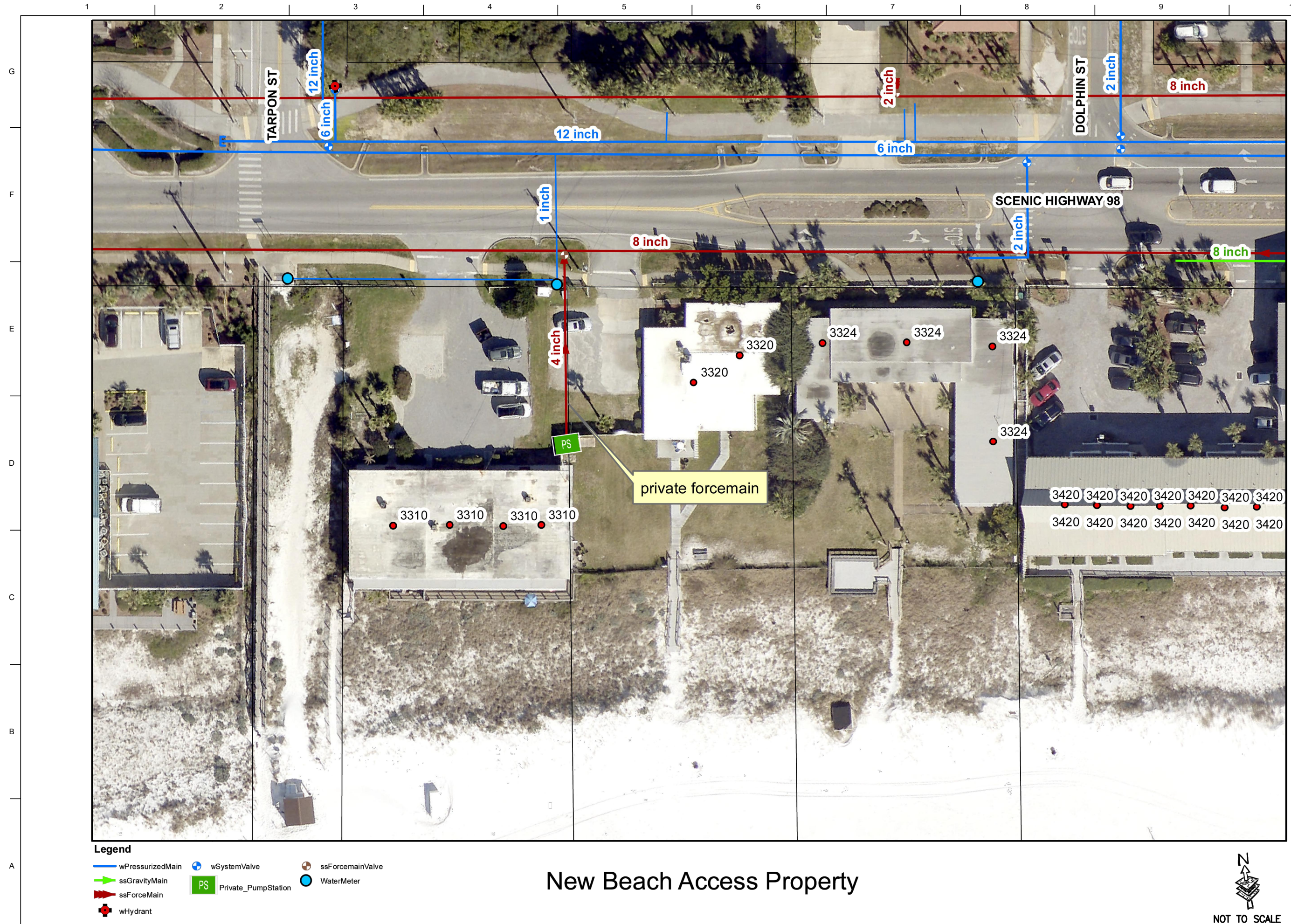
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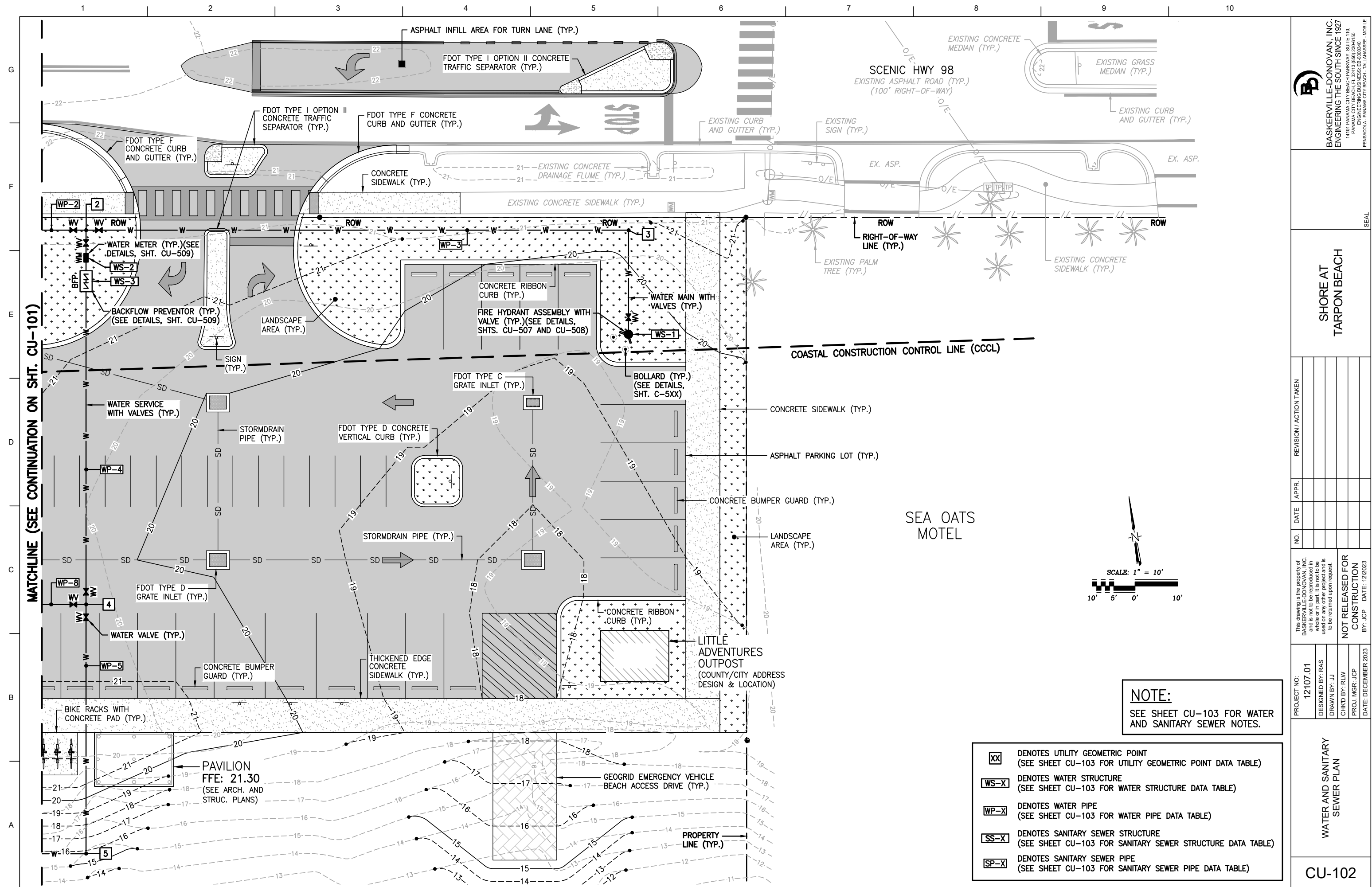
SHORE AT
TARPON BEACH

12107.01	DESIGNED BY: RAS	NOT RELEASED FOR CONSTRUCTION BY: JCP DATE: 12/20/23				
	DRAWN BY: JJ					
	CHKD BY: RLW					
	PROJ. MGR: JCP					
	DATE: DECEMBER 2023					

BEST MANAGEMENT PRACTICES DETAILS

C-801





**** ADJUST TOP TO MATCH FINISHED GRADE**
INV. US - DENOTES INVERT UP STREAM
INV. DS - DENOTES INVERT DOWN STREAM

INV. US - DENOTES INVERT UP STREAM
INV. DS - DENOTES INVERT DOWN STREAM

1. SEE SHEETS C-101 AND C-102 FOR SURVEY BENCHMARKS, SURVEY SYMBOL LEGEND AND ABBREVIATION LEGEND.
2. PROVIDE A TEE FITTING AT WATER MAIN CONNECTION POINTS. THIS WORK SHOULD BE COORDINATED WITH DESTIN WATER USERS PRIOR TO BEGINNING WORK. WATER SHUT OFFS SHOULD BE DONE AFTER WORK HOURS OR ON WEEKENDS.
3. THE CONTRACTOR IS RESPONSIBLE FOR COORDINATING ALL NECESSARY GAS SERVICE CONSTRUCTION WITH OKALOOSA GAS DISTRICT. OKALOOSA GAS DISTRICT IS RESPONSIBLE FOR ALL GAS WORK UP TO AND INCLUDING THE METER.
4. CONTRACTOR IS RESPONSIBLE FOR COORDINATING ALL NECESSARY WATER AND SANITARY SEWER SERVICE CONSTRUCTION WITH DESTIN WATER USERS.
5. CONTRACTOR TO TEMPORARILY SUPPORT EXISTING UTILITIES DURING NEW UTILITY TRENCHING AND INSTALLATION.
6. WATER LINE CONNECTION MAY REQUIRE LANE CLOSURE. IF LANE CLOSURE IS REQUIRED, CONTRACTOR SHALL SUBMIT A LANE CLOSURE PLAN TO THE CITY OF DESTIN AND OKALOOSA COUNTY FOR APPROVAL.
7. CONTRACTOR SHALL VERIFY LOCATION OF EXISTING UTILITY LINES BEFORE PROCEEDING WITH ANY UTILITY WORK. CHANGES IN LOCATION OR DEPTH SHALL IMMEDIATELY BE BROUGHT TO THE ATTENTION OF THE DESIGN ENGINEER AND OKALOOSA COUNTY.
8. PIPE LENGTHS SHOWN ARE FROM CENTER TO CENTER OF STRUCTURES.
9. NORTHING AND EASTING COORDINATES BASED ON CENTER OF STRUCTURES AND CENTER OF UTILITY PIPE BENDS.
10. SEE SHEETS C-109 THRU C-112 FOR GRADING AND DRAINAGE PLANS AND DATA TABLES.
11. SEE DETAILS FOR FIRE HYDRANT ON SHEETS CU-507 AND CU-508.
12. SEE DETAILS FOR WATER BACKFLOW PREVENTOR ON SHEET CU-509.
13. SEE DETAILS FOR WATER HOSE BIBB ON SHEET CU-511.
14. SEE DETAILS FOR BOLLARD ON SHEET C-502.
15. SEE DETAILS FOR SANITARY SEWER LIFT STATION ON SHEETS CU-512 AND CU-513.
16. SEE DETAILS FOR SANITARY SEWER CLEANOUT ON SHEET CU-510.
17. SEE DETAILS FOR WOOD BOARD FENCE ENCLOSURE WITH DOUBLE SWING GATE ON SHEET C-504.
18. DI - DENOTES DUCTILE IRON PIPE
PVC - DENOTES POLYVINYL CHLORIDE PIPE
T.C. - DENOTES TERRACOTTA PIPE
19. SEE ARCHITECTURAL AND STRUCTURAL PLANS FOR WOODEN BOARDWALK PLANS AND DETAILS.
20. SEE DETAILS FOR PUBLIC SHOWER WITH FOOT WASH AND CONCRETE PAD ON SHEET CU-511.

XX DENOTES UTILITY GEOMETRIC POINT (SEE TABLE FOR TYPE AND LOCATION)

SS-X DENOTES SANITARY SEWER STRUCTURE (SEE TABLE FOR TYPE AND INVERTS)

SP-X DENOTES SANITARY SEWER PIPE (SEE TABLE FOR TYPE, SIZE, LENGTH, AND INVERT)

WS-X DENOTES WATER STRUCTURE (SEE TABLE FOR TYPE AND LOCATION)

WP-X DENOTES WATER PIPE (SEE TABLE FOR TYPE, SIZE AND LENGTH)

SYMBOL NO.	XX	NORTHING	EASTING	DESCRIPTION
1		507552.31	1364080.60	90° BEND (6" WATER)
2		507539.59	1364165.16	6"x6"x2" TEE (WATER)
3		507520.64	1364291.21	90° BEND (6" WATER)
4		507452.63	1364152.09	2"x2"x2" TEE (WATER)
5		507394.73	1364143.38	90° BEND (2" WATER)
6		507400.62	1364104.24	2"x2"x2" TEE (WATER)
7		507404.43	1364078.89	90° BEND (2" WATER)
8		507476.56	1363992.95	90° BEND (2" WATER)
9		507449.73	1364070.48	45° BEND (4" SEWER)
10		507453.14	1364067.96	45° BEND (4" SEWER)
11		507538.26	1363999.19	45° BEND (1.5" SEWER FM)
12		507544.22	1364007.27	45° BEND (1.5" SEWER FM)

PIPE NO.	WP-X	SIZE (IN)	TYPE	LENGTH (FT)
WP-1		6	PVC	61.75±
WP-2		6	PVC	85.51
WP-3		6	PVC	151.93
WP-4		2	PVC	87.94
WP-5		2	PVC	98.13
WP-6		2	PVC	30.63
WP-7		2	PVC	24.49
WP-8		2	PVC	166.48

ALL PIPE LENGTHS ARE $\pm$

STRUCTURE NO. <u>WS-XX</u>	TYPE	NORTHING	EASTING
WS-1	FIRE HYDRANT	507496.45	1364287.57
WS-2	WATER METER (WM)	507533.17	1364164.20
WS-3	BACKFLOW PREVENTOR (BFP)	507527.73	1364163.38
WS-4	PUBLIC SHOWER WITH FOOT WASH	507424.84	1364107.88
WS-5	HOSE BIBB (HB)	507471.06	1363992.12



TARPON BEACH

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12107.01

DESIGNED BY: RAS
DRAWN BY: JJ

CHK'D BY: RLW

DATE: DECEMBER 2023

WATER AND SANITARY SEWER STRUCTURE AND PIPE DATA TABLES

CU-103

	1	2	3	4	5	6	7	8	9	10	
G	1-9 AS-BUILT DRAWINGS			2-8 AS-BUILT DRAWINGS			3-4.2 SEWER MANHOLES			BASKERVILLE-DONOVAN, INC. ENGINEERING THE SOUTH SINCE 1927 14101 PANAMA CITY BEACH PARKWAY, SUITE 110, PANAMA CITY BEACH, FL 32413 (850) 230-6150 ENGINEERING BUSINESS: EB-0000360 PENSCOLA - PANAMA CITY BEACH - TALLAHASSEE - MOBILE	
F	END OF SECTION			END OF SECTION			SEWER MANHOLES SHALL BE COATED WITH A SELF-PRIMING HEAVY DUTY COLD APPLIED COAL TAR MATERIAL SIMILAR AND EQUAL TO KOPPERS "BITUMASTIC SUPER SERVICE BLACK". PROVIDE A MINIMUM OF TWO (2) COATS AT A RATE OF 50 TO 60 SQUARE FEET PER GALLON PER COAT.			SEAL	
E	<u>SECTION 2 - RECLAIMED WATER DISTRIBUTION SYSTEM (A.K.A. REUSE WATER)</u>			<u>SECTION 3 - SANITARY SEWAGE SYSTEM</u>			3-5 BACKFILLING			SHORE AT TARPON BEACH	
D	SPECIFICATIONS FOR THE RELOCATION OF THE 16" RECLAIM MAIN PER THE DWU COMMONS DRIVE RECLAIMED WATER EXTENSION PHASE III PLANS AND SPECIFICATIONS DATED JANUARY 2011 AND PREPARED BY BASKERVILLE-DONOVAN, INC.			THE WORK SPECIFIED IN THIS SECTION CONSISTS OF THE CONSTRUCTION OF A GRAVITY SANITARY SEWER COLLECTION SYSTEM, INCLUDING SANITARY SEWER COLLECTION LINES, SERVICE LINES, SANITARY SEWER MANHOLES, AND OTHER APPURTENANCES, IN CONFORMITY WITH THE PLANS AND IN ACCORDANCE WITH THESE SPECIFICATIONS, OR THE SPECIFICATIONS AND REQUIREMENTS OF THE DESTIN WATER USERS, INC. (UTILITY COMPANY), WHICHEVER IS MORE STRINGENT.			BACKFILL PIPE TRENCHES AND AROUND STRUCTURES IN ACCORDANCE WITH SECTION 2 OF THESE SPECIFICATIONS.			REVISION / ACTION TAKEN	
C	2-1 DESCRIPTION			3-1 DESCRIPTION			3-6 INSPECTION AND TESTING			APPR.	
B	THE WORK SPECIFIED IN THIS SECTION CONSISTS OF THE CONSTRUCTION OF RECLAIMED WATER SERVICES AND OTHER APPURTENANCES, IN CONFORMITY WITH THE PLANS AND IN ACCORDANCE WITH THESE SPECIFICATIONS, OR THE GENERAL UTILITY SPECIFICATIONS OF DESTIN WATER USERS, INC. (UTILITY COMPANY), WHICHEVER IS MORE STRINGENT.			THE WORK SPECIFIED IN THIS SECTION CONSISTS OF THE CONSTRUCTION OF A GRAVITY SANITARY SEWER COLLECTION SYSTEM, INCLUDING SANITARY SEWER COLLECTION LINES, SERVICE LINES, SANITARY SEWER MANHOLES, AND OTHER APPURTENANCES, IN CONFORMITY WITH THE PLANS AND IN ACCORDANCE WITH THESE SPECIFICATIONS, OR THE SPECIFICATIONS AND REQUIREMENTS OF THE DESTIN WATER USERS, INC. (UTILITY COMPANY), WHICHEVER IS MORE STRINGENT.			INSPECT PIPING TO DETERMINE WHETHER LINE DISPLACEMENT OR OTHER DAMAGE HAS OCCURRED. MAKE INSPECTIONS AFTER LINES BETWEEN MANHOLES, OR MANHOLE LOCATIONS, HAVE BEEN INSTALLED AND APPROXIMATELY 2' OF BACKFILL IS IN PLACE, AND AGAIN AT THE COMPLETION OF THE PROJECT. IF INSPECTION INDICATES POOR ALIGNMENT, DEBRIS, DIS- PLACEMENT, OR OTHER DEFECTS, CORRECT SUCH DEFECTS AND REINSPECT.			DATE	
A	2-2 CODES AND STANDARDS			3-2 CODES AND STANDARDS			LEAKAGE TESTS MAY INCLUDE APPROPRIATE WATER OR LOW PRESSURE AIR TESTING. THE LEAKAGE OUTWARD OR INWARD (EXFILTRATION OR INFILTRATION) SHALL NOT EXCEED 50 GALLONS PER INCH OF PIPE DIAMETER PER MILE PER DAY FOR ANY SECTION OF THE SYSTEM. AN EXFILTRATION OR INFILTRATION TEST AS APPROPRIATE SHALL BE PERFORMED WITH A MINIMUM POSITIVE HEAD OF 2'. THE WATER TEST, IF USED, SHALL BE RUN CONTINUOUSLY FOR A PERIOD OF NOT LESS THAN 3 HOURS, WITH WEIR READING TAKEN AT 20 MINUTE INTERVALS. THE AIR TEST, IF USED, SHALL, AS A MINIMUM, CONFORM TO THE TEST PROCEDURE DESCRIBED IN ASTM F1417-92 (1998) "STANDARD TEST METHOD FOR INSTALLATION ACCEPTANCE OF PLASTIC GRAVITY SEWER LINES USING LOW-PRESSURE AIR". ALL TEST TIMES SHALL BE CALCULATED USING RAMSEIER'S EQUATION $T = 0.085 (DK/Q)$ WHERE T = SHORTEST TIME, IN SECONDS ALLOWED FOR THE AIR PRESSURE TO DROP 1.0 PSIG K = 0.000419 DL, BUT NOT LESS THAN 1.0 Q = 0.0015 CUBIC FEET/MINUTE/ SQUARE FEET OF INTERNAL SURFACE D = NOMINAL PIPE DIAMETER IN INCHES L = LENGTH OF PIPE BEING TESTED IN FEET FOR MORE EFFICIENT TESTING OF LONG TEST SECTIONS AND /OR SECTIONS OF LARGER DIAMETER PIPES A TIMED PRESSURE DROP OF 0.5 PSIG MAY BE USED IN LIEU OF THE 1.0 PSIG DROP. IF 0.5 PSIG PRESSURE DROP IS USED, APPROPRIATE REQUIRED TEST TIMES SHALL BE EXACTLY HALF AS LONG AS THOSE OBTAINED USING RAMSEIER'S EQUATION FOR T CITED ABOVE.			NO.	
	2-3 MATERIALS			3-3 MATERIALS			THE TESTING METHODS PROVIDED SHOULD TAKE INTO CONSIDERATION THE RANGE IN GROUNDWATER ELEVATIONS PROJECTED AND THE SITUATION DURING THE TEST.			This drawing is the property of BASKERVILLE-DONOVAN, INC. and is not to be reproduced, stored in a retrieval system, or transmitted in any form or by any means, electronic, mechanical, photocopying, recording, or by any information storage and retrieval system, without the prior written permission of Baskerville-Donovan, Inc. The drawing is to be used on any other project and is to be returned upon request.	
	2-3.1 DETECTOR WIRE			3-3.1 GRAVITY SEWER COLLECTION LINES AND FITTINGS			T = SHORTEST TIME, IN SECONDS ALLOWED FOR THE AIR PRESSURE TO DROP 1.0 PSIG K = 0.000419 DL, BUT NOT LESS THAN 1.0 Q = 0.0015 CUBIC FEET/MINUTE/ SQUARE FEET OF INTERNAL SURFACE D = NOMINAL PIPE DIAMETER IN INCHES L = LENGTH OF PIPE BEING TESTED IN FEET			NOT RELEASED FOR CONSTRUCTION BY: JCP DATE: 12/02/23	
	NO. 12 COPPER TRACER WIRE SHALL BE REQUIRED FOR ALL NON-METALLIC SERVICES AND SHALL BE PROTECTED DURING BACKFILLING OPERATIONS TO PREVENT BREAKAGE.			GRAVITY SEWER COLLECTION LINE PIPING AND FITTINGS (6" THROUGH 12") SHALL BE POLYVINYL CHLORIDE (PVC) CONFORMING TO ASTM D 3034, TYPE PSM, SDR 35. JOINTING SHALL BE ACCOMPLISHED BY MEANS OF ELASTOMERIC GASKET JOINTS CONFORMING TO ASTM D 3212. GASKET MATERIAL SHALL BE SUITABLE FOR USE WITH DOMESTIC SEWAGE AND SHALL CONFORM TO ASTM F 477.			FOR MORE EFFICIENT TESTING OF LONG TEST SECTIONS AND /OR SECTIONS OF LARGER DIAMETER PIPES A TIMED PRESSURE DROP OF 0.5 PSIG MAY BE USED IN LIEU OF THE 1.0 PSIG DROP. IF 0.5 PSIG PRESSURE DROP IS USED, APPROPRIATE REQUIRED TEST TIMES SHALL BE EXACTLY HALF AS LONG AS THOSE OBTAINED USING RAMSEIER'S EQUATION FOR T CITED ABOVE.			PROJECT NO: 12107.01	
	2-3.2 GATE VALVES - SEE BASKERVILLE-DONOVAN PLANS AND SPECIFICATIONS			3-3.2 SEWER SERVICE LINES			THE TEST SHALL BE MADE BY THE CONTRACTOR WITH THE UTILITY COMPANY REPRESENTATIVE BEING PRESENT TO VERIFY THE TEST ACCURACY. THE ENGINEER AND THE UTILITY COMPANY 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 SYSTEM WITHIN THE ALLOWABLE INFILTRATION LIMITS.			DESIGNED BY: RAS	
	2-3.3 PIPING AND PIPE FITTINGS - SEE BASKERVILLE-DONOVAN PLANS AND SPECIFICATIONS			SEWER SERVICE LINE PIPING AND FITTINGS (4" AND SMALLER) SHALL BE POLYVINYL CHLORIDE (PVC) CONFORMING TO ASTM D 2466. EXTEND SEWER SERVICE LINES TO RIGHT-OF-WAY LINE AND BEND UP AT A 45° ANGLE. EXTEND 18" ABOVE GROUND AND CAP.			THE SEWER OR SEWERS SHALL BE PUMPED OUT AND NORMAL INFILTRATION CONDITIONS PREVAIL BEFORE TESTING SHALL BE STARTED.			DRAWN BY: JJ	
	2-3.3.1 RECLAIMED WATER MAINS - SEE BASKERVILLE-DONOVAN PLANS AND SPECIFICATIONS			3-3.3 MANHOLES			ALL SEWER MAINS AND SERVICES SHALL BE PRESSURE TESTED AS SPECIFIED IN THIS SECTION OR AS REQUIRED BY THE FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION AND THE UTILITY COMPANY.			CHKD BY: RLW	
	2-3.3.2 RECLAIMED WATER SERVICE PIPING			SANITARY SEWER MANHOLES SHALL BE CONSTRUCTED OF PRECAST REINFORCED CONCRETE, SIZED AS INDICATED, AND COMPLYING WITH ASTM C 478. MANHOLE TOPS SHALL BE ECCENTRIC CONE TYPE AND MANHOLE BASES SHALL BE BASE RISER SECTIONS WITH INTEGRAL FLOORS. NO STEPS SHALL BE PROVIDED IN ANY SANITARY SEWER MANHOLES OF ANY DEPTH.			ALL SANITARY SEWER MAINS AND MANHOLES MUST BE VIDEO TAPED AND PROVIDED TO THE UTILITY COMPANY BEFORE ACCEPTED FOR SERVICE.			PROJ. MGR: JCP	
	WATER SERVICE PIPING SHALL BE POLYETHYLENE (PE) TUBING CONFORMING TO ASTM D 1248, CLASS 160, WITH BRASS OR BRONZE BARBED FITTINGS WITH 2 STRAP-TYPE STAINLESS STEEL CLAMPS OVER PIPE AT EACH INSERT. ALL RECLAIMED WATER INFRASTRUCTURE (MAINS, SERVICES, ETC.) SHALL BE COLOR CODED USING PANTONE PURPLE 522C USING LIGHT STABLE COLORANTS.			SANITARY SEWER MANHOLE FRAMES AND COVERS SHALL BE OF HEAVY-DUTY CAST IRON CONSTRUCTION, SIZED AS INDICATED. THE MANHOLE COVER SHALL BE OF INDENTED TOP DESIGN WITH LETTERING CAST INTO THE TOP READING "SEWER". MANHOLE FRAMES AND COVERS SHALL BE VULCAN FOUNDRY NO. VM-37, NEENAH FOUNDRY NO. R-1600, OR APPROVED EQUAL. MANHOLE FRAMES AND COVERS ARE TO BE COATED WITH COAL-TAR EPOXY.			3-7 AS-BUILT CERTIFICATION			DATE: DECEMBER 2023	
	2-3.3.3 RECLAIMED WATER SERVICE CLAMPS AND STOPS			3-3.4 CLEANOUTS			3-8 AS-BUILT DRAWINGS			MISCELLANEOUS WATER AND SANITARY SEWER SPECIFICATIONS	
	2-3.3.3.1 SERVICE CLAMPS			SANITARY SEWER CLEANOUTS SHALL BE CONSTRUCTED OF PVC PIPE EXTENDED TO THE GROUND SURFACE WITH PVC PLUGS.			THE CONTRACTOR SHALL FURNISH THE ENGINEER AT THE CLOSE OF THE PROJECT, WITH THREE (3) SETS OF MARKED-UP CONSTRUCTION PLANS DEPICTING AS-BUILT CONDITIONS OF THE SANITARY SEWER SYSTEM. THE AS-BUILT PLANS SHALL SHOW THE LOCATION OF SANITARY SEWER SERVICES AND THE LOCATION AND ELEVATION OF SANITARY SEWER MANHOLES. ELEVATIONS SHALL BE RELATIVE TO PROJECT DATUM. ENGINEERING APPROVAL OF THE SANITARY SEWER SYSTEM WILL NOT BE MADE UNTIL ACCURATE AND LEGIBLE AS-BUILT PLANS ARE RECEIVED. THE UTILITY COMPANY REQUIRES AN ELECTRONIC CAD FILE IN ADDITION TO CERTIFIED RECORD DRAWINGS.			14 INDUSTRIAL PARK LANE, DESTIN, FL 32541 (850) 837-6146	
	2-3.3.3.2 CORPORATION STOPS			3-4 INSTALLATION			END OF SECTION			CU-502	
	CORPORATION STOPS SHALL BE FORD MODEL NO. F-1000, OR APPROVED EQUAL. INLETS SHALL HAVE COMPRESSION CONNECTIONS AND OUTLETS SHALL HAVE IRON PIPE THREADS.			3-4.1 GRAVITY COLLECTION AND SERVICE LINES							
	2-3.3.3.3 CURB STOPS			EACH SECTION OF PIPE SHALL BE CAREFULLY INSPECTED BEFORE AND AFTER IT IS IN- STALLED AND DEFECTIVE PIPE SHALL BE REJECTED AND REMOVED. SEWER LINES SHALL BE LAID BEGINNING AT THE LOW POINT OF THE SYSTEM, TRUE TO THE GRADE AND ALIGNMENT INDICATED, WITH UNBROKEN CONTINUITY OF INVERT. CLEAR INTERIOR OF PIPING OF DIRT AND OTHER SUPERFLUOUS MATERIAL AS WORK PROGRESSES. OPEN ENDS OF PIPE AT THE END OF EACH DAY'S WORK SHALL BE CLOSED TEMPORARILY WITH WOOD BLOCKS OR BULKHEADS. IN ADDITION TO THE ABOVE, PVC GRAVITY SEWER LINES SHALL BE INSTALLED IN ACCORDANCE WITH UNI-B-5.							
	CURB STOPS SHALL BE AS MANUFACTURED BY FORD, OR APPROVED EQUAL. INLETS SHALL HAVE COMPRESSION CONNECTIONS AND OUTLETS SHALL HAVE IRON PIPE THREADS.			SEWERS SHALL BE LAID AT LEAST 10' HORIZONTALLY FROM ANY EXISTING OR PROPOSED WATER MAIN. THE DISTANCE SHALL BE MEASURED EDGE TO EDGE. IN CASES WHERE IT IS NOT PRACTICAL TO MAINTAIN A TEN FOOT SEPARATION, AND WHEN APPROVED BY D.E.P., DWU, AND THE ENGINEER, THE SEWER MAY BE INSTALLED CLOSER TO THE WATER MAIN, PROVIDED THAT THE WATER MAIN IS IN A SEPARATE TRENCH OR ON AN UNDISTURBED EARTH SHELF LOCATED ON ONE SIDE OF THE SEWER AT AN ELEVATION SO THAT THE BOTTOM OF THE WATER MAIN IS AT LEAST 18" ABOVE THE TOP OF THE SEWER.							
	2-3.3.4 VALVE BOXES - SEE BASKERVILLE-DONOVAN PLANS AND SPECIFICATIONS			SEWERS CROSSING UNDER WATER MAINS SHALL BE LAID TO PROVIDE A MINIMUM VERTICAL DISTANCE OF 18" BETWEEN THE INVERT OF THE UPPER PIPE AND THE CROWN OF THE LOWER PIPE. WHERE THIS MINIMUM SEPARATION CANNOT BE MAINTAINED, THE CROSSING SHALL BE ARRANGED SO THAT THE SEWER PIPE JOINTS AND WATER MAIN JOINTS ARE EQUIDISTANT FROM THE POINT OF CROSSING WITH NO LESS THAN 10' BETWEEN ANY TWO JOINTS. ALTERNATIVELY, THE SEWER MAIN MAY BE PLACED IN A SLEEVE OR ENCASED IN CONCRETE TO OBTAIN THE EQUIVALENT OF THE REQUIRED 11' SEPARATION.							
	2-3.4 ANCHORAGES - SEE BASKERVILLE-DONOVAN PLANS AND SPECIFICATIONS			EXCAVATION OF PIPE TRENCHES SHALL CONFORM TO SECTION 2 OF THESE SPECIFICATIONS.							
	2-5 INSTALLATION - SEE BASKERVILLE-DONOVAN PLANS AND SPECIFICATIONS										
	2-6 FIELD TESTING - SEE BASKERVILLE-DONOVAN PLANS AND SPECIFICATIONS										
	2-7 AS-BUILT CERTIFICATION										
	IN ACCORDANCE WITH THE RULES OF FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION, CHAPTER 62-604, THE ENGINEER OF RECORD WILL BE RESPONSIBLE FOR OBSERVATION OF THE CONSTRUCTION OF THE RECLAIMED WATER SYSTEM TO ASSURE COMPLIANCE WITH PLANS AND SPECIFICATIONS, AND SAID ENGINEER WILL REPORT TO DEP UPON COMPLETION OF THE CONSTRUCTION BEFORE THE SYSTEM CAN BE PLACED INTO SERVICE. THE CONTRACTOR SHALL NOTIFY THE ENGINEER A MINIMUM OF 24 HOURS BEFORE BEGINNING CONSTRUCTION ON THE RECLAIMED WATER SYSTEM.										

	1	2	3	4	5	6	7	8	9	10																																																																																																												
G	4-12.1.3 START-UP, INITIAL OPERATION THE CONTRACTOR SHALL START UP AND PROVIDE INITIAL TESTING BEFORE OPERATION OF THE COMPLETED PUMPING STATION. THE INITIAL OPERATION SHALL INCLUDE FILLING (USING POTABLE WATER, IF NECESSARY) OF THE WET WELL AS NECESSARY, TO CYCLE AND TEST THE PUMPS AND CONTROLS, INCLUDING SIMULATED PUMP FAILURE, AND HIGH WATER ALARM, PUMP ALTERNATION, AND OTHER FEATURES OF THE SPECIFIED EQUIPMENT. TESTING OF THE STATION SHALL BE COORDINATED WITH THE ENGINEER AND THE UTILITY COMPANY.										 BASKERVILLE-DONOVAN, INC. ENGINEERING THE SOUTH SINCE 1927 14101 PANAMA CITY BEACH PARKWAY, SUITE 110, PANAMA CITY BEACH, FL 32413 (850) 230-6150 ENGINEERING BUSINESS: EB-0000360 PENSAFLOCA-PANAMA CITY BEACH - PALAPANSSEE - MOBILE	SEAL	SHORE AT TARPON BEACH	REVISION / ACTION TAKEN <table><tr><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td></tr></table>																									APPR. <table><tr><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td></tr></table>																									DATE <table><tr><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td></tr></table>																									NO. <table><tr><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td></tr></table>																									The drawing is the property of BASKERVILLE-DONOVAN, INC. and is not to be reproduced in whole or in part. It is not to be used on any other project and is to be returned upon request. NOT RELEASED FOR CONSTRUCTION BY: JCP DATE: 12/20/23	PROJECT NO: 12107.01 DESIGNED BY: RAS DRAWN BY: JJ CHKD BY: RLW PROJ. MGR: JCP DATE: DECEMBER 2023	MISCELLANEOUS WATER AND SANITARY SEWER SPECIFICATIONS	 DESTIN WATER USERS, INC. 14 INDUSTRIAL PARK LANE, DESTIN, FL 32541 (850) 837-6146	CU-504
F	4-12.2 PRESSURE PIPING 4-12.2.1 GENERAL PRESSURE PIPING SHALL BE INSTALLED IN ACCORDANCE WITH THE MANUFACTURER'S PRINTED INSTRUCTIONS. 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 WIPE 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 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. PRESSURE PIPING CROSSING UNDER WATER MAINS SHALL BE LAID TO PROVIDE A MINIMUM VERTICAL DISTANCE OF 18" BETWEEN THE INVERT OF THE UPPER PIPE AND THE CROWN OF THE LOWER PIPE. WHERE THIS MINIMUM SEPARATION CANNOT BE MAINTAINED, THE CROSSING SHALL BE ARRANGED SO THAT THE SEWER PRESSURE PIPING JOINTS AND WATER MAIN JOINTS ARE EQUIDISTANT FROM THE POINT OF CROSSING WITH NO LESS THAN 10' BETWEEN ANY TWO JOINTS. ALTERNATIVELY, THE SEWER PRESSURE PIPING MAY BE PLACED IN A SLEEVE OR ENCLOSED IN CONCRETE TO OBTAIN THE EQUIVALENT OF THE 12' SEPARATION. EXCAVATION AND BACKFILLING OF SEWER PRESSURE PIPING SHALL CONFORM TO SECTION 2 OF THESE SPECIFICATIONS. PROVIDE A MINIMUM OF 30" OF COVER OVER SEWER PRESSURE PIPING.																																																																																																																					
E	4-13 TESTING TESTING OF THE PRESSURE CONDUIT SHALL CONFORM TO SECTION 1-5 UNDER POTABLE WATER SYSTEM OF THESE SPECIFICATIONS. 4-14 AS-BUILT CERTIFICATION IN ACCORDANCE WITH THE RULES OF THE FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION, CHAPTER 62-604, THE ENGINEER OF RECORD WILL BE RESPONSIBLE FOR OBSERVATION OF THE CONSTRUCTION OF THE SANITARY SEWER PUMPING SYSTEM TO ASSURE COMPLIANCE WITH THE PLANS AND SPECIFICATIONS. AND SAID ENGINEER WILL REPORT TO DEP UPON COMPLETION OF THE CONSTRUCTION BEFORE THE SYSTEM CAN BE PLACED INTO OPERATION. THE CONTRACTOR SHALL NOTIFY THE ENGINEER A MINIMUM OF 24 HOURS BEFORE BEGINNING CONSTRUCTION ON THE SANITARY SEWER PUMPING SYSTEM. 4-15 AS-BUILT DRAWINGS THE CONTRACTOR SHALL FURNISH THE ENGINEER AT THE CLOSE OF THE PROJECT WITH ONE (1) SET OF MARKED-UP CONSTRUCTION PLANS DEPICTING AS-BUILT CONDITIONS OF THE SANITARY SEWER PUMPING SYSTEM. THE AS-BUILT PLANS SHALL SHOW THE LOCATION AND ELEVATIONS OF THE SANITARY SEWER PUMPING SYSTEM. ELEVATIONS SHALL BE RELATIVE TO PROJECT DATUM. ENGINEERING APPROVAL OF THE SANITARY SEWER PUMPING SYSTEM WILL NOT BE MADE UNTIL ACCURATE AND LEGIBLE AS-BUILT PLANS ARE RECEIVED. THE UTILITY COMPANY REQUIRES AN ELECTRONIC CAD FILE IN ADDITION TO CERTIFIED RECORD DRAWINGS. END OF SECTION																																																																																																																					
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BASKERVILLE-DONOVAN, INC.
ENGINEERING THE SOUTH SINCE 1927

14101 PANAMA CITY BEACH PARKWAY, SUITE 110,
 PANAMA CITY BEACH, FL 32413 (850) 230-6150
 ENGINEERING BUSINESS: EE-0000340
 PENSACOLA - PANAMA CITY BEACH - TALLAHASSEE - MOBILE

SEAL

REVISION / ACTION TAKEN

2						
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DATE						
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CONSTRUCTION**

BY: JCP DATE: 12/20/23

PROJECT NO.	12107.01
DESIGNED BY:	RAS
DRAWN BY:	JJ
CHK'D BY:	RLW
PROJ. MGR:	JCP
DATE:	DECEMBER 2023

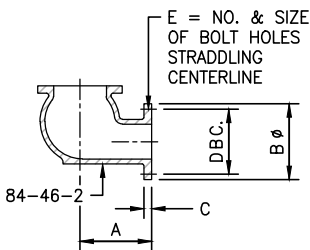
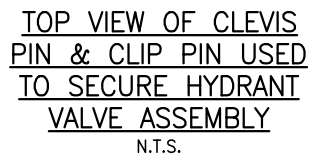
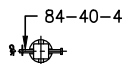
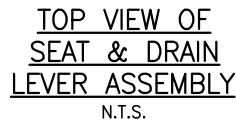
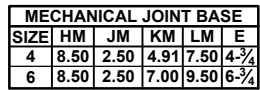
MISCELLANEOUS
WATER AND SANITARY
SEWER DETAILS

CU-506

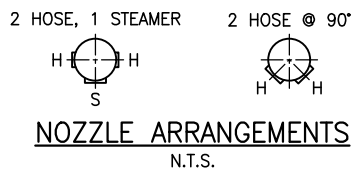
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N.T.S.





FLANGED BASE					
SIZE	A	B	C	D	E
4	8.00	9.00	0.94	7.50	8- ³ / ₄
6	8.50	11.00	1.00	9.50	8- ⁷ / ₈



1. SIZE AND SHAPE OF OPERATING NUT AND NUT ON CAPS, THREADING ON NOZZLES AND CAPS AND THE DIRECTION OF OPENING MADE TO SPECIFICATIONS.
2. CAP CHAINS ARE NOT FURNISHED UNLESS SPECIFIED.
3. ALL GRAY IRON IS ASTM A126 CLASS B.
4. BOLTS AND NUTS ARE RUSTPROOFED STEEL ASTM A307 OR EQUIVALENT IN ACCORDANCE WITH AWWA C502.
5. WORKING PRESSURE: 250 P.S.I. AWWA 200 P.S.I. FACTORY MUTUAL & UNDERWRITERS LAB. TEST PRESSURE: 500 P.S.I.
6. HYDRANT CONFORMS TO AWWA STANDARD C502.
7. UPPER BARREL CAN BE ROTATED 360°.
8. FACTORY MUTUAL APPROVED AND UNDERWRITERS LABORATORIES LISTED IF MARKED.

PARTS LIST			
PART NO.	QTY.	PART NAME	MATERIAL & ASTM NO.
84-1	1	OPERATING NUT	BRONZE B763 ALLOY 865
84-2-1	2	COVER O-RING	BUNA N
84-2-2	2	HOUSING O-RING	BUNA N
84-4-4	1	THRUST WASHER	NYLATRON
84-5-3	1	PIPE PLUG	STEEL
84-7-5	1	TAMPER RESISTANT COVER	DUCTILE IRON
84-7-8	1	O-RING	BUNA N
84-9	1	HOUSING COVER	GRAY IRON
84-11-2	4	COVER CAP SCREWS	SEE NOTE 4
84-13	1	COVER GASKET	FIBER
84-14	1	HOUSING GASKET	COMPOSITION RUBBER
84-15	1	HOUSING	DUCTILE IRON
84-16	6	HOUSING BOLTS & NUTS	SEE NOTE 4
84-18-60	1	UPPER BARREL	DUCTILE IRON
84-19-SR	1	LOWER BARREL	DUCTILE IRON A536
84-20-60	2	HOSE NOZZLE	BRONZE B763 ALLOY 876
84-20-61	2	HOSE NOZZLE SEAL	BUNA N
84-20-62	2	HOSE NOZZLE RETAINER	DUCTILE IRON
84-20-63	2	HOSE NOZZLE RETAINER WASHER	TEFLON
84-21	2	HOSE CAPS	GRAY IRON
84-22	2	HOSE CAP GASKETS	RUBBER
84-23-1	2	HOSE CAP CHAINS WITH S HOOK	STEEL
84-23-2	3	S HOOK	STEEL
84-23-18	1	PUMPER CAP CHAIN WITH S-HOOK	STEEL
84-25-60	1	PUMPER NOZZLE	BRONZE B763 ALLOY 867
84-25-61	1	PUMPER NOZZLE SEAL	BUNA N
84-25-62	1	PUMPER NOZZLE RETAINER	DUCTILE IRON
84-25-63	1	PUMPER NOZ RETAINER WASHER	TEFLON
84-26	1	PUMPER CAP	GRAY IRON
84-27	1	PUMPER CAP GASKET	RUBBER
84-29-13	1	BARREL FLANGE	DUCTILE IRON A536
84-29-13B	1	BASE FLANGE	DUCTILE IRON A536
84-29-14	2	SNAP RINGS	STAINLESS STEEL
84-29-30	1	ROD COUPLING	GRAY IRON
84-29-31	2	COUPLING & CLIP PINS	STAINLESS STEEL
84-29-45	1	BREAKABLE FLANGE	GRAY IRON
84-30-03	1	HYDRANT SPRING	STAINLESS STEEL
84-30-04	1	SPRING PLATE	STAINLESS STEEL
84-30-06	1	TRAVEL STOP NUT	BRONZE B283 ALLOY 377
84-30-07	1	SPRING PLATE PIN	STAINLESS STEEL
84-30-11	1	UPPER ROD	STEEL
84-30-12	1	LOWER ROD	STEEL
84-31	1	DRAIN LEVER	BRONZE B584 ALLOY 922
84-35-02	1	HYDRANT SEAT	BRONZE B584 ALLOY 922
84-36-1	2	SEAT O-RINGS	BUNA N
84-37	1	DRAIN RING	BRONZE B763 ALLOY 876
84-38	2	DRAIN RING GASKETS	COMPOSITION RUBBER
84-38-1	1	BARREL GASKET	COMPOSITION RUBBER
84-39	8	BASE BOLTS & NUTS	STAINLESS STEEL 304
84-39-9	8	BARREL BOLTS & NUTS	SEE NOTE 4
84-40	1	VALVE TOP	GRAY IRON
84-40-4	1	VALVE TOP CLEVIS & CLIP PIN	STAINLESS STEEL
84-41	1	HYDRANT VALVE	RUBBER
84-42	1	VALVE BOTTOM	DUCTILE IRON
84-46-2	1	FLANGED BASE	DUCTILE IRON
84-46-5	1	MECHANICAL JOINT BASE	DUCTILE IRON
84-46-TY	1	TYTON BASE	DUCTILE IRON
84-145	1	ROD SLEEVE	BRONZE
84-146	2	SLEEVE O-RINGS	BUNA N



**14 INDUSTRIAL PARK LANE,
DESTIN, FL 32541
(850) 837-6146**



BASKERVILLE-DONOVAN, INC.
ENGINEERING THE SOUTH SINCE 1927

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PANAMA CITY BEACH, FL 32413 (850) 230-6150
ENGINEERING BUSINESS: EB-0000340
PENSACOLA - PANAMA CITY BEACH - TALLAHASSEE - MOBILE

SHORE AT
TARPON BEACH

[illegible]

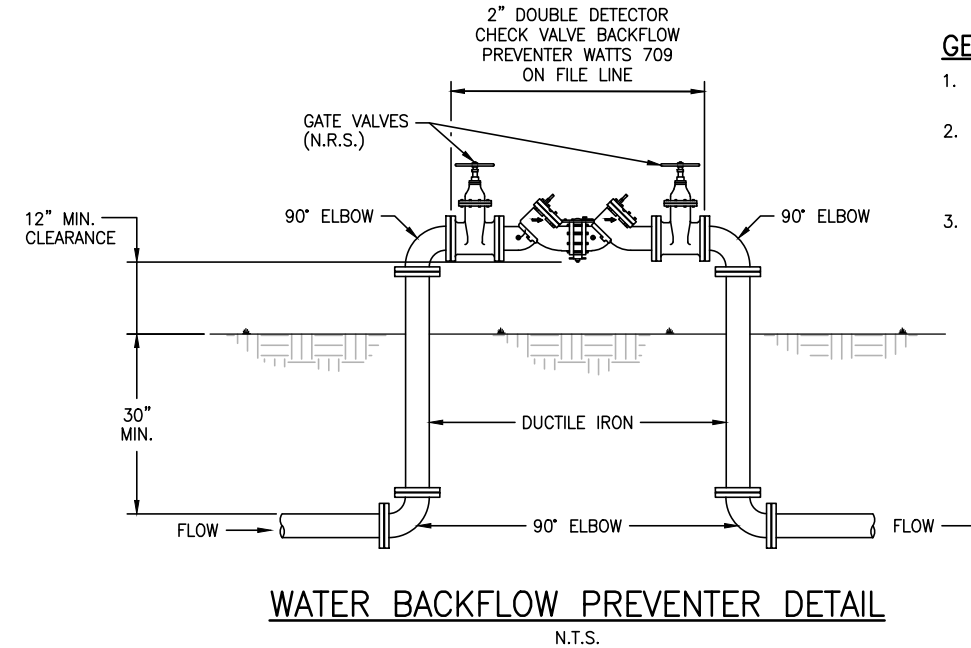
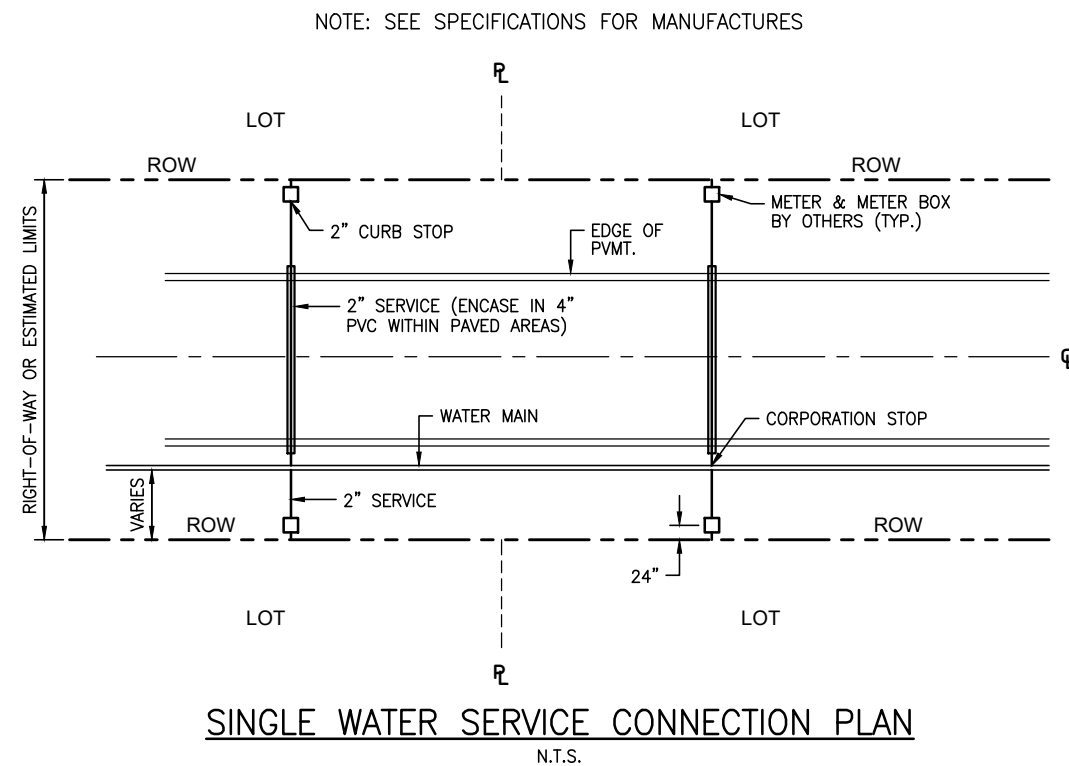
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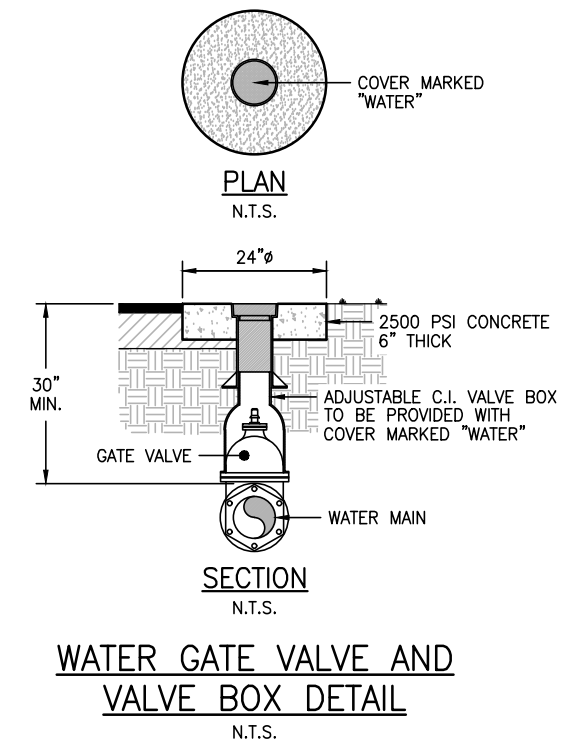
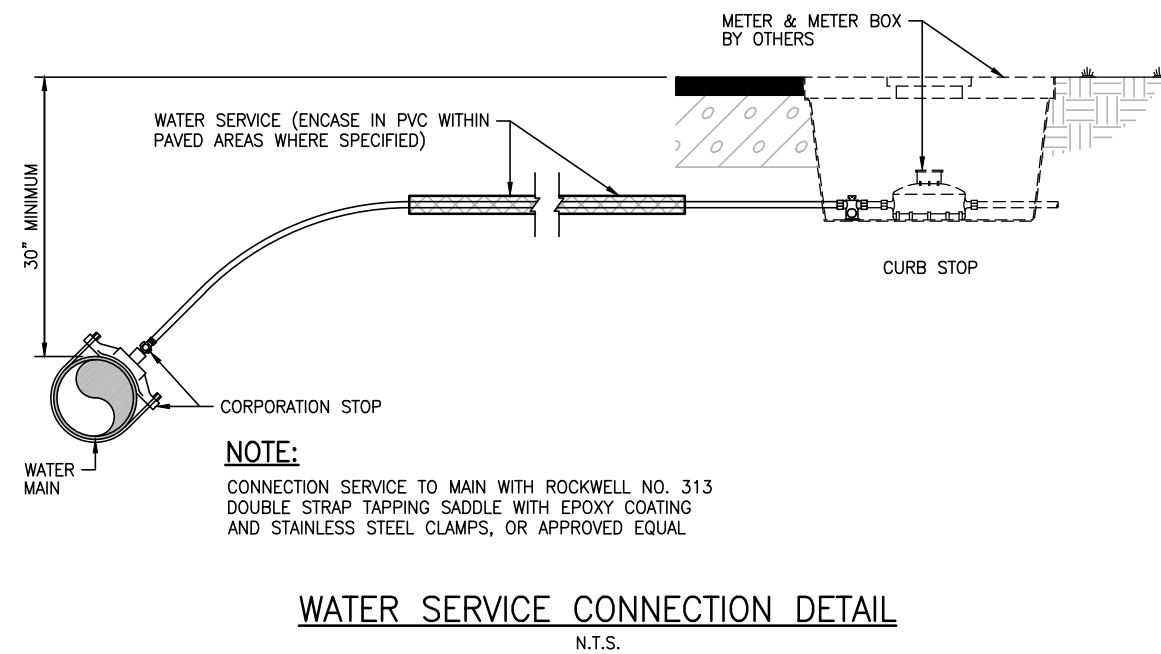
PROJECT NO:	12107.01
DESIGNED BY:	RAS
DRAWN BY:	JJ
CHK'D BY:	RLW
PROJ. MGR:	JCP
DATE:	DECEMBER 2023

MISCELLANEOUS
WATER AND SANITARY
SEWER DETAILS

CU-507



- ## GENERAL NOTES:
1. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING BACTERIOLOGICAL EXAMINATIONS ON ALL NEW WATER MAINS (AS REQUIRED BY AND TO THE SATISFACTION OF) THE DEPARTMENT OF HEALTH AND REHABILITATIVE SERVICES. THESE REQUIREMENTS NECESSITATE A SATISFACTORY SAMPLE AT EACH SAMPLE LOCATION FOR TWO CONSECUTIVE DAYS. IF THE EXAMINATION IS BY PERSONS OTHER THAN THE LOCAL HEALTH DEPARTMENT, THEN THE CONTRACTOR SHALL BE RESPONSIBLE FOR DELIVERING THE LABORATORY REPORTS TO THE ENGINEER FOR SUBMITTAL TO THE STATE DEPARTMENT OF ENVIRONMENTAL PROTECTION (D.E.P.).
 2. INSTALLATION OF WATER MAINS AND SERVICES SHALL COMPLY WITH ALL GOVERNING AUTHORITIES.
 3. THE CONTRACTOR SHALL VERIFY ALL FIELD DIMENSIONS AND REPORT ANY DISCREPANCIES PRIOR TO COMMENCING WORK.
 4. ALL PIPES SHALL BE PVC UNLESS OTHERWISE NOTED OR REQUIRED. ALL MAINS TO BE MARKED WITH NO. 14 INSULATED COPPER TRACER WIRE TO FACILITATE THEIR LOCATIONS.
 5. THE CONTRACTOR SHALL PROVIDE A MINIMUM OF 36" OF COVER OVER WATER MAINS WITHIN PAVED AND UNPAVED AREAS.



GENERAL NOTES:

1. ALL FITTINGS SHALL BE CAST OR DUCTILE IRON.
2. PROVIDE THRUST BLOCKS FOR BELOW GROUND FITTINGS, SEE THRUST BLOCK DETAIL.
3. PROVIDE SUPPORTS UNDER BACKFLOW PREVENTER AS REQUIRED.

Baskerville-Donovan, Inc.
ENGINEERING THE SOUTH SINCE 1927



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PENSACOLA - PANAMA CITY BEACH - TALLAHASSEE - MOBILE

SEAL

TARPON BEACH

[illegible]

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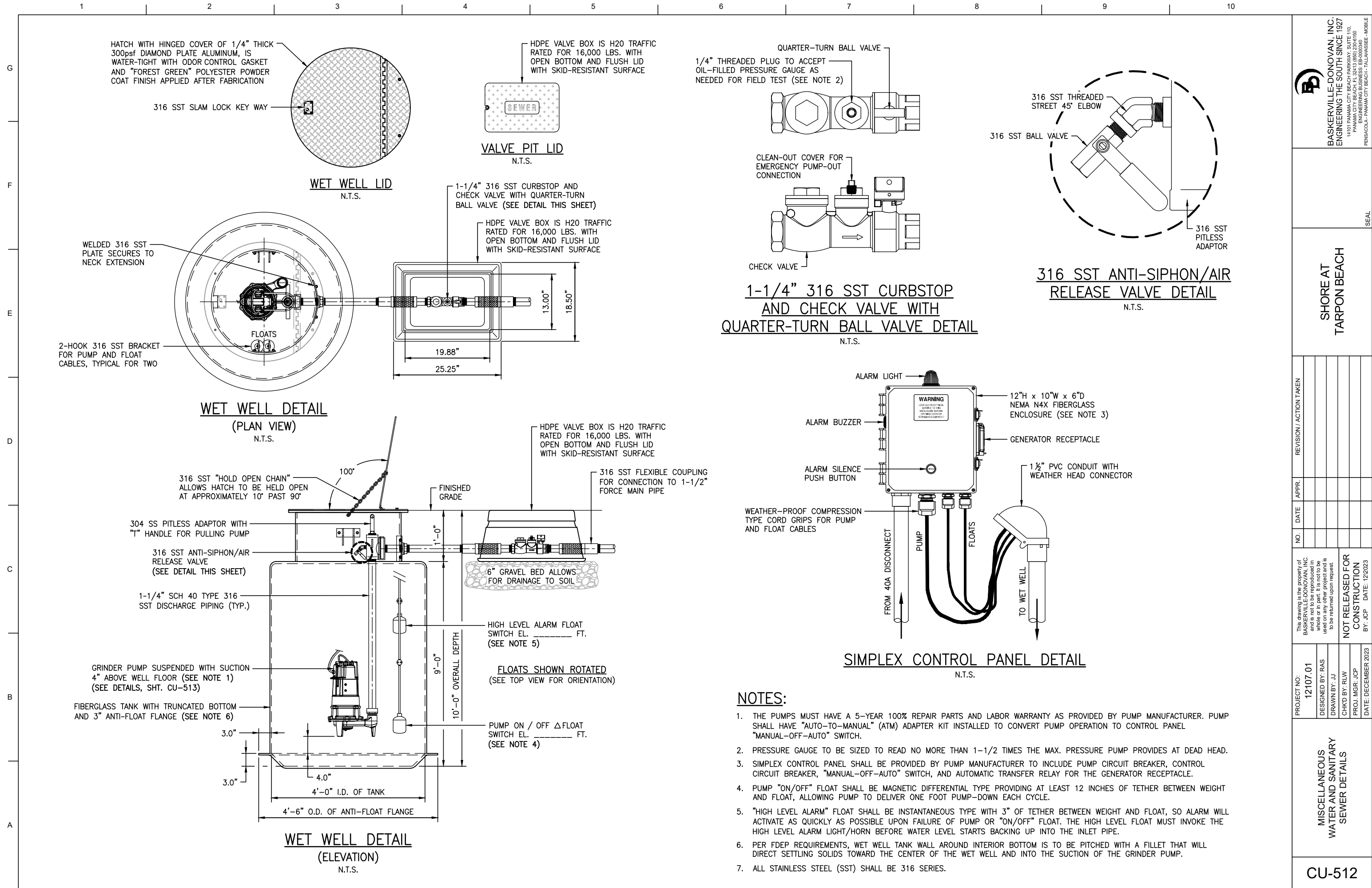
WATER AND SANITARY SEWER DETAILS

CU-509



DESTIN WATER USERS, INC.

14 INDUSTRIAL PARK LANE,
DESTIN, FL 32541
(850) 837-6146



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PANAMA CITY BEACH, FL 32413 (850) 230-6150
ENGINEERING BUSINESS: EB-0000360
PENINSULA - PANAMA CITY BEACH - PALM SPRING - MOBILE

SEAL

**SHORE AT
TARPON BEACH**

NO.	DATE	APPR.	REVISION / ACTION TAKEN

PROJECT NO:
12107.01

DESIGNED BY: RAS

DRAWN BY: JJ

CHKD BY: RLW

PROJ. MGR: JCP

DATE: DECEMBER 2023

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MISCELLANEOUS
WATER AND SANITARY
SEWER DETAILS

CU-512

G

F

E

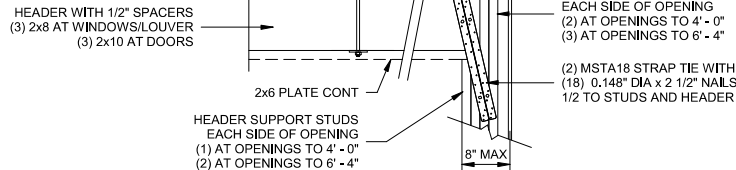
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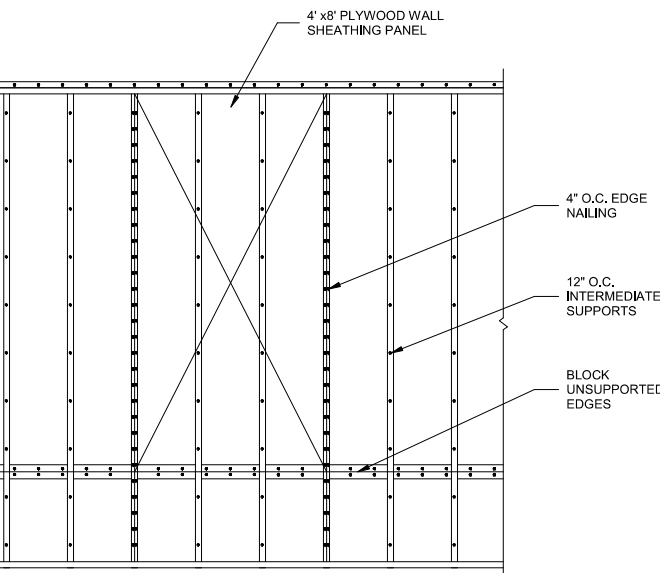
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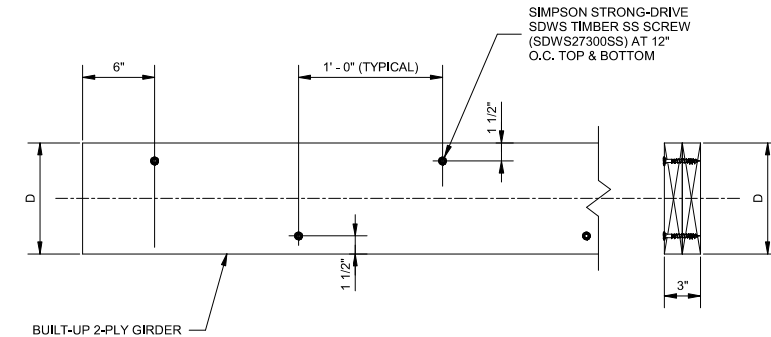
NOT TO SCALE



3/4" = 1'-0"



3/4" = 1'-0"


$$1\frac{1}{2}'' = 1'-0''$$

1. MATERIALS TO CONFORM TO THE FOLLOWING:

- WIND DESIGN DATA:

- | | |
|--------------------------------|------------------------------------|
| ULTIMATE DESIGN WIND SPEED: | 145 MPH |
| NOMINAL DESIGN WIND SPEED: | 112 MPH |
| RISK CATEGORY: | II |
| WIND EXPOSURE: | D |
| ENCLOSURE CLASSIFICATION: | RESTROOM: ENCLOSED, PAVILION: OPEN |
| INTERNAL PRESSURE COEFFICIENT: | +0.18 |
| COMPONENT AND CLADDING FORCES: | AS SCHEDULED |

FACILITY IS LOCATED WITHIN WIND-BORNE DEBRIS REGION & ALL GLAZED OPENINGS REQUIRE IMPACT PROTECTION.

3. THE PRIMARY STRUCTURAL SYSTEM OF THIS BUILDING HAS BEEN DESIGNED IN ACCORDANCE WITH THE 2020 FLORIDA BUILDING CODE 7TH EDITION.

4. PREPARE SITE AND FOUNDATIONS IN ACCORDANCE WITH THE TIMBER PILE FOUNDATION RECOMMENDATIONS NOTED IN THE PROJECT REPORT OF GEOTECHNICAL EXPLORATION PREPARED BY TIERRA; PROJECT NO. 4511-23-038 DATED AUGUST 18, 2023.

5. VERIFY ELEVATIONS SHOWN ON STRUCTURAL PLANS WITH CIVIL AND ARCHITECTURAL PLANS.

6. FRAMING CONNECTORS SHALL BE SIMPSON STRONG-TIE MODELS SPECIFIED OR EQUIVALENT INSTALLED ACCORDING TO THE MANUFACTURER'S RECOMMENDATIONS WITH THE SIZE AND QUANTITY OF FASTENERS REQUIRED TO ACHIEVE MAXIMUM LOAD CAPACITY. SIMPSON 2-MAX GALVANIZED COATING MINIMUM AND HOT-DIP GALVANIZED FASTENERS WHEN ANCHORED TO DRY USE PRESSURE TREATED WOOD. USE HOT-DIP GALVANIZED OR STAINLESS STEEL CONNECTORS AND FASTENERS AS INDICATED WHEN ANCHORED TO WET USE PRESSURE TREATED WOOD.

7. COMPLY WITH MINIMUM FASTENER REQUIREMENTS IN 2020 FBC 7TH EDITION SECTION 2304.10, TABLE 2304.10.1 FASTENING SCHEDULE FOR ALL WOOD FRAMING MEMBERS AND AS NOTED AND DETAILED ON PLANS.

8. COORDINATE AND VERIFY ALL DIMENSIONS WITH ARCHITECTURAL DRAWINGS.

LEGEND:

- | | |
|--------|------------------------|
| HDG | HOT DIPPED GALVANIZED |
| P.T. | PRESSURE TREATED |
| U.N.O. | UNLESS NOTED OTHERWISE |
| S.S. | STAINLESS STEEL |



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SHORE AT TARPON BEACH

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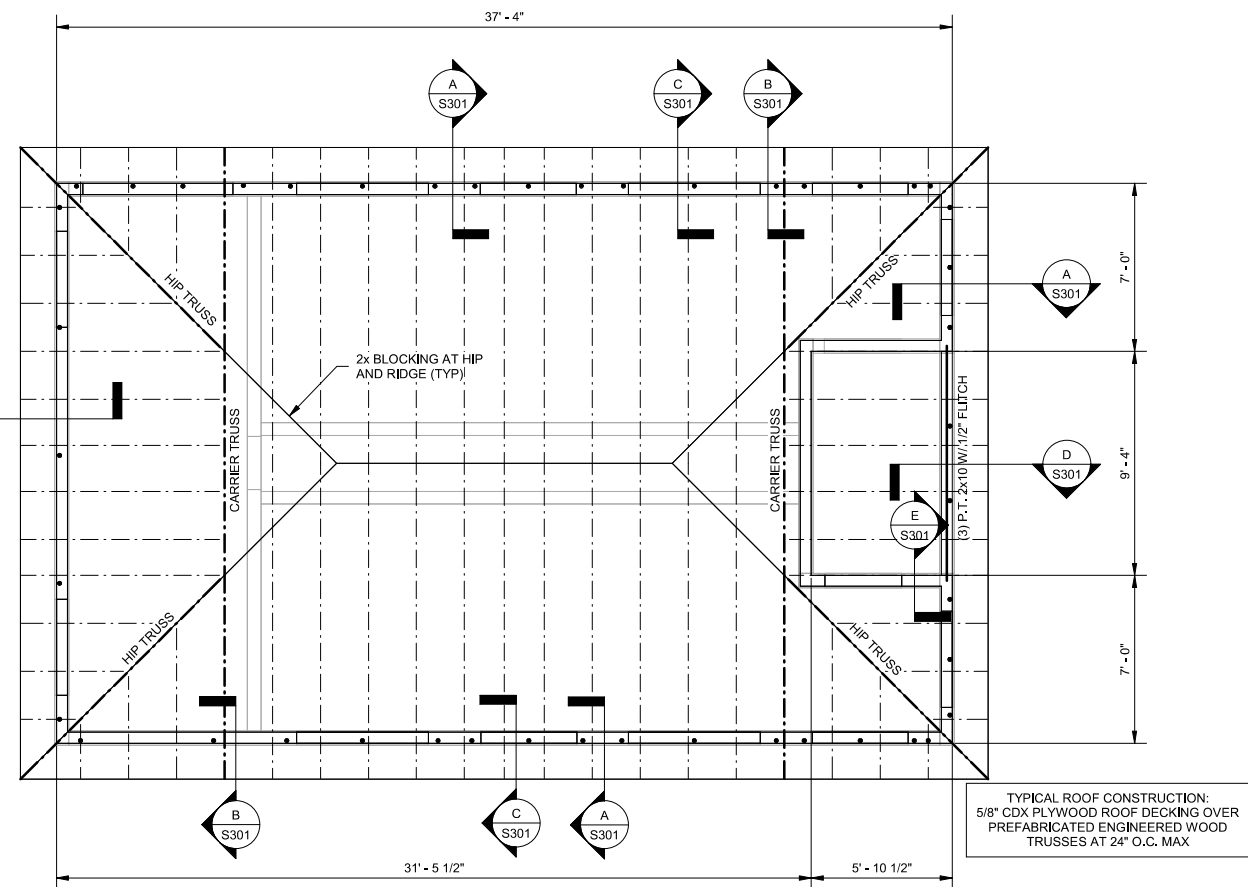
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PROJECT NO:	12107.01
DESIGNED BY:	SWL
DRAWN BY:	NRL
CHK'D BY:	RLW
PROJ. MGR:	JCP
DATE:	DECEMBER 2023

GENERAL NOTES & TYPICAL DETAILS

S001





  **RESTROOM ROOF FRAMING PLAN**
S101 1/4" = 1'-0"

RESTROOM ROOF FRAMING NOTES:

1. ROOF TRUSS DESIGN LOADS:

TOP CHORD:
LIVE LOAD 20 PSF (REDUCIBLE PER THE FBC)
DEAD LOAD 10 PSF
WIND LOAD (SEE SHEET S001)

BOTTOM CHORD:
DEAD LOAD 10 PSF
LIVE LOAD 0 PSF

2. PREFABRICATED ENGINEERED WOOD ROOF TRUSSES SHOP DRAWINGS SHALL BE SUBMITTED TO ENGINEER FOR APPROVAL PRIOR TO FABRICATION. SHOP DRAWINGS SHALL BE DESIGNED AND SEALED BY REGISTERED FLORIDA ENGINEER AND INCLUDE LAYOUT, DETAILS, CALCULATIONS, AND REACTIONS. TRUSS MANUFACTURER IS RESPONSIBLE FOR TRUSS TO TRUSS CONNECTIONS. REFER TO SHOP-FABRICATED WOOD TRUSSES SPECIFICATIONS.

3. CAPACITY OF HURRICANE ANCHORS SHOWN ON PLANS SHALL BE VERIFIED WITH TRUSS MANUFACTURER'S REACTIONS. CONTRACTOR IS RESPONSIBLE FOR PROVIDING CONNECTORS MEETING UPLIFT REACTIONS PER TRUSS MANUFACTURER'S CALCULATIONS BUT NOT LESS THAN THE CONNECTIONS SHOWN ON PLANS.

- **THREADED RODS, SEE DETAILS ON S301**

ROOF FRAMING CONNECTOR SCHEDULE		
LOCATION	SIMPSON CONNECTOR	FASTENERS
TRUSS (U.N.O.)	H10A	(9) 10d x 1 1/2" TRUSS AND PLATES
HIP (CORNER) TRUSS	(2) HCP2	(6) 10d x 1 1/2" EACH, TRUSS AND PLATES
CARRIER TRUSS	LGT2	(14) #9 x 1 1/2" SD SCREWS PLATES/STUD (16) TRUSS

NOTE: FOR 3 PLY CARRIER TRUSSES, USE SIMPSON LGT3. FOR 4 PLY USE LGT4.



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SHORE AT
TARPON BEACH

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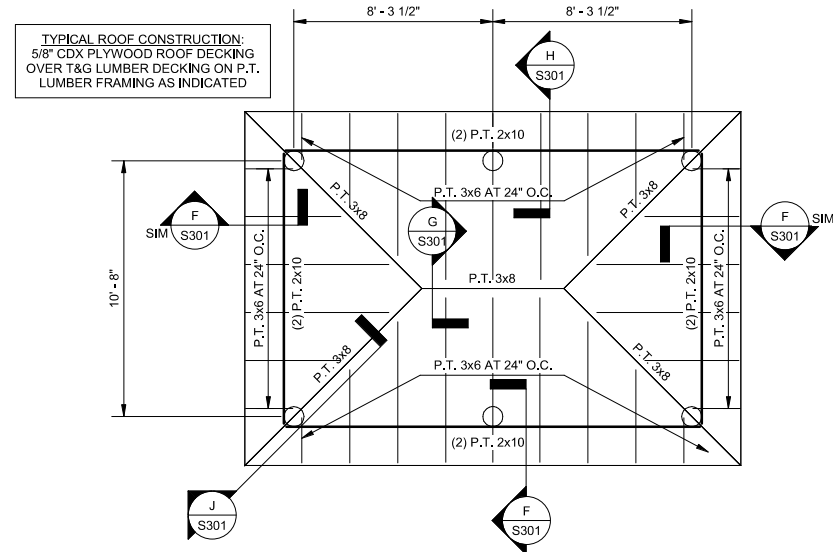
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RESTROOM FLOOR & ROOF FRAMING PLAN

S101





 **2** PAVILION ROOF FRAMING PLAN
S102 1/4" = 1'-0"

TIMBER PILE WITH MINIMUM 8" TIP DIAMETER.
+7 TON BEARING AND -2 TON UPLIFT SERVICE LOADS
-6'-0" NAVD 88 TIP ELEVATION
REFER TO TIMBER PILE SPEC FOR ADDITIONAL INFO

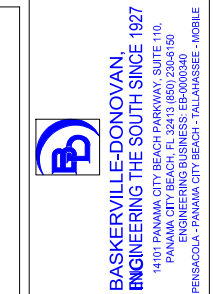
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	PROJ. MGR: JCP					
	DATE: DECEMBER 2023					

PAVILION FLOOR AND
ROOF FRAMING PLAN

S102





SHORE AT TARPON BEACH

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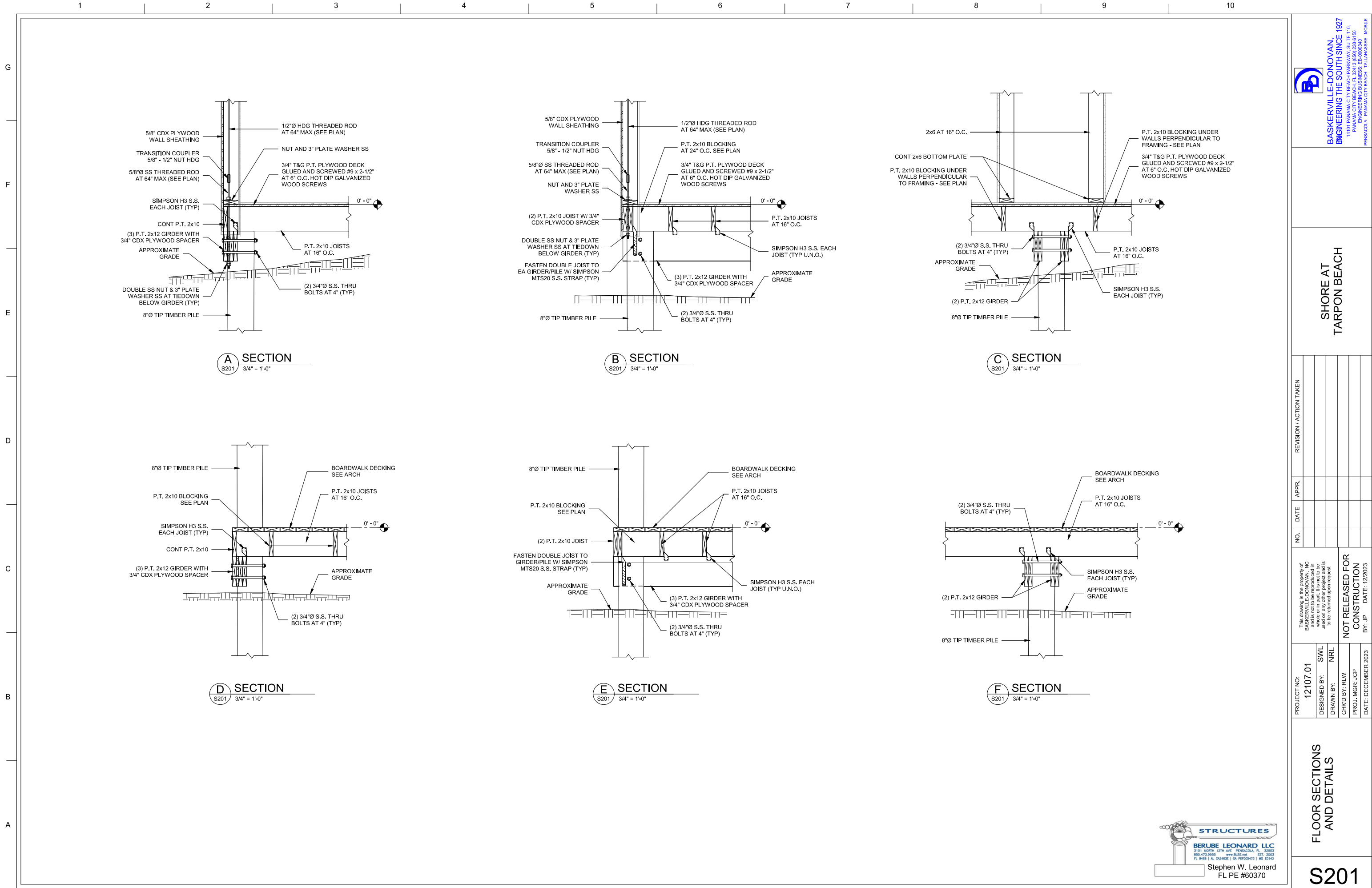
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PROJECT NO:
12107.01

BOARDWALK
FOUNDATION PLAN -
NORTH

S103



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ENGINEERING BUSINESS: EP-00000560
PENSAFOLA - PANAMA CITY DESIGN - TALLAHASSEE - MOBILE

**SHORE AT
TARPON BEACH**

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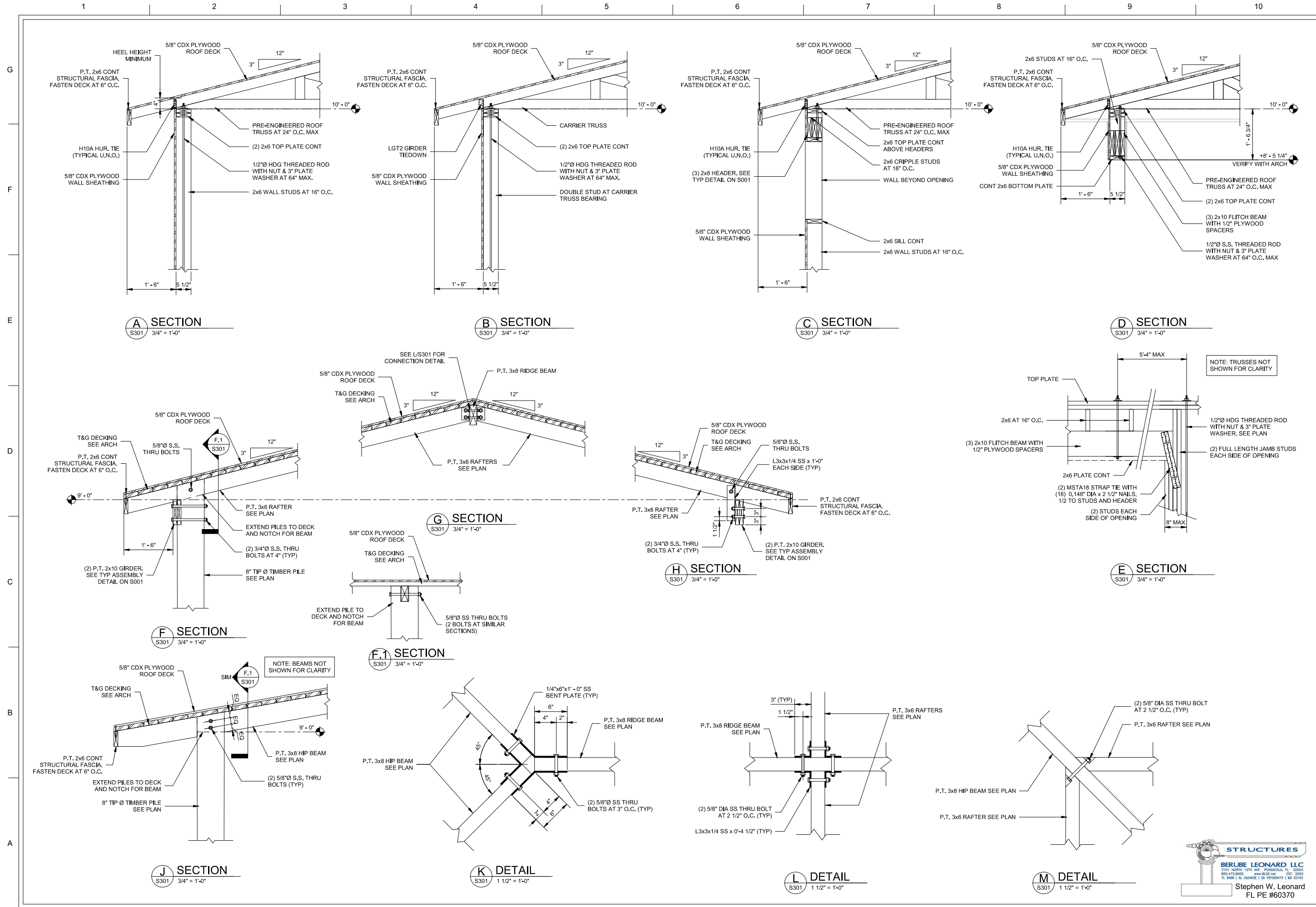
PROJECT NO:	12107.01
DESIGNED BY:	SWL
DRAWN BY:	NRL
CHKD BY:	RLW
PROJ. MGR:	JCP
DATE:	DECEMBER 2023

**FLOOR SECTIONS
AND DETAILS**

S201



100% SUBMITTAL



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**SHORE AT
TARPON BEACH**

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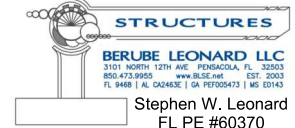
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DATE:	DECEMBER 2023

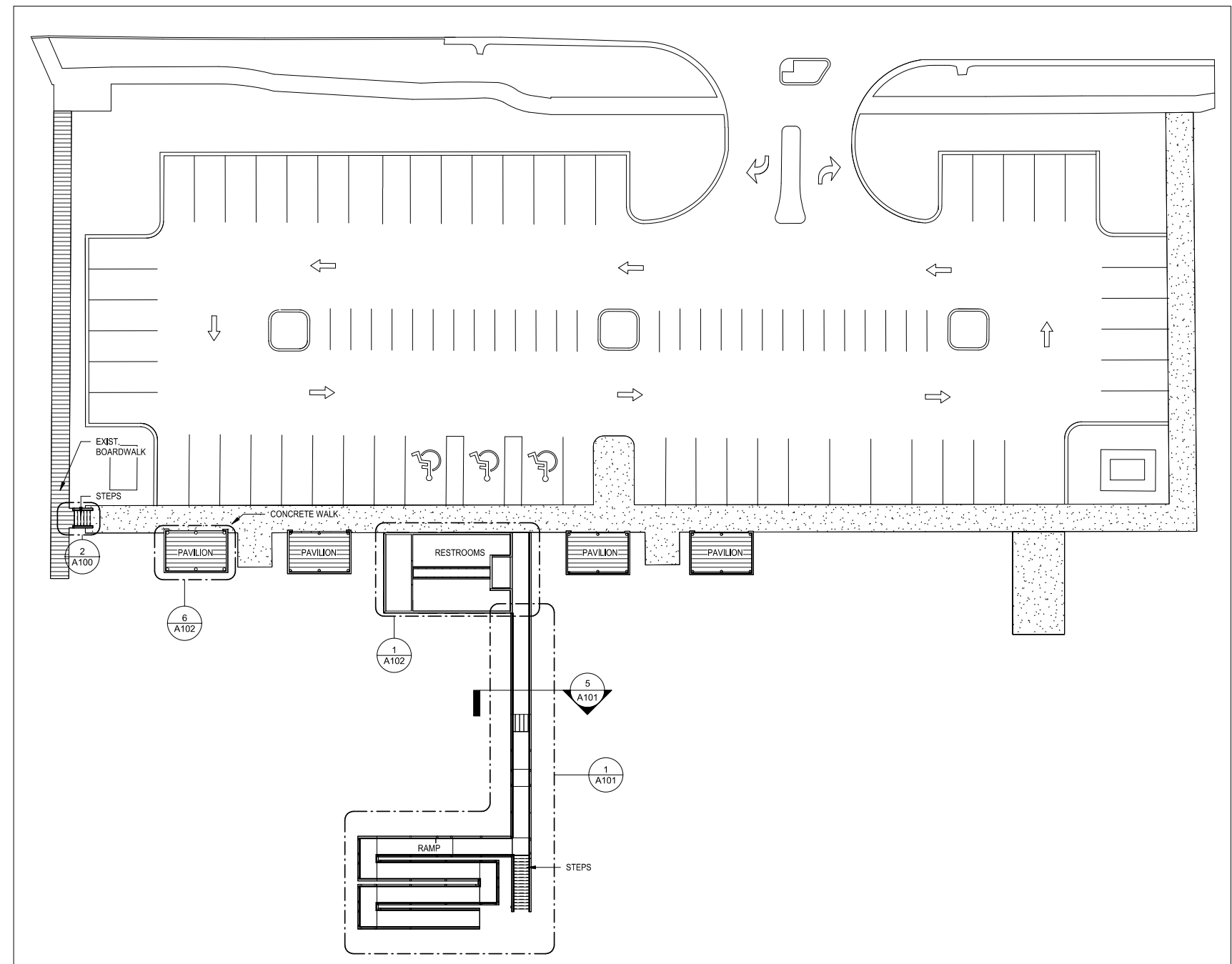
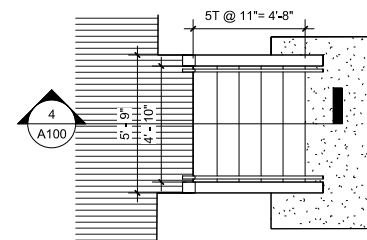
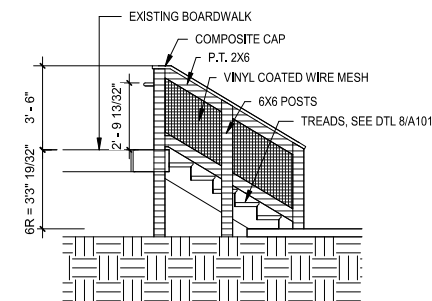
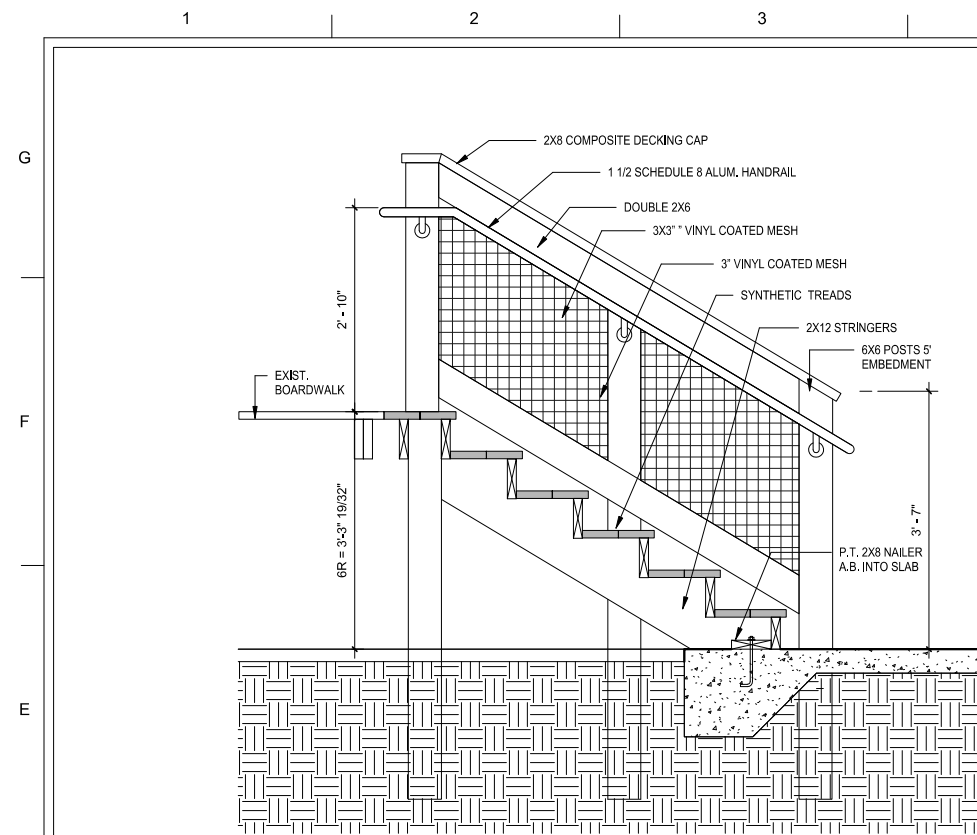
**ROOF SECTIONS AND
DETAILS**

S301



BERUBE LEONARD LLC
3101 NORTH 12TH AVE. PENSACOLA, FL 32503
850-473-3905 www.BLERB.com CST: 2303
FL 9408 | AL 042403E | GA P10705473 | MS E0143
Stephen W. Leonard
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DRAWN BY:	MM				
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PROJ. MGR.: JCP DATE: DECEMBER 2023		NOT RELEASED FOR CONSTRUCTION BY: JP DATE: 12/2023			

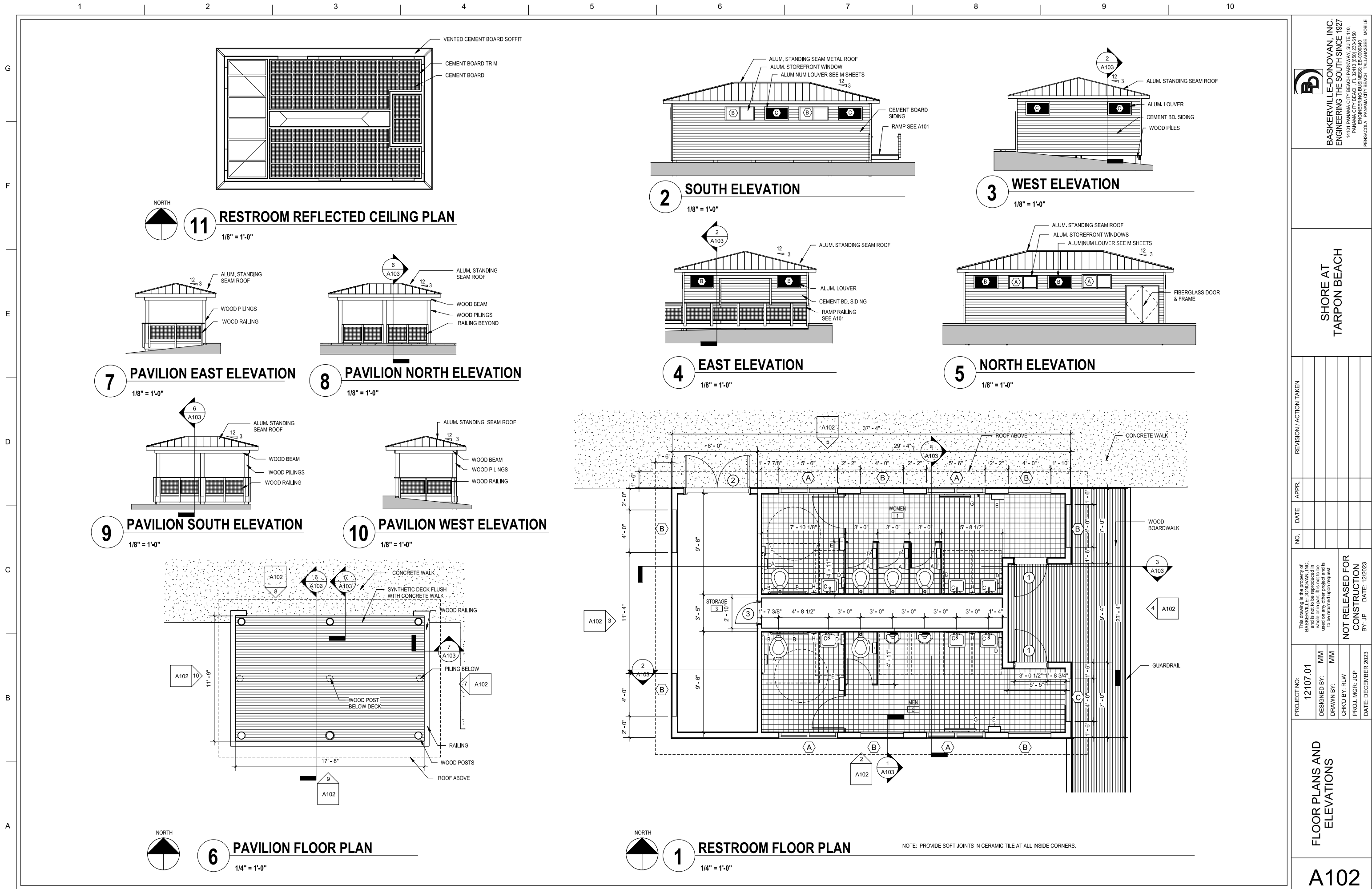


SHORE AT TARPON BEACH

PROJECT NO:	12107.01	DESIGNED BY:	MM	DRAWN BY:	MM	CHK'D BY:	RLW	PROJ. MGR:	JCP	DATE:	DECEMBER 2023
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RAMP PLAN ELEVATION & DETAILS

A101



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PANAMA CITY BEACH, FL 32413 (850) 230-6190
ENGINEERING BUSINESS: BB-0000000
PENINSULA - PANAMA CITY DESIGN - PALM BEACH - MOBILE

**SHORE AT
TARPON BEACH**

REVISION / ACTION TAKEN

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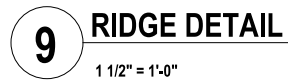
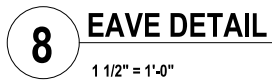
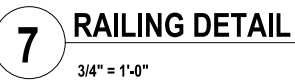
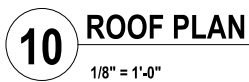
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CONSTRUCTION**
BY: JP DATE: 12/2023

PROJECT NO: 12107.01
DESIGNED BY: MM
DRAWN BY: MM
CHKD BY: RLW
PROJ. MGR: JCP
DATE: DECEMBER 2023

**FLOOR PLANS AND
ELEVATIONS**

A102

100% SUBMITTAL

A103

1

2

3

4

5

6

7

8

9

10

G

F

E

D

C

B

A

PLUMBING FIXTURE SCHEDULE							
MARK	FIXTURE	BASIS OF DESIGN		CONNECTIONS			DESCRIPTION
		MANUFACTURER	MODEL/MODEL#	SAN (IN)	DCW (IN)	DHW (IN)	
P-1	WATER CLOSET	ZURN	Z5655; Z6000AV	3	1	-	FLOOR MOUNTED TOILET WITH MANUAL FLUSH VALVE. WHITE VITREOUS CHINA, 1.6 GPF WITH SIPHON JET FLUSHING ACTION. ADA ELONGATED FRONT RIM, WITH 1-1/2" TOP SPUD. PROVIDE WITH WHITE, OPEN FRONT TOILET SEAT LESS COVER WITH STAINLESS STEEL HINGE.
P-1A	WATER CLOSET (ADA)	ZURN	Z5665; Z6000AV	3	1	-	FLOOR MOUNTED TOILET WITH MANUAL FLUSH VALVE. WHITE VITREOUS CHINA, 1.6 GPF WITH SIPHON JET FLUSHING ACTION. ADA ELONGATED FRONT RIM, WITH 1-1/2" TOP SPUD. PROVIDE WITH WHITE, OPEN FRONT TOILET SEAT LESS COVER WITH STAINLESS STEEL HINGE. ADA HEIGHT.
P-2	WALL HUNG SINK	KOHLER	K-2005	1-1/2	1/2	-	20"x 18" WHITE VITREOUS CHINA WALL MOUNT SINK. PROVIDE WITH K-8998 P-TRAP AND HANGER. MOUNT PER ARCHITECTURAL REQUIREMENTS.
		T&S	B-0805				SINGLE HOLE, SINGLE TEMPERATURE DECK MOUNT FAUCET WITH POLISHED CHROME PLATED BRASS BODY, 2.2 GPM AERATOR, METERING CARTRIDGE, AND PUSH BUTTON CAP.
FD	FLOOR DRAIN	ZURN	Z415B	3	-	-	3" FLOOR DRAIN. CAST IRON BODY WITH BOTTOM OUTLET, COMBINATION INVERTIBLE MEMBRANE CLAMP AND ADJUSTABLE COLLAR WITH SEEPAGE SLOTS. POLISHED NICKEL BRONZE, LIGHT DUTY STRAINER. PROVIDE WITH TRAP PRIMER CONNECTION.
CO	FLOOR CLEANOUT	ZURN	ZN1400	SEE FLP			ADJUSTABLE FLOOR CLEANOUT WITH BOTTOM OUTLET, CLEANOUT GASKETED PLUG, ROUND TOP AND POLISHED NICKEL BRONZE TOP FINISH, SCORIATED COVER.
WCO	WALL CLEANOUT	ZURN	Z1469-ZS	SEE FLP			WALL CLEANOUT WITH ROUND WALL ACCESS COVER AND POLISHED STAINLESS STEEL COVER.
HB	HOSE BIBB	WOODFORD	24	-	3/4	-	ANTI SIPHON, VACUUM BREAKER, CHROME FINISH, WHEEL HANDLE AND LOOSE TEE KEY.

NOTES:

1. PROVIDE WITH ALL REQUIRED ACCESSORIES AND FITTINGS FOR A COMPLETE INSTALLATION.

2. PROVIDE WATER HAMMER ARRESTORS ON COLD AND HOT WATER SUPPLY BRANCHES. REFER TO WATER HAMMER ARRESTOR SCHEDULE.

3. REFER TO ARCHITECTURAL DRAWINGS FOR ALL PLUMBING FIXTURES' MOUNTING HEIGHT. COORDINATE WITH ADA REQUIREMENTS.

4. PROVIDE FULL SIZE WATER AND SANITARY PIPING TO EACH FIXTURE UNLESS NOTED OTHERWISE.

5. PROVIDE BASIS OF DESIGN MANUFACTURER AND MODEL OR APPROVED EQUAL WITH PERFORMANCE, COMPONENTS AND TRIM OPTIONS WHICH EXCEED OR EQUAL TO BASIS OF DESIGN.

6. ALL EXPOSED DOMESTIC WATER AND P-TRAP BELOW SINK SHALL BE CHROME PLATED.

PIPE STRAPS

PIPE CELLULAR GLASS INSULATION AND ALUMINUM JACKET PER SPECS

45°

SECTION VIEW

12" TYPICAL

HEAT TRACE CABLE SHALL BE EVENLY DISTRIBUTED ALONG PIPE

HEAT TRACE JOINTS

TAPE OR BANDING

ELEVATION VIEW

SEE NOTE 3

TAPE OR BANDING

SEE NOTE 3

PIPE ELBOW APPLICATION

3

PIPE HEAT TRACE TAPE DETAIL

NOT TO SCALE

DETAIL 3 NOTES:

1. PROVIDE SELF REGULATING LOW TEMPERATURE HEAT TRACE CABLE EQUAL TO CHROMALOX MODEL CPR CABLE. PROVIDE WITH UL LISTED NON-INDICATING TEMPERATURE CONTROLLERS MODEL THR. HEAT TRACE SHALL BE ENERGIZED AUTOMATICALLY WHEN AMBIENT TEMPERATURE IS BELOW 40°F FOR FREEZE PROTECTION.

2. PROVIDE WITH ALL REQUIRED ACCESSORIES BUT NOT LIMITED TO TAPE, CABLE TIES, PIPE STRAPS, JUNCTION BOX, HEAT SHRINK SPLICE AND TEE KITS. HEAT SHRINK END CAPS. INSTALL IN STRICT ACCORDANCE TO MANUFACTURER'S INSTALLATION MANUAL.

3. HEATING CABLE IS APPLIED TO THE OUTSIDE (LONG) RADIUS OF THE PIPE ELBOW.

4. CONTRACTOR SHALL PROVIDE AND COORDINATE HEAT TRACE CIRCUITS AND ALL OTHER ELECTRICAL POWER REQUIREMENTS. COORDINATE CURRENT SWITCH INSTALLATION WITH DDC CONTRACTOR.

5. PROVIDE HARDWIRE FOR POWER CONNECTIONS. PLUG IN TYPE IS NOT ALLOWABLE.

6. HEAT TRACE SHALL MEET THE FOLLOWING REQUIREMENTS:

6.1. THE HEAT SYSTEM MUST BE SELF-REGULATING AND ENSURE THE SURFACE TEMPERATURE OF THE PIPE AND FITTINGS WILL NOT EXCEED 158°F (70°C).

6.2. THE SYSTEM MUST BE INSTALLED FOLLOWING THE MANUFACTURER'S INSTRUCTIONS FOR INSTALLATION, AND THE PRODUCT/SYSTEM LISTINGS.

6.3. SHALL BE USED IN COMPLIANCE WITH ALL APPLICABLE LOCAL CODES.

1/2" HW (IF APPLICABLE)

1/2" CW

WALL HUNG SINK

WATER SUPPLIES WITH ESCUTCHIONS (KEY OPERATED)

P-TRAP

1/2" CW, ROUTE CONCEALED TO HOSE BIBB

WALL MOUNT HOSE BIBB WITH FLANGE (KEY OPERATED)

FINISHED FLOOR

PROVIDE ADEQUATE CLEARANCE FOR MAINT.

SEE ARCHITECTURE FOR MOUNTING HEIGHT

MIN. 12" AFF.

1

SINK AND HOSE BIBB DETAIL

NOT TO SCALE

FINISHED WALL

VENT PIPING

FLUSH VALVE

DOMESTIC COLD WATER PIPING

FINISHED FLOOR

CONCRETE SLAB

DOUBLE WYE FITTING OR 45° DOUBLE WYE FITTING. DOUBLE SANITARY TEE FITTING IS NOT ALLOWED

2

BACK TO BACK WC CONNECTION DETAIL

NOT TO SCALE

AL

ANTON LEE ENGINEERING

ANTON LEE ENGINEERING, LLC
1765 E. NINE MILE RD., STE. 1 #220
PENSACOLA, FL 32514
CERTIFICATE OF AUTHORIZATION:
FL 32794 | AL 5685-E
ANTON LEE, PE
FL PER 92369 | AL PER 37427-E
PROJECT NUMBER 23-108

MECHANICAL SCHEDULE AND DETAILS

M-002

BASKERVILLE-DONOVAN,
ENGINEERING THE SOUTH SINCE 1927
14101 PANAMA CITY BEACH PARKWAY, SUITE 110
PANAMA CITY BEACH, FL 32413 (850) 230-6190
ENGINEERING BUSINESS EB-0000340
PENSACOLA - PANAMA CITY BEACH - TALLAHASSEE - MOBILE

SHORE AT
TARPON BEACH

REVISION / ACTION TAKEN

APPR.

DATE

NO.

PROJECT NO: 12107.01

DESIGNED BY: AL

DRAWN BY: AL

CHKD BY: AL

PROJ. MGR: JCP

DATE: DEC 2023

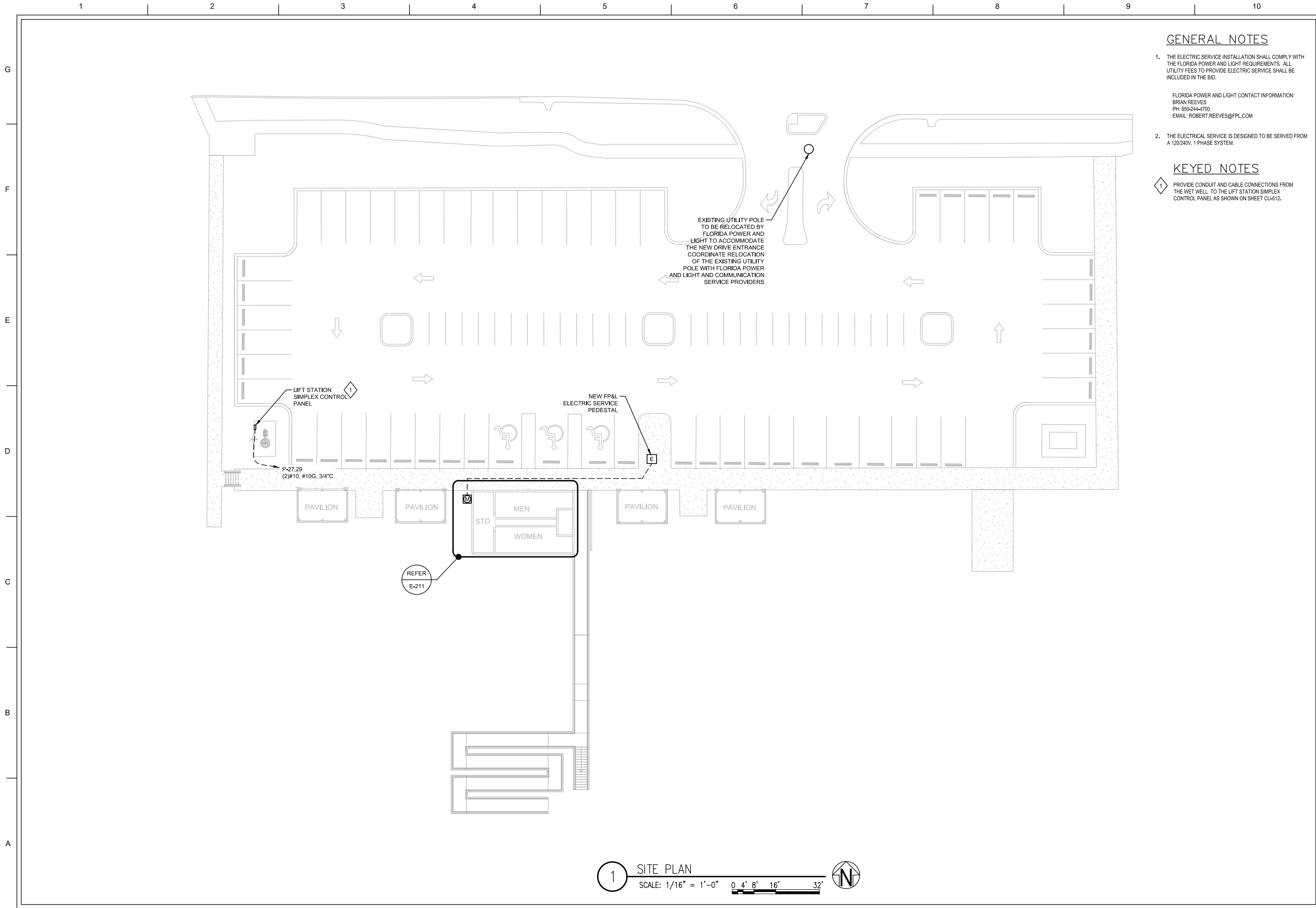
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NOT RELEASED FOR CONSTRUCTION

BY: AL DATE: 11/15/2023

100% SUBMITTAL





GENERAL NOTES

- 1. THE ELECTRIC SERVICE INSTALLATION SHALL COMPLY WITH THE FLORIDA POWER AND LIGHT REQUIREMENTS. ALL UTILITY FEES TO PROVIDE ELECTRIC SERVICE SHALL BE INCLUDED IN THE BID.

FLORIDA POWER AND LIGHT CONTACT INFORMATION:
BRIAN REEVES
PH: 850-244-4700
EMAIL: ROBERT.REEVES@FPL.COM
- 2. THE ELECTRICAL SERVICE IS DESIGNED TO BE SERVED FROM A 120/240V, 1 PHASE SYSTEM.

KEYED NOTES

- 1 PROVIDE CONDUIT AND CABLE CONNECTIONS FROM THE WET WELL TO THE LIFT STATION SIMPLEX CONTROL PANEL AS SHOWN ON SHEET CU-512.



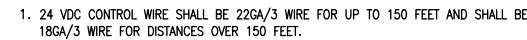
**BASKERVILLE-DONOVAN,
ENGINEERING THE SOUTH SINCE 1927**
14101 PANAMA CITY BEACH PARKWAY, SUITE 110,
PANAMA CITY BEACH, FL 32413 (850) 230-6190
ENGINEERING BUSINESS EB-0000340
FLORIDA PROFESSIONAL ENGINEERING LICENSE NO. 12543
PENINSULA - PANAMA CITY BEACH - TALLAHASSEE - MOBILE

SHORE AT
TARPON BEACH

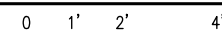
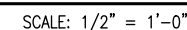
PROJECT NO: 12107.01		DESIGNED BY: JJT		NO.		DATE		APPR.		REVISION / ACTION TAKEN	
		DRAWN BY: JLB									
		CHK'D BY: RLW									
		PROJ. MGR.:JCP									
DATE: DECEMBER 2023											
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NOT RELEASED FOR CONSTRUCTION											
BY: JJT DATE: 12/2023											

SITE PLAN

E-101



- 1 PROVIDE BUTTON TYPE PHOTOCELL. ALL EXTERIOR LIGHTING SHALL BE CONTROLLED BY THE PHOTOCELL.
- 2 EMERGENCY LIGHTING UNIT SHALL BE UNSWITCHED AND INSTALLED AT 7'-6" AFF TO TOP OF LIGHTING UNIT.
- 3 REFER TO RESTROOM OCCUPANCY SENSOR CONTROL SCHEMATIC, DETAIL 3 ON THIS SHEET.



STORMWATER MANAGEMENT PLAN

SHORES AT TARPON BEACH

OKALOOSA COUNTY, FLORIDA

DECEMBER 2023

Prepared for:

OKALOOSA COUNTY, FLORIDA

Prepared by:

Raven Roberts, PE
FL License No. 89932



1201 Montlimar Drive; Suite 650
Mobile, AL 36609
EB-0000340

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Project Description

This project is for the construction of the park at the Shores at Tarpon Beach. Site improvements include flexible pavement for the parking lot, striping/signage, concrete sidewalks, utilities, and stormwater infrastructure.

The stormwater infrastructure will consist of storm sewer inlets and piping, and an underground full retention storm chamber system which will allow for infiltration into the existing sandy beach soils. A summary of the stormwater management is provided below.

Total Area (to MHWL) = 3.06 acres

Total Disturbed Area = 1.37 acres

Impervious Area = 0.83 acres

Recovery Analysis = 9 hours

Treatment Required = 5,000 CF (retaining the first 1" of rainfall per Destin LDC for ERP)

Treatment Provided = 13,600 CF

Existing Conditions

The site is currently a completely undeveloped site as demolition of existing structures and utilities occurred prior to design development and survey. The undeveloped site currently drains toward an existing sandy swale located toward the south of proposed construction activities. Existing contours are clearly shown on sheet C-101 of the plan set.

Soils on site are Newhan-Corolla complex with high permeability. A report from the soil survey has been provided for the site and is attached.

A geotechnical investigation was conducted and consisted of two 35-foot deep Standard Penetration Test (SPT) borings and two 7-foot deep auger borings at the location of the proposed beach park in August 2023. The soils identified were classified as white, gray, brown sands (SP). Samples were collected from the borings for the following laboratory tests: moisture content, #200 sieve analysis, and falling head permeability tests. Results for the vertical and horizontal permeability were provided as 27.4 ft/day and 41.1ft/day, respectively. Groundwater was encountered at the SPT boring locations approximately 18 feet below existing grade at the time of drilling, which was during a period of above-normal seasonal rainfall. Groundwater was not encountered in the 7-ft deep stormwater management facility borings. The geotechnical report with boring logs is attached.

The site lies within FEMA Zone VE, indicating that the site is within a coastal area with a 1% or greater chance of flooding and hosts an additional hazard associated with storm waves.

Drainage Design

The site is currently a cleared undeveloped site with no existing stormwater management features. Per the City of Destin Land Development Code (LDC), it is required to retain the first inch of rainfall on site for the 25-year, 24-hour storm event. The stormwater treatment volume required to meet this criterion for the project is approximately 5,000 cf. However, the total

provided treatment volume for the proposed work is approximately 13,600 cf, which is over 2.5 times more than required. This volume is provided based on the 25-year, 8-hour storm event.

The site is divided into six basins for stormwater management which all collect and drain to the underground retention chambers and are described below. The basins are indicated on the attached basin map.

Basin A:

Basin A includes the west area of the proposed parking lot. This area drains via overland sheet flow to a proposed storm inlet, structure S-1, and then east via a 15-inch reinforced concrete pipe (RCP), P-1, to Basin B. The impact to basin A includes approximately 0.08 acres of impervious area which consists of flexible pavement parking lot, sidewalk, and a pavilion. Basin A is approximately 0.09 acres total.

Basin B:

Basin B includes a large area of the proposed parking lot toward the mid-west of the site. This area drains eastward to a proposed storm inlet, structure S-2, and then east via an 18-inch RCP, P-2, to Basin C. The impact to basin B includes approximately 0.24 acres of impervious area which consists of flexible pavement parking lot, sidewalk, pavilions, and the restroom facility. Basin B is approximately 0.27 acres total.

Basin C:

Basin C is in the center of the site. This area drains eastward to a proposed storm inlet, structure S-3, and then north via a 24-inch RCP, P-3, to Basin F. The impact to basin C includes approximately 0.12 acres of impervious area which consists of flexible pavement parking lot, sidewalk, and pavilions. Basin C is approximately 0.13 acres total.

Basin D:

Basin D includes the largest area to the east of the site. This area drains mostly southeast to a proposed storm inlet, structure S-7, and then west via a 18-inch RCP, P-6, to Basin C. The impact to basin D includes approximately 0.32 acres of impervious area which consists of flexible pavement parking lot and sidewalks. Basin D is approximately 0.39 acres total.

Basin E:

Basin E includes the northeast area of the project site. This area drains south to a proposed storm inlet, structure S-6, and then south via a 15-inch RCP, P-5, to Basin D. The impact to basin E includes approximately 0.03 acres of impervious area which consists of flexible pavement parking lot and some sidewalks located within the right of way. Basin E is approximately 0.05 acres total.

Basin F:

Basin F includes the area north of the project site in the vicinity of the parking lot entrance. This area drains south to a proposed storm inlet, structure S-4, and then northwest via a 24-inch RCP, P-4, to the underground storm chamber manhole. This small area basin was created to

maximize slopes to move stormwater along the parking lot surface, while also maintaining minimal cut to ensure adequate cover over stormwater utilities within the area. The impact to basin F includes approximately 0.03 acres of impervious area which consists of flexible pavement parking lot, concrete islands/curbing, and a minor section of sidewalk located within the right of way. Basin F is approximately 0.03 acres total.

There is approximately 0.37 acres of disturbed area that is not draining to the system. This area consists primarily of the area around the proposed boardwalk, switchbacks, and stairs with a minimal area being around the edges of the property allowing for grade tie ins.

Underground Stormwater Retention Chambers:

The underground stormwater retention chambers used as the basis of design for ICPR modeling are the ADS Stormtech MC-7200 system. *While the contractor is not required to use this system, he/she shall ensure the provided system meets all the same requirements, storage and treatment volumes as necessary per the calculations and specifications.* The ADS Stormtech MC-7200 chambers themselves are 5-foot high corrugated, polypropylene, arch-shaped structures with an invert of 12.26. The chambers will sit on a minimum 9" bed of gravel and have a minimum of 12" gravel overtopping, followed by additional fill, base, and flexible pavement to reach proposed finish grade. Modeling of the chambers was performed using ICPR and inputs and results from the model are attached.

A recovery analysis has been performed, with the chambers recovering the treatment volume within 9 hours. The recovery analysis calculations are attached.

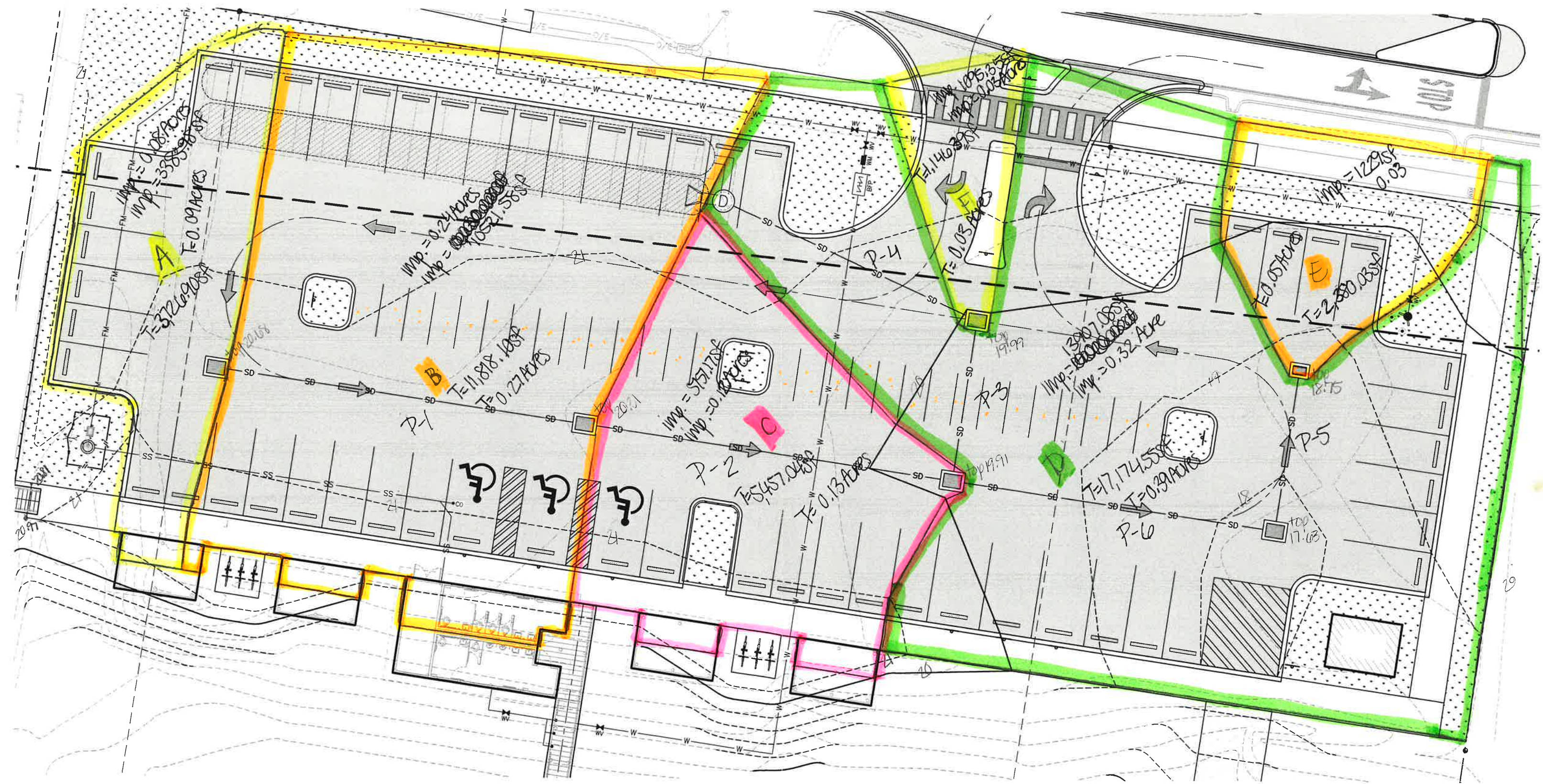
Erosion and Sediment Controls

Best management practices will be utilized during construction to minimize the potential for erosion and sedimentation. Silt fences will be installed at the limits of construction prior to the start of land disturbances. A double layer of silt fence will be provided along the entire southern border of the disturbed area of the site to prevent any additional sediment or erosion toward the coastal waters. Geotextile wattles will be provided around all proposed storm inlets once installed. A temporary gravel construction entrance will also be provided to reduce sediment tracking onto Scenic Highway 98. The erosion control facilities shall be maintained throughout the construction period until stabilization is achieved and approved by the engineer.

Operation and Maintenance

The property owner shall be responsible for maintenance and operation of the new stormwater facilities. The stormwater conveyance systems shall be inspected on a regular basis. Any deficiencies will be corrected to ensure that the system operates as designed and permitted. An additional O & M plan is attached.

Appendix A: Basin Map



Appendix B: ERP Calculations

Tarpon Beach
Conveyance Calculations
9/12/2023

Basin	Total Area (Ac.)	Impervious Area (Ac.)	Pervious Area (Ac.)	Weighted C	Tc (min)	I ₁₀	Q _{10 yr} = CIA (cfs)	I ₂₅	Q _{25 yr} = CIA (cfs)	I ₁₀₀	Q _{100 yr} = CIA (cfs)
A	0.09	0.08	0.01	0.87	10	7.38	0.58	8.12	0.63	9.80	0.76
B	0.27	0.24	0.03	0.87	10	7.38	1.73	8.12	1.90	9.80	2.29
C	0.13	0.12	0.01	0.89	10	7.38	0.86	8.12	0.94	9.80	1.14
D	0.39	0.32	0.07	0.82	10	7.38	2.35	8.12	2.58	9.80	3.12
E	0.05	0.03	0.02	0.65	10	7.38	0.24	8.12	0.26	9.80	0.32
F	0.03	0.03	0.00	0.95	10	7.38	0.21	8.12	0.23	9.80	0.28

****Results:**

STORM DRAINAGE PIPE DATA TABLE						
Pipe No. P-X	Size (In)	Type	Slope (%)	Q ₂₅	Q _{cap}	% Capacity
P-1	15	RCP	0.5	0.63	4.96	13%
P-2	18	RCP	0.5	2.53	8.07	31%
P-3	24	RCP	0.5	6.32	17.38	36%
P-4	24	RCP	0.5	6.55	17.38	38%
P-5	15	RCP	0.5	0.26	4.96	5%
P-6	18	RCP	0.5	2.85	8.07	35%

Tarpon Beach

Required Treatment Volume

$$1.37 \text{ Acres} = 59,841.27 \text{ SF}$$

Per Destin LDC 10.03.02 retain first 1" of rainfall

$$\frac{59,841.27 \text{ ft}^2 \times 1"}{12"/\text{ft}} = 4,986.77 \text{ cf}$$

Recovery

5' chamber

$$K_r = 27.4 \text{ ft/d} \quad F.S.2 = 13.7 \text{ ft/d}$$

$$24 \text{ hrs/d} \times 5' / 13.7 \text{ ft/d} = 8.8 \text{ hrs.} \approx 9 \text{ hrs.}$$

Project: _____



Chamber Model -
Units -
Number of Chambers -
Number of End Caps -
Voids in the stone (porosity) -
Base of Stone Elevation -
Amount of Stone Above Chambers -
Amount of Stone Below Chambers -

MC-7200
Imperial
51
6
40
11.51
12
9

%
ft
in
in

Area of system -

3524 sf Min. Area - 3257 sf min. area

☒ Include Perimeter Stone in Calculations

☐ Click for Stage Area Data

☐ Click to Invert Stage Area Data

[Click Here for Metric](#)

StormTech MC-7200 Cumulative Storage Volumes

Height of System (inches)	Incremental Single Chamber (cubic feet)	Incremental Total Chamber (cubic feet)	Incremental Stone (cubic feet)	Incremental Ch & St (cubic feet)	Cumulative Chamber (cubic feet)	Elevation (feet)	Cumulative System (cubic feet)	Elevation (feet)
81	0.00	0.00	0.00	0.00	117.48	117.48	15040.60	18.26
80	0.00	0.00	0.00	0.00	117.48	117.48	14923.12	18.18
79	0.00	0.00	0.00	0.00	117.48	117.48	14805.64	18.09
78	0.00	0.00	0.00	0.00	117.48	117.48	14688.17	18.01
77	0.00	0.00	0.00	0.00	117.48	117.48	14570.69	17.93
76	0.00	0.00	0.00	0.00	117.48	117.48	14453.21	17.84
75	0.00	0.00	0.00	0.00	117.48	117.48	14335.74	17.76
74	0.00	0.00	0.00	0.00	117.48	117.48	14218.26	17.68
73	0.00	0.00	0.00	0.00	117.48	117.48	14100.78	17.59
72	0.00	0.00	0.00	0.00	117.48	117.48	13983.30	17.51
71	0.00	0.00	0.00	0.00	117.48	117.48	13865.83	17.43
70	0.00	0.00	0.00	0.00	117.48	117.48	13748.35	17.34
69	0.06	0.01	3.03	0.08	116.23	119.34	13630.87	17.26
68	0.19	0.03	9.70	0.20	113.52	123.42	13511.53	17.18
67	0.28	0.05	14.03	0.31	111.74	126.08	13388.11	17.09
66	0.36	0.07	18.22	0.40	110.03	128.65	13262.03	17.01
65	0.46	0.08	23.38	0.50	107.93	131.80	13133.38	16.93
64	0.74	0.11	37.82	0.63	102.09	140.55	13001.58	16.84
63	1.10	0.13	55.92	0.79	94.79	151.50	12861.03	16.76
62	1.32	0.16	67.24	0.97	90.19	158.40	12709.53	16.68
61	1.50	0.19	76.41	1.13	86.46	164.00	12551.13	16.59
60	1.65	0.22	84.38	1.31	83.20	168.89	12387.12	16.51
59	1.79	0.25	91.49	1.48	80.29	173.26	12218.23	16.43
58	1.92	0.28	97.90	1.65	77.66	177.21	12044.97	16.34
57	2.04	0.30	103.91	1.81	75.19	180.91	11867.76	16.26
56	2.15	0.33	109.41	1.97	72.93	184.30	11686.85	16.18
55	2.25	0.35	114.63	2.13	70.77	187.53	11502.55	16.09
54	2.34	0.38	119.50	2.30	68.76	190.56	11315.02	16.01
53	2.43	0.41	124.11	2.46	66.85	193.41	11124.46	15.93
52	2.52	0.44	128.47	2.65	65.03	196.15	10931.04	15.84
51	2.60	0.47	132.63	2.81	63.30	198.74	10734.90	15.76
50	2.68	0.50	136.60	2.97	61.65	201.22	10536.15	15.68
49	2.75	0.52	140.38	3.12	60.07	203.58	10334.94	15.59
48	2.82	0.54	144.00	3.27	58.57	205.83	10131.36	15.51
47	2.89	0.57	147.46	3.40	57.13	207.99	9925.52	15.43
46	2.96	0.59	150.77	3.53	55.75	210.06	9717.53	15.34
45	3.02	0.61	153.96	3.66	54.43	212.05	9507.47	15.26
44	3.08	0.63	157.01	3.79	53.16	213.96	9295.42	15.18
43	3.14	0.64	159.95	3.86	51.95	215.76	9081.46	15.09
42	3.19	0.68	162.78	4.06	50.74	217.58	8865.70	15.01
41	3.25	0.70	165.50	4.20	49.60	219.29	8648.11	14.93
40	3.30	0.72	168.11	4.33	48.50	220.94	8428.82	14.84
39	3.35	0.74	170.63	4.46	47.44	222.53	8207.88	14.76
38	3.39	0.76	173.05	4.59	46.42	224.06	7985.34	14.68
37	3.44	0.79	175.38	4.71	45.44	225.53	7761.29	14.59
36	3.48	0.80	177.63	4.82	44.50	226.94	7535.75	14.51
35	3.53	0.82	179.79	4.92	43.59	228.30	7308.81	14.43
34	3.57	0.84	181.87	5.03	42.71	229.62	7080.51	14.34
33	3.61	0.85	183.88	5.11	41.88	230.87	6850.88	14.26
32	3.64	0.86	185.82	5.16	41.09	232.06	6620.01	14.18
31	3.68	0.89	187.68	5.34	40.27	233.29	6387.95	14.09
30	3.71	0.90	189.46	5.43	39.52	234.41	6154.67	14.01
29	3.75	0.92	191.18	5.50	38.80	235.49	5920.25	13.93
28	3.78	0.92	192.83	5.52	38.14	236.49	5684.77	13.84
27	3.81	0.94	194.41	5.66	37.45	237.52	5448.28	13.76
26	3.84	0.96	195.93	5.74	36.81	238.48	5210.76	13.68
25	3.87	0.97	197.38	5.81	36.20	239.39	4972.28	13.59
24	3.90	0.98	198.77	5.89	35.61	240.27	4732.89	13.51
23	3.92	0.97	200.10	5.83	35.11	241.03	4492.62	13.43
22	3.95	1.00	201.36	6.02	34.52	241.91	4251.59	13.34
21	3.97	1.01	202.57	6.07	34.02	242.66	4009.68	13.26
20	3.99	1.02	203.72	6.12	33.54	243.38	3767.02	13.18
19	4.02	1.03	204.81	6.18	33.08	244.07	3523.64	13.09
18	4.04	1.04	205.85	6.23	32.65	244.72	3279.57	13.01
17	4.06	1.05	206.83	6.28	32.24	245.34	3034.84	12.93
16	4.07	1.05	207.75	6.32	31.85	245.92	2789.50	12.84
15	4.09	1.05	208.62	6.30	31.51	246.43	2543.58	12.76
14	4.11	1.06	209.44	6.34	31.16	246.95	2297.15	12.68
13	4.12	1.08	210.23	6.45	30.81	247.48	2050.21	12.59
12	4.14	1.08	210.96	6.50	30.49	247.95	1802.72	12.51
11	4.15	1.09	211.65	6.53	30.21	248.38	1554.77	12.43
10	4.17	1.11	212.72	6.64	29.73	249.09	1306.39	12.34
9	0.00	0.00	0.00	0.00	117.48	117.48	1057.29	12.26
8	0.00	0.00	0.00	0.00	117.48	117.48	939.82	12.18
7	0.00	0.00	0.00	0.00	117.48	117.48	822.34	12.09
6	0.00	0.00	0.00	0.00	117.48	117.48	704.86	12.01
5	0.00	0.00	0.00	0.00	117.48	117.48	587.39	11.93
4	0.00	0.00	0.00	0.00	117.48	117.48	469.91	11.84
3	0.00	0.00	0.00	0.00	117.48	117.48	352.43	11.76
2	0.00	0.00	0.00	0.00	117.48	117.48	234.95	11.68
1	0.00	0.00	0.00	0.00	117.48	117.48	117.48	11.59

Simple Basin: Post Dev

Scenario: Scenario1
Node: storm chamber
Hydrograph Method: NRCS Unit Hydrograph
Infiltration Method: Curve Number
Time of Concentration: 10.0000 min
Max Allowable Q: 0.00 cfs
Time Shift: 0.0000 hr
Unit Hydrograph: UH484
Peaking Factor: 484.0
Area: 1.3700 ac
Curve Number: 86.0
% Impervious: 0.00
% DCIA: 0.00
% Direct: 0.00
Rainfall Name:

Comment:

Simple Basin: Pre Dev

Scenario: Scenario1
Node: Groundwater
Hydrograph Method: NRCS Unit Hydrograph
Infiltration Method: Curve Number
Time of Concentration: 10.0000 min
Max Allowable Q: 0.00 cfs
Time Shift: 0.0000 hr
Unit Hydrograph: UH484
Peaking Factor: 484.0
Area: 1.3700 ac
Curve Number: 68.0
% Impervious: 0.00
% DCIA: 0.00
% Direct: 0.00
Rainfall Name:

Comment:

Node: Groundwater

Scenario: Scenario1
Type: Time/Stage
Base Flow: 0.00 cfs
Initial Stage: 4.00 ft
Warning Stage: 5.00 ft
Boundary Stage:

Year	Month	Day	Hour	Stage [ft]
0	0	0	0.0000	4.00
0	0	0	999.0000	4.00

Comment:

Node: storm chamber

Scenario: Scenario1
Type: Stage/Volume
Base Flow: 0.00 cfs
Initial Stage: 12.26 ft
Warning Stage: 17.26 ft

Stage [ft]	Volume [ac-ft]	Volume [ft3]
18.26	0.35	15041
18.18	0.34	14923
18.09	0.34	14806
18.01	0.34	14688
17.93	0.33	14571
17.84	0.33	14453
17.76	0.33	14336
17.68	0.33	14218
17.59	0.32	14101
17.51	0.32	13983
17.43	0.32	13866
17.34	0.32	13748
17.26	0.31	13631
17.18	0.31	13512
17.09	0.31	13388
17.01	0.30	13262
16.93	0.30	13133
16.84	0.30	13002
16.76	0.30	12861
16.68	0.29	12710
16.59	0.29	12551
16.51	0.28	12387
16.43	0.28	12218
16.34	0.28	12045
16.26	0.27	11868
16.18	0.27	11687
16.09	0.26	11503
16.01	0.26	11315
15.93	0.26	11124
15.84	0.25	10931
15.76	0.25	10735
15.68	0.24	10536

Stage [ft]	Volume [ac-ft]	Volume [ft3]
15.59	0.24	10335
15.51	0.23	10131
15.43	0.23	9926
15.34	0.22	9718
15.26	0.22	9507
15.18	0.21	9295
15.09	0.21	9081
15.01	0.20	8866
14.93	0.20	8648
14.84	0.19	8429
14.76	0.19	8208
14.68	0.18	7985
14.59	0.18	7761
14.51	0.17	7536
14.43	0.17	7309
14.34	0.16	7081
14.26	0.16	6851
14.18	0.15	6620
14.09	0.15	6388
14.01	0.14	6155
13.93	0.14	5920
13.84	0.13	5685
13.76	0.13	5448
13.68	0.12	5211
13.59	0.11	4972
13.51	0.11	4733
13.43	0.10	4493
13.34	0.10	4252
13.26	0.09	4010
13.18	0.09	3767
13.09	0.08	3524
13.01	0.08	3280
12.93	0.07	3035
12.84	0.06	2790
12.76	0.06	2544
12.68	0.05	2297
12.59	0.05	2050
12.51	0.04	1803
12.43	0.04	1555
12.34	0.03	1306
12.26	0.02	1057
12.18	0.02	940
12.09	0.02	822
12.01	0.02	705
11.93	0.01	587
11.84	0.01	470
11.76	0.01	352
11.68	0.01	235
11.59	0.00	117

Stage [ft]	Volume [ac-ft]	Volume [ft3]
11.51	0.00	0

Comment:

Rating Curve Link: infiltration

Scenario: Scenario1
 From Node: storm chamber
 To Node: Groundwater
 Link Count: 1
 Flow Direction: Both

Table	Elev On [ft]	Elev On Node	Elev Off [ft]	Elev Off Node
RC drawdown	11.55	storm chamber	11.51	storm chamber
horizontal drawdown	11.55	storm chamber	11.51	storm chamber

Comment:

Simulation: FDOT 25yr-24hr

Scenario: Scenario1
 Run Date/Time: 11/22/2023 11:02:15 AM
 Program Version: ICPR4 4.07.08

General

Run Mode: Normal

	Year	Month	Day	Hour [hr]
Start Time:	0	0	0	0.0000
End Time:	0	0	0	48.0000
	Hydrology [sec]	Surface Hydraulics [sec]	Groundwater [sec]	
Min Calculation Time:	60.0000	0.1000	900.0000	
Max Calculation Time:		30.0000		

Output Time Increments

Hydrology

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.0000	15.0000

Surface Hydraulics

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.0000	15.0000

Groundwater

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.0000	60.0000

Restart File

Save Restart: False

Resources & Lookup Tables

Resources

Rainfall Folder:
Reference ET Folder:
Unit Hydrograph
Folder:

Lookup Tables

Boundary Stage Set:
Extern Hydrograph Set:
Curve Number Set:

Green-Ampt Set:
Vertical Layers Set:
Impervious Set:
Roughness Set:
Crop Coef Set:
Fillable Porosity Set:
Conductivity Set:
Leakage Set:

Tolerances & Options

Time Marching: SAOR
Max Iterations: 6
Over-Relax Weight: 0.5 dec
Fact:
dZ Tolerance: 0.0010 ft

Max dZ: 1.0000 ft
Link Optimizer Tol: 0.0001 ft

Edge Length Option: Automatic

Dflt Damping (2D): 0.0000 ft
Min Node Srf Area: 100 ft2
(2D):
Energy Switch (2D): Energy

IA Recovery Time: 24.0000 hr
ET for Manual Basins: False

Smp/Man Basin Rain: Global
Opt:
OF Region Rain Opt: Global
Rainfall Name: ~FDOT-24
Rainfall Amount: 10.80 in
Storm Duration: 24.0000 hr

Dflt Damping (1D): 0.0000 ft
Min Node Srf Area: 100 ft2
(1D):
Energy Switch (1D): Energy

Comment:

Simulation: FDOT 25yr-8hr

Scenario: Scenario1

Run Date/Time: 11/22/2023 11:02:58 AM
 Program Version: ICPR4 4.07.08

General

Run Mode: Normal

	Year	Month	Day	Hour [hr]
Start Time:	0	0	0	0.0000
End Time:	0	0	0	16.0000

	Hydrology [sec]	Surface Hydraulics [sec]	Groundwater [sec]
Min Calculation Time:	60.0000	0.1000	900.0000
Max Calculation Time:		30.0000	

Output Time Increments

Hydrology

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.0000	15.0000

Surface Hydraulics

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.0000	15.0000

Groundwater

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.0000	60.0000

Restart File

Save Restart: False

Resources & Lookup Tables

Resources

Rainfall Folder:
 Reference ET Folder:
 Unit Hydrograph
 Folder:

Lookup Tables

Boundary Stage Set:
 Extern Hydrograph Set:
 Curve Number Set:

 Green-Ampt Set:
 Vertical Layers Set:
 Impervious Set:
 Roughness Set:
 Crop Coef Set:
 Fillable Porosity Set:
 Conductivity Set:
 Leakage Set:

Tolerances & Options

Time Marching:	SAOR	IA Recovery Time:	24.0000 hr
Max Iterations:	6	ET for Manual Basins:	False
Over-Relax Weight	0.5 dec		
Fact:			
dZ Tolerance:	0.0010 ft	Smp/Man Basin Rain	Global
		Opt:	
Max dZ:	1.0000 ft	OF Region Rain Opt:	Global
Link Optimizer Tol:	0.0001 ft	Rainfall Name:	~FDOT-8
		Rainfall Amount:	7.52 in
Edge Length Option:	Automatic	Storm Duration:	8.0000 hr
Dflt Damping (2D):	0.0000 ft	Dflt Damping (1D):	0.0000 ft
Min Node Srf Area	100 ft2	Min Node Srf Area	100 ft2
(2D):		(1D):	
Energy Switch (2D):	Energy	Energy Switch (1D):	Energy

Comment:

Node Max Conditions [Scenario1]

Node Name	Sim Name	Warning Stage [ft]	Max Stage [ft]	Min/Max Delta Stage [ft]	Max Total Inflow [cfs]	Max Total Outflow [cfs]	Max Surface Area [ft2]
Groundwater	FDOT 25yr-24hr	5.00	4.00	0.0000	1.99	0.00	0
storm chamber	FDOT 25yr-24hr	17.26	13.13	0.0010	1.41	0.88	3096
Groundwater	FDOT 25yr-8hr	5.00	4.00	0.0000	4.11	0.00	0
storm chamber	FDOT 25yr-8hr	17.26	16.80	0.0010	4.06	1.14	3096

Link Min/Max Conditions [Scenario1]

Link Name	Sim Name	Max Flow [cfs]	Min Flow [cfs]	Min/Max Delta Flow [cfs]	Max Us Velocity [fps]	Max Ds Velocity [fps]	Max Avg Velocity [fps]
infiltration	FDOT 25yr-24hr	0.88	0.00	-0.77	0.00	0.00	0.00
infiltration	FDOT 25yr-8hr	1.14	0.00	-0.77	0.00	0.00	0.00

Simple Basin Runoff Summary [Scenario1]

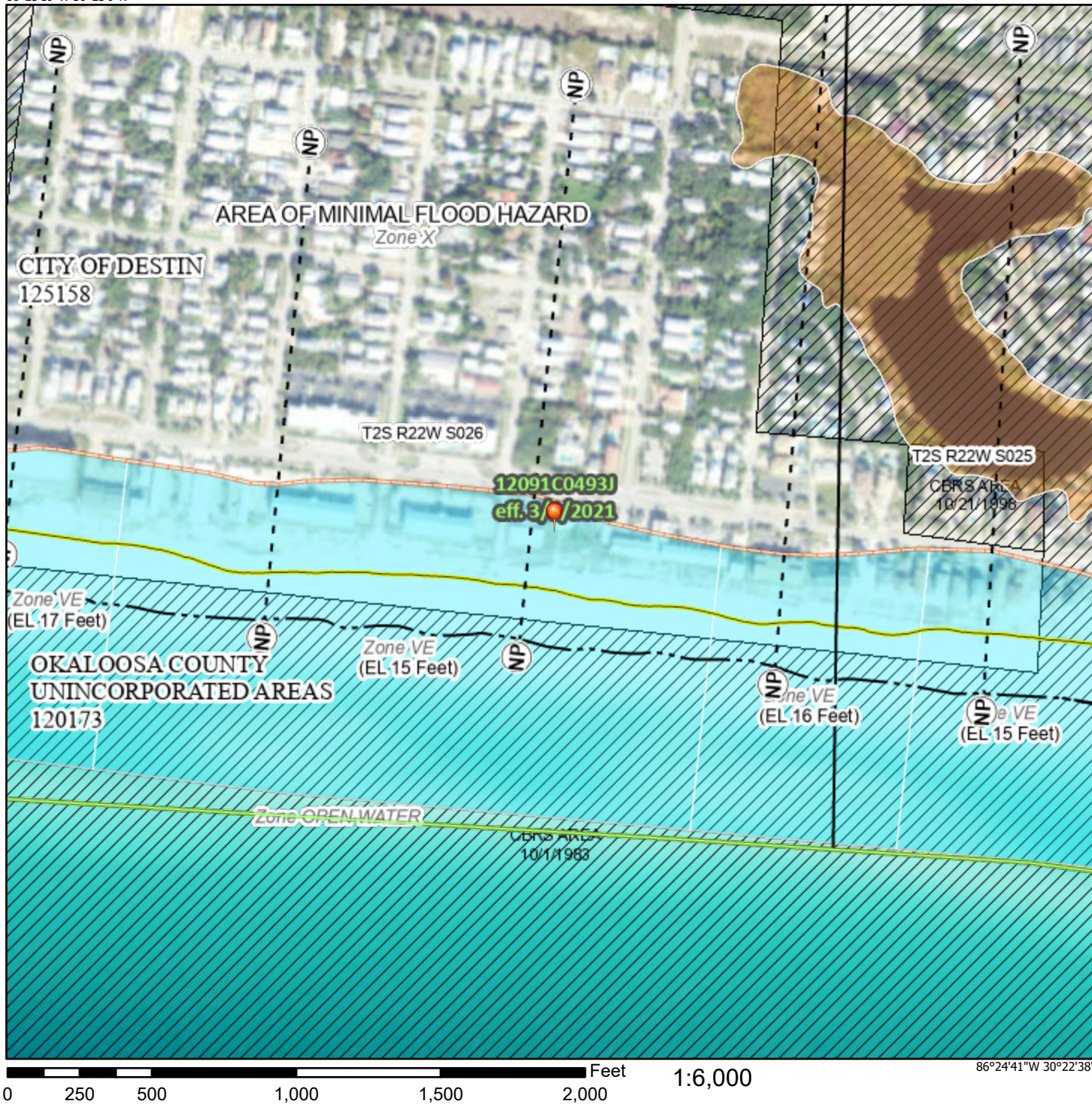
Basin Name	Sim Name	Max Flow [cfs]	Time to Max Flow [hrs]	Total Rainfall [in]	Total Runoff [in]	Area [ac]	Equivalent Curve Number	% Imperv	% DCIA
Post Dev	FDOT 25yr-24hr	1.41	12.0000	10.80	9.09	1.3700	86.0	0.00	0.00
Pre Dev	FDOT 25yr-24hr	1.12	12.0000	10.80	6.69	1.3700	68.0	0.00	0.00
Post Dev	FDOT 25yr-8hr	4.06	4.0000	7.52	5.88	1.3700	86.0	0.00	0.00
Pre Dev	FDOT 25yr-8hr	3.06	4.0167	7.52	3.84	1.3700	68.0	0.00	0.00

Appendix C: FEMA Flood Zone Map

National Flood Hazard Layer FIRMMette



86°25'19"W 30°23'9"N



Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS		Without Base Flood Elevation (BFE) Zone A, V, A99
		With BFE or Depth Zone AE, AO, AH, VE, AR
		Regulatory Floodway
OTHER AREAS OF FLOOD HAZARD		0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile Zone X
		Future Conditions 1% Annual Chance Flood Hazard Zone X
		Area with Reduced Flood Risk due to Levee. See Notes. Zone X
		Area with Flood Risk due to Levee Zone D
OTHER AREAS		NO SCREEN Area of Minimal Flood Hazard Zone X
		Effective LOMRs
GENERAL STRUCTURES		Area of Undetermined Flood Hazard Zone D
		Channel, Culvert, or Storm Sewer
		Levee, Dike, or Floodwall
OTHER FEATURES		20.2 Cross Sections with 1% Annual Chance Water Surface Elevation
		17.5 Cross Sections with 1% Annual Chance Water Surface Elevation
		Coastal Transect
		Base Flood Elevation Line (BFE)
		Limit of Study
		Jurisdiction Boundary
MAP PANELS		Coastal Transect Baseline
		Profile Baseline
		Hydrographic Feature
		Digital Data Available
		No Digital Data Available
		Unmapped

The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

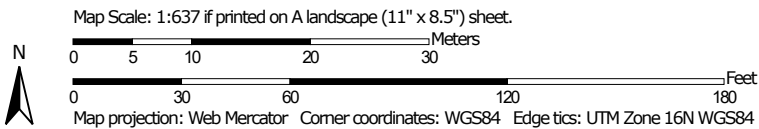
The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on **11/28/2023 at 3:59 PM** and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.

Basemap Imagery Source: USGS National Map 2023

Appendix D: Soil Survey

Soil Map—Okaloosa County, Florida
(Tarpon Beach Park)



Soil Map—Okaloosa County, Florida
(Tarpon Beach Park)

MAP LEGEND

Area of Interest (AOI)

 Area of Interest (AOI)

Soils

 Soil Map Unit Polygons

 Soil Map Unit Lines

 Soil Map Unit Points

Special Point Features



Blowout



Borrow Pit



Clay Spot



Closed Depression



Gravel Pit



Gravelly Spot



Landfill



Lava Flow



Marsh or swamp



Mine or Quarry



Miscellaneous Water



Perennial Water



Rock Outcrop



Saline Spot



Sandy Spot



Severely Eroded Spot



Sinkhole



Slide or Slip



Sodic Spot



Spoil Area



Stony Spot



Very Stony Spot



Wet Spot



Other



Special Line Features

Water Features



Streams and Canals

Transportation



Rails



Interstate Highways



US Routes



Major Roads



Local Roads

Background



Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:20,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service

Web Soil Survey URL:

Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Okaloosa County, Florida

Survey Area Data: Version 22, Aug 24, 2023

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Dec 31, 2009—Dec 10, 2017

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
3	Beaches	0.0	3.0%
18	Newhan-Corolla complex, 2 to 30 percent slopes	1.6	97.0%
Totals for Area of Interest		1.7	100.0%

Appendix E: O&M Plan

OPERATIONS & MAINTENANCE INSTRUCTIONS
FOR THE
TARPON BEACH PARK
STORMWATER MANAGEMENT SYSTEM

I. GENERAL:

Stormwater Management Systems require periodic maintenance to ensure that the facilities function as designed.

II. FACILITY OPERATION

Stormwater systems normally do not require any kind of operational tasks. Most systems function by the force of gravity.

III. FACILITY MAINTENANCE

Facilities within this project which will require maintenance include the following:

1. Underground storm retention chambers
2. Inlets and piping systems

A. Underground Storm Detention Chambers

1. Inspection and Maintenance for all isolator row plus rows
 - a. Remove cover from structure at upstream end of isolator row plus.
 - b. Using a flashlight, inspect down the isolator row plus for visual inspection of sediment levels.
 - i. Mirrors on poles and cameras may be used to avoid confined space entry.
 - ii. Follow all OSHA regulations for confined space entry into the manhole.
 - c. If sediment buildup is at, or above 3", cleanout the isolator row plus using the jetvac process.
 - i. Use a fixed culvert cleaning nozzle with rear facing spread of 45" or more.
 - ii. Apply multiple passes of the jetvac until backflush water is clean.
 - iii. Vacuum the structure sump as required to remove sediment.
 - d. Replace manhole lid and record observations and actions performed.

B. Inlets and Piping Systems

1. Regular Maintenance
 - a. Keep inlets and the surrounding drainage area clean and free of any trash and debris which may degrade the system.
 - b. Following rainfall events, inspect drainage structures and note any standing water inside structures which may indicate a blockage within the drainage system.

2. Restoration

- a. When a blockage within the drainage system is apparent, inspect the pipes and structures by visual inspection, snaking or video camera, whichever is appropriate.
- b. Remove any blockage using a pressure water system.
- c. Remove all soil and debris from the bottom of inlets.
- d. Repair failures in the drainage structures or pipe network. Depressed areas in the ground above the pipe network or adjacent to drainage structures may indicate possible failures in the drainage system.

IV. INSPECTION

A. Reporting

Regular inspection of the stormwater management system shall be performed by a registered professional as outlined in these instructions and required by the rules and permit governing the operation of the stormwater management facility. A report describing the results of inspections and certifying that the system is operating as designed and permitted, must be filed with the FDEP within 30 days after the inspection. In the event of a system failure, a report shall be submitted to the FDEP within 30 days of the failure. The results of all inspections shall be filed with the FDEP using Form "Operation and Maintenance Inspection Certification".

B. Frequency

1. Underground Storm Retention Chambers: Inspect every 6 months for the first year of operation. Adjust the inspection interval based on previous observations of sediment accumulation and high-water elevation. Conduct jetting and vactoring annually or as often as inspection shows that maintenance is necessary.
2. Other routine inspections shall be performed as required to ensure the proper operation of the stormwater management system and in accordance with the conditions of the stormwater permit.

Appendix F: Geotechnical Report

Mike Marshall, 2023

02 01 00 SUB-SURFACE INVESTIGATION

PART 1 GENERAL

1.01 RELATED DOCUMENTS:

The General Provision of the Contract, including bidding conditions and contractual conditions, apply to the work specified in this section.

1.02 SCOPE:

The geo-technical exploration, boring log and recommendation of the Soil Engineer is made a part of this specification.



REPORT OF GEOTECHNICAL EXPLORATION

**Tarpon Beach Facilities
Okaloosa County, Florida**

Tierra Project No. 4511-23-038

Prepared for:

**Sam Marshall Architects
325 S Palafox Street
Pensacola, Florida 32502
Attn: Mr. Mike Marshall, AIA, CSI**

Prepared by:

**Tierra, Inc.
1300 West Main Street
Pensacola, Florida 32502**

August 18, 2023



**1300 West Main Street • Pensacola, FL 32502
Phone (850) 462-8774 • Fax (850) 462-8784**

TIERRA

August 18, 2023

Sam Marshall Architects
325 S Palafox Street
Pensacola, Florida 32502
Attn: Mr. Mike Marshall, AIA, CSI

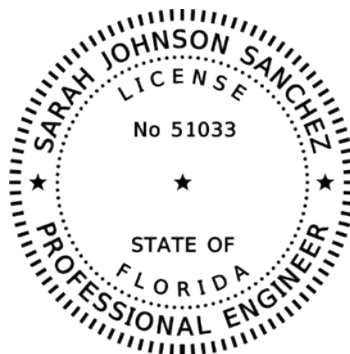
Subject: Tarpon Beach Facilities
Okaloosa County, Florida
Tierra Project No. 4511-23-038

Mr. Marshall:

Thank you for choosing Tierra, Inc. (Tierra) as your Geotechnical consultant. Per your authorization, we have completed the Geotechnical exploration for the subject project. The results of the study are discussed in this report.

Should you have any questions regarding the enclosed report or the project in general, please do not hesitate to contact us at (850) 462-8774.

Sincerely,
TIERRA, INC.



*THIS ITEM HAS BEEN DIGITALLY
SIGNED AND SEALED BY*

ON THE DATE ADJACENT TO THE SEAL

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TIERRA, INC.
1300 WEST MAIN STREET
PENSACOLA, FLORIDA 32502

SARAH JOHNSON SANCHEZ, P.E. NO. 51033

Mitchell L. Smith, PE
Principal Geotechnical Engineer
Florida License No. 43416

Sarah Johnson Sanchez, PE
Sr. Project Engineer
Florida License No. 51033



1300 West Main Street • Pensacola, FL 32502
Phone (850) 462-8774 • Fax (850) 462-8774

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APPENDIX A

Boring Location Plan and Soil Profiles

Table 1 – Summary of Falling Head Permeability Tests

Falling Head Permeability Test Results

1.0 PROJECT INFORMATION

1.1 Project Authorization

Authorization to proceed on this project was issued by Mr. Mike Marshall, Vice President with Sam Marshall Architects via acceptance of our Geotechnical Engineering Services Proposal 45-22-130 dated October 13, 2022. A formal contract has been executed between Tiera, Inc. and Sam Marshall Architects for these services.

1.2 Project Description

Based on the information provided, we understand that the development will include a new bathroom building on the south side of the site with two connecting pavilions on either side. The new bathroom/pavilions will be lightly loaded, timber pile supported structures established at/near existing site grades. A stormwater management facility (SMF) will be found beneath the paved parking north of the bathroom/pavilion structures.

If any of the project information noted above is incorrect or has changed, please inform Tierra so that we may amend the recommendations presented in this report, if necessary.

1.3 Purpose and Scope of Services

The purpose of this exploration was to evaluate the subsurface conditions present in the subject areas and to render timber pile foundation recommendations as well as parameters for stormwater drawdown analysis for the proposed SMF.

The exploration consisted of two (2) 35-foot deep Standard Penetration Test (SPT) borings to evaluate the subsurface conditions for the restrooms/pavilions and two (2) 7-foot deep auger borings in the proposed SMF area; laboratory soil testing including water content tests, wash #200 sieve tests, and falling head permeability tests; and a site visit, visual classification of the soil samples, and analysis by our engineering staff.

2.0 SITE AND SUBSURFACE CONDITIONS

2.1 Site Location and Description

The gulf front site is located on the south side of Scenic Highway 98 near the intersection of Tarpon Street in Okaloosa County, Florida. An aerial photograph depicting the site location is shown on the Boring Location Plan (Appendix A).

At the time of our exploration, the site was clear and relatively level. Based on review of the topographic survey provided, as well as the survey data on Google Earth, the north portion of the site is relatively level at/near EL +20 feet to EL +22 feet, and the property slopes downward to the south to near EL +7 feet.

2.2 Subsurface Conditions

The Boring Location Plan and the Soil Profiles of the borings drilled for this study can be found in Appendix A. The borings were field located and staked using a Garmin GPSMap 66ST Global Positioning System (GPS) unit with a reported accuracy of ± 1 meter. Therefore, the boring locations should be considered approximate.

We have estimated ground surface elevations at the boring locations using the topographic survey provided, as well as the topographic information provided in Google Earth. The subsurface conditions encountered will be discussed in general terms below.

The restroom/pavilion borings (B-1 and B-2) encountered the following idealized profile:

<u>Elevation (ft.)</u>	<u>Soil Description</u>
+20 to +5	Very loose to loose SAND (SP)
+5 to -20	Medium dense SAND (SP)

The SMF borings (SW-1 and SW-2) generally encountered sand from the ground surface (average EL +22 feet) to the bottom of the 7-foot deep borings.

The above subsurface descriptions are of a generalized nature, provided to highlight the major soil stratum encountered. The Soil Profiles should be reviewed for specific subsurface conditions at each boring location. The stratification shown on the Soil Profiles represents the subsurface conditions at the actual boring locations only, and variations in the subsurface conditions can and

may occur between boring locations and should therefore be expected. The stratification represents the approximate boundary between subsurface materials, and the transitions between strata may be gradual.

2.3 Groundwater Conditions

Groundwater was encountered in SPT borings B-1 and B-2 approximately 18 feet below existing grade at the time of drilling, which was during a period of above-normal seasonal rainfall. Based on the ground surface elevations at the boring locations estimated from the topographic survey and Google Earth, this corresponds to groundwater elevation of approximately +3 feet NAVD 88. Groundwater was not encountered in the SMF borings.

Groundwater levels will fluctuate with rainfall and tides and could vary several feet during typical seasonal fluctuations. Larger fluctuations are possible under severe weather conditions. We recommend that the Contractor determine the actual groundwater levels at the time of construction to determine potential impacts groundwater can/will have on construction procedures.

2.4 Laboratory Soil Testing

Laboratory soil testing consisted of water content tests, wash #200 sieve tests, and falling head permeability tests. The results of the water content and wash #200 sieve tests can be found on the Soil Profiles opposite the samples tested.

Falling head permeability tests were performed on remolded bulk samples of the sand soils encountered in the SMF borings. The densities to which the samples were remolded were based on the N_f values obtained from the nearby SPT borings. The results of the tests are summarized in Table 1 attached in Appendix A. The laboratory permeability test data sheets are attached in Appendix A.

3.0 EVALUATION AND RECOMMENDATIONS

3.1 General Comments

Based on our understanding of the proposed facility, the exploration encountered subsurface conditions that will provide adequate support for the proposed structure provided the recommendations presented in this report are followed.

The subsurface conditions encountered in the SMF borings are suitable for conventional dry treatment. Stormwater design parameters are presented in Section 3.5 below.

3.2 Timber Pile Foundation Recommendations

We have evaluated compression and tension pile capacities for 8-inch and 10-inch tip diameter timber piles to support the proposed restroom facility. Table 2 below shows allowable compression and tension capacities for driven timber piles with a tip elevation of -6 feet NAVD 88 (note – all elevations referenced to NAVD 88). The capacities presented in Table 2 assume a pile butt elevation of +18 feet, a ground surface elevation of +20 feet (assuming no scour), include a Factor of Safety of 2, and assume a pilot hole to elevation +10 feet to aide in standing the piles prior to driving.

TABLE 2		
ALLOWABLE TIMBER PILE COMPRESSION & TENSION CAPACITIES		
Pile Size	Allowable Compression Capacity	Allowable Tension Capacity
8-inch Diameter Timber Pile	7 tons	4 tons
10-inch Diameter Timber Pile	10 tons	6 tons

3.3 Pile Group Action

No reductions of the individual pile capacities will be required if piles are spaced center-to-center a minimum of 3 times their width/diameter. If piles are spaced closer, our office should be notified so that pile capacity reductions can be evaluated.

3.4 Settlement

Settlements of driven pile foundations are typically small and should not be a concern on this project provided the piles are embedded as recommended herein. Pile head settlements should be on the order of ½ inch or less. Group settlements are estimated to be on the same order of magnitude for the expected lightly loaded structure.

3.5 Stormwater Management Facility Recommendations

The subsurface conditions encountered in the SMF auger borings are suitable for conventional dry treatment of stormwater runoff. Geotechnical parameters for analysis/design are presented below:

- **Effective Aquifer Thickness:** A confining unit, which would hydrogeologically define the thickness of the surficial aquifer, was not encountered to a depth of 45 feet below existing grade (the deepest boring drilled on the site). For the purposes of modeling, we recommend setting the bottom of the aquifer no deeper than the bottom of the boring elevation (EL -20 feet). Note that a shallower effective aquifer thickness for modeling a shallow SMF may be more appropriate given the expected minimal head, and a sensitivity analysis using this parameter is warranted.
- **Seasonal High Groundwater Level:** Groundwater was encountered at approximately EL +3 feet at the time of drilling. Given that the borings were drilled during a period of above-normal rainfall, we have estimated the “normal” SHWT to be at/near elevation +3 feet.
- **Vertical Permeability:** Vertical flow from the bottom of the SMF will be controlled by the vertical permeability of the soil immediately beneath the bottom of the SMF. Based on the results of the falling head permeability tests (Table 1), an average vertical permeability of 27.4 ft/day for Stratum 1 would be reasonable for modeling.
- **Horizontal Permeability:** Horizontal flow from the pond will be through the Stratum 1 soils. The horizontal permeability of Stratum 1 has been estimated based on the results of the vertical permeability tests and extensive experience with similar soils from field permeability tests. While horizontal permeabilities have generally been found to range from 3 to 10 times higher than vertical permeabilities of regional deposits, we recommend that a multiplier of 3 with a factor of safety of 2 be used for design (effectively, a 1.5 multiplier). Therefore, a K_h

value of 41.1 ft/day would be reasonable for modeling the Stratum 1 materials (27.4 ft/day x 1.5).

- **Effective Porosity:** Based on the fines contents of the soils encountered in the test borings, an effective porosity of 0.30 would be appropriate for modeling the Stratum 1 soils.

4.0 REPORT LIMITATIONS

The recommendations submitted are based on the available soil information obtained by Tierra, Inc. and design details furnished by Baskerville-Donovan for the subject project. If there are any revisions to the plans for this project or if deviations from the subsurface conditions noted in this report are encountered during construction, Tierra should be notified immediately to determine if changes in the foundation, or other, recommendations are required. If Tierra is not retained to perform these functions, we cannot be responsible for the impact of such conditions on the performance of the project.

The findings, recommendations, specifications, and professional advice contained herein have been made in accordance with generally accepted professional Geotechnical engineering practices in the local area.

After the plans and specifications are more complete, the Geotechnical engineer should be provided the opportunity to review the final design plans and specifications to assure our engineering recommendations have been properly incorporated into the design documents. At that time, it may be necessary to submit supplementary recommendations. This report has been prepared for the exclusive use of Sam Marshall Architects for the specific application to the subject project.

APPENDIX A

Boring Location Plan and Soil Profiles

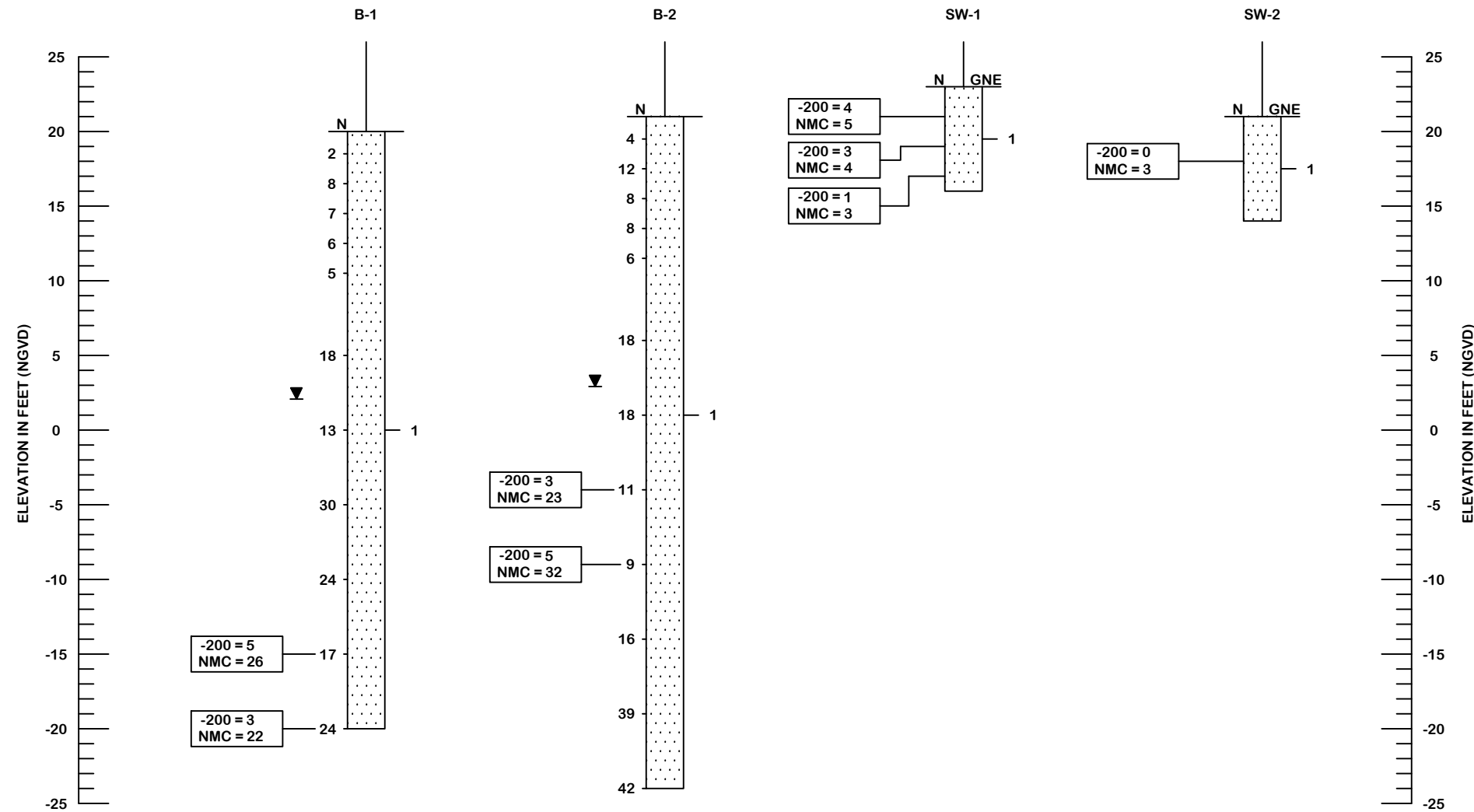
Table 1 – Summary of Falling Head Permeability Tests

Falling Head Permeability Test Results

SOIL PROFILES

LEGEND

- 1 [Symbol] WHITE, GRAY, BROWN SAND (SP)
- ▼ GROUNDWATER LEVEL ENCOUNTERED DURING INVESTIGATION
- N SPT N-VALUE IN BLOWS/FOOT FOR 12 INCHES OF PENETRATION (UNLESS OTHERWISE NOTED)
- SP UNIFIED SOIL CLASSIFICATION SYSTEM (ASTM D 2488) GROUP SYMBOL AS DETERMINED BY VISUAL REVIEW AND LABORATORY TESTING ON SELECTED SAMPLES FOR CONFIRMATION OF VISUAL REVIEW.
- GNE GROUNDWATER TABLE NOT ENCOUNTERED
- 200 PERCENT PASSING #200 SIEVE
- NMC NATURAL MOISTURE CONTENT (%)
- NOTE: ELEVATIONS OBTAINED FROM GOOGLE EARTH



SAFETY HAMMER	
GRANULAR MATERIALS- RELATIVE DENSITY	SPT N-VALUE (BLOWS/FT.)
VERY LOOSE	LESS THAN 4
LOOSE	4 TO 10
MEDIUM	10 TO 30
DENSE	30 TO 50
VERY DENSE	GREATER THAN 50
SILTS AND CLAYS CONSISTENCY	SPT N-VALUE (BLOWS/FT.)
VERY SOFT	LESS THAN 2
SOFT	2 TO 4
FIRM	4 TO 8
STIFF	8 TO 15
VERY STIFF	15 TO 30
HARD	GREATER THAN 30

DRAWN BY:
SW

CHECKED BY:
SJS

APPROVED BY:
SJS

DATE:
AUG 2023

ENGINEER OF RECORD:
SARAH J. SANCHEZ, P.E.
FLORIDA LICENSE NO.:
51033



SCALE:
NOTED

PROJECT NUMBER:
4511-23-038

GEOTECHNICAL ENGINEERING SERVICES
TARPON BEACH FACILITIES
OKALOOSA COUNTY, FLORIDA

SHEET 2

TABLE 1
SUMMARY OF LABORATORY SOIL PERMEABILITY TESTS (FALLING HEAD METHOD)
TARPON BEACH FACILITIES
WALTON COUNTY, FLORIDA
TIERRA PROJECT NO. 4511-23-038

Soil Stratum Number ⁽¹⁾	Boring	Sample Elevation (ft. NAVD 88) ⁽²⁾	Sample Description	% Fines	Dry Density (pcf)	Vertical Permeability (ft/day)
1	SW-1	21 - 18	White, Gray, Brown SAND (SP)	3	104	15.7
1	SW-1	18 - 16	White, Gray, Brown SAND (SP)	1	102	26.5
1	SW-2	21 - 17	White, Gray, Brown SAND (SP)	0	97	40 ⁽³⁾

Notes: (1) See Soil Profiles (Appendix A).

(2) Ground surface elevations obtained from Google Earth

(3) Permeability value limited to 40 ft/day due to test method recommended limitations

FALLING HEAD PERMEABILITY TEST



Project Name: Tarpon Beach Facilities, Walton County, FL
Project Number: 4511-23-038 **Sample Location:** SW-1 @ 2.5 ft - 5 ft
Sample Description: White, Gray, Brown SAND (Stratum 1)
Remolded Compactive Effort: Standard **No. of Layers:** 3 **Blows Per Layer:** 15
Date: 8/14/2023 **Technician:** BC **Soil Classification:** SP

- Assumes:**
1. Standard Proctor Mold (L = 4.5 in.)
 2. 1/2 Inch Diameter Tubing

$$K_v = \frac{(2.3 \cdot a \cdot L) \log(h_1/h_2)}{(A) (\Delta t)}$$

where a = 1.267 cm (area of tube)
 L = 4.584 in. (height of soil sample)
 = 11.64336 cm (L = 4.5 in. for full mold)
 A = 12.57 sq. in. (area of Proctor mold)
 = 81.1 sq. cm

Head (ft)	Time (sec)		Avg. Time (sec)
	Run #1	Run #2	
7	0	0	0
6	4.5	4.4	4.5
5	10	10	10.0
4	17.4	17	17.2
3	26.9	36.6	31.8
2	40.5	40.1	40.3
1	64.1	63.7	63.9

h1	h2	Delta t (sec)	K _v (cm/sec)
7	1	63.9	5.5E-03
6	1	59.45	5.5E-03
7	2	40.3	5.6E-03

Average K _v =	5.6E-03 cm/sec
	15.7 ft/day

Remolded Test Sample Density

Can #	2R
Wt. Can + Wet Soil, g	416.0
Wt. Can + Dry Soil, g	398.6
Wt. of Water, g	17.4
Wt. of Can, g	259.3
Wt. of Dry Soil, g	139.3
Moisture Content, %	12.5%
Wt. Wet Soil + Mold, lbs.	8.4
Wt. of Mold, lbs.	4.5
Wt. of Wet Soil, lbs.	3.9
Wet Density, pcf	116.4
Dry Density, pcf	103.5

Fines Content of Test Sample

Can #	45
Wt. Can + Wet Soil, g	252.4
Wt. Can + Dry Soil, g	247.3
Wt. of Water, g	5.2
Wt. of Can, g	121.8
Wt. of Dry Soil, g	125.5
Wt. of Dry Sample After Washing + Can, g	243.8
Wt. of Soil Lost During Washing, g	3.4
Moisture Content, %	4.1%
Percent Fines, %	2.7%

FALLING HEAD PERMEABILITY TEST



Project Name: Tarpon Beach Facilities, Walton County, FL
Project Number: 4511-23-038 **Sample Location:** SW-1 @ 5 ft -7 ft
Sample Description: White, Gray, Brown SAND (Stratum 1) **Soil Classification:** SP
Remolded Compactive Effort: Standard **No. of Layers:** 3 **Blows Per Layer:** 15

Date: 8/14/2023

Technician: BC

- Assumes:**
1. Standard Proctor Mold (L = 4.5 in.)
 2. 1/2 Inch Diameter Tubing

$$K_v = \frac{(2.3 \cdot a \cdot L) \log(h_1/h_2)}{(A) (\Delta t)}$$

where a = 1.267 cm (area of tube)
 L = 4.584 in. (height of soil sample)
 = 11.64336 cm (L = 4.5 in. for full mold)
 A = 12.57 sq. in. (area of Proctor mold)
 = 81.1 sq. cm

Head (ft)	Time (sec)		Avg. Time (sec)
	Run #1	Run #2	
7	0	0	0
6	2.9	2.9	2.9
5	6.4	6.3	6.4
4	10.8	10.3	10.6
3	16.6	15.8	16.2
2	24.8	23.8	24.3
1	38.5	37.3	37.9

h1	h2	Delta t (sec)	K _v (cm/sec)
7	1	37.9	9.3E-03
6	1	35	9.3E-03
7	2	24.3	9.4E-03

Average K _v =	9.3E-03 cm/sec
	26.5 ft/day

Remolded Test Sample Density

Can #	1R
Wt. Can + Wet Soil, g	387.5
Wt. Can + Dry Soil, g	367.7
Wt. of Water, g	19.8
Wt. of Can, g	256.3
Wt. of Dry Soil, g	111.4
Moisture Content, %	17.8%
Wt. Wet Soil + Mold, lbs.	8.5
Wt. of Mold, lbs.	4.5
Wt. of Wet Soil, lbs.	4.0
Wet Density, pcf	119.7
Dry Density, pcf	101.6

Fines Content of Test Sample

Can #	46
Wt. Can + Wet Soil, g	243.4
Wt. Can + Dry Soil, g	239.4
Wt. of Water, g	4.0
Wt. of Can, g	120.2
Wt. of Dry Soil, g	119.2
Wt. of Dry Sample After Washing + Can, g	238.5
Wt. of Soil Lost During Washing, g	0.9
Moisture Content, %	3.4%
Percent Fines, %	0.8%

FALLING HEAD PERMEABILITY TEST



Project Name: Tarpon Beach Facilities, Walton County, FL
Project Number: 4511-23-038 **Sample Location:** SW-2 @ 0 ft - 4.25 ft
Sample Description: White, Gray, Brown SAND (Stratum 1)
Remolded Compactive Effort: Standard **No. of Layers:** 3 **Blows Per Layer:** 15
Date: 8/14/2023 **Technician:** BC **Soil Classification:** SP

- Assumes:**
1. Standard Proctor Mold (L = 4.5 in.)
 2. 1/2 Inch Diameter Tubing

$$K_v = \frac{(2.3 \cdot a \cdot L) \log (h_1/h_2)}{(A) (\Delta t)}$$

where a = 1.267 cm (area of tube)
 L = 4.584 in. (height of soil sample)
 = 11.64336 cm (L = 4.5 in. for full mold)
 A = 12.57 sq. in. (area of Proctor mold)
 = 81.1 sq. cm

Head (ft)	Time (sec)		Avg. Time (sec)
	Run #1	Run #2	
7	0	0	0
6	1.5	1.3	1.4
5	3.2	2.9	3.1
4	5.1	4.8	5.0
3	7.5	7.1	7.3
2	11	10.5	10.8
1	17	16.9	17.0

h1	h2	Delta t (sec)	K _v (cm/sec)
7	1	16.95	2.1E-02
6	1	15.55	2.1E-02
7	2	10.75	2.1E-02

Average K _v =	2.1E-02 cm/sec
	59.5 ft/day

Remolded Test Sample Density

Can #	2R
Wt. Can + Wet Soil, g	386.8
Wt. Can + Dry Soil, g	370.5
Wt. of Water, g	16.3
Wt. of Can, g	259.3
Wt. of Dry Soil, g	111.2
Moisture Content, %	14.7%
Wt. Wet Soil + Mold, lbs.	8.2
Wt. of Mold, lbs.	4.5
Wt. of Wet Soil, lbs.	3.7
Wet Density, pcf	111.0
Dry Density, pcf	96.8

Fines Content of Test Sample

Can #	47
Wt. Can + Wet Soil, g	251.0
Wt. Can + Dry Soil, g	246.8
Wt. of Water, g	4.2
Wt. of Can, g	120.4
Wt. of Dry Soil, g	126.4
Wt. of Dry Sample After Washing + Can, g	246.4
Wt. of Soil Lost During Washing, g	0.3
Moisture Content, %	3.4%
Percent Fines, %	0.3%

**ENGINEER'S OPINION
OF PROBABLE CONSTRUCTION COST**



PROJECT NAME: 12107.01 Tarpon Beach Gulf Front Park

CLIENT: Okaloosa County/City of Destin

DATE: 11/8/2023

ESTIMATED BY: SES

REVIEWED BY: JCP

BDI PROJECT NO. 12107.01

SUBMITTAL PHASE: 100%

ITEM	DESCRIPTION	QTY	UNIT	UNIT PRICE	AMOUNT
	Mobilization	1	LS	\$100,000.00	\$100,000.00
	Earthwork	1	LS	\$20,000.00	\$20,000.00
	Restroom Building	880	SF	\$420.00	\$369,600.00
	(4) Pavilions	940	SF	\$285.00	\$267,900.00
	Dune Crossover	260	LF	\$620.00	\$161,200.00
	Final Grading and Seal Rolling Prior to Paving	3,400	SY	\$8.50	\$28,900.00
	1 1/2" Type SP 12.5 Asphalt, over 1500sy	3,400	SY	\$8.50	\$28,900.00
	Geotextile Grid, less than 500lf	50	SY	\$6.00	\$300.00
	Remove Existing Asphalt	150	CF	\$3.50	\$525.00
	Sawcut Existing Asphalt	250	LF	\$2.00	\$500.00
	Remove Existing 3' Wood Picket Fence	195	LF	\$7.00	\$1,365.00
	Remove Existing Sign	3	EA	\$62.00	\$186.00
	Remove Existing Roadway Striping, Arrow	1	EA	\$6.50	\$6.50
	12" Stabilized Subgrade, over 1000sy	3,490	SY	\$3.00	\$10,470.00
	Prime Coat	3,400	SY	\$1.00	\$3,400.00
	6" Graded aggregate Base "Min. LBR 100 at 100% Modified Proctor", over 1000sy	3,490	SY	\$16.00	\$55,840.00
	Thermoplastic 6" Solid Stripe, White	1,310	LF	\$1.19	\$1,558.90
	Thermoplastic 6" Dotted Guide Line, White	16	LF	\$1.79	\$28.64
	Thermoplastic 6" Double Solid Stripe, Yellow	190	LF	\$2.50	\$475.00
	Crosswalk	45	LF	\$27.50	\$1,237.50
	Thermoplastic Stop Bar	30	LF	\$8.00	\$240.00
	Thermoplastic Directional Arrow, Single Head (Straight Ahead) 12sf	8	EA	\$75.00	\$600.00
	Thermoplastic Directional Arrow, Single Head (Turn Left/Right)	3	EA	\$90.00	\$270.00
	Thermoplastic Handicap Parking Space with Symbol	3	EA	\$500.00	\$1,500.00
	"Stop" Sign, R1-01	1	EA	\$250.00	\$250.00
	Handicap "Reserved Parking" Sign, R7-08	3	EA	\$200.00	\$600.00
	"One Way" Sign, R6-02R	4	EA	\$225.00	\$900.00
	LSV Parking Only Sign, Custom	2	EA	\$31.00	\$62.00
	"No Parking Any Time" Sign, Double Arrow, R7-01	2	EA	\$19.00	\$38.00
	"Right Turn Only" Sign, R3-05R	1	EA	\$21.00	\$21.00
	"No Parking Loading Zone" Sign, R7-06	3	EA	\$24.00	\$72.00
	"Authorized Vehicles Only" Sign, R5-11	1	EA	\$21.00	\$21.00

1' Ribbon Curb, Per County Detail	560	LF	\$13.00	\$7,280.00
Concrete Vertical Curb, Type D	410	LF	\$20.00	\$8,200.00
Concrete Curb and Gutter, Type F	95	LF	\$22.00	\$2,090.00
5' Fiber Reinforced Concrete Sidewalk, over 80 lf	135	LF	\$28.00	\$3,780.00
8' Fiber Reinforced Concrete Sidewalk, over 100lf	450	LF	\$35.00	\$15,750.00
Concrete Traffic Separator, Type 1, 4' Wide	30	LF	\$87.00	\$2,610.00
Concrete Traffic Separator, Type 1, 6' Wide	15	LF	\$167.00	\$2,505.00
Concrete Traffic Separator, Type 1, 8.5' Wide	25	LF	\$190.00	\$4,750.00
Landscape Areas	7,300	SF	\$15.00	\$109,500.00
Detectable Handicap Warning Mat, FDOT Index 304	22	SF	\$50.00	\$1,100.00
Remove Existing Concrete, up to 6" thick	230	SY	\$6.50	\$1,495.00
Ditch Bottom Inlet, Type C, 6'-12' depth	2	EA	\$3,000.00	\$6,000.00
Ditch Bottom Inlet, Type D, 6'-12' depth	4	EA	\$4,500.00	\$18,000.00
15" RCP Pipe	130	LF	\$50.00	\$6,500.00
18" RCP Pipe	165	LF	\$65.00	\$10,725.00
24" RCP Pipe	110	LF	\$80.00	\$8,800.00
Storm Chambers MC-7200	1	LS	\$130,600.00	\$130,600.00
Storm Manhole with weep hole, Type 8, 6-12 ft deep	1	EA	\$6,000.00	\$6,000.00
Lift Station	1	LS	\$20,000.00	\$20,000.00
6' Wood Fence Enclosure	30	LF	\$25.00	\$750.00
Double Wood Gate, 6' x 5'	1	EA	\$500.00	\$500.00
1.5" PVC Sewer Force Main	130	LF	\$10.00	\$1,300.00
4" PVC Sewer Pipe	110	LF	\$20.00	\$2,200.00
45° PVC Bend for 1.5" Sewer Force Main	2	EA	\$3.00	\$6.00
45° PVC Bend for 4" Sewer Pipe	2	EA	\$15.00	\$30.00
4" Sewer PVC Clean Out	1	EA	\$35.00	\$35.00
8" x 8" x 1.5" PVC Sewer Tee	1	EA	\$90.00	\$90.00
2" PVC Water Main	390	LF	\$110.00	\$42,900.00
6" PVC Water Main	310	LF	\$30.00	\$9,300.00
Fire Hydrant Assembly	1	EA	\$5,000.00	\$5,000.00
90° DI Bend for 2" Water Main	3	EA	\$52.00	\$156.00
90° DI Bend for 6" Water Main	2	EA	\$234.00	\$468.00
6" x 6" x 2" PVC Water Tee	1	EA	\$72.00	\$72.00
2" x 2" x 2" PVC Water Tee	1	EA	\$8.00	\$8.00
6" x 6" x 6" PVC Water Tee	1	EA	\$66.00	\$66.00
Water Meter Box, 2"	1	EA	\$570.00	\$570.00
Backflow Preventor	1	EA	\$1,200.00	\$1,200.00
Public Shower with Foot Wash	3	EA	\$4,000.00	\$12,000.00
Water Hose Bibb	1	EA	\$15.00	\$15.00
2" Water Gate Valves	5	EA	\$100.00	\$500.00
6" Water Gate Valves	4	EA	\$1,500.00	\$6,000.00
Silt Fence Type IV	1,240	LF	\$5.00	\$6,200.00
Temporary Gravel Construction Entrance	120	SY	\$20.00	\$2,400.00
permits, etc.	1	EA	\$800.00	\$800.00

	Synthetic Erosion Control Wattles	6	LF	\$8.00	\$48.00
	Parking Bumpers	55	EA	\$500.00	\$27,500.00
	Bike Rack (3 Bikes)	2	EA	\$2,000.00	\$4,000.00
	Bollards	2	EA	\$1,200.00	\$2,400.00
	Subtotal Construction Costs				\$1,549,166
	Contractors Mark-up and General Conditions		15%		\$232,375
	Bonds and Insurance		5%		\$77,458
	Construction Contingencies		20%		\$309,833
	ESTIMATED TOTAL CONSTRUCTION COSTS				\$2,168,832

Engineer's opinions or estimates of probable construction costs are prepared upon the basis of Engineer's experience and qualifications and represent Engineer's judgment as a professional generally familiar with the industry. However, since Engineer has no control over the cost of labor, materials, equipment, or services furnished by others, over contractor's methods of determining prices, or over competitive bidding or market conditions, Engineer cannot and does not guarantee that proposals, bids, or actual construction cost will not vary from Engineer's opinions or estimates of probable construction costs.

SHORES AT TARPON BEACH

OKALOOSA COUNTY, FLORIDA

DECEMBER 2023

Prepared for:

OKALOOSA COUNTY

Prepared by:

Raven Roberts, PE
FL License No. 89932



1201 Montlimar Drive, Suite 650
Mobile, AL 36609
EB-0000340

TECHNICAL SPECIFICATIONS

Civil

- *FDOT Standard Specifications for Road and Bridge Construction, Latest Edition*
- Destin Water Users – MISCELLANEOUS WATER AND SANITARY SEWER SPECIFICATIONS – See sheets CU-501 through CU-504
- UNDERGROUND STORMWATER RETENTION CHAMBERS – *See sheet C-505 for underground stormwater retention chamber specifications. The ADS Stormtech MC-7200 chamber is the basis of design only and is not the required product to be used. However, the contractor is responsible for choosing a system that meets all the requirements as identified as part of the specification.*
- OUTDOOR SHOWER TOWER ENGINEERING TECHNICAL SPECIFICATION - *The Outdoor Shower Tower product is the basis of design only and is not the required product to be used. However, the contractor is responsible for choosing a product that meets all the requirements as identified as part of the specification.*
- 32 14 33.13 PERMEABLE PLASTIC PAVING - *The truegridpaver.com product is the basis of design only and is not the required permeable paver product to be used. However, the contractor is responsible for choosing a product that meets all the requirements as identified as part of the specification.*
- SANITARY SEWER LIFT STATION – See sheet CU-513. *The ZOELLER PUMP COMPANY Shark Grinder Model 803 product is the basis of design only and is not the required pump to be used. However, the contractor is responsible for choosing a product that meets all the requirements of this model including the motor, materials, and pump performance.*
- 33 32 16.14 SANITARY SEWER GRINDER PACKAGE PUMP
- 02800 FENCING
- 12931 BIKE RACKS

Architectural, Structural, Mechanical, and Plumbing

02 01 00	SUBSURFACE INVESTIGATION
05 60 00	HANDRAILS
06 10 00	CARPENTRY
06 17 53	SHOP-FABRICATED WOOD TRUSSES
07 21 00	SPRAY FOAM INSULATION
07 41 00	PREFORMED STANDING SEAM METAL ROOF
07 62 00	FLASHING AND SHEET METAL
07 92 00	WATER PROOFING AND SEALANTS
08 16 13	FRP DOORS AND FRAMES
08 43 00	ALUMINUM STOREFRONT
08 71 00	HARDWARE
08 81 00	GLASS AND GLAZING
09 27 00	CEMENT BACKER BOARDS
09 30 13	CERAMIC TILE
09 91 00	PAINTING
10 14 00	INTERIOR AND EXTERIOR SIGNS
10 22 00	TOILET PARTITIONS
10 28 00	TOILET ACCESSORIES

22 00 00	PLUMBING GENERAL
22 05 17	SLEEVES AND SLEEVE SEALS FOR PLUMBING PIPING
22 05 18	ESCUTCHEONS FOR PLUMBING PIPING
22 05 23	GENERAL-DUTY VALVES FOR PLUMBING PIPING
22 05 29	HANGERS AND SUPPORTS FOR PLUMBING PIPING AND EQUIPMENT
22 05 53	IDENTIFICATION FOR PLUMBING PIPING AND EQUIPMENT
22 11 16	DOMESTIC WATER PIPING
22 11 19	DOMESTIC WATER PIPING SPECIALTIES
22 13 16	SANITARY WASTE AND VENT PIPING
22 13 19	SANITARY WASTE PIPING SPECIALITIES
23 00 00	MECHANICAL GENERAL
31 62 19	TIMBER PILES

APPLICABLE PERMITS

FDEP General Sewer Permit

FDEP Notice of Intent to use the General Permit for Construction of Water Main Extensions for PWSs

FDEP Coastal Construction Control Line Permit

FDEP Environmental Resource Permit (ERP)

FDOT Driveway Connection Permit

GEOTECHNICAL INVESTIGATION

Report of Geotechnical Exploration – Tarpon Beach Facilities Okaloosa County, Florida

OUTDOOR SHOWER TOWER ENGINEERING TECHNICAL SPECIFICATION

1. General Description:

1.1 The Outdoor Shower Tower is designed for outdoor use, providing a durable and long-lasting solution for various environments.

2. Dimensions:

2.1 Each shower column measures 81.5 inches in height and has a base diameter of 17.1 inches.

3. Construction Material:

3.1 The shower column is constructed using a tough, non-porous polymer – polyethylene.

3.2 The polyethylene material is UV stabilized and FDA approved, ensuring resistance to sun exposure, salt, water, and chlorine.

4. Durability and Warranty:

4.1 The Outdoor Shower Tower is warranted for a period of 5 years under normal use.

4.2 The warranty covers the product against cracking, rusting, corrosion, fading, or breaking.

4.3 This product has demonstrated longevity in harsh environments, with some installations exceeding 20 years.

5. Material Properties:

5.1 Polyethylene, the unique tower construction material, provides excellent resistance to environmental elements.

5.2 The molded-in color eliminates the need for painting or waterproofing.

6. Vandal Resistance:

6.1 Both the column and fixtures are designed to be vandal-resistant, ensuring the longevity and functionality of the Outdoor Shower Tower in public spaces.

7. Installation:

7.1 The Outdoor Shower Tower is designed for easy installation in outdoor environments.

7.2 Installation instructions are provided with each unit to ensure proper setup and use.

8. Maintenance:

8.1 The product requires minimal maintenance due to its durable and non-porous construction.

8.2 Routine cleaning with mild soap and water is recommended to preserve the appearance and functionality.

9. Compliance:

9.1 The Outdoor Shower Tower complies with relevant industry standards and regulations.

9.2 The product is designed to meet or exceed quality and safety requirements.

10. Safety Considerations:

10.1 The Outdoor Shower Tower is designed with user safety in mind, considering both material selection and construction.

10.2 Users are advised to follow the provided instructions and guidelines for safe and proper use.

11. Conclusion:

11.1 The Outdoor Shower Tower, made from UV stabilized and FDA approved polyethylene, stands as a durable and reliable outdoor shower solution. With a 5-year warranty and a proven track record of longevity in harsh environments, it offers a low-maintenance and vandal-resistant option for outdoor installations.



PRODUCT GUIDE SPECIFICATION

SECTION 32 14 33.13 – PERMEABLE PLASTIC PAVING

REV 11-06-23 v4

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Base material, over sub base prepared by others.
- B. Porous pavement system with S-flexural joints for seasonal expansion and contraction.
- C. Parking, fire lane, and traffic delineation.
- D. Gravel fill.
- E. Grass fill.

1.2 RELATED REQUIREMENTS

- A. Section 31 20 00 – Earth Moving: Subgrade Preparation.
- B. Section 33 41 00 – Subdrainage: Subsurface Drainage.
- C. Section 32 10 00 – Bases, Ballasts, and Paving.
- D. Section 32 80 00 – Irrigation: Irrigation System.
- E. Section 32 30 00 – Site Improvements.
- F. Section 32 92 00 – Turf and Grasses.

1.3 PREINSTALLATION MEETINGS

- A. Convene pre-installation meeting a minimum of two weeks prior to start of porous paving systems Specifier Notes:
- B. Verify project requirements, subbase and base conditions, manufacturer's installation instructions and coordinate with other related work.
- C. Require attendance of parties directly affecting work of this section, including the contractor, architect, engineer, and installer. Manufacturer's representative may attend by phone conference as needed.

1.4 SUBMITTALS

- A. Submit under provisions of Section 01.
- B. Product Data: Submit manufacturer's product data.
 - 1. Preparation instructions and recommendations.
 - 2. Storage and handling requirements and recommendations.
 - 3. Installation methods.
- C. Shop drawings: Submit manufacturer's shop drawings including laying pattern and parking delineation locations.
- D. Samples: Submit two square samples of TRUEGRID Paver units.
- E. LEED and other Sustainable Design Submittals: Provide documentation of how the requirements for credit/certification will be met including, but not limited to: Recycled content, stormwater management, heat-island mitigation, water use reduction, site development, and regional materials.
- F. Manufacturer's Certificates: Certify products meet or specified requirements.
- G. Closeout Submittals: Provide manufacturer's maintenance instructions that include recommendations for periodic fertilizing and maintenance.

1.5 QUALITY ASSURANCE

- A. Manufacturer's Qualifications: Manufacturer with a minimum of five years documented experience with products specified.
- B. Installer Qualifications: Installer experienced in performing work of this section that has specialized in installation of work similar to that required for this project. Installer must also be able to provide skilled workman with satisfactory record of performance on landscaping or paving projects of comparable size and quality.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Store products in manufacturer's unopened packaging until ready for installation.
- B. Protect porous paver units from damage during delivery and store under tarp when the time from delivery to installation exceeds 30 days.
- C. Protect materials during handling and installation to prevent damage.

1.7 SEQUENCING

- A. Ensure that products of this section are supplied to affected trades in time to prevent interruption of construction progress.

1.8 PROJECT CONDITIONS

- A. Maintain environmental conditions recommended by manufacturer for desired results. Do not install products under conditions outside manufacturer's absolute limits.
- B. Do not begin installation of porous pavements until all hard surface paving adjacent to porous pavement areas, including concrete walks and asphalt paving, is completed.
- C. Install turf when ambient air temperature is at least 55 degrees F.
- D. In wet weather, do not build on wet, saturated or muddy subgrade.

- E. In cold weather, do not use frozen materials or materials coated with ice or frost, and do not build on frozen base or wet, saturated or muddy subgrade.
- F. Protect partially completed porous paving against damage from other construction traffic when work is in progress.
- G. Protect grass fill / sodded paving areas from traffic until grass root system has matured for at least 3 to 4 weeks. Use barricades to only permit access by emergency and fire equipment.

1.9 WARRANTY

- A. Provide the manufacturer's 10-year limited warranty.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Acceptable Manufacturer: Airlite Plastics Co. DBA TRUEGRID Pavers, 6110 Abbott Dr, Omaha, NE 68110. Phone: 1-855-355-GRID. Email: info@truegridpaver.com Website: www.truegridpaver.com.
- B. Substitutions: Not permitted.

2.2 PRODUCTS

- A. Permeable Pavers, TRUEGRID PRO PLUS for grass or gravel applications.
 - 1. AASHTO H20, HS20 Rated.
 - 2. Manufactured in the USA.
 - 3. High density polyethylene (HDPE): 100 percent post-consumer recycled materials
 - 4. Recycled and recyclable content: 100 percent.
 - 5. S-Flexural joints molded in for soil seasonal expansion and contraction.
 - 6. Color: black- carbon black additive for long-term UV stabilization.
 - 7. Paver size: 24 inches by 24 inches by 1.8 inches.
 - 8. Pre-assembled: 4-foot by 4-foot sections.
 - 9. Cylindrical cell design for column strength.

10. Cell size: 3.30 inch inside diameter.
 11. Co-joined cells at 48 places for strength.
 12. Wall thickness: 0.150 inches / .250-inch nominal.
 13. A minimum of 2 co-joined common walls per cell for structural integrity.
 14. Connections:
 - a. No clips or stakes necessary.
 - b. No additional parts or tools needed.
 - c. Integral male-female three-point locking system.
 - d. Wall thickness at tabs: 0.290 inch.
 15. Molded in X-anchors to stabilize pavers.
 16. Nominal Coverage per Paver: 4 square feet.
 17. Weight per paver: 5.25 lbs.
 18. Permeability of System: 100 percent.
 19. Compressive Strength (filled): 17,729 psi.
 20. Material Safety: Groundwater neutral, 100 percent inert.
 21. Chemical Resistant: Excellent: highly resistant to hydrocarbons, oils.
- B. Parking Delineators: TRUEGRID SuperSpots for grass or gravel applications.
1. H20, HS20 rated.
 2. Domed for high visibility and ribbed for high strength.
 3. 0.90-inch profile above grid.
 4. Long-term UV stabilized.
 5. 3.25-inch diameter.
 6. Available Colors: Yellow, white, blue, and red.
- C. Parking Delineators: TRUEGRID SnowSpots for grass or gravel applications.
1. H20, HS20 rated.
 2. Snow plowable and ADA compliant.
 3. Level (0.00-inch) profile above grid.
 4. Long-term UV stabilized.
 5. 3.25-inch diameter.
 6. Available Colors: Yellow, white, blue, and red
- D. Reflective Parking Delineators: TRUEGRID Reflectors for grass or gravel applications.
1. H20, HS20 rated.

2. Long-term UV stabilized.
 3. 0.90-inch profile above grid.
 4. 3.25-inch diameter.
 5. Available Colors: Translucent yellow, white, and red.
- E. Surface Signage, ADA, Traffic, and Parking Identifiers: TRUEGRID Plates for grass or gravel applications.
1. Durable, long lasting, weather resistant and highly visible.
 2. Snap-fit into TRUEGRID PRO PLUS grid.
 3. 0.20-inch profile above grid
 4. ADA compliant.
- F. Base Material: TRUEGRID PRO PLUS was developed to accept multiple acceptable base materials. Locally sourced angular stone/clean for base material. Crushed granite, sandy gravel material, crushed concrete, and limestone rock are some of the acceptable materials. Common base materials include:
1. Hard, clean, angular, and open-graded (uniform size) drain rock -- from 1" to 1-1/2" (19mm to 38mm). Commonly #4 stone when size limits are met.
 2. Base Course: Graded aggregate base course conforming to the following sieve analysis and requirements:
 - a. Percent Passing: 100 - Sieve Size: 3/4 – 1 inch
 - b. Percent Passing: 85 - Sieve Size: 3/8 inch
 - c. Percent Passing: 60 - Sieve Size: #4
 - d. Percent Passing: 30 - Sieve Size: #40
 - e. Percent Passing: <3 - Sieve Size: #200, or 3 to 8 Percent for Grass Infill
- G. Gravel Fill: Obtain clean, washed angular rock to fill the 1.8-inch-tall TRUEGRID PRO PLUS cells and spaces between. TRUEGRID PRO PLUS should be filled level to the top of the cells or only slightly above for compaction and settling. Fill rock should be 5/8 inch to 3/4-inch diameter.
- H. Base Course for Grass Filled TRUEGRID: Use base course from above *Section 2.2 E 3* or comparable base material suitable for grass growth and traffic loads. Choose materials with neutral pH ranges and avoid sources from recycled/reclaimed concrete or asphalt.

- I. Grass Surface with Soil Fill: A sandy loam or loam soil should be used to fill the empty TRUEGRID PRO PLUS grid. The selection of sandy loam or loam soil should be made based upon the soil requirements of the turf variety selected for the project. Other soils if compatible with type of seed or sod are acceptable.
 - 1. Choose turf grasses with deep-growing vertical roots, high wear capacity, and for the local growing zone and climate.
 - 2. Grass – Choose either sod or seed:
 - a. Seed – The Preferred Method: Hydro-seeding/mulching is recommended with a wood or paper cellulose commercial mulch.
 - b. Sod shall be grown in sand or sandy loam soils only. Sod grown in soils of clay, silt, or high organic materials such as peat, will not be accepted.
- J. Base Course for Sloped Areas Above 3 degrees (5%): Use base course from above *Section 2.2 E 3* or other dense-graded base common for road use.
- K. Geotextile Fabric, Geomembrane, or Geogrid by Others.
 - 1. Choose for properties suitable for soil conditions, loading requirements, and permeability / impermeability requirements.
- L. Anchor Nails by others.
 - 1. 3/8-inch by 10-inch galvanized ring shank nail common for landscape use.
 - a. Choose for high frequency traffic areas, areas with breaking and acceleration, transitions, and areas subject to surface water from other sources.
 - b. For sloped areas above 3 degrees (5%).

PART 3 EXECUTION

3.1 EXAMINATION

- A. Before beginning installation, verify site conditions are as indicated on the drawings. Notify the Architect if site conditions are not acceptable. Do not begin preparation or installation until unacceptable conditions have been corrected.
- B. Ensure that adjacent hard-surfaced paving work is completed before installing porous pavement system.

3.2 PREPARATION

A. Subgrade:

1. Prepare subgrade as specified in Section 33 41 00. Verify subgrade in accordance with porous paving system manufacturer's instructions.
2. Excavate area allowing for unit thickness and the engineered base depth (where required).
3. Provide adequate drainage from excavated area if area has potential to collect water when working with in-place soils that have poor permeability.
4. Ensure in-place soil is relatively dry and free from standing water.
5. Uniformly grade base.
6. Level and clear base of large objects, such as rocks and pieces of wood.
7. Install irrigation, if applicable, in accordance with Section 32 80 00.
8. Install and secure geotextile fabric, geomembrane, or geogrid mesh as needed for soil stabilization and loading requirements.

B. Install Base as specified in Section 32 10 00. Verify engineered base is installed in accordance with porous paving system manufacturer's instructions.

1. Coordinate base installation and preparation with subdrains specified in Section 33 41 00.
2. If required, place a geotextile separation layer between the natural ground and the engineered base.
3. Place base course material over prepared sub base to grades indicated on the drawings or from manufacturer's recommended depths per application type.
4. Place in lifts not to exceed 4 inches, compacting each lift separately to 95 percent Modified Proctor for non-open grade material. Open grade base material to be leveled and heavily compacted in 4-inch lifts to settle and lock in angular stone.
5. If required, install irrigation in accordance with Section 32 80 00.
6. Leave minimum 1.8 inches for Permeable Paver unit for final elevation.

3.3 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Install TRUEGRID PRO PLUS Permeable Paver units by placing cells face up. Sheets are preassembled in 4-foot by 4-foot sheets are connected with friction fit interlocking

connectors. No tooling is required to connect or disconnect units. Sheets may be separated into 4 Individual 24 inch by 24-inch pieces and reconfigured as needed. Cut units around curves and organic shapes with an electrical handsaw. Place units to maintain a 1-inch clearance to any pre-installed object or surface structure. Top of cells shall be level (0.00 inch) to 0.5 inch below the surface of adjacent hard-surface pavements. Utilize TRUEGRID's S-Flexural joints for undulations or grade reversals when required by design or in freeze-thaw climates for expansion and contraction.

- C. Parking, Traffic, and Fire Lane Delineators: Install TRUEGRID SuperSpots, TRUEGRID SnowSpots, TRUEGRID Reflectors, and TRUEGRID Plates as indicated on the drawings or per manufacturer's recommendations.
 - 1. Align SuperSpots, SnowSpots, Reflectors, and Plates locking tabs with grooves in TRUEGRID PRO PLUS grid.
 - 2. Push SuperSpots, SnowSpots, Reflectors, and Plates into TRUEGRID PRO PLUS grid until it locks.
 - 3. All TRUEGRID delineators and markers can be removed and repositioned by disconnecting the locking tabs and pulling out of the grid.
- D. Anchors: Stake TRUEGRID PRO LITE to the base as indicated on the drawings or per manufacturer's recommendations.
 - 1. Pre-drill pilot hole with ¼" (6mm) through a PRO LITE cell containing an X-Anchor.
 - 2. Drive anchor until head makes contact with X-Anchor using a hammer or impact hammer with suitable driver head.
- E. Gravel Surfacing: Install Gravel into TRUEGRID cavities by back dumping directly from dump truck or from buckets mounted to tractors. Hand shoveling fill gravel into the cells is also acceptable for smaller jobs.
 - 1. Direct vehicles to exit the site by driving forward. Avoid sharp turns over unfilled rings.
 - 2. Spread gravel fill using steer loaders, power brooms, blades, flat-bottomed shovels, and/or wide "asphalt rakes" to fill the cells.
 - 3. Place and maintain infill gravel to be level to the top of the cell walls after settling, natural compaction, and use. A rolling compactor, plate compactor, or hand tamper may be used for final leveling of infill aggregate within the TRUEGRID cells.

F. Grass Surfacing:

1. Install soil into TRUEGRID cavities by back dumping directly from dump truck or from buckets mounted to tractors. Hand shoveling soil mix into the cells is also acceptable for smaller jobs.
 - a. For Seeding Applications: Fill soil mix level to the top of the TRUEGRID PRO LITE cell wall, 1.8-inch depth.
 - b. For Sodding Applications: Fill soil mix into cells at 1.8-inch *minus* the root (soil) depth of the sod.
2. Hydroseeding/Hydro-Mulch Surfacing: Provide and place as specified in 32 92 00 – Turf and Grasses. Homogeneously mix a combination of water, seed, and fertilizer in a truck mounted tank. Spray the seed mixture onto the site at specification rates. Coverage should be uniform and complete. Following germination of the seed, areas lacking germination larger than 8-inches by 8-inches must be reseeded immediately. Seeded areas must be fertilized and kept moist during development of the turf.

G. Sod: Provide and place as specified in 32 92 00 – Turf and Grasses.

1. Use sod from a reputable grower. Species should be wear resistant, free from disease, and in excellent condition.
2. Spray the sod rolls until saturated.
3. Use a heavy sod roller over entire sodded area to ensure root contact with the fill soil and TRUEGRID interface.

3.4 PROTECTION

- A. Protect installed products until completion of project.
- B. Gravel fill: Avoid sharp turns or “jack knives” in trailered vehicles when cells are empty. Damage due to buckling can occur. TRUEGRID can be driven on pre-fill by gravel trucks and construction equipment to speed the installation process.
- C. Grass Fill / Seeded: Protect seeded areas from any traffic, other than emergency vehicles, for a period of 4 to 6 weeks, or until the grass is mature to handle traffic. Avoid sharp turns or “jack knives” in trailered vehicles when cells are empty. Damage due to buckling can occur.

- D. Grass Fill / Sodded: Sodded areas must be protected from any traffic, other than emergency vehicles, for a period of 3 to 4 weeks, or until root system has been established.
- E. Dumpster areas: A concrete pad is recommended for dumpster areas due to the drop and drag action. Permeable pavers are not recommended in these areas under and directly around the dumpster.
- F. Repair or replace damaged products before substantial completion.

3.5 MAINTENANCE

- A. For gravel fill surfaces, maintain the stone fill inside the TRUEGRID to be level to the cell wall height - level to the top of the grid. Surface should be inspected from time to time to identify signs of slight cell infill loss.
- B. Maintain grass in accordance with manufacturer's instructions and as specified in Section 32 92 00 – Turf and Grasses.
 - 1. Maintain the soil or growing media inside the TRUEGRID to be level to the cell wall height -- level to the top of the grid. Do not overfill with soil above grid.
- C. Monitor pavement to ensure traffic frequency and loading does not exceed the pavement design.
- D. When snow removal is required, keep a metal edged plow blade from coming in contact with the surface during plowing operations to avoid causing damage to the units. Use a plow blade a minimum of 1 inch above the surface and with a flexible rubber edge or with skids on the lower outside corners so the plow blade does not come in contact with the units.

END OF SECTION

SECTION 33 32 16.14 - SANITARY SEWER GRINDER PACKAGE

PART 1 - GENERAL

1.1 SUMMARY

- A. Simplex Sanitary Sewer Grinder Package
 - 1. Sanitary Sewer Grinder Pump
 - 2. Sanitary Sewer Wet Well
 - 3. Valve and Valve Box
 - 4. Simplex Control Panel with Generator Receptacle

1.2 DESCRIPTION OF WORK

- A. The Contractor shall furnish and install all simplex sanitary sewer grinder packages as shown on the drawings and as specified herein.

1.3 MEASUREMENT AND PAYMENT

- A. Measurement: The simplex sanitary sewer grinder package installed will be measured as an assembly.
- B. Payment: Payment will be made as a unit price for the simplex sanitary sewer grinder pump package, complete and installed.
- C. Includes: Unit price includes, but is not limited to, furnishing and installing sanitary sewer grinder pump, sanitary sewer wet well, valve and valve box, simplex control panel with generator receptacle, electrical power supply service, bedding material, placing bedding and backfill material, fittings, pipe joints, pipe connections; dewatering, testing, and inspection.

1.4 COORDINATION

- A. Coordinate Work of this Section with City of Destin and utilities within construction area. Contractor shall also coordinate location of grinder station with each resident and Owner's representative.
- B. No connection between the grinder station and the collection system shall occur without approval from the city or Destin Water Users representative.

1.5 SUBMITTAL REQUIREMENTS

- A. The following General guidelines shall be used in preparing submittals:

1. Manufacturer's specification or data sheets shall be clearly marked to delineate the options or styles to be furnished. Options or equipment not being provided shall be neatly crossed-out.
 2. Submit only complete systems, not pieces of equipment from various systems.
 3. Submittals shall reference assigned equipment and device tag numbers.
 4. Submittals not following these and related requirements will be returned without review.
- B. Shop Drawings shall be submitted to the engineer for review. These drawings shall include:
1. Suppliers name and model.
 2. Submit detailed dimensions for materials and equipment, including pump basins, pumps, piping, controls including wiring schematics, and accessories.
 3. Submit detailed instructions on installation requirements, including storage and handling procedures, anchoring, and layout.
 4. Outline and foundation plan showing overall dimensions, anchor bolt size and locations, equipment lifting requirements, connection part sizes, locations and other pertinent installation data.
 5. Detailed drawings and specifications for vibration isolators, scroll conveyor drive, automatic differential (torque) control, vibration switch, flexible connections, chutes and similar components.
 6. Static and dynamic loads including location and natural frequency.
 7. Materials of construction.
 8. Component weights.
 9. Power and utility requirements.
 10. Process and instrumentation drawings showing all process and control equipment together with schematic delineation of all piping and wiring links required between equipment for process and control purposes.
 11. Complete wiring diagrams for all electrical and control equipment.
 12. Manufacturers recommended spare parts.
 13. Recommended storage requirement.
 14. Certified calculations for bearing life.
 15. Statement for equipment warranties.
 16. Equipment data book (includes all certificates of test results)
- C. Submittal data to consist of:
1. Pump catalog data
 2. Pump performance curve
 3. SST "Quick Removal System"
 4. Wet Well Cover data
 5. Typical installation drawing
 6. Control panel data
 7. Panel wiring schematic
 8. Accessory data
 9. Installation & Operation Manuals with Parts List
 10. Copy of the five (5) year, 100% parts/shop labor warranty.
- D. Field Quality-Control Submittals: Indicate results of Contractor-furnished tests and inspections.
- E. Manufacturer Reports: Certify that equipment has been installed according to manufacturer instructions.

F. Qualifications Statements:

1. Submit qualifications for manufacturer and installer.
2. Submit manufacturer's approval of installer.

1.6 CLOSEOUT SUBMITTALS

- A. Project Record Documents: Record actual locations and final orientation of equipment and accessories.

1.7 QUALITY ASSURANCE

- A. Perform Work according to generally accepted construction practices.

1.8 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing products specified in this Section with minimum three years' documented experience.
- B. Installer: Company specializing in performing Work of this Section with minimum three years' experience and approved by manufacturer.

1.9 DELIVERY, STORAGE, AND HANDLING

- A. Inspection: Accept materials on Site in manufacturer's original packaging and inspect for damage.
- B. Handling:
1. Handle materials to prevent damage to interior or exterior surfaces.
 2. Prepare pumps and accessories for shipment in such a manner as to prevent entry of foreign matter into product body.
- C. Storage:
1. Store materials according to manufacturer instructions.
 2. Store products in areas protected from weather, moisture, or possible damage.
 3. Do not store products directly on ground.
- D. Protection:
1. Protect materials from moisture and dust by storing in clean, dry location remote from construction operations areas.
 2. Provide additional protection according to manufacturer instructions.

PART 2 - PRODUCTS

2.1 SIMPLEX SANITARY SEWER GRINDER PACKAGE

A. Sanitary Sewer Grinder Pump

1. Design:

- a. A centrifugal submersible grinder pump which incorporates a regenerative turbine technology designed to reduce all material found in normal domestic sewage, including plastics, rubber, sanitary napkins, and disposable diapers into a finely ground slurry. The resultant slurry is then pumped through small diameter piping to gravity interceptor or treatment facility. The temperature limitation of the liquid being pumped is 104°F (40°C) continuous and shall be capable of running dry for extended periods.

2. Performance:

- a. In order to ensure proper operation in all conditions, pump(s) must provide, without overheating in continuous operation, maximum head condition required by the system: 19 GPM @ 22ft.TDH. Pump(s) must also be capable of operating at zero or negative heads without damage to the pump(s). At “dead head” or shut valve situation the pumps will recirculate via the ¼” recirculation port in the SST quick removal system until level reaches “high level alarm” float alerting homeowner via control panel “Audio/Visual” alarm of problem so Plumbing Contractor and Destin Water Users can investigate.

3. Construction:

- a. 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. Discharge connection shall be a standard 1.25 inch NPT in the vertical position using a threaded bolt-on discharge flange

4. Impeller:

- a. The pump impeller shall be 316 stainless steel construction, machined and then coated with an HVOF thermal spray.

5. Bearing design:

- a. The pump shall be a two bearing design consisting of an upper angular contact ball bearing carrying both the radial and thrust loads, and lower angular contact ball bearing also carrying both radial and thrust loads. Sleeve bearings for ball bearings will not be considered equal. Bearings shall operate in an oil bath atmosphere for superior life. Permanently lubricated bearings are not acceptable.

6. Grinder:

- a. The grinder mechanism shall be specifically designed for use in a sewage grinder pump. Garbage disposal cutting mechanisms are not acceptable. The mechanism shall consist of a radial cutter threaded and locked on the motor shaft by a washer

in conjunction with a countersunk flat head capscrew, and a shredding ring containing a minimum of fifteen flow passages with cutting edges. Grinding shall be accomplished by a slicing action as opposed to a chopping action. Chopping-type cutter mechanisms will not be allowed. Grinder design shall be able to alternately engage cutters at start and shall exert a minimum cutting force of 30 pounds, thus eliminating the need for excessive motor torque. The shredding ring shall be reversible to provide twice the cutting edge life. All grinding mechanism components, including both the shredding ring and radial cutter, shall be constructed of 440C stainless steel hardened to a minimum Rockwell C55 and shall be finish ground for a fine cutting edge. Two-stage cutter mechanisms and/or those requiring external adjustment for proper clearance are not acceptable.

- b. The grinder shall be placed immediately below the pumping elements and shall be direct-driven by a single, one-piece, 400 series stainless steel motor shaft. The grinding assembly shall operate without objectionable noise or vibration over the entire range of recommended operating pressures. The grinder shall be constructed so as to eliminate clogging and jamming under all normal operating conditions including starting. In order to demonstrate adequate flow velocity and grinding capability, the grinder pump shall be capable of passing a series of stringy type solids (diapers, rags, feminine products, etc.) through the pump without roping or winding the material in or immediately below the pump suction.

7. Electric Motor:

- a. Single-phase motors shall be of the capacitor start, capacitor run design, 115/230 volt, and single phase, 0.5HP. The motor shall meet the performance requirements of the Zoeller Shark Grinder Model 803 performance curve. The motor shall be designed to be non-overloading throughout the entire pump curve. The motor shall be constructed with the open windings operating in a sealed housing, which contains clean dielectric oil for heat dissipation from the windings and for lubrication of the bearings, making it capable of operating in a totally, partially, or non-submerged condition for extended periods of time without damage due to heat being generated. Oil used must be able to be disposed of as non-hazardous waste. Air-filled motors shall not be acceptable. 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 assemblies between the stator and motor housing shall not be considered acceptable. The motor shaft shall be of 1215 cold rolled steel.
- b. An automatically resetting, heat sensing thermal device that interrupts current flow if excessive temperature and/or current is detected shall provide protection against excessive temperature.
- c. The pumps shall be equipped with 15ft of type UL Listed 3-wire plug power cord. The power cord and motor shall be connected via quick disconnect pin terminals located within the motor housing. Pin receptacles shall be crimped and molded to the power cord in a PVC plug. The plug shall be secured with a stainless steel compression plate to prevent water from entering the motor housing and to provide strain relief at the point of cord entry. A polybutylene terephthalate terminal block with brass pin inserts shall connect the power cord leads with the motor leads. The ground pin shall be longer than the other pins such that the ground connection is the first connection made and the last connection broken when the plug is inserted and removed, respectively. A Buna-N o-ring shall provide isolation sealing between terminal block and the motor housing. The plug assembly shall be

guaranteed by the manufacturer to meet UL approval for submersion. Changing to longer cords as needed can be done simply by “unplugging” old cord and “plugging” in a 50ft, 75ft or up to 100ft cord.

8. Float Switches:

- a. A “GREEN” mechanical float switch must be supplied for pump on and off signalization.
- b. A “BLUE” mercury float level switch must be supplied for high level alarm signalization.
- c. Floats must include external weights. Adjustment of the weight on the float cord will determine how long pump will run and GPM pump will deliver: 1ft pump down equals 53 gallons per foot in the 36” diameter specified fiberglass tank.
- d. Float Switches to be suspended into wet well via 316 series SST cord hook.
- e. Pump on/off float to turn pump off with water level covering pump to prevent “air born corrosion” of the cast iron pump.
- f. Alarm float must activate before water can back up into inlet pipe.

9. Mechanical Seal:

- a. The pump shall be equipped with double floating, self-aligning rotary shaft seal to prevent leakage between the motor and pump. The materials of construction shall be silicon carbide for both the rotating face and for the stationary face, lapped and polished to a tolerance of one light band, with 300 stainless steel hardware and all elastomers of Buna-N.

10. The pump manufacturer shall perform the following inspections and tests:

- a. A check of the motor voltage and frequency shall be made as shown on the name plate.
- b. A motor and cable insulation test for moisture content or insulation defects shall be made per CSA criteria.
- c. The pump shall be completely submerged and run to determine that the unit meets three pre-determined hydraulic performance points.
- d. If certified testing is required, the manufacturer shall offer to perform tests in accordance with Grades B, E and U of Hydraulic Institute standards.

11. Start-Up:

- a. 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.

12. Documentation:

- a. Electronic Submittal must be provided to the Engineer to confirm compliance. Refer to standard submittal data requirements from SUBMITTAL REQUIREMENTS section.

B. Wet Well

1. Design

- a. The fiberglass wet well shall be 48" diameter with 24" X 12" tall access neck making overall depth of basin 10" and must include quick removal systems with SST components and SST backing plate bent to the 24" radius of the access neck. Note: The radius bent back plate shall be ¼" thick, 10 inch x 10 inch 316 SST. **Wet Wells must include pitched fillet around interior bottom of wet well to push solids towards suction of pumps as settlement occurs.**
- b. The pumps will be suspended 3" above basin floor via "Hang and Bang" quick removal systems. Piping will be 1-1/4" diameter Sch.40 316 SST. All piping and quick removal Hang and Bang apparatus inside the wet well shall be 316 SST.
- c. Wet well covers shall be ¼ inch thick diamond plate aluminum with SST slam locks with PVC plate between cover and lock to prevent galvanic corrosion. Diamond plate hatch shall be gasketed and must be powder coated forest green. Cover will be rated 300 PSF loading.
- d. Hatches must have 3/16th inch SST "stop" chains. One end attached to basin wall via aluminum bracket, other end attached to aluminum bracket welded to hatch. Chain to allow hatch to open at 10 degs past 90 degs.
- e. Each basin must include a 2" adapt-a-flex and 4" adapt-a-flex. 2" is for electrical conduit and the 4" is for inlet pipe.
- f. Anti-Siphon/Air Release Valve will be provided. Assembly will consist of 316 SST ball valve, threaded street 45 degs elbow and pitless adapter. Pitless adapter will have "T" handle for pulling pump.
- g. All hardware and brackets used must be SST. All Piping must be SST. Pitless Adapter must be SST. All to match as indicated in detail on plans.

C. Valve and Valve Box

1. Design

- a. Valve Assembly and 12" valve box will be provided. 316 SST Check/Cleanout/Curb Stop /SST Flex assembly will be as supplied by pump manufacturer to assure single source responsibility and culpability and must be all 316 series SST construction. The cleanout on the SST combo valve must be tapped and a ¼ inch SST ball valve with 0-160psi SST "face up" pressure gauge must be included.
- b. Poly Valve box top must be green and have the word "Sewer" etched or cast.

D. Simplex Control Panel

1. Design

- a. Panel must be provided by pump manufacturer to assure single source responsibility and culpability and shall have 25 amp breaker for pump and 10 amp breaker for alarm light/horn (Audio/Visual)
- b. Enclosure shall be PVC and must have external horn silence button.
- c. Electrical Power Service Supply to panel must be 35 amps with an electrical disconnect as needed per code.
- d. Panel must have a generator receptacle with Automatic Transfer Contactor to prevent backfeed into transmission line(s) and possible injury to Electrical Line Workmen if Generator is plugged into receptacle.

- e. Panel will include contactor for pump and Hand-Off-Auto switch.
- f. Panel will have Terminals to accept pump power wires and GREEN mechanical pump “On/Off” float and BLUE mercury “High Level” alarm float.
- g. Panel will include cord compression glands for floats and pump cords.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify layout and orientation of pumps, accessories, and piping connections.

3.2 INSTALLATION

- A. Coordinate location of pump control panel, pump units and accessories with property Owner.
- B. Trenching: As specified in the FDOT Specifications.
- C. Backfill: As specified in the FDOT Specifications.
- D. Provide and connect piping, accessories, and power and control conduit and wiring to make system operational and ready for startup.
- E. Flush piping with clean water

3.3 FIELD QUALITY CONTROL

- A. Inspection: Check and adjust liquid-level control and alarm settings.
- B. Start-up and Performance Testing:
 - 1. Test each unit on clear water through minimum of four complete cycles under supervision of manufacturer's representative and city and/or county's representative.
 - 2. Demonstrate that system performance, control functions, and alarms meet specified requirements.
- C. Manufacturer Services: Furnish services of manufacturer's representative experienced in installation of products to be placed under this Section for not less than 3 days on-Site for installation, inspection, field testing, startup, and instructing Owner's personnel in maintenance of equipment.
- D. Equipment Acceptance:
 - 1. Adjust, repair, modify, or replace components failing to perform as specified and rerun tests.
 - 2. Make final adjustments to equipment under direction of manufacturer's representative.
- E. Furnish installation certificate from equipment manufacturer's representative attesting that equipment has been properly installed and is ready for startup and testing.

3.4 DEMONSTRATION

- A. Demonstrate equipment startup, shutdown, routine maintenance, alarm condition responses, and emergency repair procedures to Owner's personnel.

3.5 OPERATION AND MAINTENANCE MANUALS

- A. At a minimum, the operation and maintenance manual shall meet the requirements set forth below in B and C.
- B. Operation and maintenance manuals will be provided by the equipment manufacturer at least two weeks prior to shipment of major equipment components. Each manual shall be a bound, indexed binder with drawings and parts lists prepared specifically for this project rather than general instructions that are not designed for this project.
- C. As a minimum the manual shall contain:
 - 1. Certified as-built drawings (general arrangement and general arrangement detail drawings).
 - 2. Erection drawings.
 - 3. A complete bill of materials for the equipment including the weights of all structural steel components.
 - 4. Installation and maintenance instructions for the specific equipment including the erection sequence, maintenance and trouble-shooting check points, and complete lubrication procedures with recommended grades of lubricants.
 - 5. Cut sheets for all equipment items purchased from sub-vendors.
- D. Grinder Pump System Protection
 - 1. Vendor shall provide flyers to system end user indicating proper use of grinder pump station and caution against common mistakes that lead to system failure.
 - 2. Vendor shall provide a maintenance plan for end users that includes (but is not limited to):
 - a. Maintenance schedule and instructions for the specific equipment including cleaning/repair requirements and trouble-shooting check points.
 - b. A list of the equipment manufacturer's spare parts specifically denoting wear items, long delivery items, and all items convenient for stocking as optional replacement items.
 - c. Action to take during abnormal weather. This should include precautions to take before, during and after a storm.

3.6 PROTECTION

- A. Conduct operations as to not interfere with, interrupt, damage, destroy, or endanger integrity of surface structures or utilities in immediate or adjacent areas to the Work.

3.7 WARRANTY

- A. The pump manufacturer shall provide a five (5) year parts and labor warranty (not prorated) for the materials and equipment provided by the manufacturer, including but not limited to the pump, control panel, float switches and valves. In the event a pump, control panel or valve is replaced under warranty, the replacement pump shall have the same manufacturer's warranty for five (5) years from the new install date.
- B. In addition to pump manufacturer's warranty, the entire fiberglass package including pipe, valves, fittings, hatch cover and fiberglass basin shall be warranted for five (5) years.
- C. The supplier will be responsible for providing start-up including provisions of what the warranty covers and does not cover. A notification plate shall be provided on the unit that identifies the company name and an emergency phone number as well as on the instructions pamphlet provided to the owner/operator.
- D. Vendor shall provide a copy of warranty to system end user at each installation site.

END OF SECTION 33 32 16.14

SECTION 02800 - FENCING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions, apply to this Section.
- B. Florida Department of Transportation, *Standard Specifications for Road and Bridge Construction* (FDOT Specs), *Section 550, Latest Edition, and Design Standard Index 802*. Work shall comply with requirements of FDOT Specs as modified herein.
- C. GENERAL EXCEPTIONS: Any reference to FDOT *Standard Specifications for Road and Bridge Construction*, Latest Edition, *Division I General Requirements & Covenants* shall be excluded and not applicable to any specification referred herein or otherwise listed in this document.

1.2 SUMMARY

- A. This Section includes, but is not limited to, the following:
 - 1. Wood privacy fence

1.3 PROJECT CONDITIONS

- A. Traffic: Conduct fencing operations to ensure minimum interference with roads, streets, walks, and other adjacent occupied or used facilities and to minimize disturbance of the activities of adjacent property owners. Do not close or obstruct streets, walks, or other occupied or used facilities without prior approval.
- B. Security: Do not leave any fence unfinished or incomplete which might allow the access to a private/public equipment without temporary measures in place during construction.

1.4 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Deliver material in manufacturer's original packaging with all tags and labels intact and legible.
- B. Handle and store material in such a manner as to avoid damage.

PART 2 – PRODUCTS

2.1 WOOD PRIVACY FENCE:

- A. Materials shall be of size, type, treatment, etc. as shown in the drawings.
- B. Shall be constructed as per industry standard with proper clearance below fence so as not to impede stormwater flow.

PART 3 – EXECUTION

3.1 WOOD PRIVACY FENCING:

Shall be constructed as per industry standard with proper clearance below fence so as not to impede stormwater flow.

PART 4 - MEASUREMENT/PAYMENT

2.1 METHOD OF MEASUREMENT

2.1.1 GENERAL

The quantities to be paid for will be either the number of gates, the length of each type of fence, the number of corner post assemblies, constructed and accepted or the length of each type of fence with all other items necessary for construction as incidental. In addition, extra payment will be made, for additional lengths of post approved by the Engineer and/or County/CEI.

B. MEASUREMENT OF FENCE LENGTH

The length of fence to be paid for will be measured along the bottom of the panels, out-to-out of end posts, in the completed and accepted fence. Measurement for Resetting Fence will be the actual length of existing fence reset, including gates when applicable.

C. CORNER POST ASSEMBLIES, PULL, AND END POST ASSEMBLIES

The number of corner post assemblies and of pull and end post assemblies to be paid for will be the number of such post assemblies constructed and accepted.

4.2 BASIS OF PAYMENT

A. BASIC ITEMS OF FENCING

The contract unit price will be full compensation for all work and materials necessary for the complete installation, including line posts, but not including the corner, end, and pull posts and the assemblies thereof.

B. ITEMS OF POST ASSEMBLIES

The Contract unit prices for the items of Corner Post Assemblies and Pull and End Post Assemblies will include the posts and the complete assemblies therewith for each such item. Approach posts and brace posts will be considered as part of the assembly of the corner, end, or pull post serves as a brace in more than one horizontal line.

C. PAYMENT RATES FOR EXTRA-LENGTH POSTS

For any length of posts in excess of the standard length for each particular type of post, approved by the Engineer as provided above, payment will be made for each foot in excess of the standard length at the percentage of the Contract unit price per foot for the item of Fencing, as shown in the following schedule.

Additional Payment for Each Foot of Post in Excess of the Standard Length
(in percent of Contract Unit Price for Fencing):

Total Post Length	Timber Posts
Standard up to 14 ft.	60%
Over 14 ft., up to 20 feet	80%
Over 20 ft.*	*

The standard length of timber posts will be the required length as indicated in the plans for each type and case. The above provisions for extra length payment will apply to end, corner and pull posts.

The payment for additional length of post will include the cost of additional concrete to extend concrete bases, as applicable.

D. GATE PAYMENT

The quantities to be paid for will be full compensation for all labor, materials, posts and associated hardware for the complete installation of the type gate specified in the plans and accepted by the Engineer and/or County/CEI.

END OF SECTION 02800

DIVISION 12
FURNISHINGS

SECTION: 12931
BIKE RACKS

PART 1 GENERAL

1.01 RELATED DOCUMENTS:

Drawings and General Provision of the Contract, including General and Supplementary Condition and Division 1 Specification sections, apply to work of this section.

1.02 SCOPE:

This section includes thermoplastic coated, stainless steel, loop type bike racks and all labor, material and equipment required for the proper execution of the work.

1.03 RELATED SECTIONS:

FDOT Standard Specifications for Road and Bridge Construction, Latest Edition: Concrete for the footings for support of bike racks.

1.04 STANDARDS:

A. American Society for Testing and Materials (ASTM) Publications:

1. ASTM B117 - Standard Practice for Operating Salt Spray (Fog) Apparatus.
2. ASTM D822 - Tests on Paint and Related Coatings Using Filtered Open-Flame Carbon-Arc Exposure Apparatus.
3. ASTM D1794 - Resistance of Organic Coatings to the Effects of Rapid Deformation (Impact).
4. ASTM D3363 - Test Method for Film Hardness by Pencil Test.

1.05 SUBSTITUTIONS.

A. Bike racks are by Park n Pool of Lexington, VA (877) 777-3700. Other similar and equal products will be considered if they meet the requirements of this specification and are submitted in accordance with requirements of the city/county.

1.06 SUBMITTALS:

1. Product data for components and accessories.
2. Shop drawings showing layout, dimensions, spacing of components.
3. Copy of warranty specified in Paragraph 1.4 for review by Architect.

1.07 WARRANTY

5 years warranty for factory finish against cracking, peeling, and blistering under normal use.

PART 2 MATERIALS

A. Loop Style

B. Stainless steel

C. Thermoplastic Coating

D. Grout: Non-shrink type, pre-mixed compound consisting of non-metallic aggregate, cement, and water reducing and plasticizing additives.

E. Provide racks of type and size indicated on Drawings.

1. Construction: 2 3/8" diameter stainless steel bike racks with thermoplastic coating. Provide coated extensions on the racks for setting in a concrete footing.

F. Factory Finish

1. Stainless steel racks are to be coated with 3-coat application of thermoplastic coating.

2. Salt spray resistance tested in accordance with ASTM B117: No undercutting, rusting, or blistering after 500 hours in 5 percent salt spray at 95 degrees F and 95 percent relative humidity and after 1000 hours less than 3/16 inch undercutting.

3. Weather ability tested in accordance with ASTM D822: No film failure and 88 percent gloss retention after 1-year exposure in South Florida with test panels tilted at 45 degrees.

PART 3 INSTALLATION

1. Install racks in a level and plumb fashion. Set in concrete footing and provide bracing which does not penetrate the coating until concrete is set. Concrete will be laid over mounting pipes. Provide thermoplastic coated escutcheons to trim out around concrete paving.

END OF SECTION

Mike Marshall, 12/2023

02 01 00 SUB-SURFACE INVESTIGATION

PART 1 GENERAL

1.01 RELATED DOCUMENTS:

The General Provision of the Contract, including bidding conditions and contractual conditions, apply to the work specified in this section.

1.02 SCOPE:

The geo-technical exploration, boring log and recommendation of the Soil Engineer is made a part of this specification.



REPORT OF GEOTECHNICAL EXPLORATION

**Tarpon Beach Facilities
Okaloosa County, Florida**

Tierra Project No. 4511-23-038

Prepared for:

**Sam Marshall Architects
325 S Palafox Street
Pensacola, Florida 32502
Attn: Mr. Mike Marshall, AIA, CSI**

Prepared by:

**Tierra, Inc.
1300 West Main Street
Pensacola, Florida 32502**

August 18, 2023



**1300 West Main Street • Pensacola, FL 32502
Phone (850) 462-8774 • Fax (850) 462-8784**

TIERRA

August 18, 2023

Sam Marshall Architects
325 S Palafox Street
Pensacola, Florida 32502
Attn: Mr. Mike Marshall, AIA, CSI

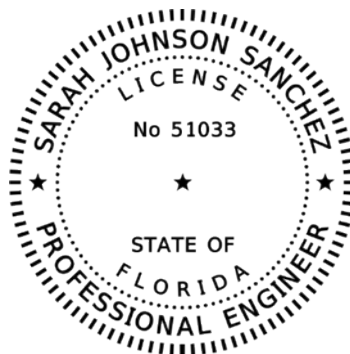
Subject: Tarpon Beach Facilities
Okaloosa County, Florida
Tierra Project No. 4511-23-038

Mr. Marshall:

Thank you for choosing Tierra, Inc. (Tierra) as your Geotechnical consultant. Per your authorization, we have completed the Geotechnical exploration for the subject project. The results of the study are discussed in this report.

Should you have any questions regarding the enclosed report or the project in general, please do not hesitate to contact us at (850) 462-8774.

Sincerely,
TIERRA, INC.



*THIS ITEM HAS BEEN DIGITALLY
SIGNED AND SEALED BY*

ON THE DATE ADJACENT TO THE SEAL

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TIERRA, INC.
1300 WEST MAIN STREET
PENSACOLA, FLORIDA 32502

SARAH JOHNSON SANCHEZ, P.E. NO. 51033

Mitchell L. Smith, PE
Principal Geotechnical Engineer
Florida License No. 43416

Sarah Johnson Sanchez, PE
Sr. Project Engineer
Florida License No. 51033



1300 West Main Street • Pensacola, FL 32502
Phone (850) 462-8774 • Fax (850) 462-8774

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APPENDIX A

Boring Location Plan and Soil Profiles

Table 1 – Summary of Falling Head Permeability Tests

Falling Head Permeability Test Results

1.0 PROJECT INFORMATION

1.1 Project Authorization

Authorization to proceed on this project was issued by Mr. Mike Marshall, Vice President with Sam Marshall Architects via acceptance of our Geotechnical Engineering Services Proposal 45-22-130 dated October 13, 2022. A formal contract has been executed between Tiera, Inc. and Sam Marshall Architects for these services.

1.2 Project Description

Based on the information provided, we understand that the development will include a new bathroom building on the south side of the site with two connecting pavilions on either side. The new bathroom/pavilions will be lightly loaded, timber pile supported structures established at/near existing site grades. A stormwater management facility (SMF) will be found beneath the paved parking north of the bathroom/pavilion structures.

If any of the project information noted above is incorrect or has changed, please inform Tierra so that we may amend the recommendations presented in this report, if necessary.

1.3 Purpose and Scope of Services

The purpose of this exploration was to evaluate the subsurface conditions present in the subject areas and to render timber pile foundation recommendations as well as parameters for stormwater drawdown analysis for the proposed SMF.

The exploration consisted of two (2) 35-foot deep Standard Penetration Test (SPT) borings to evaluate the subsurface conditions for the restrooms/pavilions and two (2) 7-foot deep auger borings in the proposed SMF area; laboratory soil testing including water content tests, wash #200 sieve tests, and falling head permeability tests; and a site visit, visual classification of the soil samples, and analysis by our engineering staff.

2.0 SITE AND SUBSURFACE CONDITIONS

2.1 Site Location and Description

The gulf front site is located on the south side of Scenic Highway 98 near the intersection of Tarpon Street in Okaloosa County, Florida. An aerial photograph depicting the site location is shown on the Boring Location Plan (Appendix A).

At the time of our exploration, the site was clear and relatively level. Based on review of the topographic survey provided, as well as the survey data on Google Earth, the north portion of the site is relatively level at/near EL +20 feet to EL +22 feet, and the property slopes downward to the south to near EL +7 feet.

2.2 Subsurface Conditions

The Boring Location Plan and the Soil Profiles of the borings drilled for this study can be found in Appendix A. The borings were field located and staked using a Garmin GPSMap 66ST Global Positioning System (GPS) unit with a reported accuracy of ± 1 meter. Therefore, the boring locations should be considered approximate.

We have estimated ground surface elevations at the boring locations using the topographic survey provided, as well as the topographic information provided in Google Earth. The subsurface conditions encountered will be discussed in general terms below.

The restroom/pavilion borings (B-1 and B-2) encountered the following idealized profile:

<u>Elevation (ft.)</u>	<u>Soil Description</u>
+20 to +5	Very loose to loose SAND (SP)
+5 to -20	Medium dense SAND (SP)

The SMF borings (SW-1 and SW-2) generally encountered sand from the ground surface (average EL +22 feet) to the bottom of the 7-foot deep borings.

The above subsurface descriptions are of a generalized nature, provided to highlight the major soil stratum encountered. The Soil Profiles should be reviewed for specific subsurface conditions at each boring location. The stratification shown on the Soil Profiles represents the subsurface conditions at the actual boring locations only, and variations in the subsurface conditions can and

may occur between boring locations and should therefore be expected. The stratification represents the approximate boundary between subsurface materials, and the transitions between strata may be gradual.

2.3 Groundwater Conditions

Groundwater was encountered in SPT borings B-1 and B-2 approximately 18 feet below existing grade at the time of drilling, which was during a period of above-normal seasonal rainfall. Based on the ground surface elevations at the boring locations estimated from the topographic survey and Google Earth, this corresponds to groundwater elevation of approximately +3 feet NAVD 88. Groundwater was not encountered in the SMF borings.

Groundwater levels will fluctuate with rainfall and tides and could vary several feet during typical seasonal fluctuations. Larger fluctuations are possible under severe weather conditions. We recommend that the Contractor determine the actual groundwater levels at the time of construction to determine potential impacts groundwater can/will have on construction procedures.

2.4 Laboratory Soil Testing

Laboratory soil testing consisted of water content tests, wash #200 sieve tests, and falling head permeability tests. The results of the water content and wash #200 sieve tests can be found on the Soil Profiles opposite the samples tested.

Falling head permeability tests were performed on remolded bulk samples of the sand soils encountered in the SMF borings. The densities to which the samples were remolded were based on the N_f values obtained from the nearby SPT borings. The results of the tests are summarized in Table 1 attached in Appendix A. The laboratory permeability test data sheets are attached in Appendix A.

3.0 EVALUATION AND RECOMMENDATIONS

3.1 General Comments

Based on our understanding of the proposed facility, the exploration encountered subsurface conditions that will provide adequate support for the proposed structure provided the recommendations presented in this report are followed.

The subsurface conditions encountered in the SMF borings are suitable for conventional dry treatment. Stormwater design parameters are presented in Section 3.5 below.

3.2 Timber Pile Foundation Recommendations

We have evaluated compression and tension pile capacities for 8-inch and 10-inch tip diameter timber piles to support the proposed restroom facility. Table 2 below shows allowable compression and tension capacities for driven timber piles with a tip elevation of -6 feet NAVD 88 (note – all elevations referenced to NAVD 88). The capacities presented in Table 2 assume a pile butt elevation of +18 feet, a ground surface elevation of +20 feet (assuming no scour), include a Factor of Safety of 2, and assume a pilot hole to elevation +10 feet to aide in standing the piles prior to driving.

TABLE 2		
ALLOWABLE TIMBER PILE COMPRESSION & TENSION CAPACITIES		
Pile Size	Allowable Compression Capacity	Allowable Tension Capacity
8-inch Diameter Timber Pile	7 tons	4 tons
10-inch Diameter Timber Pile	10 tons	6 tons

3.3 Pile Group Action

No reductions of the individual pile capacities will be required if piles are spaced center-to-center a minimum of 3 times their width/diameter. If piles are spaced closer, our office should be notified so that pile capacity reductions can be evaluated.

3.4 Settlement

Settlements of driven pile foundations are typically small and should not be a concern on this project provided the piles are embedded as recommended herein. Pile head settlements should be on the order of ½ inch or less. Group settlements are estimated to be on the same order of magnitude for the expected lightly loaded structure.

3.5 Stormwater Management Facility Recommendations

The subsurface conditions encountered in the SMF auger borings are suitable for conventional dry treatment of stormwater runoff. Geotechnical parameters for analysis/design are presented below:

- **Effective Aquifer Thickness:** A confining unit, which would hydrogeologically define the thickness of the surficial aquifer, was not encountered to a depth of 45 feet below existing grade (the deepest boring drilled on the site). For the purposes of modeling, we recommend setting the bottom of the aquifer no deeper than the bottom of the boring elevation (EL -20 feet). Note that a shallower effective aquifer thickness for modeling a shallow SMF may be more appropriate given the expected minimal head, and a sensitivity analysis using this parameter is warranted.
- **Seasonal High Groundwater Level:** Groundwater was encountered at approximately EL +3 feet at the time of drilling. Given that the borings were drilled during a period of above-normal rainfall, we have estimated the “normal” SHWT to be at/near elevation +3 feet.
- **Vertical Permeability:** Vertical flow from the bottom of the SMF will be controlled by the vertical permeability of the soil immediately beneath the bottom of the SMF. Based on the results of the falling head permeability tests (Table 1), an average vertical permeability of 27.4 ft/day for Stratum 1 would be reasonable for modeling.
- **Horizontal Permeability:** Horizontal flow from the pond will be through the Stratum 1 soils. The horizontal permeability of Stratum 1 has been estimated based on the results of the vertical permeability tests and extensive experience with similar soils from field permeability tests. While horizontal permeabilities have generally been found to range from 3 to 10 times higher than vertical permeabilities of regional deposits, we recommend that a multiplier of 3 with a factor of safety of 2 be used for design (effectively, a 1.5 multiplier). Therefore, a K_h

value of 41.1 ft/day would be reasonable for modeling the Stratum 1 materials (27.4 ft/day x 1.5).

- **Effective Porosity:** Based on the fines contents of the soils encountered in the test borings, an effective porosity of 0.30 would be appropriate for modeling the Stratum 1 soils.

4.0 REPORT LIMITATIONS

The recommendations submitted are based on the available soil information obtained by Tierra, Inc. and design details furnished by Baskerville-Donovan for the subject project. If there are any revisions to the plans for this project or if deviations from the subsurface conditions noted in this report are encountered during construction, Tierra should be notified immediately to determine if changes in the foundation, or other, recommendations are required. If Tierra is not retained to perform these functions, we cannot be responsible for the impact of such conditions on the performance of the project.

The findings, recommendations, specifications, and professional advice contained herein have been made in accordance with generally accepted professional Geotechnical engineering practices in the local area.

After the plans and specifications are more complete, the Geotechnical engineer should be provided the opportunity to review the final design plans and specifications to assure our engineering recommendations have been properly incorporated into the design documents. At that time, it may be necessary to submit supplementary recommendations. This report has been prepared for the exclusive use of Sam Marshall Architects for the specific application to the subject project.

APPENDIX A

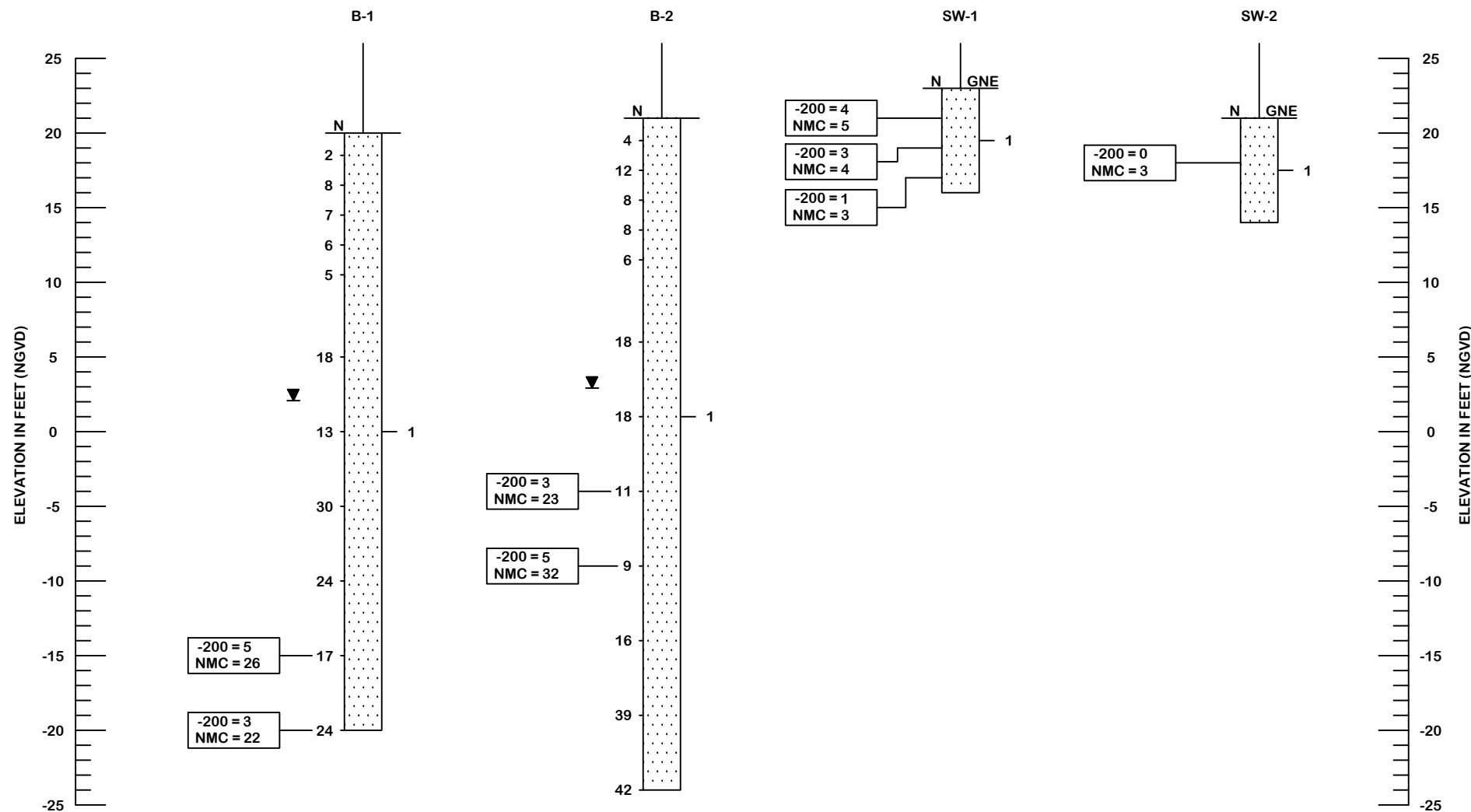
Boring Location Plan and Soil Profiles

Table 1 – Summary of Falling Head Permeability Tests

Falling Head Permeability Test Results

SOIL PROFILES

LEGEND



- 1 [Symbol] WHITE, GRAY, BROWN SAND (SP)
- [Symbol] GROUNDWATER LEVEL ENCOUNTERED DURING INVESTIGATION
- N SPT N-VALUE IN BLOWS/FOOT FOR 12 INCHES OF PENETRATION (UNLESS OTHERWISE NOTED)
- SP UNIFIED SOIL CLASSIFICATION SYSTEM (ASTM D 2488) GROUP SYMBOL AS DETERMINED BY VISUAL REVIEW AND LABORATORY TESTING ON SELECTED SAMPLES FOR CONFIRMATION OF VISUAL REVIEW.
- GNE GROUNDWATER TABLE NOT ENCOUNTERED
- 200 PERCENT PASSING #200 SIEVE
- NMC NATURAL MOISTURE CONTENT (%)
- NOTE: ELEVATIONS OBTAINED FROM GOOGLE EARTH

SAFETY HAMMER	
GRANULAR MATERIALS- RELATIVE DENSITY	SPT N-VALUE (BLOWS/FT.)
VERY LOOSE	LESS THAN 4
LOOSE	4 TO 10
MEDIUM	10 TO 30
DENSE	30 TO 50
VERY DENSE	GREATER THAN 50
SILTS AND CLAYS CONSISTENCY	SPT N-VALUE (BLOWS/FT.)
VERY SOFT	LESS THAN 2
SOFT	2 TO 4
FIRM	4 TO 8
STIFF	8 TO 15
VERY STIFF	15 TO 30
HARD	GREATER THAN 30

DRAWN BY:
SW

CHECKED BY:
SJS

APPROVED BY:
SJS

DATE:
AUG 2023

ENGINEER OF RECORD:
SARAH J. SANCHEZ, P.E.
FLORIDA LICENSE NO.:
51033



SCALE:
NOTED

PROJECT NUMBER:
4511-23-038

GEOTECHNICAL ENGINEERING SERVICES
TARPON BEACH FACILITIES
OKALOOSA COUNTY, FLORIDA

SHEET 2

TABLE 1
SUMMARY OF LABORATORY SOIL PERMEABILITY TESTS (FALLING HEAD METHOD)
TARPON BEACH FACILITIES
WALTON COUNTY, FLORIDA
TIERRA PROJECT NO. 4511-23-038

Soil Stratum Number ⁽¹⁾	Boring	Sample Elevation (ft. NAVD 88) ⁽²⁾	Sample Description	% Fines	Dry Density (pcf)	Vertical Permeability (ft/day)
1	SW-1	21 - 18	White, Gray, Brown SAND (SP)	3	104	15.7
1	SW-1	18 - 16	White, Gray, Brown SAND (SP)	1	102	26.5
1	SW-2	21 - 17	White, Gray, Brown SAND (SP)	0	97	40 ⁽³⁾

Notes: (1) See Soil Profiles (Appendix A).

(2) Ground surface elevations obtained from Google Earth

(3) Permeability value limited to 40 ft/day due to test method recommended limitations

FALLING HEAD PERMEABILITY TEST



Project Name: Tarpon Beach Facilities, Walton County, FL
Project Number: 4511-23-038 **Sample Location:** SW-1 @ 2.5 ft - 5 ft
Sample Description: White, Gray, Brown SAND (Stratum 1)
Remolded Compactive Effort: Standard **No. of Layers:** 3 **Blows Per Layer:** 15
Date: 8/14/2023 **Technician:** BC **Soil Classification:** SP

- Assumes:**
1. Standard Proctor Mold (L = 4.5 in.)
 2. 1/2 Inch Diameter Tubing

$$K_v = \frac{(2.3 \cdot a \cdot L) \log(h_1/h_2)}{(A) (\Delta t)}$$

where a = 1.267 cm (area of tube)
 L = 4.584 in. (height of soil sample)
 = 11.64336 cm (L = 4.5 in. for full mold)
 A = 12.57 sq. in. (area of Proctor mold)
 = 81.1 sq. cm

Head (ft)	Time (sec)		Avg. Time (sec)
	Run #1	Run #2	
7	0	0	0
6	4.5	4.4	4.5
5	10	10	10.0
4	17.4	17	17.2
3	26.9	36.6	31.8
2	40.5	40.1	40.3
1	64.1	63.7	63.9

h1	h2	Delta t (sec)	K _v (cm/sec)
7	1	63.9	5.5E-03
6	1	59.45	5.5E-03
7	2	40.3	5.6E-03

Average K _v =	5.6E-03 cm/sec
	15.7 ft/day

Remolded Test Sample Density

Can #	2R
Wt. Can + Wet Soil, g	416.0
Wt. Can + Dry Soil, g	398.6
Wt. of Water, g	17.4
Wt. of Can, g	259.3
Wt. of Dry Soil, g	139.3
Moisture Content, %	12.5%
Wt. Wet Soil + Mold, lbs.	8.4
Wt. of Mold, lbs.	4.5
Wt. of Wet Soil, lbs.	3.9
Wet Density, pcf	116.4
Dry Density, pcf	103.5

Fines Content of Test Sample

Can #	45
Wt. Can + Wet Soil, g	252.4
Wt. Can + Dry Soil, g	247.3
Wt. of Water, g	5.2
Wt. of Can, g	121.8
Wt. of Dry Soil, g	125.5
Wt. of Dry Sample After Washing + Can, g	243.8
Wt. of Soil Lost During Washing, g	3.4
Moisture Content, %	4.1%
Percent Fines, %	2.7%

FALLING HEAD PERMEABILITY TEST



Project Name: Tarpon Beach Facilities, Walton County, FL
Project Number: 4511-23-038 **Sample Location:** SW-1 @ 5 ft -7 ft
Sample Description: White, Gray, Brown SAND (Stratum 1) **Soil Classification:** SP
Remolded Compactive Effort: Standard **No. of Layers:** 3 **Blows Per Layer:** 15
Date: 8/14/2023 **Technician:** BC

- Assumes:**
1. Standard Proctor Mold (L = 4.5 in.)
 2. 1/2 Inch Diameter Tubing

$$K_v = \frac{(2.3 \cdot a \cdot L) \log (h_1/h_2)}{(A) (\Delta t)}$$

where a = 1.267 cm (area of tube)
 L = 4.584 in. (height of soil sample)
 = 11.64336 cm (L = 4.5 in. for full mold)
 A = 12.57 sq. in. (area of Proctor mold)
 = 81.1 sq. cm

Head (ft)	Time (sec)		Avg. Time (sec)
	Run #1	Run #2	
7	0	0	0
6	2.9	2.9	2.9
5	6.4	6.3	6.4
4	10.8	10.3	10.6
3	16.6	15.8	16.2
2	24.8	23.8	24.3
1	38.5	37.3	37.9

h1	h2	Delta t (sec)	K _v (cm/sec)
7	1	37.9	9.3E-03
6	1	35	9.3E-03
7	2	24.3	9.4E-03

Average K _v =	9.3E-03 cm/sec
	26.5 ft/day

Remolded Test Sample Density

Can #	1R
Wt. Can + Wet Soil, g	387.5
Wt. Can + Dry Soil, g	367.7
Wt. of Water, g	19.8
Wt. of Can, g	256.3
Wt. of Dry Soil, g	111.4
Moisture Content, %	17.8%
Wt. Wet Soil + Mold, lbs.	8.5
Wt. of Mold, lbs.	4.5
Wt. of Wet Soil, lbs.	4.0
Wet Density, pcf	119.7
Dry Density, pcf	101.6

Fines Content of Test Sample

Can #	46
Wt. Can + Wet Soil, g	243.4
Wt. Can + Dry Soil, g	239.4
Wt. of Water, g	4.0
Wt. of Can, g	120.2
Wt. of Dry Soil, g	119.2
Wt. of Dry Sample After Washing + Can, g	238.5
Wt. of Soil Lost During Washing, g	0.9
Moisture Content, %	3.4%
Percent Fines, %	0.8%

FALLING HEAD PERMEABILITY TEST



Project Name: Tarpon Beach Facilities, Walton County, FL
Project Number: 4511-23-038 **Sample Location:** SW-2 @ 0 ft - 4.25 ft
Sample Description: White, Gray, Brown SAND (Stratum 1)
Remolded Compactive Effort: Standard **No. of Layers:** 3 **Blows Per Layer:** 15
Date: 8/14/2023 **Technician:** BC **Soil Classification:** SP

- Assumes:**
1. Standard Proctor Mold (L = 4.5 in.)
 2. 1/2 Inch Diameter Tubing

$$K_v = \frac{(2.3 \cdot a \cdot L) \log(h_1/h_2)}{(A) (\Delta t)}$$

where a = 1.267 cm (area of tube)
 L = 4.584 in. (height of soil sample)
 = 11.64336 cm (L = 4.5 in. for full mold)
 A = 12.57 sq. in. (area of Proctor mold)
 = 81.1 sq. cm

Head (ft)	Time (sec)		Avg. Time (sec)
	Run #1	Run #2	
7	0	0	0
6	1.5	1.3	1.4
5	3.2	2.9	3.1
4	5.1	4.8	5.0
3	7.5	7.1	7.3
2	11	10.5	10.8
1	17	16.9	17.0

h1	h2	Delta t (sec)	K _v (cm/sec)
7	1	16.95	2.1E-02
6	1	15.55	2.1E-02
7	2	10.75	2.1E-02

Average K _v =	2.1E-02 cm/sec
	59.5 ft/day

Remolded Test Sample Density

Can #	2R
Wt. Can + Wet Soil, g	386.8
Wt. Can + Dry Soil, g	370.5
Wt. of Water, g	16.3
Wt. of Can, g	259.3
Wt. of Dry Soil, g	111.2
Moisture Content, %	14.7%
Wt. Wet Soil + Mold, lbs.	8.2
Wt. of Mold, lbs.	4.5
Wt. of Wet Soil, lbs.	3.7
Wet Density, pcf	111.0
Dry Density, pcf	96.8

Fines Content of Test Sample

Can #	47
Wt. Can + Wet Soil, g	251.0
Wt. Can + Dry Soil, g	246.8
Wt. of Water, g	4.2
Wt. of Can, g	120.4
Wt. of Dry Soil, g	126.4
Wt. of Dry Sample After Washing + Can, g	246.4
Wt. of Soil Lost During Washing, g	0.3
Moisture Content, %	3.4%
Percent Fines, %	0.3%

SECTION 05 60 00 – HANDRAILS

A. General

This section is to cover the fabrication and installation of steel and aluminum hand and guardrails. This section does not pertain to grab bars used in restrooms.

B. Quality Assurance:

1. The design of the rails shall be in accordance with the current revisions of SREF and Florida Accessibility Code for Building Construction.
2. Fabrication: Work shall be performed by experienced and qualified fabricators who have experience in aluminum rail fabrication.
3. Pipe cuts shall square and without burrs. All Welds shall be ground smooth to the surface of the pipe. Curved sections shall be bent with no crimping or flattening of the inside radius. All welded joints in rail-to-rail connections shall be internally reinforced.
4. The rails shall be anchored in such a manor as to meet the guidelines in the Florida Accessibility Code for Building Construction.
5. Prepare shop drawings for the rails at each campus after field measuring each stadium. Submit shop drawings for review.
6. Prepare a physical sample indicating all three methods of attachment for review prior to beginning fabrication. Sample shall demonstrate finish of railing, welds, bolts for connections and separation of dissimilar materials.
7. All welded connections shall be TIG welded.
8. Prepare a sample for approval of the top and bottom corners as shown on the drawings. These corners may be welded or bent.

C. Materials:

1. All aluminum handrail pipes shall be 1-1/2" O.D.- 1 5/8" O.D., Schedule 80 extruded aluminum pipe, alloy 6063-T-6.
2. Finish: All exposed aluminum shall be mill finished aluminum. This is a finished product. Protect in the field.
3. All fasteners shall be type 300 stainless steel.
4. Wall mounting brackets shall be aluminum and fastened as indicated on drawings.

D. Installation:

1. Railings shall be installed as shown on approved shop drawings by mechanics experienced in the installation of aluminum railing.

2. Railings shall be firmly mounted and aligned both vertically and horizontally to the structure installed on.
3. After installation, railings shall be cleaned and protected from damage until final acceptance of the project.
4. Damage to adjacent structures during installation of railing will be required like new at no cost to the owner.

END OF SECTION

06 10 00 CARPENTRY

PART 1: GENERAL

- 1.01 RELATED DOCUMENTS:
Drawings and General Provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification sections, apply to work of this section.
- 1.02 SCOPE:
Includes carpentry work and material necessary for a complete installation.
- 1.03 RELATED WORK:
1. Light Steel Framing
2. Roof and Coping Framing
3. Roofing
- 1.04 STANDARDS:
Each piece of lumber and plywood shall have a grade mark of an agency certified by the board of review of the American Lumber Standards Committee.
- 1.05 SUBMITTALS:
Provide (7) seven copies of manufacturers shop drawings and installation instructions.

PART 2: MATERIALS

- 2.01 Framing and blocking shall be #2 dense SYP of sizes and dimensions shown. Members used on the exterior and in contact with concrete or masonry and where indicated on the drawings shall be pressure treated.
- 2.02 Plywood shall be 3/4" and 1/2" CDX, pressure treated in lower exterior walls. Roofing sheathing shall be 5/8" CDX.
- 2.03 Cement board material is specified under hard tile section, 09 30 00.
- 2.04 Synthetic Siding is 7 1/4" x 5/16" Cedar Mill lap siding with 6" exposure and Cedar Mill vertical sheet panel by James Hardie Building Products.
- 2.05 Corner and edge trim is to be Hardi Trim by James Hardie Building Products in widths and thicknesses shown.
- 2.06 Ceilings are to be 120"x 48" x .312" Hardie Panel Vertical siding.

- 2.07 Soffits are to be 120" x 16" x .25" Hardie Vented Smooth soffit. Similar and equal products by CertainTeed or GAF will be considered equal.
- 2.08 Steps and ramps infill material is to be McNichols 0.105 3"x 3" vinyl coated wire mesh or equal by Parco, Inc. or Josph Fazio, Inc.
- 2.09 Railing caps are to be 2"x8" composite decking similar to Trex or Wear deck, by Owens Corning.
- 2.10 Fasteners for exterior decking, ramps, steps and railing are to be #10 (304) stainless steel decking screws.
- 2.11 Tongue and Groove Wood Decking:
- A. Standard for Solid-Sawn Wood Roof Decking: Comply with AITC 112.
 - B. Roof Decking Species: Southern Pine.
 - C. Roof Decking Nominal Size: 2 by 6. (1-7/16" dressed thickness)
 - D. Roof Decking Grade: S.P.I.B. No. 1 Grade Timber Decking, T&G.
 - E. Grade Stamps: Factory mark each item with grade stamp of grading agency. Apply grade stamp to surfaces that are not exposed to view.
 - F. Moisture Content: Provide wood roof decking with 15 percent maximum moisture content at time of dressing.
 - G. Face Surface: Smooth.
 - H. Edge Pattern: Vee grooved.
 - I. Pressure treat wood roof decking
 - J. Preservative Chemicals: Wolman EraWood as prescribed by the manufacturer.
 - K. Penetrating Sealer: Clear sanding sealer complying with Section 09 91 23 "Painting" and compatible with topcoats specified for use over it.
 - L. Oil Stain: As selected from the manufacturer's line of stains. Factory apply.

PART 3: INSTALLATION

- 3.01 Blocking and grounds shall be installed in a manner to eliminate cupping and warping. Members over 4" nominal width shall be kurfed on downside. Blocking shall be bolted to sub structure or otherwise securely attached to prevent movement. Nails will be double galvanized common nails of appropriate size (or galvanized screw nails). Provide solid blocking in framed partitions for support of door stops, other hardware items mounted to the walls and for light switches, electrical outlets and devices and recessed speakers. Provide 2X blocking in walls for base and upper cabinets.

- 3.02 Apply synthetic lap siding and trim over water resistive barrier (specified in Section 07100) over $\frac{3}{4}$ " plywood attached to wood stud framing. Blind nail attach using stainless steel screws, No. 8-18 x.323" HD x 1 $\frac{5}{8}$ " long. Stainless steel screws must penetrate $\frac{1}{2}$ " into material siding is to be attached to. Screw heads must be flush with the plank face and NOT countersunk. The first course of any wall should be installed over a $\frac{1}{4}$ " lath strip to ensure a consistent plank angle. Install Hardiplank siding in compliance with local building codes for clearance between the bottom edge of plank and the finished grade. Butt ends of planks to trim. Caulk all joints with caulking (specified in Section 07100).

END OF SECTION

06 17 53 SHOP-FABRICATED WOOD TRUSSES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Wood roof trusses.
 - 2. Wood girder trusses.

1.2 ACTION SUBMITTALS

- A. Product Data: For metal-plate connectors, metal truss accessories, and fasteners.
- B. Shop Drawings: Show fabrication and installation details for trusses.
 - 1. Show location, pitch, span, camber, configuration, and spacing for each type of truss required.
 - 2. Indicate sizes, stress grades, and species of lumber.
 - 3. Indicate locations, sizes, and materials for permanent bracing required to prevent buckling of individual truss members due to design loads.
 - 4. Indicate type, size, material, finish, design values, orientation, and location of metal connector plates.
 - 5. Show splice details and bearing details.
- C. Delegated-Design Submittal: For metal-plate-connected wood trusses indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1.3 QUALITY ASSURANCE

- A. Metal Connector-Plate Manufacturer Qualifications: A manufacturer that is a member of TPI and that complies with quality-control procedures in TPI 1 for manufacture of connector plates.
 - 1. Manufacturer's responsibilities include providing professional engineering services needed to assume engineering responsibility.
 - 2. Engineering Responsibility: Preparation of Shop Drawings and comprehensive engineering analysis by a qualified professional engineer.
- B. Fabricator Qualifications: Shop that participates in a recognized quality-assurance program, complies with quality-control procedures in TPI 1, and involves third-party inspection by an independent testing and inspecting agency acceptable to Architect and authorities having jurisdiction.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Handle and store trusses to comply with recommendations in SBCA BCSI, "Building Component Safety Information: Guide to Good Practice for Handling, Installing, Restraining, & Bracing Metal Plate Connected Wood Trusses."

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Engage a qualified professional engineer licensed in the State of Florida to design metal-plate-connected wood trusses.
- B. Structural Performance: Metal-plate-connected wood trusses shall be capable of withstanding design loads within limits and under conditions indicated. Comply with requirements in TPI 1.
- C. Comply with applicable requirements and recommendations of TPI 1, TPI DSB, and SBCA BCSI.
- D. Wood Structural Design Standard: Comply with applicable requirements in AF&PA's "National Design Specifications for Wood Construction" and its "Supplement."

2.2 DIMENSION LUMBER

- A. Lumber: DOC PS 20 and applicable rules of any rules-writing agency certified by the American Lumber Standard Committee (ALSC) Board of Review. Provide lumber graded by an agency certified by the ALSC Board of Review to inspect and grade lumber under the rules indicated.
 - 1. Provide dry lumber with 19 percent maximum moisture content at time of dressing.
- B. Permanent Bracing: Provide wood bracing that complies with 15% maximum moisture content construction grade southern pine, appearance grade where exposed.

2.3 METAL CONNECTOR PLATES

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - 1. Alpine Engineered Products, Inc.; a division of ITW Building Components Group, Inc.
 - 2. MiTek Industries, Inc.
 - 3. Truswal Systems Corporation.

- B. General: Fabricate connector plates to comply with TPI 1.
- C. Hot-Dip Galvanized-Steel Sheet: ASTM A 653/A 653M; Structural Steel (SS), high-strength low-alloy steel Type A (HSLAS Type A), or high-strength low-alloy steel Type B (HSLAS Type B); G60 coating designation; and not less than 0.036 inch thick.

2.4 FASTENERS

- A. General: Provide fasteners of size and type indicated that comply with requirements specified in this article for material and manufacture.
 - 1. Provide fasteners for use with metal framing anchors that comply with written recommendations of metal framing manufacturer.
 - 2. Where trusses are exposed to weather, in ground contact, or in area of high relative humidity, provide fasteners with hot-dip zinc coating complying with ASTM A 153/A 153M.
- B. Nails, Brads, and Staples: ASTM F 1667.

2.5 METAL FRAMING ANCHORS AND ACCESSORIES

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - 1. Simpson Strong-Tie Co., Inc.
 - 2. MiTek Structural Connectors.
- B. Allowable design loads, as published by manufacturer, shall comply with or exceed those of basis-of-design products. Manufacturer's published values shall be determined from empirical data or by rational engineering analysis and demonstrated by comprehensive testing performed by a qualified independent testing agency. Framing anchors shall be punched for fasteners adequate to withstand same loads as framing anchors.
- C. Galvanized-Steel Sheet: Hot-dip, zinc-coated steel sheet complying with ASTM A 653/A 653M, G60 coating designation.

2.6 FABRICATION

- A. Assemble truss members in design configuration indicated; use jigs or other means to ensure uniformity and accuracy of assembly, with joints closely fitted to comply with tolerances in TPI 1. Position members to produce design camber indicated.
 - 1. Fabricate wood trusses within manufacturing tolerances in TPI 1.
- B. Connect truss members by metal connector plates located and securely embedded simultaneously in both sides of wood members by air or hydraulic press.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install wood trusses only after supporting construction is in place and is braced and secured.
- B. If trusses are delivered to Project site in more than one piece, assemble trusses before installing.
- C. Hoist trusses in place by lifting equipment suited to sizes and types of trusses required, exercising care not to damage truss members or joints by out-of-plane bending or other causes.
- D. Install and brace trusses according to TPI recommendations and as indicated.
- E. Anchor trusses securely at bearing points; use metal truss tie-downs or floor truss hangers as applicable. Install fasteners through each fastener hole in metal framing anchors according to manufacturer's fastening schedules and written instructions.
- F. Securely connect each truss ply required for forming built-up girder trusses.
- G. Install and fasten permanent bracing during truss erection and before construction loads are applied. Anchor ends of permanent bracing where terminating at walls or beams.
- H. Install wood trusses within installation tolerances in TPI 1.
- I. Do not alter trusses in field. Do not cut, drill, notch, or remove truss members.
- J. Replace wood trusses that are damaged or do not comply with requirements.

END OF SECTION

SECTION 07 21 00 – SPRAY FOAM INSULATION

1. GENERAL:

- A. THE CONTRACTOR SHALL FURNISH ALL LABOR, MATERIALS, TOOLS, EQUIPMENT, AND PERFORM ALL WORK SERVICES FURNISHING AND INSTALLATION, COMPLETE, OF ALL FOAM INSULATION AS SHOWN ON DRAWINGS AND AS SPECIFIED, IN ACCORDANCE WITH PROVISIONS OF THE CONTRACT DOCUMENTS, AND COMPLETELY COORDINATED WITH WORK OF ALL OTHER TRADES.
- B. ALTHOUGH SUCH WORK IS NOT SPECIFICALLY INDICATED, FURNISH AND INSTALL ALL SUPPLEMENTARY OR MISCELLANEOUS ITEMS, APPURTENANCES AND DEVICES INCIDENTAL TO OR NECESSARY FOR A SOUND, SECURE AND COMPLETE INSTALLATION.

2. SUBMITTALS:

- A. INSTALLATION INSTRUCTIONS AND RECOMMENDATIONS FROM MATERIALS MANUFACTURER. INCLUDE CERTIFICATION OR DATA SUBSTANTIATING THAT MATERIALS COMPLY WITH REQUIREMENTS.
- B. ACTUAL SAMPLES WHEN ARCHITECT DIRECTS.

3. SCOPE OF WORK

A. WALL FOAM INSULATION:

- 1) INSTALL 3 1/2" OF CLOSED CELL FOAM INSULATION IN EXTERIOR STUD WALL CAVITY FROM THE INTERIOR WHERE INDICATED ON FLOOR PLAN AND WALL SECTIONS.
- 2) DRILL HOLES IN STUD WALLS FROM THE INTERIOR, PRESSURE INJECT FOAM INTO OPEN CELLS. INSTALL PER MANUFACTURERS INSTALLATION INSTRUCTIONS. CLEAN AND SEAL ALL DRILLED HOLES AFTER INSULATION INSTALLATION IS COMPLETE FOR UNIFORM WALL FINISH. (SEE SECTION 07216) - FOAMED-IN-PLACE INSULATION.
- 3) COMPLETE APPROXIMATELY 20' OF INSULATION AND EXAMINE WITH ARCHITECT AND OBTAIN APPROVAL PRIOR TO PROCEEDING WITH BALANCE OF PROJECT.
- 4) SEE WALL SECTIONS FOR GENERAL INFORMATION.

A. ROOF DECK FOAM INSTALLATION

- 1) INSTALL 3 1/2" OF CLOSED CELL SPRAY FOAM INSULATION ON BOTTOM OF ROOF DECK AS INDICATED ON FLOOR PLAN AND WALL SECTIONS
- 2) INSTALL SPRAY APPLIED INTUMESCENT IGNITION BARRIER TO EXPOSED WALL AND ROOF DECK INSULATION.

- B. PROVIDE PRESCRIPTIVE THERMAL BARRIERS, PRESCRIPTIVE IGNITION BARRIERS AND INTUMESCENT COATINGS WHERE REQUIRED BY CODES OR MANUFACTURERS INSTRUCTIONS

Mike Marshall, 12/2023

4. MATERIALS:

- A. SPRAY FOAM INSULATION SHALL BE: NEXSEAL 2.0 CLOSED CELL SPRAY FOAM INSULATION DEMALAC SPRAY FOAM INSULATION, THERMOSEAL 2000 MEDIUM DENSITY CLOSED CELL SPRAY FOAM OR APPROVED EQUAL.

END OF SECTION

07 41 00 - PREFORMED STANDING SEAM METAL ROOF

1. PART 1 - GENERAL

1.1 DESCRIPTION OF WORK

1. This Section covers the , pre-finished, prefabricated Architectural standing seam roof system. All metal trim, accessories, fasteners, insulation, and sealants indicated on the drawings as part of this section.
2. Related Work Specified Elsewhere:
 1. Refer to all sections in Division 0, CONTRACT REQUIREMENTS, and Division 1, GENERAL REQUIREMENTS.

1.2 QUALITY ASSURANCE

1. **Petersen Aluminum Corporation, Acworth, GA 800-272-4482** products establish a minimum of quality required.
2. The manufacturer and erector shall demonstrate experience of a minimum of ten (10) years in this type of project.

1.3 SUBSTITUTIONS

1. The material, products and equipment specified in this section establish a standard for required function, dimension, appearance and quality to be met by any proposed substitution.

1.4 ROOF SYSTEM PERFORMANCE TESTING

1. Water Penetration: When tested per ASTM E-283/1680 and ASTM E-331/1646 there shall be no uncontrolled water penetration or air infiltration through the panel joints.
2. ***Roof System shall be designed to meet Florida Building Code wind load requirements for the specific project location. The panel shall have been tested to ASTM E-1592 Requirements and shall have a Negative Load Table in the required FBC format with a 2.0 Factor of Safety shown in this Negative Load Table.***
3. Roof System shall be designed to meet a UL Class 90 wind uplift in accordance with UL standard 580 and panel system shall be ASTM 1592 Tested and approved: U. S Army Corps of Engineer requirement. Roof system shall have current FLORIDA BUILDING CODE PRODUCT APPROVAL and shall be supported by ASCE 7 “stamped/sealed” Florida Independent Engineer Calculations from the Roofing System Manufacturer to support the applicable Zone 1, Zone 2 and Zone 3 loads for this particular project. Extrapolations will not be allowed in these calculations, only interpolations by the Engineer to illustrate the clip layout for each Zone listed above.

1.5 WARRANTIES

1. The Manufacturer shall warrant for twenty years (20) from the date of substantial completion of the Work related to this section, that the work is not defective in workmanship or material, and that the roof will be adequate to prevent leaks. This warranty may be provided in the short term by the Contractor/Roof Installer, however must have the backing and assurance of the roof system manufacturer.
2. **Finish Warranty on Aluminum: (Coastal Application)**
Written 20 Year Finish Warranty shall be required for the Aluminum Standing Seam Roof System including Flashings, and related rain-carrying equipment. as supplied by the manufacturer and roofing contractor. This warranty will be for 20 Years and cover: Chalking, Fading and Integrity of the Kynar 500™ paint finish on the Aluminum. Note this is a Coastal Application with exposure to the ocean and Salt Spray. This 20 Year Finish Warranty shall cover this type of Coastal Application and must be signed and executed by the Roofing System manufacturer.

1.6 SUBMITTALS

1. Furnish detailed drawings showing profile and gauge of exterior sheets, location and type of fasteners, location, gauges, shape and method of attachment of all trim locations and type of sealants, and any other details as may be required for a weather-tight installation.
2. Provide finish samples of all colors specified.

2. PART 2 - PRODUCTS

2.1 PANEL DESIGN

1. Roof panels shall be standing seam in 18" widths with 2" high seam, mechanically seamed panels with Factory-supplied & calibrated Mechanical Seamers that form the completed seam to an 180° seamed panel.
2. Gauge specified herein is minimum .040" Aluminum Gauge Thickness.
3. Panels shall be factory manufactured either "with Striations" or "with pencil ribs and with striations" at the selection of the Architect.

2.2 ACCEPTABLE MANUFACTURERS

1. This project is detailed around the roofing product of Petersen Aluminum Corporation, Kennesaw, GA "**TITE-LOC PLUS**" PANEL,
Similar products of the following manufacturers will be considered equal:
IMETCO, Tucker, GA,
MERCHANT & EVANS, Burlington, NJ.
ATAS International, Inc.
2. **Color shall be: "PAC-CLAD" Kynar 500™ color: Silver.**

2.3 MATERIAL AND FINISHES

1. Face Sheet Material: Aluminum Standing Seam Sheet shall be produced from ASTM B-209 quality Aluminum, 3105 H-14 Alloy and Temper material. Aluminum shall be tension leveled (temper passed and stretcher leveled) with camber a maximum of 1/4 inch in 20 feet, manufactured in the USA, and be .040" Thick Aluminum U.S. standard gauge. ***Standards and shall meet applicable Florida Building Code Wind load requirements for this project location. Additionally, Florida Professional Engineer Stamped Calculations will be required for the project to certify the roof panel assembly meets the applicable Building Code wind loads per ASCE 7 standards.***

2. FINISH

1. Finish:
 1. Finish shall be Kynar 500 or Hylar 5000 Fluorocarbon coating with a top side film thickness of 0.70 to 0.90 mil over 0.25 to 0.31 mil prime coat to provide a total dry film thickness of 0.95 to 1.25 mil. Bottom side shall be coated with a primer with a dry film thickness of 0.25 mil. Finish shall conform to all tests for adhesion, flexibility, and longevity as specified by Kynar 500 or Hylar 5000 finish supplier.
 2. If Strippable coating shall be applied on the pre-finished panels to the top side to protect the finish during fabrication, shipping and field handling. This strippable coating shall be removed before installation.
 3. Field protection must be provided by the Contractor at the job site so material is not exposed to weather and moisture.
2. Exposed Flashing and Trim:
 1. Unless otherwise specified, all exposed adjacent flashing and trim shall be of the same material and finish as panel system.
3. Forming: Use continuous end rolling method. No end laps on panels.
The manufacturer may elect to roll panels on the job site due to panel lengths that exceed normal transportation limitations of the trucking industry.
4. Trim: Trim shall be fabricated of the same material and finish to match the profiled sheeting and press broken in lengths of 10 to 12 feet. Trim shall be formed only by the manufacturer or their approved dealer. Trim to be erected in overlapped condition. Use lap strips only as indicated on drawings. Miter conditions shall be factory welded material to match the sheeting.
5. Closures: Use composition or metal profiled closures at the top of each elevation to close ends of the panels. Metal closures to be made of the same material and finish as face sheet.
6. Panel Clips: Shall be Stainless Steel as required by the panel manufacturer in appropriate Gage and ***spacing of Clips to meet the job-specific Wind Load requirements by the Florida Building Code. Necessary engineering documentation of this clip spacing and attachment to be provided in the submittal stage to the Architect.***
7. Fasteners: Fasteners shall be 400 series stainless steel, dished washers stainless steel with bonded neoprene.
8. Zees: Where required by design of primary structural framing system shall be used to span between beams and/or joists. Thermally responsive base and top clips shall

- be fastened to the zees on 12" centers.
9. Insulation: See Section 07210: Building Insulation.

2.4 ROOFING UNDERLAYMENT

1. On all surfaces to be covered with roofing material, furnish and install a 40 Mil "Peel & Stick Membrane" will be required as outlined by the metal panel manufacturer. Membrane to be minimum of 40 MIL Thickness, smooth, non-granular, one of the following manufacturers:
 - a) W.R. Grace "Ice & Water Shield" (High Temperature).
 - b) Carlisle: CCW WIP 300HT.
 - c) Interwrap : Titanium PSU.
 - d) MFM Corp : "Wind & Water Shield".
 - e) MID-STATES Asphalt: Quick Stick HT
 - f) Polyguard: Polyglas HT.
 - g) TAMKO: TW Tile & Metal Underlayment.
2. Underlayment shall be laid in horizontal layers with joints lapped toward the eaves a minimum of 6", and well secured along laps and at ends as necessary to properly hold the felt in place. All underlayment shall be preserved unbroken and whole.

2.5 SEALANTS

1. Exterior grade silicone sealant recommended by roofing manufacturer.

2.6 FABRICATION

1. Comply with dimensions, profile limitations, gauges and fabrication details shown and if not shown and, if not shown, provide manufacturer's standard product fabrication.
2. Fabricate components of the system in the factory, ready for field assembly.
3. Fabricate components and assemble units to comply with fire and performance requirements specified.
4. Apply specified finishes in conformance with manufacturer's standards, and according to manufacturer's instructions.

3. PART 3 - EXECUTION

3.1 INSPECTION

1. Examine alignment of structural steel and related supports prior to installation and do not proceed until the defects are corrected by the responsible contractor.

3.2 FASTENERS

1. Secure units to supports.
2. Place fasteners as indicated in manufacturer's standards.

3.3 INSTALLATION

1. Panels shall be installed plumb and true in proper alignment and relation to the structural framing. The erector must have at least five years' successful experience with similar applications.
2. Install metal panels, fasteners, trim and related sealants in accordance with approved shop drawings and as may be required for a weather-tight installation.
3. Remove all strippable coating and provide a dry wipe-down cleaning of the panels as they are erected.

3.4 DAMAGED MATERIAL

1. Upon determination of responsibility, repair or replace damaged metal panels and trim to the satisfaction of the Architect and Owner.

END OF SECTION

07 62 00 FLASHING AND SHEET METAL

PART 1 - GENERAL

1.01 SUMMARY

- A. Provide flashing and sheet metal components for building construction.
 - 1. Copings.
 - 2. Conductor heads and downspouts.
 - 3. Exposed metal trim units.
 - 4. Miscellaneous sheet metal accessories.

1.02 PERFORMANCE REQUIREMENTS

- A. System Design: Provide flashing and sheet metal components that are identical to systems that have been successfully tested by a qualified testing and inspecting agency to resist uplift pressure calculated according to ASCE 7-98.
 - 1. Design wind velocity shall be as shown on structural Drawings.
 - 2. Design pressures are indicated on structural Drawings.

1.03 SUBMITTALS

- A. Submit for approval samples, shop drawings, product data.
- B. Manufacturer Certificates: Signed by roofing manufacturer certifying that flashing and sheet metal components comply with requirements specified in "Performance Requirements" Article.

1.04 QUALITY ASSURANCE

- A. Comply with governing codes and regulations. Provide products of acceptable manufacturers which have been in satisfactory use in similar service for three years. Use experienced installers. Deliver, handle, and store materials in accordance with manufacturer's instructions.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Copings and other roof flashing, rafter end covers, etc.: Minimum .040 (unless otherwise noted on drawings) formed aluminum with hold-down clips and splice plates
- B. Finish: Kynar 500 2-coat fluoropolymer to match metal roofing.

Mike Marshall, 12/2023

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Follow recommendations of SMACNA "Sheet Metal Manual." Allow for expansion. Isolate dissimilar materials to prevent galvanic corrosion.
- B. Install materials and systems in accordance with manufacturer's instructions and approved submittals. Install materials and systems in proper relation with adjacent construction and with a uniform appearance. Coordinate installation with roofing system and work of other sections to ensure weathertight performance. Anchor securely to structure to withstand inward and outward loads.
- C. Restore damaged components and finishes. Clean and protect work from damage.

END OF SECTION

07 92 00 - WATERPROOFING & SEALANTS

PART 1 GENERAL

1.01 RELATED DOCUMENTS:

Drawings and General Provisions of the Contract including General and Supplementary Conditions and Division 1 Specification Sections, apply to work of this section.

1.02 SCOPE:

This section includes waterproofing and damp proofing of retaining walls below grade, under slabs on grade, below toppings of suspended slabs, under and behind ceramic tile, thru walls and at faces of walls, masonry waterproofing, and sealant caulking, and related items.

1.03 RELATED WORK:

- A. Cast in Place Concrete
- B. Cement Board Siding
- C. Metal Siding / Metal Roofs
- D. Windows and Doors

1.04 SUBMITTALS

Submit technical data on proposed materials, colors if applicable and MSDS sheets. See section 013000 for submittal requirements.

PART 2 MATERIALS

2.01 ADHESIVES: Shall be Nerva-Plast by Rubber and Plastic Compound Company and Bituthane 3000 by W.R. Grace or equal.

2.02 THRU-WALL FLASHING: See section 048000 Unit Masonry Assemblies

2.03 FLUID APPLIED AIR BARRIER: Tyvek Fluid Applied WB. Similar and equal products by Prosoco will be considered equal.

2.04 SEALANT

- A. One-part caulk shall be VLM 150 by BASF or Sherwin Williams Loxon, H1. (See Section 08 43 00 for sealant around perimeter of aluminum storefront and louvers).

2.05 BACKER ROD: Shall be closed cell polyethylene rod.

2.06 PRECOMPRESSED EXPANDING FOAM SEALANT: Emseal joint systems or equal.

PART 3 INSTALLATION

3.01 SEALANT: Apply one-part sealant around perimeter of door frames and as indicated in recesses. Flow on smoothly for even surface. Color will be selected

by the architect from manufacturers standard color palette. Use backer rod to achieve two points of contact between materials. Review minimum sealant joint width at door perimeters of 3/8”.

3.02 UNDER STANDING SEAM METAL ROOFING: See section 074113

3.03 FLUID APPLIED AIR BARRIER: Apply air and water-resistive barrier to a clean, dry substrate within temperature and weather limitations per manufacturer’s written instructions.

A. FLUID-APPLIED AIR & WATER-RESISTIVE BARRIER INSTALLATION:

1. Apply to recommended thickness.
2. Allow product to cure and dry.
3. Inspect membrane before covering. Repair any punctures or damaged areas by applying additional material.
4. Back roll as necessary to ensure there are no pinholes, voids, or gaps in the membrane. Apply fluid applied air and water-resistive barrier per manufacturer’s recommendations.
5. Apply additional coats per manufacturer’s written instructions.

B. AT DOORS AND PENETRATIONS:

1. General: Comply with weather and air barrier manufacturer’s installation instructions, temperature limitations, product data and shop drawings.
2. Apply liquid flashing membrane over surfaces to seal and waterproof rough openings per manufacturer’s written instructions. Spread the wet product to create an opaque, monolithic flashing membrane which surrounds the rough opening and extends 4 to 6 inches over the face of the structural wall. Apply additional coats as needed to achieve void- and pinhole-free surface.

END OF SECTION

08 16 13 – FIBERGLASS REINFORCED PLASTIC (FRP) DOORS AND FRAMES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SECTION INCLUDES

- A. Fiberglass Reinforced Plastic (FRP) Doors
- B. Fiberglass Reinforced Plastic (FRP) Frames

1.3 RELATED SECTIONS

- A. Section 06105 - Miscellaneous Carpentry
- B. Section 07920 - Joint Sealants
- C. Section 08710 - Finish Hardware
- D. Section 08800 - Glass and Glazing
- E. Section 09911 - Exterior Painting
- F. Section 09912 - Interior Painting

1.4 SUBMITTALS

- A. Submit shop drawings and product data under provisions of Section 01 30 0.
- B. Shop Drawings – Include the following:
 - 1. Elevation of each door type including door size, handing and finish
 - 2. Cutout locations for lites and hardware
 - 3. Internal reinforcement
 - 4. Frame configuration, anchor types and spacing
- C. Product data including manufacturer's literature, fabrication descriptions and installation instructions.
- D. Construction and/or color samples as requested.

1.5 QUALITY ASSURANCE

- A. General Qualifications:
 - 1. Manufacturer Qualifications: A company that specializes in manufacturing FRP doors and frames with a minimum of 30 years' experience.

2. Quality Assurance: Obtain all FRP doors and FRP frames from a single manufacturer to ensure consistent quality.
3. Quality Assurance: Hardware and accessories for all FRP doors and FRP frames shall exactly adhere to the Architect's specification.
4. Quality Assurance: Glass for windows in doors shall be ¼" UL Wire glass.

B. Regulatory Requirements:

1. Flame Spread: All rated FRP component parts, including the finish, shall have a flame spread classification of 25 or less per ASTM E84 and shall be self-extinguishing per ASTM D635, unless operating conditions dictate otherwise.
 2. Resins and coatings to meet with USDA standards for incidental food contact, if applicable to this project.
 3. Products conforming to the Florida Building Code (FBC).
- C. Warranty:
1. To include ten (10) years free from defects in material and workmanship from date of shipment, and lifetime from corrosion from date of shipment, provided that the structural integrity of the doors and frames have not been violated or compromised.

1.6 DELIVERY, STORAGE, HANDLING, AND PROTECTION

- A. Doors and frames will be individually packaged in cardboard cartons. Cartons will be clearly labeled with project information and will include fasteners and installation instructions, if required. Only remove cartons upon arrival if cartons are wet or damaged.
- B. Deliver and store doors and frames at the job site in such a manner as to prevent damage; out of weather and/or extreme temperatures. The doors shall be stored in a vertical position on blocking, clear of the floor and with blocking between the doors to permit air circulation between the doors.
- C. All damaged or otherwise unsuitable doors and frames, when so ascertained, shall be immediately removed from job site.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

- A. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
- B. Basis of Design Product: Subject to compliance with requirements, provide:
 1. Fiberglass Reinforced Plastic Doors and Frames by CORRIM Company, Oshkosh, Wisconsin 54901. Phone: 920-231-2000 Fax: 920-231-2238 www.corrim.com . Similar and equal products by Tiger Door will be accepted as an equal.

2.2 FRP DOORS

A. Door Fabrication:

1. Total door thickness to be a nominal 1-3/4 inches thick.
2. Lock stiles on non-rated active leaves shall be factory beveled 1/8" in 2".
3. Provide doors with completely seamless construction on all six (6) surfaces.

B. Face Sheets: FRP face sheets shall be manufactured using a corrosion resistant resin system with light stabilizing additives. The resin shall be reinforced with fiberglass, 50% average by weight for enhanced strength. Face sheets shall be a minimum of 0.125-inch-thick fiberglass. Face sheets will be Architect's choice of smooth, pebble or woodgrain seamless finish.

C. Stiles and Rails: Stiles and rails shall be 1-1/2-inch square pultruded fiberglass tubes. Pultrusion is a fiberglass fabrication process that results in a much stronger, more durable product. Non-rated and 20-minute doors will have a full width horizontal 1-1/2-inch square pultruded fiberglass tube every 24 inches in height for internal reinforcement. A 1-1/2-inch square solid fiberglass block shall be used at all hardware reinforcements and corner intersections. A minimum of 1,150 pounds screw withdrawal force shall be required per screw. The bottom rail shall allow for 1-1/4 inches of height alterability without loss of the panel's integrity. Absolutely no metal or wood reinforcements, including #2 SPF (Spruce Pine Fir), will be allowed in any part of the stile and rail configuration.

D. Core Options:

1. Polyurethane Foam Core: A 1-1/2-inch-thick rigid block of polyurethane shall be laminated to the interior of the panels. The "R" factor shall be 12. The polyurethane insulation shall be Class A and CFC free. Foam properties comply with ASTM E-84 and The International Building Code (IBC).
2. Balsa Core: 1-1/2 inches thick Balsa core of end grain construction for enhanced strength, shall be laminated to the interior of the panels. The balsa shall have a density of 8.5 – 9.0 lbs./cu. Ft. Compressive strength, perpendicular to the door panel surface shall be 1400 psi.
3. Honeycomb Core: Phenolic impregnated resin paper honeycomb.

E. Hardware Preparations: Doors shall be reinforced and mortised for hardware with 1-1/2 inches x 1-1/2 inches of solid fiberglass to allow application of hinges and locks, in accordance with the hardware schedule, hardware manufacturer's instructions and templates.

1. Reinforcement Blocking: Non-swelling polymer or firestop blocking will be used for all lockset, surface mounted hardware and thru-bolted hardware blocking.
2. Pilot holes for full mortise butt hinges will be pre-drilled by factory.
3. All hardware shall be attached / installed by using pilot hole and stainless-steel wood screws.

F. Door Accessories

1. Louvers: Louvers shall be fabricated with pultruded FRP material of an inverted “V” design and shall be subject to the same performance guarantee as the door panel. The louver opening will be fabricated in the same method as for glazing above.
2. Fasteners: Provide countersunk stainless-steel fasteners as required for glazing openings and louvers.
3. Transoms: All transom panels will be identical to the doors in construction, materials, thickness, color, and reinforcement.
4. Astragals: Astragals for pairs of doors to be fabricated with FRP material of manufacturer’s standard flat design.

2.3 FRP FRAMES

A. Fabrication: FRP frames shall be rigid, neat in appearance, free from defects and the finish shall match the doors. Fabricate FRP doors and frames as shown on the drawings and in accordance with best shop practices. Field measurements shall be taken as required for coordinating with adjoining work.

1. Provide frames for doors, transoms, sidelights and borrowed lites, as required.
2. All frames shall be 100% pultruded fiberglass with an average 50% glass content by weight which results in an industrial fiberglass frame as strong as a 14-gauge hollow metal frame.
3. Non-rated and 20-minute UL labeled: Standard one-piece FRP profile with integral stop: 5-3/4” x 2” equal rabbet
(Optional: 4-inch header)
(Optional: modified depth with equal rabbet)
(Optional: modified depth with un-equal rabbet)
(Optional: single rabbet design)
4. Head and jamb members shall be standard 45-degree miter, providing a neatly mitered corner connection, fabricated for Knocked Down (KD) field assembly.
(Optional: one piece frame, resin bonded and assembled at factory, available on non-rated frames only)

B. Reinforcements and Braces / Supports

1. Frames shall be reinforced and mortised for hardware in accordance with the hardware schedule, manufacturer’s instructions, and templates. Absolutely no metal reinforcements will be allowed in any part of the FRP frame configuration.
2. Corner Reinforcement: 4 inches x 4 inches x 5-3/8 inches x 1/4-inch-thick pultruded fiberglass angle. Attached to head bar at factory using stainless steel screws.

3. Mortise Hinge Reinforcement: 3 inches x 7 inches x 9/16 inch (or 3/8 inch) thick FRP material attached to frame by means of bonding and stainless-steel countersunk screws.
4. Closer Reinforcement: 1-1/2 inches x 19 inches x 3/16-inch thick FRP material attached to frame by means of bonding.
5. Strike Reinforcement: 1-1/2 inches x 9 inches x 3/4-inch thick FRP material attached to frame by means of bonding and stainless-steel countersunk screws.
6. Anchoring Systems - Furnish at least three (3) anchors in each jamb of frames up to 90 inches high and one (1) additional anchor for each 30 inches in height above 90 inches, in shapes, sizes and spacing shown or required for anchorage into adjoining wall construction.
 - a. New Masonry: T-Strap or Wire Anchor (optional: stainless steel T-Strap)
 - b. New Stud (before sheathing): New Stud Anchor
 - c. Butt Existing Wall: Existing Opening Anchor; Masonry, Steel or Wood (Optional: concealed)
 - d. Wrap Existing Wall: Compression Anchor
 - e. Consult factory for additional anchoring options.

2.4 FINISH

- A. Seamless 25 mil matte gelcoat (smooth faces only), selected by Architect, from manufacturer's full range of colors.
Prime finish for field painting; all face options. Finish on door and frame units will match.

PART 3 - EXECUTION

3.1 INSPECTION

- A. Installer shall examine the substrate and conditions under which fiberglass reinforced plastic work is to be installed and notify the General Contractor in writing of any conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions have been corrected in a manner acceptable to the installer.

3.2 INSTALLATION

- A. Doors and frames will be delivered in individual cartons with the identifying mark number listed on each carton.
- B. Install FRP doors, frames, and accessories in accordance with manufacturers printed instructions, final shop drawings and standards for FBC labeled openings.

- C. Provide clearance for doors of 1/8 inch at jambs and heads; 1/4-inch clearance above threshold.

3.3 ADJUSTING

- A. At substantial completion, adjust all operable components to ensure proper installation. Doors shall function smoothly and swing freely without binding. Doors shall remain open at any angle without being affected by gravitational influence.

3.4 CLEANING

- A. Remove dirt and excess sealant from exposed surfaces. Follow the manufacturer's recommended cleaning techniques and procedures for cleaning all surfaces. Only use cleaning products that will not scratch or damage the surfaces and are recommended by the manufacturer.

PART 4 - Material Properties of Fiber Reinforced Plastic (FRP) Profiles

4.1 Door Properties

ASTM D-256:	Notched Izod Impact
ASTM D-638:	Tensile Strength Properties of Plastic
ASTM D-695:	Compressive Strength
ASTM D-732:	Shear Strength
ASTM D-790:	Flexural Strength / Flexural Modulus
ASTM D-2583:	Barcol Hardness
ASTM E-283:	Air Infiltration Test
ASTM E-330:	Static Load Test
ASTM E-331:	Water Infiltration
ASTM E-1886:	Impact by Missiles & Exposed to Cyclic Pressure Differentials
ASTM E-1996:	Impact by Wind Borne Debris
TAS 201:	Large Missile Impact
TAS 202:	Static Load Test
TAS 203:	Cyclic Load Test
SFBC 3603.2:	Forced Entry

4.2 Foam Core Properties

ASTM C-203:	Flexural Modulus
ASTM C-272:	Water Absorption
ASTM C-273:	Shear Strength
ASTM C-518:	K-Factor / R-Factor
ASTM D-1621:	Compressive Modulus

ASTM D-1622:	Density
ASTM D-1623:	Tensile Strength
ASTM D-2126:	Dimensional Stability
ASTM D-2856:	Closed Cell Content
ASTM E-84:	Surface Burning Characteristics
ASTM E-96:	Water Vapor Permeability

4.3 Balsa Core Properties

ASTM C-271:	Apparent Normal Density
ASTM C-273:	Shear Strength
ASTM C-297:	Tensile Strength
ASTM C-365:	Compressive-Strength
ASTM D-177:	Thermal Conductivity
BSS-7238:	Smoke Density & Toxic Gas Generation
CMVSS/FMVSS 302:	Motor Vehicle Flammability Safety Test
MIL-STD-907B:	Fire Resistance Test

4.4 Adhesive Properties: Urethane Adhesive System

ASTM D-570:	Water Absorption
ASTM D-638:	Elongation Percent
ASTM D-638:	Tensile Strength
ASTM D-638:	Young's Modulus
ASTM D-2240:	Shore Hardness, D
ASTM D-3163:	Bond Configuration Lap Shear
ASTM E-132:	Poisson Ratio
ASTM E-1640:	Glass Transition Temperature
ISO MAT-2208:	CLTE@ -30 to 0 deg. C
ISO MAT-2208:	CLTE@ 50 to 100 deg. C
SAE J-1525:	Crosshead Speed

4.5 Resin Properties

ASTM D-256:	Notched Izod Impact
ASTM D-570:	Water Absorption
ASTM D-638:	Tensile Strength Properties of Plastics
ASTM D-638:	Tensile Modulus
ASTM D-638:	Tensile Elongation @ Yield
ASTM D-648:	Heat Deflection Temperature
ASTM D-695:	Compressive Strength / Compressive Modulus
ASTM D-790:	Flexural Strength / Flexural Modulus
ASTM D-2566:	Linear Shrinkage
ASTM D-2583:	Barcol Hardness

END OF SECTION 08220

08 43 00 - ALUMINUM STOREFRONT

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes the following:
 - 1. Exterior thermally broken, impact resistant aluminum storefront systems fixed framing-
- B. Related Sections:
 - 1. 08 81 00 "Glass & Glazing"
 - 2. 07 92 00 "Flashing and Sealants"

1.2 SYSTEM DESCRIPTION

- A. General: Provide aluminum storefront systems capable of withstanding loads and thermal and structural movement requirements indicated without failure, based on testing manufacturer's standard units in assemblies similar to those indicated for this Project. Failure includes the following:
 - 1. Air infiltration and water penetration exceeding specified limits.
 - 2. Framing members transferring stresses, including those caused by thermal and structural movement, to glazing units.
 - a. Drawings are diagrammatic and do not purport to identify nor solve problems of thermal or structural movement, glazing, anchorage, or moisture disposal.
 - b. Requirements shown by details are intended to establish basic dimension of units, sight lines and profiles of members.
 - c. Provide concealed fastening whenever possible.
 - d. Provide entrance and storefront systems, including necessary modifications, to meet specified requirements and maintaining visual design concepts.
 - e. Attachment considerations are to take into account site peculiarities and expansion and contraction movements so there is no possibility of loosening, weakening, or fracturing connection between units and building structure or between units themselves.
 - f. Anchors, fasteners and braces shall be structurally stressed not more than 50% of allowable stress when maximum loads are applied.
 - g. Provide for expansion and contraction due to structural movement without detriment to appearance or performance.
 - h. Framing systems shall accommodate expansion and contraction movement due to surface temperature differentials of 180 degrees F without causing buckling, stress on glass, failure of joint seals, excessive stress on structural elements, reduction of performance, or other detrimental effects.
- B. Glazing: Physically and thermally isolate glazing from framing members.
- C. Wind loads: provide framing systems, including anchorage, capable of withstanding wind-load design pressures of (70) lbs./sq. ft. inward and (70) lbs./sq. ft. outward calculated according to requirements of authorities having jurisdiction or the American Society of Civil Engineers' ASCE 7, "Minimum Design Loads for Buildings and Other Structures," 6.4.2, "Analytical Procedure," whichever are more stringent.

1. Design wind velocity shall be 180 mph with a wind load importance factor of 1.0.
 2. Deflection of framing members in a direction normal to wall plane is limited to 1/175 of clear span or 3/4 inch (19 mm), whichever is smaller, unless otherwise indicated.
 3. Static-Pressure Test Performance: Provide storefront systems that do not evidence material failures, structural distress, failure of operating components to function normally, or permanent deformation of main framing members exceeding 0.2 percent of clear span when tested according to ASTM E 330.
 - a. Test Pressure: 150 percent of inward and outward wind-load design pressures.
 - b. Duration: As required by design wind velocity; fastest 1 mile (1.609 km) of wind for relevant exposure category.
 - c. Design pressures for components and cladding shall be as indicated on structural drawings.
- D. Hurricane-Resistance Test Performance: Provide storefront systems that pass large and small missile-impact tests, in accordance with ASTM E 1886, information in ASTM E 1996 and TAS 201/203.
1. Large Missile Impact: All aluminum-framed systems located within 30 feet (9.1M) of grade.
- E. Dead Loads: Provide storefront-system members that do not deflect an amount which will reduce glazing bite below 75 percent of design dimension when carrying full dead load.
1. Provide a minimum 1/8-inch (3.18-mm) clearance between members and top of glazing or other fixed part immediately below.
- F. Air Infiltration: Provide storefront systems with permanent resistance to air leakage through fixed glazing and frame areas of not more than 0.06 cfm/sq. ft. (0.3 L/s/sq. m) of fixed wall area when tested according to ASTM E 283 at a static-air-pressure difference of 1.57 lbf/sq. ft. (75.2 Pa).
- G. Water Penetration: Provide storefront systems that do not evidence water leakage through fixed glazing and frame areas when tested according to ASTM E 331 at minimum differential pressure of 20 percent of inward-acting wind-load design pressure as defined by ASCE 7, "Minimum Design Loads for Buildings and Other Structures," but not less than 6.24 lbf/sq. ft. (299 Pa). Water leakage is defined as follows:
1. Uncontrolled water infiltrating systems or appearing on systems' normally exposed interior surfaces from sources other than condensation. Water controlled by flashing and gutters that is drained back to the exterior and cannot damage adjacent materials or finishes is not water leakage.
- H. Thermal Movements: Provide storefront systems, including anchorage, that accommodate thermal movements of systems and supporting elements resulting from the following maximum change (range) in ambient and surface temperatures without buckling, damaging stresses on glazing, failure of joint sealants, damaging loads on fasteners, and other detrimental effects.
1. Temperature Change (Range): 120 deg F (67 deg C), ambient; 180 deg F (100 deg C), material surfaces.
- I. Structural-Support Movement: Provide storefront systems that accommodate structural movements including, but not limited to, sway and deflection.

- J. Condensation Resistance: Provide storefront systems with condensation resistance factor (CRF) of not less than 59 when tested according to AAMA 1503.1.
- K. Average Thermal Conductance: Provide storefront systems with average U-values of not more than 0.45 Btu/sq. ft. x h x deg F (3.57 W/sq. m x K) when tested according to AAMA 507.
- L. Dimensional Tolerances: Provide storefront systems that accommodate dimensional tolerances of building frame and other adjacent construction.

1.3 SUBMITTALS

- A. Product Data: For each product specified. Include details of construction relative to materials, dimensions of individual components, profiles, and finishes.
- B. Shop Drawings: For storefront systems. Show details of fabrication and installation, including plans, elevations, sections, details of components, provisions for expansion and contraction, and attachments to other work.
- C. Installer Certificates: Signed by manufacturer certifying that installers comply with specified requirements.
- D. Product Test Reports: Based on evaluation of tests performed by manufacturer and witnessed by a qualified independent testing agency, indicate compliance of storefront systems with requirements based on comprehensive testing of current systems.

1.4 QUALITY ASSURANCE

- A. Installer Qualifications: Engage an experienced installer to assume engineering responsibility and perform work of this Section who has specialized in installing storefront systems similar to those required for this Project and who is acceptable to manufacturer.
 - 1. Engineering Responsibility: Prepare data for storefront systems, including Shop Drawings, based on testing and engineering analysis of manufacturer's standard units in assemblies similar to those indicated for this Project.
- B. Source Limitations: Obtain each type of storefront system through one source from a single manufacturer.

1.5 PROJECT CONDITIONS

- A. Field Measurements: Verify dimensions by field measurements before fabrication and indicate measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

1.6 WARRANTY

- A. General Warranty: The special warranty specified in this Article shall not deprive the Owner of other rights the Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by the Contractor under requirements of the Contract Documents.

- B. Special Warranty: Submit a written warranty executed by the manufacturer agreeing to repair or replace components of storefront systems that fail in materials or workmanship within the specified warranty period. Failures include, but are not limited to, the following:
 - 1. Structural failures including, but not limited to, excessive deflection.
 - 2. Adhesive sealant failures.
 - 3. Cohesive sealant failures.
 - 4. Failure of system to meet performance requirements.
 - 5. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
 - 6. Water leakage through fixed glazing and frame areas.
- C. Warranty Period: 2 years from date of Substantial Completion.
- D. Warranty Period for Metal Finishes: 10 years from date of Substantial Completion.
- E. Warranty Period for Insulating Glass: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Basis-of-Design Product: The design for aluminum storefront systems is based on the following products. Subject to compliance with requirements, provide the named product or an equivalent product by one of the manufacturers listed in paragraph 2.1.B below.
 - 1. Fixed Framing: IR 501 T Impact Framing manufactured by Kawneer
- B. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - 1. YKK AP
 - 2. OldCastle
 - 3. Coral Architectural Products

2.2 MATERIALS

- A. Aluminum: Alloy and temper recommended by manufacturer for type of use and finish indicated, complying with the requirements of standards indicated below.
 - 1. Sheet and Plate: ASTM B 209 (ASTM B 209M).
 - 2. Extruded Bars, Rods, Shapes, and Tubes: ASTM B 221 (ASTM B 221M).
 - 3. Extruded Structural Pipe and Tubes: ASTM B 429.
 - 4. Bars, Rods, and Wire: ASTM B 211 (ASTM B 211M).
 - 5. Welding Rods and Bare Electrodes: AWS A5.10.
- B. Glazing as specified in Division 8 Section "Glazing."
- C. Glazing Gaskets: Manufacturer's standard compression types; replaceable, extruded EPDM rubber.

- D. Spacers, Setting Blocks, Gaskets, and Bond Breakers: Manufacturer's standard elastomeric type for spacers and setting blocks. Bond Breaker Tape, manufacturer's standard TFE-fluorocarbon or polyethylene material to which sealants will not develop adhesion.
- E. Secondary Sealant: For use as weatherseal, compatible with structural silicone sealant and other system components with which it comes in contact, and that accommodates a 50 percent increase or decrease in joint width at the time of application when measured according to ASTM C 719.
 - 1. Color: As selected by Architect from manufacturer's full range of colors.
 - 2. Use neutral-cure silicone sealant with insulating-glass units.
- F. Framing system gaskets, sealants, and joint fillers as recommended by manufacturer for joint type.
- G. Sealants and joint fillers for joints at perimeter of storefront systems as specified in Division 7 Section "Joint Sealants."
- H. Bituminous Paint: Cold-applied asphalt-mastic paint complying with SSPC-Paint 12 requirements, except containing no asbestos, formulated for 30-mil (0.762-mm) thickness per coat.

2.3 COMPONENTS

- A. Brackets and Reinforcements: Provide manufacturer's standard brackets and reinforcements that are compatible with adjacent materials. Provide non-staining, nonferrous shims for aligning system components.
- B. Fasteners and Accessories: Manufacturer's standard corrosion-resistant, non-staining, nonbleeding fasteners and accessories compatible with adjacent materials.
 - 1. Reinforce members as required to retain fastener threads.
 - 2. Do not use exposed fasteners, except for hardware application. For hardware application, use countersunk Phillips flat-head machine screws finished to match framing members or hardware being fastened, unless otherwise indicated.
- C. Concrete and Masonry Inserts: Hot-dip galvanized cast-iron, malleable-iron, or steel inserts complying with ASTM A 123 or ASTM A 153 requirements.
- D. Concealed Flashing: Dead-soft, 0.018-inch- (0.457-mm-) thick stainless steel, complying with ASTM A 666, of type selected by manufacturer for compatibility with system.²

2.4 FABRICATION

- A. General: Fabricate components that, when assembled, will have accurately fitted joints with ends coped or mitered to produce hairline joints free of burrs and distortion. After fabrication, clearly mark components to identify their locations in Project according to Shop Drawings.

- B. Forming: Form shapes with sharp profiles, straight and free of defects or deformations, before finishing.
- C. Prepare components to receive concealed fasteners and anchor and connection devices.
- D. Fabricate components to drain water passing joints and condensation and moisture occurring or migrating within the system to the exterior.
- E. Glazing Channels: Provide minimum clearances for thickness and type of glass indicated according to FGMA's "Glazing Manual."
- F. Metal Protection: Where aluminum will contact dissimilar metals, protect against galvanic action by painting contact surfaces with primer or by applying sealant or tape recommended by manufacturer for this purpose. Where aluminum will contact concrete or masonry, protect against corrosion by painting contact surfaces with bituminous paint.
- G. Storefront: Fabricate framing in profiles indicated for flush glazing (without projecting stops). Provide subframes and reinforcing of types indicated or, if not indicated, as required for a complete system. Factory assemble components to greatest extent possible. Disassemble components only as necessary for shipment and installation.

2.6 ALUMINUM FINISHES

- A. General: Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations relative to applying and designating finishes.
- B. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in the same piece are not acceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.
- C. Finish designations prefixed by AA conform to the system established by the Aluminum Association for designating aluminum finishes.
- D. Class I, Clear Anodized Finish: AA-M10C21A41/AA-M45C22A41 (Mechanical Finish: non-specular as fabricated; Chemical finish: etched, medium matte; Anodic Coating: Architectural Class I, Clear coating (0.7 mils minimum) complying with AAMA 611.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of storefront systems. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. General: Comply with manufacturer's written instructions for protecting, handling, and installing storefront systems. Do not install damaged components. Fit frame joints to produce hairline joints free of burrs and distortion. Rigidly secure nonmovement joints. Seal joints watertight.
- B. Metal Protection: Where aluminum will contact dissimilar metals, protect against galvanic action by painting contact surfaces with primer or by applying sealant or tape recommended by manufacturer for this purpose. Where aluminum will contact concrete or masonry, protect against corrosion by painting contact surfaces with bituminous paint.
- C. Install components to drain water passing joints and condensation and moisture occurring or migrating within the system to the exterior.
- D. Set continuous sill members and flashing in a full sealant bed to provide weathertight construction, unless otherwise indicated. Comply with requirements of Division 7 Section "Joint Sealants."
- E. Install framing components plumb and true in alignment with established lines and grades without warp or rack of framing members.
- F. Install entrances plumb and true in alignment with established lines and grades without warp or rack. Lubricate operating hardware and other moving parts according to hardware manufacturers' written instructions.
 - 1. Install surface-mounted hardware according to manufacturer's written instructions using concealed fasteners to greatest extent possible.
- G. Install glazing to comply with requirements of Division 8 Section "Glazing," unless otherwise indicated.
- H. Install secondary-sealant weatherseal according to sealant manufacturer's written instructions to provide weatherproof joints. Install joint fillers behind sealant as recommended by sealant manufacturer.
- I. Install perimeter sealant to comply with requirements of Division 7 Section "Joint Sealants," unless otherwise indicated.
- J. Erection Tolerances: Install storefront systems to comply with the following maximum tolerances:
 - 1. Variation from Plane: Limit variation from plane or location shown to 1/8 inch in 12 feet (3 mm in 3.7 m); 1/4 inch (6 mm) over total length.
 - 2. Alignment: Where surfaces about in line, limit offset from true alignment to 1/16 inch (1.5 mm). Where surfaces meet at corners, limit offset from true alignment to 1/32 inch (0.8 mm).
 - 3. Diagonal Measurements: Limit difference between diagonal measurements to 1/8 inch (3 mm).

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3.3 ADJUSTING AND CLEANING

- A. Remove excess sealant and glazing compounds, and dirt from surfaces.

3.4 PROTECTION

- A. General Contractor shall provide final protection and maintain conditions, in a manner acceptable to manufacturer and Installer, which ensure storefront systems are without damage or deterioration at the time of Substantial Completion.

END OF SECTION

08 71 00 - HARDWARE

PART 1 GENERAL

1.01 RELATED DOCUMENTS

Drawings and General Provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification sections, apply to work of this section.

1.02 WORK INCLUDES

“Finish hardware” includes items known commercially as finish hardware which are required for swing, sliding and folding doors, except special types of unique and non-matching hardware specified in the same section as the door and door frame.

1.03 RELATED WORK

Hardware supplier shall check with other sections of this specification for related work such as aluminum entrances, metal doors and frames, wood doors, toilet partitions and accessories, or any other items that may relate to work in this section.

1.04 QUALITY ASSURANCE

- A. The finish hardware supplier shall furnish to the General Contractor all finishing hardware as hereinafter specified or as obviously required to complete the project. Items not specifically mentioned but necessary to complete the work shall be furnished, matching in quality and finish to the items hereinafter specified or described. Should an opening be omitted, this supplier shall provide finish hardware equal to that specified for similar or adjacent openings and as approved by the architect for function and quality. No extras will be allowed for omitted buy required items. Clarify all questions with the architect in writing, prior to bid opening.
- B. Experience: Hardware shall be furnished by those having experience in the builder's hardware field, competent to correctly interpret the plans, specifications; to furnish appropriate technician regularly employed by them to immediately service the job as required. This technician shall operate out of a stocking builders warehouse located within 75 miles of the job site in order to insure immediate servicing of the project. This supplier shall make two scheduled visits to the job site during the application of the finish hardware. Prior to each visit, he shall notify the General Contractor and the Architect in writing of his intention to visit the job so that either or both parties may have representation on the job to discuss any hardware problems that might need to

be discussed. In addition, this supplier shall immediately service the job upon the call of the General Contractor and/or the Architect. Upon the completion of the job and prior to the final construction inspection, this supplier shall lubricate and adjust all hardware according to the manufacturer's recommendations. These service requirements shall be demanded and strictly enforced by the architects.

- C. Product Delivery: All items of finish hardware shall be received at supplier's warehouse, checked for correctness of product, strikes, brackets, screws, and miscellaneous items, etc. Hardware is to be accumulate at supplier's warehouse and as far as practical be delivered in one complete delivery by supplier's own personnel. Contractor shall refuse drop or factory shipments. Supplier is to coordinate delivery with Contractor and Contractor is to check all items of hardware at the time of delivery with personnel from supplier's office.
- D. Product Handling: Provide secure lock-up for hardware delivered to the project, but not yet installed. Control the handling and installation of hardware items which are not completely replaceable so that the completion of the work will not be delayed by hardware losses, both before and after installation.
- E. Fire Rated Openings: Provide hardware for fire-rated openings in compliance with NFPA Standard No. 80 and the Florida Department of Educations Code requirements. Provide only hardware that has been tested and listed by Underwriters Laboratories, Inc. for types and sizes of doors required and complies with requirements of door and doorframe labels.
- F. Adjust and Clean:
 - 1. Adjust and check each operating item of hardware and each door to insure proper operation or function of every unit. Lubricate moving parts with type lubrication recommended by manufacturer (graphite-type if no other recommended). Replace units which cannot be adjusted and lubricated to operate freely and smoothly as intended for the application made.
 - 2. Clean adjacent surfaces soiled by hardware installation.
 - 3. Final Adjustment: Wherever hardware installation is made more than one month prior to acceptance or occupancy of a space or area, return to the work during the week prior to acceptance or occupancy, and make final check and adjustment of all hardware items in such space or area. Clean operating items as necessary to restore proper function and finish of hardware and doors. Adjust door controls devices to compensate for final operation of heating and ventilating equipment.

PART 2 PRODUCTS

2.01 FASTENINGS

- A. Furnish all finish hardware with all necessary screws, bolts, and other

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fasteners of suitable size and type to anchor the hardware in position for long life under hard use.

- B. Furnish sex bolts for all panic or exit devices and closers.
- C. All fastenings shall harmonize with the hardware as to material and finish.

2.02 ACCEPTABLE MANUFACTURERS

Products Approved: (Subject to the series and design approved by Architect)

Products for Exterior Doors must meet Florida Building Code requirements.

Hinges	McKinney, Hager, and Ives
Locks	Sargent, Corbin and Schlage
Thresholds	Hager, NGP and Pemko
Misc.	Rockwood, Hager, and Ives

2.03

Hardware sets below are for design. Supply locks & seals per manufacturers valid Florida Product Approval for Impact Rating.

HARDWARE SET #1

Doors 1

3 ea. Hinges	TA2314 4.5 x 4.5 NRP	626
1 ea. Classroom Lk	8205 LNL	626
1 ea. Closer	1431 – UO	689
1 ea. Threshold	520S x DW	Alum
1 set Weather-strip	891S x LR	Alum
1 ea. Door Sweep	770S x DW (Nylon Brush)	Alum

HARDWARE SET #2

Door 2

6 ea. Hinges	TA2314 4.5 x 4.5 NRP	626
1 ea. Surface Bolt	SB360 12 in x US2C	US2C
1 ea. Storeroom Lk	L9480 06A	626
2 ea. OH Holder	GJ90H x DW	689
1ea. Threshold	520S x 72"	Alum
2 set Weather-strip	891S x LR	Alum
1ea. Rain Drip	142AA x 76"	Alum
2 ea. Door Sweep	339AA x36"	Alum

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HARDWARE SET #3

Door 3

3 ea. Hinges	TA2314 4.5 x 4.5 NRP	626
1 ea. Storeroom Lk	L9480-06A	626
1 ea. OH Holder	GJ90H x DW	689

END OF SECTION

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SECTION 08 81 00 - GLASS AND GLAZING

PART 1 - GENERAL

1.01 SUMMARY

- A. Provide glass and glazing for all applications, including without limitation, entrances and storefront, windows, glazed doors, transoms, and sidelights.
- B. Glass Schedule:
 - 1. Exterior Windows: 1-5/16" thick insulating unit; tinted 1/4" tempered exterior pane, clear laminated impact-resistant interior unit.

1.02 SUBMITTALS

- A. Submit for approval samples, product data, warranty, and test reports.

1.03 QUALITY ASSURANCE

- A. Comply with governing codes and regulations. Provide products of acceptable manufacturers, which have been in satisfactory use in similar service for three years. Use experienced installers. Deliver, handle, and store materials in accordance with manufacturer's instructions.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Glazing sheets:
 - 1. Primary glass, Fed. Spec DD-G-451:
 - a. Clear and tinted float glass.
 - 2. Heat treated glass products, Fed. Spec DD-G-1403:
 - a. Heat-strengthened glass.
 - b. Tempered glass.
 - c. Spandrel glass.
 - 2. Impact-resistant Glass – Provide at all exterior windows.
- B. Insulating impact glass units. Insulating glass warranty: 10 years.
Note: These are to be obscure glass units
 - 1. Overall Thickness approximately 1 5/16"
 - 2. Exterior Lite: 1/4" Bronze Tempered Substrate
 - 3. Air Space Content: Air, 1/2" thickness
 - 4. Interior Lite: 19/32" Heat Strengthened Impact-Resistant Laminated Glass. Class 1, (clear)
 - 5. Exterior Lite: Solarban 70 Low E on the #2 Surface

- a. Kind FT, (fully tempered)
- 6. Interior Lite: Type I (transparent glass, Laminated).
 - c. (Class 1, (clear both lites)
 - d. Laminate Interlayer .090" DuPont Sentry Glass for windows
 - e. Kind HS, (Heat strengthened)

2.2 ELASTOMERIC GLAZING SEALANTS

- A. General: Provide products of type indicated, complying with the following requirements:
 - 1. Compatibility: Select glazing sealants that are compatible with one another and with other materials they will contact, including glass products, seals of insulating glass units, and glazing channel substrates, under conditions of service and application, as demonstrated by sealant manufacturer based on testing and field experience.
 - 2. Suitability: Comply with sealant and glass manufacturers' written instructions for selecting glazing sealants suitable for applications indicated and for conditions existing at time of installation.
 - 3. Colors of Exposed Glazing Sealants: As selected by Architect from the manufacturer's full range for this characteristic.
- B. Elastomeric Glazing Sealant Standard: Comply with ASTM C 920-05 and other requirements indicated for each liquid-applied, chemically curing sealant in the Glazing Sealant Schedule at the end of Part 3, including those referencing ASTM C 920-05 classifications for type, grade, class, and uses.

2.3 GLAZING TAPES

- A. Black-Bedding Mastic Glazing Tape: Preformed, butyl-based elastomeric tape with a solids content of 100 percent; non-staining and non-migrating in contact with nonporous surfaces; with or without spacer rod as recommended in writing by tape and glass manufacturers for application indicated; packaged on rolls with a release paper backing; and complying with and AAMA 800 for products indicated below:
 - 1. AAMA 807.3 tape, for glazing applications in which tape is not subject to continuous pressure.
- B. Expanded Cellular Glazing Tape: Closed-cell, PVC foam tape; factory coated with adhesive on both surfaces; packaged on rolls with release liner protecting adhesive; and complying with AAMA 800 for the following types:
 - 1. Type 1, for glazing applications in which tape acts as the primary sealant.
 - 2. Type 2, for glazing applications in which tape is used in combination with a full bead of liquid sealant.

2.4 MISCELLANEOUS GLAZING MATERIALS

- A. Provide products of material, size, and shape complying with referenced glazing standard, requirements of manufacturers of glass and other glazing materials for application indicated, and with a proven record of compatibility with surfaces contacted in installation.
- B. Cleaners, Primers, and Sealers: Types recommended by sealant or gasket manufacturer.
- C. Setting Blocks: Elastomeric material with a Shore A durometer hardness of 85, plus or minus 5.
- D. Spacers: Elastomeric blocks or continuous extrusions with a Shore A durometer hardness required by glass manufacturer to maintain glass lites in place for installation indicated.
- E. Edge Blocks: Elastomeric material of hardness needed to limit glass lateral movement (side walking).

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine framing glazing, with Installer present, for compliance with the following:
 - 1. Manufacturing and installation tolerances, including those for size, squareness, and offsets at corners.
 - 2. Presence and functioning of weep system.
 - 3. Minimum required face or edge clearances.
 - 4. Effective sealing between joints of glass-framing members.
- B. Verify that surfaces of glazing channels or recesses are clean, free of obstructions that may impede moisture movement; weeps are clear, and ready to receive glazing.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Clean glazing channels and other framing members receiving glass immediately before glazing. Remove coatings not firmly bonded to substrates.
 - 1. Clean contact surfaces with solvent and wipe dry.
 - 2. Seal porous glazing channels or recesses with substrate compatible primer or sealer.
 - 3. Prime surfaces scheduled to receive sealant.
 - 4. Install sealants in accordance with ASTM C 1193 and FGMA Sealant Manual and in accordance with the manufacturer's instructions.

3.3 GLAZING, GENERAL

- A. Comply with combined written instructions of manufacturers of glass, sealants, gaskets, and other glazing materials, unless more stringent requirements are indicated, including those in referenced glazing publications.
- B. Glazing channel dimensions, as indicated on Drawings, provide necessary bite on glass, minimum edge and face clearances, and adequate sealant thicknesses, with reasonable tolerances. Adjust as required by Project conditions during installation.
- C. Protect glass edges from damage during handling and installation. Remove damaged glass from Product site and legally dispose of off Project site. Damaged glass is glass with edge damage or other imperfections that, when installed, could weaken glass and impair performance and appearance.
- D. Install setting blocks in sill rabbets, sized and located to comply with referenced glazing publications, unless otherwise required by glass manufacturer. Set blocks in thin course of compatible sealant suitable for heel bead.
- E. Provide edge blocking where indicated or needed to prevent glass lites from moving sideways in glazing channel, as recommended in writing by glass manufacturer and according to requirements in referenced glazing publications.

3.4 TAPE GLAZING

- A. Position tapes on fixed stops so that, when compressed by glass, their exposed edges are flush with or protrude slightly above sightline of stops.
- B. Install tapes continuously, but not necessarily in one continuous length. Do not stretch tapes to make them fit opening.
- C. Where framing joints are vertical, cover these joints by applying tapes to heads and sills first and then to jambs. Where framing joints are horizontal, cover these joints by applying tapes to jambs and then to heads and sills.
- D. Place joints in tapes at corners of opening with adjoining lengths butted together, not lapped. Seal joints in tapes with compatible sealant approved by tape manufacturer.
- E. Do not remove release paper from tape until just before each glazing unit is installed.
- F. Apply heel bead of elastomeric sealant.
- G. Center glass lites in openings on setting blocks and press firmly against tape by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work toward centers of openings.

3.5 SEALANT GLAZING

- A. Install continuous spacers, or spacers combined with cylindrical sealant backing,

between glass lites and glazing stops to maintain glass face clearances and to prevent sealant from extruding into glass channel and blocking weep systems until sealants cure. Secure spacers or spacers and backings in place and in position to control depth of installed sealant relative to edge clearance for optimum sealant performance.

- B. Force sealants into glazing channels to eliminate voids and to ensure complete wetting or bond of sealant to glass and channel surfaces.
- C. Tool exposed surfaces of sealants to provide a substantial wash away from glass.

3.6 PROTECTION AND CLEANING

- A. General Contractor shall provide final protection and maintain conditions in a manner acceptable to manufacturer/fabricator and Installer that ensure glass is without damage or deterioration at the time of Substantial Completion. Protect glass from damage from welding, grinding and polishing compounds, plaster, lime, acid, cement, or other harmful contaminants. General Contractor shall clean installed products in accordance with manufacturer's instructions prior to owner's acceptance.
- B. Protect exterior glass from damage immediately after installation by attaching crossed streamers to framing held away from glass. Do not apply markers to glass surface. Remove nonpermanent labels, and clean surfaces.
- C. Protect glass from contact with contaminating substances resulting from construction operations, including weld splatter. If, despite such protection, contaminating substances do meet glass, remove them immediately as recommended by glass manufacturer.
- D. Examine glass surfaces adjacent to or below exterior concrete and other masonry surfaces at frequent interval during construction, but not less than once a month, for build-up of dirt, scum alkaline deposits, or stains; remove as recommended by glass manufacturer.
- E. Remove and provide new glass that is broken, chipped, cracked, abraded, or damaged in any way, including natural causes, accidents, and vandalism, during construction period.
- F. Clean glass and adjacent surfaces.

END OF SECTION 08800

09 27 00 – CEMENT BACKER BOARDS

PART 1 - GENERAL

1.01 SUMMARY

- A. Provide cement backer boards including metal support systems:
 - 1. Interior walls and partitions to receive thin-set wall tile.

1.02 SUBMITTALS

- A. Submit for approval product data.

1.03 QUALITY ASSURANCE

- A. Comply with governing codes and regulations. Provide products of acceptable manufacturers which have been in satisfactory use in similar service for three years. Use experienced installers. Deliver, handle, and store materials in accordance with manufacturer's instructions.
- B. Tolerances: Not more than 1/16" difference in true plane at joints between adjacent boards before finishing. No gaps or voids between gypsum board units or between drywall and adjacent work, unless detailed otherwise. Not more than 1/8" in 10' deviation from true plane, plumb and level in finished work.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Backer boards: 5/8" thickness, glass mesh reinforced portland cement backer board; DUROCK Cement Board, U.S. Gypsum or approved equal.
- B. Steel studs: ASTM C 645, 20 gage screw-type steel studs, 16 inches o.c., ASTM A 653 G40, hot-dip galvanized.
- D. Joint tape: DUROCK alkali-resistant glass-fiber tape.
- E. Accessories: DUROCK screws, corrosion-resistant, 8-gage, wafer heads with countersinking ribs.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Comply with ASTM C840 and GA 216; except as otherwise indicated, extend fire-rated partitions to underside of deck above ceiling and extend other partitions at least 6" above ceilings.

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- B. Install framing system at 16" o.c., include blocking for grab bars, accessories and similar items.
- C. Provide fire-rated systems where indicated and where required by authorities having jurisdiction.
- D. Install boards vertically (parallel to framing). Do not allow butt-to-butt joints and joints that do not fall over framing members.
- E. Install cement backer board panels with ¼" open space where panels abut other construction or penetrations.
- F. Install trim and joint treatment in strict compliance with manufacturer's instructions and recommendations.

END OF SECTION

09 30 13 - CERAMIC TILE

PART 1 GENERAL

1.01 RELATED DOCUMENTS:

Drawings and General Provision of the Contract, including General and Supplementary Condition and Division 1 Specification sections, apply to work of this section.

1.02 SCOPE:

This section includes ceramic tile surfaces, marble and limestone tiles, covering all labor, material and equipment required for the proper execution of the work.

1.03 STANDARDS: Tile Council of America Quality Standards and Handbook for Tile Installation.

1.04 SUBSTITUTIONS: Ceramic tile specified is as made by American Olean but similar and equal material by United States Tile Company or Dal-Tile Corp. will be considered.

PART 2 MATERIALS

2.01 PORTLAND CEMENT: Shall conform to the requirements for such materials as specified under concrete work.

2.02 SAND: Shall be clean and free from organic matter. All sand shall pass Number 5 sieve; 90% shall pass Number 8 sieve; 30% shall pass Number 50 sieve; 5% permitted to pass Number 100 sieve. Percentages are by weight.

2.03 LATH: Shall be 3.4# galvanized key lath, self furring.

2.04 FLOOR: Shall be 8" x 8" Daltile Quarry Tile on or equal porcelain ceramic mosaic with all purpose edges. Colors will be selected by Architect from price group 1 & 2 tile.

2.05 WALL TILE FOR INTERIOR SPACES: Shall be 4"x 4" Daltile or equal porcelain ceramic mosaic with gloss glazed finish. Provide with coves caps and round outs. Color will be selected by Architect from price group 1 & 2 tile.

2.06 MARBLE THRESHOLDS: Shall be cut to profile from Alabama Cream "A" Marble.

2.07 Cement board ½" thick Durock by USG.

2.08 GROUT: Shall be Laticrete 3701 Joint & Grout Filler mixed to proper consistency. Colors shall be selected by Architect.

2.09 THIN SET GROUT: Laticrete #4237 & 3030 for Porcelain Tile or Mapei, Karabond/Keralastic.

2.10 LEVELING COAT: Laticrete #3701

2.11 SILICONIZED CAULK: Mapei Keracaulk U un-sanded siliconized Acrylic caulk.

2.12 WATERPROOF MEMBRANE

- A. General: Manufacturer's standard product that complies with ANSI A118.10 and is recommended by the manufacturer for the application indicated. Include reinforcement and accessories recommended by manufacturer. Waterproof membrane required at all floor tile in toilet rooms .
- B. Fluid-Applied Membrane: Liquid-latex rubber or elastomeric polymer.
 - 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. C-Cure; Pro-Red Waterproofing Membrane 63.
 - b. Custom Building Products; RedGard Waterproofing and Crack Prevention Membrane.
 - c. Jamo Inc.; Waterproof Membrane.

2.13 CRACK ISOLATION MEMBRANE

- C. General: Manufacturer's standard product that complies with ANSI A118.12 for high performance and is recommended by the manufacturer for the application indicated. Include reinforcement and accessories recommended by manufacturer.
- D. Fabric-Reinforced, Modified-Bituminous Sheet: Self-adhering, modified-bituminous sheet with fabric reinforcement facing; 0.040-inch nominal thickness.
 - 1. Products: Subject to compliance with requirements, Basis of Design:
 - a. Custom Building Products Crack Buster Pro Crack Isolation Membrane.
 - b. C-Cure Crack Isolation Membrane
 - c. Jamo Crack Isolation Membrane

PART 3 INSTALLATION

3.01 FLOOR TILE: Shall be laid floors in pattern directed by the Architect. Tile shall be set, grouted and cleaned in accordance with ATC specification for installation of floor tile with latex portland cement mortar, F113-84.

3.02 WALL TILE: Tile shall be set on cement mortar and metal lath over waterproof membrane applied to metal studs in accordance with ATC specification W231-84 GR applied with thin set grout to ½” cement board and against masonry in accordance with ATC specification W251-84 & on cement backer board or WP

Gypsum with Laticrete 3030.

- 3.03 BACKER BOARD: ½" thick cement board shall be screwed to framing with 1 ¼" screws @ 8"o.c.
- 3.04 TILE GROUT: Grout shall be with Laticrete #3701; joint and grout filler admix. Installation shall be in accordance with ATC Specifications and Directions of the manufacturer. Use 3/8" grout joint for floors and Color shall be selected by Architect. Use 1/16" grout joint for wall tiles.
- 3.05 MEMBRANE WATERPROOFING: Below suspended concrete floor and behind wall tile shall extend up wall 8" and secured.
- 3.06 GROUT JOINTS WITH LATICRETE: Grout with grout admixture.
- 3.07 CAULK JOINTSA: Install caulk at all inside corners and expansion joints.

END OF SECTION

09 91 00 - PAINTING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes surface preparation and the application of paint systems on the following exterior substrates:
 - 1. Fiber Cement siding and trim
 - 2. Steel and iron.
 - 3. Galvanized metal.
 - 4. Cotton or canvas insulation covering.
 - 5. ASJ insulation covering.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product. Include preparation requirements and application instructions.
 - 1. Include printout of current "MPI Approved Products List" for each product category specified, with the proposed product highlighted.
 - 2. Indicate VOC content.
- B. Product List: Cross-reference to paint system and locations of application areas. Use same designations indicated on Drawings and in schedules. Include color designations.

1.4 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Paint: [5] percent, but not less than 1 gal. Of each material and color applied.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than 45 deg F
 - 1. Maintain containers in clean condition, free of foreign materials and residue.
 - 2. Remove rags and waste from storage areas daily.

1.6 FIELD CONDITIONS

- A. Apply paints only when temperature of surfaces to be painted and ambient air temperatures are between 50 and 95 deg F.
- B. Do not apply paints in snow, rain, fog, or mist; when relative humidity exceeds 85 percent; at temperatures less than 5 deg F above the dew point; or to damp or wet surfaces.

PART 2 - PRODUCTS

MANUFACTURERS

Use first-line standard products for all systems by Sherwin Williams are the basis of design. Similar and equal products be Coronado and PPG will be accepted as equals.

- A. Products: Subject to compliance with requirements, provide products listed in the Exterior Painting Schedule for the paint category indicated.

2.2 PAINT, GENERAL

- A. Material Compatibility:
 - 1. Materials for use within each paint system shall be compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
 - 2. For each coat in a paint system, products shall be recommended in writing by topcoat manufacturers for use in paint system and on substrate indicated.
- B. Colors: As selected by Architect from manufacturer's full range
- C. Paint schedule:

1. EXTERIOR FIBER CEMENT SIDING AND TRIM

Primer LX02W0050 - Sherwin Williams Loxon Primer
Intermediate Coat: A89W02151 - Super Paint Exterior Satin
Topcoat: A89W02151 - Super Paint Exterior Satin

2. INTERIOR FIBER CEMENT SIDING AND TRIM

Primer: LX02W0050 - Loxon Primer
Intermediate Coat: K46W01151 - PI Precat Semigloss
Topcoat: K46W01151 - PI Precat Semigloss

3. EXTERIOR GALVANIZED METAL

Primer: B66A00310 - Pro Industrial Pro-Cryl® Universal Acrylic Primer Intermediate Coat:
B66W00611 - Pro Industrial High-Performance Acrylic - Gloss
Topcoat: B66W00611 - Pro Industrial High-Performance Acrylic – Gloss

4. INTERIOR CANVAS INSULATION COVERS

Primer LX02W0050 - Sherwin Williams Loxon Primer

Intermediate Coat: A89W02151 - Super Paint Exterior Satin

Topcoat: A89W02151 - Super Paint Exterior Satin

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.
- B. Maximum Moisture Content of Substrates: When measured with an electronic moisture meter as follows:
 - 1. Concrete: 12 percent.
 - 2. Masonry (Clay and CMUs): 12 percent.
 - 3. Portland cement Plaster: 12 percent.
- C. Verify suitability of substrates, including surface conditions and compatibility, with existing finishes and primers.
- D. Proceed with coating application only after unsatisfactory conditions have been corrected.
 - 1. Application of coating indicates acceptance of surfaces and conditions.

3.2 PREPARATION

- A. Comply with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual" applicable to substrates and paint systems indicated.
- B. Remove hardware, covers, plates, and comparable items already in place that are removable and are not to be painted. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and painting.
 - 1. After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection.
- C. Clean substrates of substances that could impair bond of paints, including dust, dirt, oil, grease, and incompatible paints and encapsulants.
 - 1. Remove incompatible primers and reprime substrate with compatible primers or apply tie coat as required to produce paint systems indicated.
- D. Concrete Substrates: Remove release agents, curing compounds, efflorescence, and chalk. Do not paint surfaces if moisture content or alkalinity of surfaces to be painted exceeds that permitted in manufacturer's written instructions.

- E. Masonry Substrates: Remove efflorescence and chalk. Do not paint surfaces if moisture content or alkalinity of surfaces or mortar joints exceeds that permitted in manufacturer's written instructions.
- F. Steel Substrates: Remove rust, loose mill scale, and shop primer if any. Clean using methods recommended in writing by paint manufacturer.
- G. Shop-Primed Steel Substrates: Clean field welds, bolted connections, and areas where shop paint is abraded. Paint exposed areas with the same material as used for shop priming to comply with SSPC-PA 1 for touching up shop-primed surfaces.
- H. Galvanized-Metal Substrates: Remove grease and oil residue from galvanized sheet metal by mechanical methods to produce clean, lightly etched surfaces that promote adhesion of subsequently applied paints.
- I. Pressure wash exterior of existing buildings prior to painting
- J. Within 48 hours of painting rinse all exterior surfaces with clean fresh water to remove salt.

3.1 APPLICATION

- A. Apply paints according to manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual."
 - 1. Use applicators and techniques suited for paint and substrate indicated.
 - 2. Paint surfaces behind movable items same as similar exposed surfaces. Before final installation, paint surfaces behind permanently fixed items with prime coat only.
 - 3. Paint both sides and edges of exterior doors and entire exposed surface of exterior door frames.
 - 4. Paint entire exposed surface of window frames and sashes.
 - 5. Do not paint over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.
 - 6. Primers specified in painting schedules may be omitted on items that are factory primed or factory finished if acceptable to topcoat manufacturers.
- B. Tint undercoats same color as topcoat but tint each undercoat a lighter shade to facilitate identification of each coat if multiple coats of same material are to be applied. Provide sufficient difference in shade of undercoats to distinguish each separate coat.
- C. If undercoats or other conditions show through topcoat, apply additional coats until cured film has a uniform paint finish, color, and appearance.
- D. Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.
- E. Painting Fire Suppression, Plumbing, HVAC, Electrical, Communication, and Electronic Safety and Security Work:

1. Paint the following work where exposed to view:
 - a. Equipment, including panel boards.
 - b. Uninsulated metal piping.
 - c. Uninsulated plastic piping.
 - d. Pipe hangers and supports.
 - e. Metal conduit.
 - f. Plastic conduit.
 - g. Tanks that do not have factory-applied final finishes.

3.2 FIELD QUALITY CONTROL

- A. Dry Film Thickness Testing: Owner may engage the services of a qualified testing and inspecting agency to inspect and evaluate paint for dry film thickness.
 1. Contractor shall touch up and restore painted surfaces damaged by testing.
 2. If test results show that dry film thickness of applied paint does not comply with paint manufacturer's written recommendations, Contractor shall pay for testing and apply additional coats as needed to provide dry film thickness that complies with paint manufacturer's written recommendations.

3.3 CLEANING AND PROTECTION

- A. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.
- B. After completing paint application, clean spattered surfaces. Remove spattered paints by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.
- C. Protect work of other trades against damage from paint application. Correct damage to work of other trades by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.
- D. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

3.7 MILDEWCIDE

Provide mildewcide additive to all exterior paint. Mildewcide additive shall be chemically compatible with paint formulation and shall not adversely affect the color, texture, or durability of the coating.

2. Mildewcide additive shall be EPA registered, non-toxic, low VOC composition, and shall provide complete protection against microbial defacement of painted surfaces.
3. Provide M-1 Advanced Mildewcide as manufactured by The Jomaps Company or approved equal.

END OF SECTION 09 91 00

10 14 00 INTERIOR AND EXTERIOR SIGNS

PART 1 - GENERAL

1.01 SUMMARY

- A. Provide specialty building signage. Note: Exterior building signage is shown on A200. See Allowance Section 012100.

1.02 SUBMITTALS

- A. Submit for approval samples, shop drawings, product data.

1.03 QUALITY ASSURANCE

- A. Comply with governing codes and regulations. All signs shall comply with Florida Accessibility Code for Building Construction. Provide products of acceptable manufacturers which have been in satisfactory use in similar service for three years. Use experienced installers. Deliver, handle, and store materials in accordance with manufacturer's instructions.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Panel signs; as manufactured by Mohawk signs or approved equal. Provide one for each room and room number shown on floor plans. Provide exterior grade signs for doors entered from outside. Provide one for each room on the floor plan.
 - 1. Material: Sand carved MP plastic, 1/32" H. raised graphics
 - 2. Size: Minimum 6 inches square, radiused corners
 - 3. Face Finish/Color: Matte finish/Color selected by Architect
 - 4. Number Style: Helvetica Medium
 - 5. Number Size: 1 inch
 - 6. Number Copy Position: Top left
 - 7. Letter Style: Helvetica Medium
 - 8. Letter Size: 3/4" uppercase
 - 9. Letter Copy Position: Bottom left
 - 10. Braille: Grade 2, left justified below number/letter
 - 11. Number/Letter Color: White
 - 12. Mounting: Non-corrosive fasteners and anchors

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Panel signs shall be wall mounted at sixty (60) inches above finished floor to center of sign on latch side of doors. Exact location shall be as directed by Owner.
- B. Install materials and systems in accordance with manufacturer's instructions and approved submittals. Install materials and systems in proper relation with adjacent construction and with uniform appearance.
- C. Install signs level, plumb, and at the height indicated, with sign surfaces free from distortion or other defects in appearance.
- D. Restore damaged finishes. Clean and protect work from damage.

3.02 SIGN SCHEDULE

- A. Space Identification: Provide sign indicating room name and number for each space identified on floor plan.
- B. Accessibility Signage: In addition to room name and number, provide sign with international symbol of accessibility at all toilet rooms.

END OF SECTION

10 22 00 TOILET PARTITIONS

PART 1 GENERAL

1.01 RELATED DOCUMENTS:

Drawings and General Provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification sections, apply to work of this section.

1.02 The Contractor shall furnish all labor, materials, tools, equipment and perform all work and services for toilet partitions as shown on drawings and as specified, in accordance with provisions of the contract documents, and completely coordinate with work of all other trades.

1.03 Verify dimensions by field measurements before fabrication, wherever possible without delaying project.

PART 2 SUBSTITUTIONS

2.01 Toilet partitions specified are by Comtec, but equal and similar products by Santana Products and Sanymetal will be considered.

PART 3 SUBMITTALS

3.01 Shop drawings (7 copies) for fabrication and erection; include plans and elevations. Show all anchorage and accessory items, hardware, and finishes.

PART 4 MATERIALS

4.01 All partitions shall be equal to overhead braced, solid polymer HD by Santana in colors that extend through the entire thickness of the panels. Colors to be selected by the Architect.

4.02 Doors and panels shall be 55" high and mounted at 14" above finished floor.

4.03 Pilasters shall be 82" high and fastened to non-corrosive polymer resin shoes.

4.04 All hardware shall be fabricated from heavy aluminum extrusion (6463-T5 alloy) with clear anodized finish.

4.05 Bumper Coat Hook: Provide rubber tipped combination bumper and coat hook for each compartment.

4.06 Floor shoes shall be non-metallic.

4.06 Paper holders are provided under Section 10 28 00.

PART 5 INSTALLATION

5.01 Install in a rigid, straight, plumb and level manner with layout as indicated. Provide not more than ½" clearance between pilasters and panels, and not more than 1" clearance between panels and walls.

5.02 No evidence of drilling, cutting or patching shall be visible in the finished work.

END OF SECTION

Mike Marshall, 12/2023

SECTION 10 28 00 – TOILET ACCESSORIES

PART 1 - GENERAL

1.01 SUMMARY

- A. Provide toilet accessories at toilet rooms.

1.02 SUBMITTALS

- A. Submit for approval product data, accessory schedule.

1.03 QUALITY ASSURANCE

- A. Comply with governing codes and regulations. Provide products of acceptable manufacturers which have been in satisfactory use in similar service for three years. Use experienced installers. Deliver, handle, and store materials in accordance with manufacturer's instructions.

PART 2 - PRODUCTS

- 2.01 Furnish and install the following items by Bobrick, ASI or equal:

<u>ITEM</u>	<u>DESCRIPTION</u>
A. Toilet paper roll	2890 Jumbo toilet paper roll
B. Grab Bars	B-6806.99 x 42 peened 1 ½” concealed mounting
C. Mirror	B-293-2346 24”x36” Stainless steel tilt mirror
D. Towel Dispenser	B-5262 Matrix series surface mounted Towel Dispenser
E. Waste Receptacle	B-275 Stainless steel 20-gallon surface mounted
F. Napkin Disposal	B-5270 Matrix series surface mounted napkin disposal
G. Changing Station	Koala Kare B-KB310 Surface mounted horizontal Changing station
H. Soap Dispenser	B-5050 Matrix series surface mounted soap dispenser

Mike Marshall, 12/2023

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Install materials and systems in accordance with manufacturer's instructions and approved submittals. Install materials and systems in proper relation with adjacent construction and with uniform appearance. Coordinate with work of other sections.
- B. Install grab bars to withstand a downward load of at least 250 lbs, when tested according to method in ASTM F 446.
- C. Restore damaged finishes and test for proper operation. Clean and protect work from damage.
- D. Install wood blocking in walls at grab bars and changing station.

END OF SECTION

SECTION 22 00 00 – PLUMBING GENERAL

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the contract, including general and supplementary conditions and Division 01 specification sections, apply to this section.
- A. This is a basic plumbing requirements section. The provisions of this section apply to work of all Division 22 sections.
- B. Review all other contract documents to be aware of conditions affecting work herein.
- C. All work under Division 22 shall be constructed in accordance with the codes listed herein. The design has been based on the requirements of these codes; and while it is not the responsibility of the contractor to verify that all work called for complies with these codes, he shall be responsible for calling to the architect/engineer's attention any details or specifications that are not in conformance with these or other codes.
- D. Where code conflict exists, generally the most restrictive requirement applies. Comply with current code edition, unless noted.
 - 1. 2020 Florida Building Code.
 - 2. 2020 Florida Plumbing Code.
 - 3. 2020 Fuel Gas Code.
 - 4. National Electric Code (NFPA 70).
 - 5. Life Safety Code (NFPA 101).
 - 6. Air Conditioning and Ventilating Systems (NFPA 90a).
 - 7. Handicapped Accessibility, ANSI A117.1 And Florida Statute Chapter 553, Part V.
- E. All plumbing materials, installation and systems shall meet the requirements of the following standards, including the latest addenda and amendments, to the extent referenced:
 - 1. Underwriters' Laboratories (UL)
 - 2. American National Standards Institution (ANSI)
 - 3. American Society of Testing Materials (ASTM)
 - 4. Air Conditioning and Refrigeration Institute (ARI)
 - 5. National Fire Protection Association (NFPA)
 - 6. National Electrical Manufacturers Association (NEMA)
 - 7. American Society of Plumbing Engineers (ASPE)
- F. Codes or standards applying to a specific part of the work may be included in that section.
- G. Comply with regulations and codes of suppliers of utilities.

- H. Where no specific method or form of construction is called for in the contract documents, the contractor shall comply with code requirements when carrying out such work.

1.2 SUMMARY

A. Related Sections:

1. SECTION 23 00 00 MECHANICAL GENERAL

- a. Contractor shall adhere to all requirements provided by above referenced specification sections (e.g., Summary, Definitions, Field measurements and Coordination, Submittals, Quality Assurance, Coordination with multi-discipline trades, Products and Project execution)

1.3 GENERAL INFORMATION

- A. This section is a Division-22 Basic Plumbing Materials and Methods Section and is part of each Division-22 Section referring to testing and other procedures specified herein.
- B. Notify the Architect/Engineer when system tests are ready to be witnessed at least 24 hours prior to the test.
- C. All materials, test equipment, and devices required for cleaning, testing, sterilizing, or purging shall be provided by the contractor.

1.4 DIVISION 1 GENERAL COORDINATION

- A. Coordinate with the general contractor for all cutting and patching. Contractors performing Division 22 work shall inform the general contractor of all cutting and patching required prior to bidding and shall coordinate installation.

1.5 COORDINATION

- A. Coordinate mechanical equipment installation with other building components.
- B. Arrange for pipe spaces, chases, slots, and openings in building structure during progress of construction, to allow for mechanical installations.
- C. Coordinate installation of required supporting devices and set sleeves in poured-in-place concrete and other structural components as they are constructed.
- D. Sequence, coordinate, and integrate installations of mechanical materials and equipment for efficient flow of the Work. Coordinate installation of large equipment requiring positioning before closing in building.

- E. Coordinate connection of mechanical systems with exterior underground and overhead utilities and services. Comply with requirements of governing regulations, franchised service companies, and controlling agencies.
- F. Coordinate requirements for access panels and doors for mechanical items requiring access that are concealed behind finished surfaces.
- G. Coordinate installation of identifying devices after completing covering and painting, if devices are applied to surfaces. Install identifying devices before installing acoustical ceilings and similar concealment.
- H. Refer to other Division 22 sections and/or drawings for specific requirements of the particular piping system being installed. Where another Division 22 sections or the drawings conflict with requirements of this section, the other Division 22 sections or the drawings shall take precedence over the general requirements herein.
- I. OSHA: Contractor employee worker protection for all trenching and excavation operations shall comply with 29 CFR 1926.650 Subpart P and all current OSHA requirements.

1.6 MULTI-DISCIPLINE COORDINATION

A. DIVISION SITE WORK

- 1. Refer to Division 31, 32 and 33, Sitework for:
 - a. All water, sewer, and storm water piping greater than five feet from the building.
 - b. Manholes and catch-basins.
 - c. Underground tanks and enclosures.
 - d. Site fire protection work.
- 2. The following work is part of Division 22:
 - a. Grease trap.
 - b. All site gas piping.
 - c. All site acid waste piping and neutralization tank.

B. DIVISION 3 CONCRETE

- 1. Refer to Division 3, Concrete for:
 - a. Rough grouting in and around plumbing work.
 - b. Patching concrete cut to accommodate plumbing work.
- 2. The following is part of Division 22 work, complying with the requirements of Division 3
 - a. Curbs, foundations and pads for plumbing equipment.
 - b. Basins, sumps, and vaults of plumbing work.
 - c. Underground structural concrete to accommodate plumbing work.
 - d. Inertia bases.

C. DIVISION 5 METALS

1. Refer to Division 5, Metals for:
 - a. Framing openings for plumbing equipment.
2. The following is part of Division 22 work.
 - a. Supports for plumbing work.

D. DIVISION 6 WOOD AND PLASTIC

1. Refer to Division 6, Wood for:
 - a. Framing openings for plumbing equipment

E. DIVISION 7 THERMAL AND MOISTURE PROTECTION

1. Refer to Division 7, Thermal and Moisture Protection for:
 - a. Installation of all roof curbs and roof supports for plumbing work.
 - b. Caulking and waterproofing of all wall and roof mounted plumbing work.
 - c. Providing all roof curbs and all vent flashing for metal roofs.
2. The following is part of Division 22 work, complying with the requirements of Division 7.
 - a. Fire barrier penetration seals.

F. DIVISION 9 FINISHES

1. Refer to Division 9, Finishes for:
 - a. Painting exposed ductwork, piping, and equipment.
 - b. Painting structural metal and concrete for plumbing work.
 - c. Painting door grilles and access panels.
 - d. Painting color-coded plumbing work indicated for continuous painting. See color schedule in Division 22 section, "Plumbing Identification".
 - e. Installation of access doors in gypsum drywall.
 - f. Colors shall be selected by the Architect for all painting of exposed plumbing work in occupied spaces, unless specified herein. Do not paint insulated or jacketed surfaces.
2. Perform the following as part of Division 22 work:
 - a. Touch up painting of factory finishes.

- b. Painting of all hangers.

G. DIVISION 10 SPECIALTIES

- 1. Refer to Division 10, Specialties for:
 - a. Fire extinguishers and fire extinguisher cabinets and accessories.

H. DIVISION 11 EQUIPMENT

- 1. Refer to Division 11, Equipment for:
 - a. Equipment for all food service equipment to be provided. Unless noted otherwise, this includes the cooking hoods with fire suppression, dishwasher hoods, dishwasher booster heaters, and food preparation/cleanup equipment.
 - b. Equipment for all laboratory equipment including cabinets, casework, student stations, demonstration desks, safety stations, eyewashes, and all related fixtures, fittings, and trim.
- 2. Provide the following as part of Division 22 work:
 - a. All trim including faucets, waste connections, drain traps, vents, valves, piping, flashing, fittings, strainers, and other materials necessary to make equipment operational. Provide rough-in for all equipment. Provide final connections for all equipment.
 - b. All fixtures specified in Contract Documents. See plumbing schedule.
 - c. All automatic gas valves for shutoff of gas to cooking appliances when fire suppression system activates. Div 23 to provide valve. Coordinate type of valve with fire suppression system supplier. Div. 22 to install gas valve. Coordinate power requirements with Div. 26.
 - d. All trim not furnished by Division 11 includes drains, wastes, continuous wastes, tailpieces, traps and similar devices necessary to make fixtures operational. Provide rough-in for all fixtures. Provide final connections for all fixtures. Provide all fixtures specified in Contract Documents.

I. DIVISION 26 ELECTRICAL

- a. The plumbing contractor shall coordinate the exact electrical requirements of all plumbing equipment being provided with the electrical contractor. Where approval submittals are required, this coordination shall be accomplished prior to making the submittals. The electrical design shown on the drawings supports the plumbing equipment basis of design. If plumbing equipment is submitted with different electrical requirements, it is the responsibility of the plumbing contractor to resolve all required electrical design changes (wire and conduit size, type of disconnect or overload protection, point(s) of connection, etc.) and clearly show the new electrical design on the plumbing submittal with a written statement that this design will be provided at no additional cost. Plumbing submittals made with no written reference

to the electrical design will be presumed to work with the electrical design. Any corrections required will be at no additional cost.

- b. Electrical contractors shall provide disconnect switches, starters, and contactors for plumbing equipment unless specifically noted as being furnished as part of plumbing equipment.
- c. Electrical contractors shall provide all power wiring, raceway and devices, and make final electrical connections to all plumbing equipment, switches, starters, contactors, controllers, and similar equipment.

PART 2 - PRODUCTS

2.1 EQUIPMENT AND MATERIALS

- A. See SECTION 23 00 00.

2.2 REQUEST FOR SUBSTITUTION

- A. See SECTION 23 00 00

2.3 EXCAVATION AND BACKFILL MATERIALS

- A. See Section 23 00 00

PART 3 - EXECUTION

3.1 WORKMANSHIP

- A. See Section 23 00 00

3.2 COORDINATION

- A. See Section 23 00 00

3.3 RECORD DRAWINGS

- A. See Section 23 00 00

3.4 ACCEPTANCE

- A. See Section 23 00 00

3.5 PLUMBING DEMOLITION

- A. Refer to Division 1 Sections and Contract Drawings for general demolition requirements and procedures.
- B. Disconnect, demolish, and remove mechanical systems, equipment, and components indicated to be removed.
- C. Piping to Be Removed: Remove portion of piping indicated to be removed and cap or plug remaining piping with same or compatible piping material.
- D. Piping to Be Abandoned in Place: Drain piping and cap or plug piping with same or compatible piping material.
- E. Equipment to Be Removed: Disconnect and cap services and remove equipment.
- F. Equipment to Be Removed and Reinstalled: Disconnect and cap services and remove, clean, and store equipment; when appropriate, reinstall, reconnect, and make equipment operational.
- G. Equipment to Be Removed and Salvaged: Disconnect and cap services and remove equipment and deliver to Owner.

3.6 PIPING SYSTEMS - COMMON REQUIREMENTS

- A. Install piping according to the following requirements and Division 22 Sections specifying piping systems. Individual Division 22 piping Sections specify unique piping installation requirements.
- B. Drawing plans, schematics, and diagrams indicate general location and arrangement of piping systems. Indicated locations and arrangements were used to size pipe and calculate friction loss, expansion, pump sizing, and other design considerations. Install piping as indicated unless deviations to layout are approved on Coordination Drawings.
- C. Install piping in concealed locations, unless otherwise indicated and except in equipment rooms and service areas.
- D. Install piping indicated to be exposed and piping in equipment rooms and service areas at right angles or parallel to building walls. Diagonal runs are prohibited unless specifically indicated otherwise.
- E. Install piping such that no piping passes over electrical panels.
- F. Refer to fire protection, plumbing and HVAC specifications for sleeve, sleeve seal system and escutcheon requirements.
- G. Install piping above accessible ceilings to allow sufficient space for ceiling panel removal.
- H. Install piping to permit valve servicing.

- I. Install piping at indicated slopes.
- J. Install piping free of sags and bends.
- K. Install fittings for changes in direction and branch connections.
- L. Install piping to allow application of insulation.
- M. Select system components with pressure rating equal to or greater than system operating pressure.
- N. Verify final equipment locations for roughing-in.
- O. Refer to equipment specifications in other Sections of these Specifications for roughing-in requirements.

3.7 EQUIPMENT INSTALLATION - COMMON REQUIREMENTS

- A. See Section 23 00 00

3.8 PAINTING

- A. See Section 23 00 00

3.9 CONCRETE BASES

- A. See Section 23 00 00

3.10 ERECTION OF METAL SUPPORTS AND ANCHORAGES

- A. See Section 23 00 00

3.11 CUTTING AND PATCHING

- A. See Section 23 00 00

3.12 GROUTING

- A. See Section 23 00 00

3.13 EXCAVATION AND BACKFILL

- A. See Section 23 00 00

3.14 PRESSURE TESTS

- A. General: provide temporary equipment for testing, including pump and gages. Test piping systems before insulation is installed wherever feasible and remove control devices before testing. Test each natural section of each piping system independently but do not use piping system valves to isolate sections where test pressure exceeds valve pressure rating. Fill each section with the indicated medium and pressurize for indicated pressure and time.
- B. The required test period is two hours.
- C. No piping, fixtures, or equipment shall be concealed or covered until they have been tested. The contractor shall apply each test and ensure that it is satisfactory for the period specified before calling the architect/engineer to observe the test. Test shall be repeated upon request to the satisfaction of those making the inspection.
- D. Observe each test section for leakage at the end of the test period. Test fails if leakage is observed or if pressure drop exceeds 5% of the test pressure.
- E. Check of systems during application of test pressures should include visual check for water leakage and soap bubble or similar for air and nitrogen leakage.
- F. Repair piping systems sections which fail required piping test, by disassembly and re-installation, using new materials to extent required to overcome leakage. Do not use chemicals, stop-leak compounds, mastics, or other temporary repair methods.
- G. Pressure test requirements
 - 1. Soil, waste, vent and acid waste and vent: Test all piping within the building with a 10-foot head of water. Test piping in sections so that all joints are tested. Provide test tees as required.
 - 2. Domestic water: Perform hydrostatic test on all piping within the building at twice the normal static pressure at service point, but not less than 100 psig. Once tested, flush out piping and leave under pressure of the supply main or 40 psig for the balance of the construction period.

3.15 CLEANING AND STERILIZATION

- A. Sleeve-seal systems in this article are used, in slabs-on-grade and below grade in exterior concrete walls, for a watertight seal around service piping entries into the building. These systems typically require installation in a sleeve for proper operation.
- B. Install sleeve-seal systems in sleeves in exterior concrete walls and slabs-on-grade at service piping entries into building.
- C. General: clean exterior surfaces of installed piping systems of superfluous materials and prepare for application of specified coatings (if any). Flush out piping systems with clean water before proceeding with required tests. Inspect each run of each system for completion of joints, supports and accessory items.

- D. Flush and drain all water systems at least three times. Replace startup strainers with operating strainers.
- E. Sterilization of domestic water systems
 - 1. Prerequisites: all hot and cold-water piping installed (complete), all fixtures connected, system flushed out, and system filled with water.
 - 2. The shut off valve at the water main shall be closed, all fixture outlets opened slightly, and a sterilizing solution shall be introduced at a manifold connection installed by the contractor at the meter.
 - 3. The solution shall contain 50 parts per million of available chlorine. The chlorinating material shall be either liquid chlorine or calcium hypochlorite. The solution shall be allowed to stand in the system for at least eight hours after which the entire system shall be flushed.
 - 4. After final flushing, all aerators shall be removed, cleaned, and reinstalled. After final flush the residual chlorine shall not exceed 0.2 parts per million.
 - 5. The architect/engineer shall be notified 24 hours prior to the procedure so that it can be witnessed.
 - 6. Provide sampling and certified reports by an independent testing lab. Provide written health department approval of disinfection samples.

END OF SECTION 22 00 00

SECTION 22 05 17 - SLEEVES AND SLEEVE SEALS FOR PLUMBING PIPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the contract, including general and supplementary conditions and Division 01 specification sections, apply to this section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Sleeves.
 - 2. Sleeve-seal systems.
 - 3. Grout.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated.

PART 2 - PRODUCTS

2.1 SLEEVES

- A. Cast-Iron Wall Pipes: Cast or fabricated of cast or ductile iron and equivalent to ductile-iron pressure pipe, with plain ends and integral water stop unless otherwise indicated.
- B. Galvanized-Steel Wall Pipes: ASTM A 53/A 53M, Schedule 40, with plain ends and welded steel collar; zinc coated.
- C. Galvanized-Steel-Pipe Sleeves: ASTM A 53/A 53M, Type E, Grade B, Schedule 40, zinc coated, with plain ends.
- D. PVC-Pipe Sleeves: ASTM D 1785, Schedule 40.
- E. Galvanized-Steel-Sheet Sleeves: 0.0239-inch minimum thickness; round tube closed with welded longitudinal joint.

2.2 SLEEVE-SEAL SYSTEMS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Advance Products & Systems, Inc.
2. CALPICO, Inc.
3. Metraflex Company (The).
4. Pipeline Seal and Insulator, Inc.
5. Proco Products, Inc.

B. Description: Modular sealing-element unit, designed for field assembly, for filling annular space between piping and sleeve.

1. Sealing Elements: EPDM-rubber interlocking links shaped to fit surface of pipe. Include type and number required for pipe material and size of pipe.
2. Pressure Plates: Carbon steel.
3. Connecting Bolts and Nuts: Carbon steel, with corrosion-resistant coating, of length required to secure pressure plates to sealing elements.

2.3 GROUT

- A. Standard: ASTM C 1107/C 1107M, Grade B, post-hardening and volume-adjusting, dry, hydraulic-cement grout.
- B. Characteristics: Non-shrink; recommended for interior and exterior applications.
- C. Design Mix: 5000-psi, 28-day compressive strength.
- D. Packaging: Premixed and factory packaged.

PART 3 - EXECUTION

3.1 SLEEVE INSTALLATION

- A. Install sleeves for piping passing through penetrations in floors, partitions, roofs, and walls.
- B. For sleeves that will have sleeve-seal system installed, select sleeves of size large enough to provide 1-inch annular clear space between piping and concrete slabs and walls.
 1. Sleeves are not required for core-drilled holes.
- C. Install sleeves in concrete floors, concrete roof slabs, and concrete walls as new slabs and walls are constructed.
 1. Cut sleeves to length for mounting flush with both surfaces.
 - a. Exception: Extend sleeves installed in floors of mechanical equipment areas or other wet areas 2 inches above finished floor level.
 2. Using grout, seal the space outside of sleeves in slabs and walls without sleeve-seal system.
- D. Install sleeves for pipes passing through interior partitions.

1. Cut sleeves to length for mounting flush with both surfaces.
 2. Install sleeves that are large enough to provide 1/4-inch annular clear space between sleeve and pipe or pipe insulation.
 3. Seal annular space between sleeve and piping or piping insulation; use joint sealants appropriate for size, depth, and location of joint. Comply with requirements for sealants specified in Division 07.
- E. Fire-Barrier Penetrations: Maintain indicated fire rating of walls, partitions, ceilings, and floors at pipe penetrations. Seal pipe penetrations with firestop materials. Comply with requirements for firestopping specified in Division 07.

3.2 SLEEVE-SEAL-SYSTEM INSTALLATION

- A. Install sleeve-seal systems in sleeves in exterior concrete walls and slabs-on-grade at service piping entries into building.
- B. Select type, size, and number of sealing elements required for piping material and size and for sleeve ID or hole size. Position piping in center of sleeve. Center piping in penetration, assemble sleeve-seal system components, and install in annular space between piping and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make a watertight seal.

3.3 SLEEVE AND SLEEVE-SEAL SCHEDULE

- A. Use sleeves and sleeve seals for the following piping-penetration applications:
1. Exterior Concrete Walls below Grade:
 - a. Piping Smaller Than NPS 6: Cast-iron wall sleeves with sleeve-seal system.
 - 1) Select sleeve size to allow for 1-inch annular clear space between piping and sleeve for installing sleeve-seal system.
 2. Concrete Slabs-on-Grade:
 - a. Piping Smaller Than NPS 6: Cast-iron wall sleeves with sleeve-seal system.
 - 1) Select sleeve size to allow for 1-inch annular clear space between piping and sleeve for installing sleeve-seal system.
 3. Concrete Slabs above Grade:
 - a. Piping Smaller Than NPS 6: PVC-pipe sleeves.
 4. Interior Partitions:
 - a. Piping Smaller Than NPS 6: PVC-pipe sleeves.

END OF SECTION 22 05 17

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SECTION 22 05 18 - ESCUTCHEONS FOR PLUMBING PIPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Escutcheons.
 - 2. Floor plates.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated.

PART 2 - PRODUCTS

2.1 ESCUTCHEONS

- A. One-Piece, Cast-Brass Type: With polished, chrome-plated finish and setscrew fastener.
- B. One-Piece, Deep-Pattern Type: Deep-drawn, box-shaped brass with chrome-plated finish and spring-clip fasteners.
- C. One-Piece, Stamped-Steel Type: With chrome-plated finish and spring-clip fasteners.

2.2 FLOOR PLATES

- A. One-Piece Floor Plates: Cast-iron flange with holes for fasteners.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install escutcheons for piping penetrations of walls, ceilings, and finished floors.

- B. Install escutcheons with ID to closely fit around pipe, tube, and insulation of piping and with OD that completely covers opening.
 - 1. Escutcheons for New Piping:
 - a. Piping with Fitting or Sleeve Protruding from Wall: One-piece, deep-pattern type.
 - b. Chrome-Plated Piping: One-piece, cast-brass type with polished, chrome-plated finish.
 - c. Insulated Piping: One-piece, stamped-steel type.
 - d. Bare Piping at Wall and Floor Penetrations in Finished Spaces: One-piece, cast-brass type with polished, chrome-plated finish.
 - e. Bare Piping at Wall and Floor Penetrations in Finished Spaces: One-piece, stamped-steel type.
 - f. Bare Piping at Ceiling Penetrations in Finished Spaces: One-piece, cast-brass type with polished, chrome-plated finish.
 - g. Bare Piping at Ceiling Penetrations in Finished Spaces: One-piece, stamped-steel type.
 - h. Bare Piping in Unfinished Service Spaces: One-piece, cast-brass type with polished, chrome-plated finish.
 - i. Bare Piping in Unfinished Service Spaces: One-piece, stamped-steel type.
 - j. Bare Piping in Equipment Rooms: One-piece, cast-brass type with polished, chrome-plated finish.
 - k. Bare Piping in Equipment Rooms: One-piece, stamped-steel type.
- C. Install floor plates for piping penetrations of equipment-room floors.
- D. Install floor plates with ID to closely fit around pipe, tube, and insulation of piping and with OD that completely covers opening.
 - 1. New Piping: One-piece, floor-plate type.

3.2 FIELD QUALITY CONTROL

- A. Replace broken and damaged escutcheons and floor plates using new materials.

END OF SECTION 22 05 18

SECTION 22 05 23 - GENERAL-DUTY VALVES FOR PLUMBING PIPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:

- 1. Brass ball valves.
 - 2. Bronze ball valves.
 - 3. Bronze swing check valves.
 - 4. Bronze gate valves.
 - 5. Bronze globe valves.

- B. Related Sections:

- 1. Section 22 05 53 "Identification for Plumbing Piping and Equipment" for valve tags and schedules.
 - 2. Section 22 11 16 "Domestic Water Piping" for valves applicable only to this piping.
 - 3. Section 22 13 19 "Sanitary Waste Piping Specialties" for valves applicable only to this piping.
 - 4. Section 22 14 23 "Storm Drainage Piping Specialties" for valves applicable only to this piping.

1.3 DEFINITIONS

- A. CWP: Cold working pressure.
- B. EPDM: Ethylene propylene copolymer rubber.
- C. NBR: Acrylonitrile-butadiene, Buna-N, or nitrile rubber.
- D. NRS: Non rising stem.
- E. RS: Rising stem.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of valve indicated.

1.5 QUALITY ASSURANCE

- A. Source Limitations for Valves: Obtain each type of valve from single source from single manufacturer.
- B. ASME Compliance:
 - 1. ASME B16.10 and ASME B16.34 for ferrous valve dimensions and design criteria.
 - 2. ASME B31.1 for power piping valves.
 - 3. ASME B31.9 for building services piping valves.
- C. NSF Compliance: NSF 61 for valve materials for potable-water service.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Prepare valves for shipping as follows:
 - 1. Protect internal parts against rust and corrosion.
 - 2. Protect threads, flange faces, grooves, and weld ends.
 - 3. Set angle, gate, and globe valves closed to prevent rattling.
 - 4. Set ball and plug valves open to minimize exposure of functional surfaces.
 - 5. Set butterfly valves closed or slightly open.
 - 6. Block check valves in either closed or open position.
- B. Use the following precautions during storage:
 - 1. Maintain valve end protection.
 - 2. Store valves indoors and maintain at higher than ambient dew point temperature. If outdoor storage is necessary, store valves off the ground in watertight enclosures.

PART 2 - PRODUCTS

2.1 GENERAL REQUIREMENTS FOR VALVES

- A. Refer to valve schedule articles for applications of valves.
- B. Valve Pressure and Temperature Ratings: Not less than indicated and as required for system pressures and temperatures.
- C. Valve Sizes: Same as upstream piping unless otherwise indicated.
- D. Valve Actuator Types:
 - 1. Gear Actuator: For quarter-turn valves NPS 8 and larger.
 - 2. Handwheel: For valves other than quarter-turn types.
 - 3. Hand lever: For quarter-turn valves NPS 6 and smaller.
- E. Valves in Insulated Piping: With 2-inch stem extensions and the following features:

1. Gate Valves: With rising stem.
2. Ball Valves: With extended operating handle of non-thermal-conductive material, and protective sleeve that allows operation of valve without breaking the vapor seal or disturbing insulation.

F. Valve-End Connections:

1. Grooved: With grooves according to AWWA C606.
2. Solder Joint: With sockets according to ASME B16.18.
3. Threaded: With threads according to ASME B1.20.1.

G. Valve Bypass and Drain Connections: MSS SP-45.

2.2 BRASS BALL VALVES

A. Two-Piece, Full-Port, Brass Ball Valves with Stainless-Steel Trim:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Milwaukee Valve Company.
 - b. NIBCO INC.
 - c. Watts Regulator Co.; a division of Watts Water Technologies, Inc.
2. Description:
 - a. Standard: MSS SP-110.
 - b. SWP Rating: 150 psig.
 - c. CWP Rating: 600 psig.
 - d. Body Design: Two pieces.
 - e. Body Material: Forged brass.
 - f. Ends: Threaded.
 - g. Seats: PTFE or TFE.
 - h. Stem: Stainless steel.
 - i. Ball: Stainless steel, vented.
 - j. Port: Full.

2.3 BRONZE BALL VALVES

A. Two-Piece, Full-Port, Bronze Ball Valves with Stainless-Steel Trim:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Milwaukee Valve Company.
 - b. NIBCO INC.
 - c. Watts Regulator Co.; a division of Watts Water Technologies, Inc.
2. Description:

- a. Standard: MSS SP-110.
- b. SWP Rating: 150 psig.
- c. CWP Rating: 600 psig.
- d. Body Design: Two pieces.
- e. Body Material: Bronze.
- f. Ends: Threaded.
- g. Seats: PTFE or TFE.
- h. Stem: Stainless steel.
- i. Ball: Stainless steel, vented.
- j. Port: Full.

2.4 BRONZE SWING CHECK VALVES

A. Class 150, Bronze Swing Check Valves with Bronze Disc:

- 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Milwaukee Valve Company.
 - b. NIBCO INC.
- 2. Description:
 - a. Standard: MSS SP-80, Type 3.
 - b. CWP Rating: 300 psig.
 - c. Body Design: Horizontal flow.
 - d. Body Material: ASTM B 62, bronze.
 - e. Ends: Threaded.
 - f. Disc: Bronze.

2.5 BRONZE GATE VALVES

A. Class 150, NRS Bronze Gate Valves:

- 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Milwaukee Valve Company.
 - b. NIBCO INC.
 - c. Watts Regulator Co.; a division of Watts Water Technologies, Inc.
- 2. Description:
 - a. Standard: MSS SP-80, Type 1.
 - b. CWP Rating: 300 psig.
 - c. Body Material: ASTM B 62, bronze with integral seat and union-ring bonnet.
 - d. Ends: Threaded.
 - e. Stem: Bronze.
 - f. Disc: Solid wedge; bronze.

- g. Packing: Asbestos free.
- h. Handwheel: Malleable iron, bronze, or aluminum.

2.6 BRONZE GLOBE VALVES

A. Class 150, Bronze Globe Valves with Nonmetallic Disc:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Milwaukee Valve Company.
 - b. NIBCO INC.
 - c. Watts Regulator Co.; a division of Watts Water Technologies, Inc.
2. Description:
 - a. Standard: MSS SP-80, Type 2.
 - b. CWP Rating: 300 psig.
 - c. Body Material: ASTM B 62, bronze with integral seat and union-ring bonnet.
 - d. Ends: Threaded.
 - e. Stem: Bronze.
 - f. Disc: PTFE or TFE.
 - g. Packing: Asbestos free.
 - h. Handwheel: Malleable iron, bronze, or aluminum.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine valve interior for cleanliness, freedom from foreign matter, and corrosion. Remove special packing materials, such as blocks, used to prevent disc movement during shipping and handling.
- B. Operate valves in positions from fully open to fully closed. Examine guides and seats made accessible by such operations.
- C. Examine threads on valve and mating pipe for form and cleanliness.
- D. Examine mating flange faces for conditions that might cause leakage. Check bolting for proper size, length, and material. Verify that gasket is of proper size, that its material composition is suitable for service, and that it is free from defects and damage.
- E. Do not attempt to repair defective valves; replace with new valves.

3.2 VALVE INSTALLATION

- A. Install valves with unions or flanges at each piece of equipment arranged to allow service, maintenance, and equipment removal without system shutdown.

- B. Locate valves for easy access and provide separate support where necessary.
- C. Install valves in horizontal piping with stem at or above center of pipe.
- D. Install valves in position to allow full stem movement.
- E. Install check valves for proper direction of flow and as follows:
 - 1. Swing Check Valves: In horizontal position with hinge pin level.
 - 2. Check Valves: In horizontal or vertical position, between flanges.

3.3 ADJUSTING

- A. Adjust or replace valve packing after piping systems have been tested and put into service but before final adjusting and balancing. Replace valves if persistent leaking occurs.

3.4 GENERAL REQUIREMENTS FOR VALVE APPLICATIONS

- A. If valve applications are not indicated, use the following:
 - 1. Shutoff Service: Ball or globe valves.
 - 2. Throttling Service: Ball or globe valves.
- B. If valves with specified SWP classes or CWP ratings are not available, the same types of valves with higher SWP classes or CWP ratings may be substituted.
- C. Select valves, except wafer types, with the following end connections:
 - 1. For Copper Tubing, NPS 2 and Smaller: Threaded ends except where solder-joint valve-end option is indicated in valve schedules below.
 - 2. For Copper Tubing, NPS 2-1/2 to NPS 4: Flanged ends except where threaded valve-end option is indicated in valve schedules below.
 - 3. For Grooved-End Copper Tubing: Valve ends may be grooved.

3.5 DOMESTIC, HOT- AND COLD-WATER VALVE SCHEDULE

- A. Pipe NPS 3/4 and Larger:
 - 1. Bronze and Brass Valves: May be provided with solder-joint ends instead of threaded ends.
 - 2. Ball Valves: Two-piece, full port, brass, or bronze with stainless-steel trim.
 - 3. Bronze Swing Check Valves: Class 150, bronze disc.
 - 4. Bronze Gate Valves: Class 150, NRS.
 - 5. Bronze Globe Valves: Class 150, bronze disc.

END OF SECTION 22 05 23

SECTION 22 05 29 - HANGERS AND SUPPORTS FOR PLUMBING PIPING AND EQUIPMENT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Metal pipe hangers and supports.
 - 2. Trapeze pipe hangers.
 - 3. Thermal-hanger shield inserts.
 - 4. Fastener systems.
 - 5. Pipe stands.
 - 6. Equipment supports.
- B. Related Sections:
 - 1. Section 05 50 00 "Metal Fabrications" for structural-steel shapes and plates for trapeze hangers for pipe and equipment supports.
 - 2. Section 22 05 48 "Vibration and Seismic Controls for Plumbing Piping and Equipment" for vibration isolation devices.

1.3 DEFINITIONS

- A. MSS: Manufacturers Standardization Society of The Valve and Fittings Industry Inc.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Shop Drawings: Show fabrication and installation details and include calculations for the following; include Product Data for components:
 - 1. Trapeze pipe hangers.
 - 2. Metal framing systems.
 - 3. Pipe stands.
 - 4. Equipment supports.
- C. Delegated-Design Submittal: For trapeze hangers indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.
 - 1. Detailed fabrication and assembly of trapeze hangers.
 - 2. Design Calculations: Calculate requirements for designing trapeze hangers.

1.5 INFORMATIONAL SUBMITTALS

- A. Welding certificates.

1.6 QUALITY ASSURANCE

- A. Structural Steel Welding Qualifications: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."
- B. Pipe Welding Qualifications: Qualify procedures and operators according to ASME Boiler and Pressure Vessel Code.

PART 2 - PRODUCTS

2.1 METAL PIPE HANGERS AND SUPPORTS

- A. Carbon-Steel Pipe Hangers and Supports:
 - 1. Description: MSS SP-58, Types 1 through 58, factory-fabricated components.
 - 2. Galvanized Metallic Coatings: Pre-galvanized or hot dipped.
 - 3. Nonmetallic Coatings: Plastic coating, jacket, or liner.
 - 4. Padded Hangers: Hanger with fiberglass or other pipe insulation pad or cushion to support bearing surface of piping.
 - 5. Hanger Rods: Continuous-thread rod, nuts, and washer made of carbon steel.
- B. Copper Pipe Hangers:
 - 1. Description: MSS SP-58, Types 1 through 58, copper-coated-steel, factory-fabricated components.
 - 2. Hanger Rods: Continuous-thread rod, nuts, and washer made of stainless steel.

2.2 TRAPEZE PIPE HANGERS

- A. Description: MSS SP-69, Type 59, shop- or field-fabricated pipe-support assembly made from structural carbon-steel shapes with MSS SP-58 carbon-steel hanger rods, nuts, saddles, and U-bolts.

2.3 THERMAL-HANGER SHIELD INSERTS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Carpenter & Paterson, Inc.
 - 2. Clement Support Services.
 - 3. ERICO International Corporation.
 - 4. National Pipe Hanger Corporation.
 - 5. PHS Industries, Inc.
 - 6. Pipe Shields, Inc.; a subsidiary of Piping Technology & Products, Inc.
 - 7. Piping Technology & Products, Inc.

8. Rilco Manufacturing Co., Inc.
 9. Value Engineered Products, Inc.
-
- B. Insulation-Insert Material for Cold Piping: ASTM C 552, Type II cellular glass with 100-psig or ASTM C 591, Type VI, Grade 1 polyisocyanurate with 125-psig minimum compressive strength and vapor barrier.
 - C. Insulation-Insert Material for Hot Piping: Water-repellent treated, ASTM C 533, Type I calcium silicate with 100-psig or ASTM C 591, Type VI, Grade 1 polyisocyanurate with 125-psig minimum compressive strength.
 - D. For Trapeze or Clamped Systems: Insert and shield shall cover entire circumference of pipe.
 - E. For Clevis or Band Hangers: Insert and shield shall cover lower 180 degrees of pipe.
 - F. Insert Length: Extend 2 inches beyond sheet metal shield for piping operating below ambient air temperature.

2.4 FASTENER SYSTEMS

- A. Powder-Actuated Fasteners: Threaded-steel stud, for use in hardened Portland cement concrete with pull-out, tension, and shear capacities appropriate for supported loads and building materials where used.
- B. Mechanical-Expansion Anchors: Insert-wedge-type, stainless- steel anchors, for use in hardened Portland cement concrete; with pull-out, tension, and shear capacities appropriate for supported loads and building materials where used.

2.5 PIPE STANDS

- A. General Requirements for Pipe Stands: Shop- or field-fabricated assemblies made of manufactured corrosion-resistant components to support roof-mounted piping.
- B. Low-Type, Single-Pipe Stand: One-piece stainless-steel base unit with plastic roller, for roof installation without membrane penetration.
- C. High-Type, Single-Pipe Stand:
 1. Description: Assembly of base, vertical and horizontal members, and pipe support, for roof installation without membrane penetration.
 2. Base: Stainless steel.
 3. Vertical Members: Two or more cadmium-plated-steel or stainless-steel, continuous-thread rods.
 4. Horizontal Member: Cadmium-plated-steel or stainless-steel rod with plastic or stainless-steel, roller-type pipe support.
- D. High-Type, Multiple-Pipe Stand:
 1. Description: Assembly of bases, vertical and horizontal members, and pipe supports, for roof installation without membrane penetration.
 2. Bases: One or more; plastic.

3. Vertical Members: Two or more protective-coated-steel channels.
4. Horizontal Member: Protective-coated-steel channel.
5. Pipe Supports: Galvanized-steel, clevis-type pipe hangers.

- E. Curb-Mounted-Type Pipe Stands: Shop- or field-fabricated pipe supports made from structural-steel shapes, continuous-thread rods, and rollers, for mounting on permanent stationary roof curb.

2.6 EQUIPMENT SUPPORTS

- A. Description: Welded, shop- or field-fabricated equipment support made from structural carbon-steel shapes.

2.7 PIPE POSITIONING SYSTEMS

- A. Description: IAPMO PS 42, positioning system of metal brackets, clips, and straps for positioning piping in pipe spaces; for plumbing fixtures in commercial applications.

2.8 MISCELLANEOUS MATERIALS

- A. Structural Steel: ASTM A 36/A 36M, carbon-steel plates, shapes, and bars; black and galvanized.
- B. Grout: ASTM C 1107, factory-mixed and -packaged, dry, hydraulic-cement, non-shrink and nonmetallic grout; suitable for interior and exterior applications.
1. Properties: Non-staining, noncorrosive, and nongaseous.
 2. Design Mix: 5000-psi, 28-day compressive strength.

PART 3 - EXECUTION

3.1 HANGER AND SUPPORT INSTALLATION

- A. Metal Pipe-Hanger Installation: Comply with MSS SP-69 and MSS SP-89. Install hangers, supports, clamps, and attachments as required to properly support piping from the building structure.
- B. Metal Trapeze Pipe-Hanger Installation: Comply with MSS SP-69 and MSS SP-89. Arrange for grouping of parallel runs of horizontal piping, and support together on field-fabricated trapeze pipe hangers.
1. Pipes of Various Sizes: Support together and space trapezes for smallest pipe size or install intermediate supports for smaller diameter pipes as specified for individual pipe hangers.
 2. Field fabricate from ASTM A 36/A 36M, carbon-steel shapes selected for loads being supported. Weld steel according to AWS D1.1/D1.1M.

- C. Thermal-Hanger Shield Installation: Install in pipe hangers or shield for insulated piping.
- D. Fastener System Installation:
 - 1. Install powder-actuated fasteners for use in lightweight concrete or concrete slabs less than 4 inches thick in concrete after concrete is placed and completely cured. Use operators that are licensed by powder-actuated tool manufacturers. Install fasteners according to powder-actuated tool manufacturer's operating manual.
 - 2. Install mechanical-expansion anchors in concrete after concrete is placed and completely cured. Install fasteners according to the manufacturer's written instructions.
- E. Pipe Stand Installation:
 - 1. Pipe Stand Types except Curb-Mounted Type: Assemble components and mount on smooth roof surface. Do not penetrate roof membrane.
- F. Pipe Positioning-System Installation: Install support devices to make rigid supply and waste piping connections to each plumbing fixture.
- G. Install hangers and supports complete with necessary attachments, inserts, bolts, rods, nuts, washers, and other accessories.
- H. Equipment Support Installation: Fabricate from welded-structural-steel shapes.
- I. Install hangers and supports to allow controlled thermal and seismic movement of piping systems, to permit freedom of movement between pipe anchors, and to facilitate action of expansion joints, expansion loops, expansion bends, and similar units.
- J. Install lateral bracing with pipe hangers and supports to prevent swaying.
- K. Install building attachments within concrete slabs or attach to structural steel. Install additional attachments at concentrated loads, including valves, flanges, and strainers, NPS 2-1/2 and larger and at changes in direction of piping. Install concrete inserts before concrete is placed; fasten inserts to forms and install reinforcing bars through openings at top of inserts.
- L. Load Distribution: Install hangers and supports so that piping live and dead loads and stresses from movement will not be transmitted to connected equipment.
- M. Pipe Slopes: Install hangers and supports to provide indicated pipe slopes and to not exceed maximum pipe deflections allowed by ASME B31.9 for building services piping.
- N. Insulated Piping:
 - 1. Attach clamps and spacers to piping.
 - a. Piping Operating above Ambient Air Temperature: Clamp may project through insulation.
 - b. Piping Operating below Ambient Air Temperature: Use thermal-hanger shield insert with clamp sized to match OD of insert.
 - c. Do not exceed pipe stress limits allowed by ASME B31.9 for building services piping.

2. Install MSS SP-58, Type 39, protection saddles if insulation without vapor barrier is indicated. Fill interior voids with insulation that matches adjoining insulation.
 - a. Option: Thermal-hanger shield inserts may be used. Include steel weight-distribution plate for pipe NPS 4 and larger if pipe is installed on rollers.
3. Install MSS SP-58, Type 40, protective shields on cold piping with vapor barrier. Shields shall span an arc of 180 degrees.
 - a. Option: Thermal-hanger shield inserts may be used. Include steel weight-distribution plate for pipe NPS 4 and larger if pipe is installed on rollers.
4. Shield Dimensions for Pipe: Not less than the following:
 - a. NPS 1/4 to NPS 3-1/2: 12 inches long and 0.048 inch thick.
 - b. NPS 4: 12 inches long and 0.06 inch thick.
5. Thermal-Hanger Shields: Install with insulation same thickness as piping insulation.

3.2 EQUIPMENT SUPPORTS

- A. Fabricate structural-steel stands to suspend equipment from structure overhead or to support equipment above floor.
- B. Grouting: Place grout under supports for equipment and make bearing surface smooth.
- C. Provide lateral bracing, to prevent swaying, for equipment support.

3.3 METAL FABRICATIONS

- A. Cut, drill, and fit miscellaneous metal fabrications for trapeze pipe hangers and equipment supports.
- B. Fit exposed connections together to form hairline joints. Field weld connections that cannot be shop welded because of shipping size limitations.
- C. Field Welding: Comply with AWS D1.1/D1.1M procedures for shielded, metal arc welding; appearance and quality of welds; and methods used in correcting welding work; and with the following:
 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
 2. Obtain fusion without undercut or overlap.
 3. Remove welding flux immediately.
 4. Finish welds at exposed connections so no roughness shows after finishing and so contours of welded surfaces match adjacent contours.

3.4 ADJUSTING

- A. Hanger Adjustments: Adjust hangers to distribute loads equally on attachments and to achieve indicated slope of pipe.
- B. Trim excess length of continuous-thread hanger and support rods to 1-1/2 inches.

3.5 PAINTING

- A. Touchup: Clean field welds and abraded areas of shop paint. Paint exposed areas immediately after erecting hangers and supports. Use same materials as used for shop painting. Comply with SSPC-PA 1 requirements for touching up field-painted surfaces.
 - 1. Apply paint by brush or spray to provide a minimum dry film thickness of 2.0 mils.
- B. Galvanized Surfaces: Clean welds, bolted connections, and abraded areas and apply galvanizing-repair paint to comply with ASTM A 780.

3.6 HANGER AND SUPPORT SCHEDULE

- A. Specific hanger and support requirements are in Sections specifying piping systems and equipment.
- B. Comply with MSS SP-69 for pipe-hanger selections and applications that are not specified in piping system Sections.
- C. Use hangers and supports with galvanized metallic coatings for piping and equipment that will not have field-applied finish.
- D. Use nonmetallic coatings on attachments for electrolytic protection where attachments are in direct contact with copper tubing.
- E. Use stainless-steel pipe hangers and stainless-steel attachments for hostile environment applications.
- F. Use copper-plated pipe hangers and stainless-steel attachments for copper piping and tubing.
- G. Use padded hangers for piping that is subject to scratching.
- H. Use thermal-hanger shield inserts for insulated piping and tubing.
- I. Horizontal-Piping Hangers and Supports: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
 - 1. Adjustable, Steel Clevis Hangers (MSS Type 1): For suspension of noninsulated or insulated, stationary pipes NPS 1/2 to NPS 30.
 - 2. Yoke-Type Pipe Clamps (MSS Type 2): For suspension of up to 1050 deg F, pipes NPS 4 to NPS 24, requiring up to 4 inches of insulation.
 - 3. Carbon- or Alloy-Steel, Double-Bolt Pipe Clamps (MSS Type 3): For suspension of pipes NPS 3/4 to NPS 36, requiring clamp flexibility and up to 4 inches of insulation.

4. Steel Pipe Clamps (MSS Type 4): For suspension of cold and hot pipes NPS 1/2 to NPS 24 if little or no insulation is required.
 5. Pipe Hangers (MSS Type 5): For suspension of pipes NPS 1/2 to NPS 4, to allow off-center closure for hanger installation before pipe erection.
 6. Adjustable, Swivel Split- or Solid-Ring Hangers (MSS Type 6): For suspension of noninsulated, stationary pipes NPS 3/4 to NPS 8.
 7. Adjustable, Steel Band Hangers (MSS Type 7): For suspension of noninsulated, stationary pipes NPS 1/2 to NPS 8.
 8. Adjustable Band Hangers (MSS Type 9): For suspension of noninsulated, stationary pipes NPS 1/2 to NPS 8.
 9. Adjustable, Swivel-Ring Band Hangers (MSS Type 10): For suspension of noninsulated, stationary pipes NPS 1/2 to NPS 8.
 10. Split Pipe Ring with or without Turnbuckle Hangers (MSS Type 11): For suspension of noninsulated, stationary pipes NPS 3/8 to NPS 8.
 11. Extension Hinged or Two-Bolt Split Pipe Clamps (MSS Type 12): For suspension of noninsulated, stationary pipes NPS 3/8 to NPS 3.
 12. U-Bolts (MSS Type 24): For support of heavy pipes NPS 1/2 to NPS 30.
 13. Clips (MSS Type 26): For support of insulated pipes not subject to expansion or contraction.
 14. Pipe Saddle Supports (MSS Type 36): For support of pipes NPS 4 to NPS 36, with steel-pipe base stanchion support and cast-iron floor flange or carbon-steel plate.
 15. Pipe Stanchion Saddles (MSS Type 37): For support of pipes NPS 4 to NPS 36, with steel-pipe base stanchion support and cast-iron floor flange or carbon-steel plate, and with U-bolt to retain pipe.
 16. Adjustable Pipe Saddle Supports (MSS Type 38): For stanchion-type support for pipes NPS 2-1/2 to NPS 36 if vertical adjustment is required, with steel-pipe base stanchion support and cast-iron floor flange.
- J. Vertical-Piping Clamps: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
1. Extension Pipe or Riser Clamps (MSS Type 8): For support of pipe risers NPS 3/4 to NPS 24.
 2. Carbon- or Alloy-Steel Riser Clamps (MSS Type 42): For support of pipe risers NPS 3/4 to NPS 24 if longer ends are required for riser clamps.
- K. Hanger-Rod Attachments: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
1. Steel Turnbuckles (MSS Type 13): For adjustment up to 6 inches for heavy loads.
 2. Steel Clevises (MSS Type 14): For 120 to 450 deg F piping installations.
 3. Swivel Turnbuckles (MSS Type 15): For use with MSS Type 11, split pipe rings.
 4. Malleable-Iron Sockets (MSS Type 16): For attaching hanger rods to various types of building attachments.
 5. Steel Weldless Eye Nuts (MSS Type 17): For 120 to 450 deg F piping installations.
- L. Building Attachments: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
1. Steel or Malleable Concrete Inserts (MSS Type 18): For upper attachment to suspend pipe hangers from concrete ceiling.

2. Top-Beam C-Clamps (MSS Type 19): For use under roof installations with bar-joint construction, to attach to top flange of structural shape.
 3. Side-Beam or Channel Clamps (MSS Type 20): For attaching to bottom flange of beams, channels, or angles.
 4. Center-Beam Clamps (MSS Type 21): For attaching to center of bottom flange of beams.
 5. Welded Beam Attachments (MSS Type 22): For attaching to bottom of beams if loads are considerable and rod sizes are large.
 6. C-Clamps (MSS Type 23): For structural shapes.
 7. Top-Beam Clamps (MSS Type 25): For top of beams if hanger rod is required tangent to flange edge.
 8. Side-Beam Clamps (MSS Type 27): For bottom of steel I-beams.
 9. Steel-Beam Clamps with Eye Nuts (MSS Type 28): For attaching to bottom of steel I-beams for heavy loads.
 10. Linked-Steel Clamps with Eye Nuts (MSS Type 29): For attaching to bottom of steel I-beams for heavy loads, with link extensions.
 11. Malleable-Beam Clamps with Extension Pieces (MSS Type 30): For attaching to structural steel.
 12. Welded-Steel Brackets: For support of pipes from below or for suspending from above by using clip and rod. Use one of the following for indicated loads:
 - a. Light (MSS Type 31): 750 lb.
 - b. Medium (MSS Type 32): 1500 lb.
 - c. Heavy (MSS Type 33): 3000 lb.
 13. Side-Beam Brackets (MSS Type 34): For sides of steel or wooden beams.
 14. Plate Lugs (MSS Type 57): For attaching to steel beams if flexibility at beam is required.
 15. Horizontal Travelers (MSS Type 58): For supporting piping systems subject to linear horizontal movement where headroom is limited.
- M. Saddles and Shields: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
1. Steel-Pipe-Covering Protection Saddles (MSS Type 39): To fill interior voids with insulation that matches adjoining insulation.
 2. Protection Shields (MSS Type 40): Of length recommended in writing by manufacturer to prevent crushing insulation.
 3. Thermal-Hanger Shield Inserts: For supporting insulated pipe.
- N. Comply with MSS SP-69 for trapeze pipe-hanger selections and applications that are not specified in piping system Sections.
- O. Comply with MFMA-103 for metal framing system selections and applications that are not specified in piping system Sections.
- P. Use powder-actuated fasteners or mechanical-expansion anchors instead of building attachments where required in concrete construction.
- Q. Use pipe positioning systems in pipe spaces behind plumbing fixtures to support supply and waste piping for plumbing fixtures.

END OF SECTION 22 05 29

SECTION 22 05 53 - IDENTIFICATION FOR PLUMBING PIPING AND EQUIPMENT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Equipment labels.
 - 2. Warning signs and labels.
 - 3. Pipe labels.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated.

1.4 COORDINATION

- A. Coordinate installation of identifying devices with completion of covering and painting of surfaces where devices are to be applied.
- B. Coordinate installation of identifying devices with locations of access panels and doors.
- C. Install identifying devices before installing acoustical ceilings and similar concealment.

PART 2 - PRODUCTS

2.1 EQUIPMENT LABELS

- A. Material and Thickness: Multilayer, multicolor, plastic phenolic labels for mechanical engraving, 1/8 inch thick, and having predrilled holes for attachment hardware.
- B. Letter Color: White.
- C. Background Color: Black.
- D. Maximum Temperature: Able to withstand temperatures up to 160 deg F.

- E. Minimum Label Size: Length and width vary for required label content, but not less than 2-1/2 by 3/4 inch.
- F. Minimum Letter Size: 1/4 inch for name of units if viewing distance is less than 24 inches, 1/2 inch for viewing distances up to 72 inches, and proportionately larger lettering for greater viewing distances. Include secondary lettering two-thirds to three-fourths the size of principal lettering.
- G. Fasteners: Stainless-steel rivets or self-tapping screws.
- H. Label Content: Include equipment's Drawing designation or unique equipment number, Drawing numbers where equipment is indicated (plans, details, and schedules), plus the Specification Section number and title where equipment is specified.
- I. Equipment Label Schedule: For each item of equipment to be labeled, on 8-1/2-by-11-inch (A4) bond paper. Tabulate equipment identification number and identify Drawing numbers where equipment is indicated (plans, details, and schedules), plus the Specification Section number and title where equipment is specified. Equipment schedule shall be included in operation and maintenance data.

2.2 WARNING SIGNS AND LABELS

- A. Material and Thickness: Multilayer, multicolor, plastic labels for mechanical engraving, 1/8 inch thick, and having predrilled holes for attachment hardware.
- B. Letter Color: White.
- C. Background Color: Red.
- D. Maximum Temperature: Able to withstand temperatures up to 160 deg F.
- E. Minimum Label Size: Length and width vary for required label content, but not less than 2-1/2 by 3/4 inch.
- F. Minimum Letter Size: 1/4 inch for name of units if viewing distance is less than 24 inches, 1/2 inch for viewing distances up to 72 inches, and proportionately larger lettering for greater viewing distances. Include secondary lettering two-thirds to three-fourths the size of principal lettering.
- G. Fasteners: Stainless-steel rivets or self-tapping screws.
- H. Label Content: Include caution and warning information, plus emergency notification instructions.

2.3 PIPE LABELS

- A. General Requirements for Manufactured Pipe Labels: Preprinted, color-coded, with lettering indicating service, and showing flow direction.
- B. Self-Adhesive Pipe Labels: Printed plastic with contact-type, permanent-adhesive backing.

- C. Pipe Label Contents: Include identification of piping service using same designations or abbreviations as used on Drawings, pipe size, and an arrow indicating flow direction.
 - 1. Flow-Direction Arrows: Integral with piping system service lettering to accommodate both directions, or as separate unit on each pipe label to indicate flow direction.
 - 2. Lettering Size: At least 1-1/2 inches high.
 - 3. Designation abbreviations:
 - a. DOMESTIC COLD WATER
 - b. DOMESTIC HOT WATER

PART 3 - EXECUTION

3.1 PREPARATION

- A. Clean piping and equipment surfaces of substances that could impair bond of identification devices, including dirt, oil, grease, release agents, and incompatible primers, paints, and encapsulants.

3.2 EQUIPMENT LABEL INSTALLATION

- A. Install or permanently fasten labels on each major item of plumbing equipment.
- B. Locate equipment labels where accessible and visible.

3.3 PIPE LABEL INSTALLATION

- A. Piping Color-Coding: Painting of piping is specified in Division 9.
- B. Locate pipe labels where piping is exposed or above accessible ceilings in finished spaces; machine rooms; accessible maintenance spaces such as shafts, tunnels, and plenums; and exterior exposed locations as follows:
 - 1. Near each valve and control device.
 - 2. Near each branch connection, excluding short takeoffs for fixtures and terminal units. Where flow pattern is not obvious, mark each pipe at branch.
 - 3. Near penetrations through walls, floors, ceilings, and inaccessible enclosures.
 - 4. At access doors, manholes, and similar access points that permit view of concealed piping.
 - 5. Near major equipment items and other points of origination and termination.
 - 6. Spaced at maximum intervals of 50 feet along each run. Reduce intervals to 25 feet in areas of congested piping and equipment or in concealed spaces.
 - 7. Pipe stenciling or painting of piping identification is not permitted.
- C. Pipe Label Color Schedule:
 - 1. Low-Pressure, Compressed-Air Piping:
 - a. Background Color: Blue.

- b. Letter Color: White.
- 2. Domestic Cold-Water Piping:
 - a. Background Color: Green.
 - b. Letter Color: White.
- 3. Domestic Hot-Water Piping:
 - a. Background Color: Yellow.
 - b. Letter Color: Black.
- 4. Sanitary Waste, Vent, and Storm Piping:
 - a. Background Color: Black.
 - b. Letter Color: White.
- 5. Natural Gas Piping:
 - a. Background Color: Yellow.
 - b. Letter Color: Black.

END OF SECTION 22 05 53

SECTION 22 07 19 - PLUMBING PIPING INSULATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes insulating the following plumbing piping services:
 - 1. Domestic cold-water piping.
 - 2. Domestic hot-water piping.
 - 3. Domestic recirculating hot-water piping.
 - 4. Sanitary waste piping exposed to freezing conditions.
 - 5. Supplies and drains for handicap-accessible lavatories and sinks.
- B. Related Sections:
 - 1. Section 22 07 16 "Plumbing Equipment Insulation."

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Shop Drawings: Include plans, elevations, sections, details, and attachments to other work.
 - 1. Detail application of protective shields, saddles, and inserts at hangers for each type of insulation and hanger.
 - 2. Detail attachment and covering of heat tracing inside insulation.
 - 3. Detail insulation application at pipe expansion joints for each type of insulation.
 - 4. Detail insulation application at elbows, fittings, flanges, valves, and specialties for each type of insulation.
 - 5. Detail removable insulation at piping specialties, equipment connections, and access panels.
 - 6. Detail application of field-applied jackets.

1.4 INFORMATIONAL SUBMITTALS

- A. Field quality-control reports.

1.5 QUALITY ASSURANCE

- A. Surface-Burning Characteristics: For insulation and related materials, as determined by testing identical products according to ASTM E 84 by a testing agency acceptable to authorities having jurisdiction. Factory label insulation and jacket materials and adhesive, mastic, tapes, and cement material containers, with appropriate markings of applicable testing agency.
 - 1. Insulation Installed Indoors: Flame-spread index of 25 or less, and smoke-developed index of 50 or less.
 - 2. Insulation Installed Outdoors: Flame-spread index of 75 or less, and smoke-developed index of 150 or less.
- B. Comply with the following applicable standards and other requirements specified for miscellaneous components:
 - 1. Supply and Drain Protective Shielding Guards: ICC A117.1.

1.6 COORDINATION

- A. Coordinate clearance requirements with piping Installer for piping insulation application. Before preparing piping Shop Drawings, establish and maintain clearance requirements for installation of insulation and field-applied jackets and finishes and for space required for maintenance.
- B. Coordinate installation and testing of heat tracing. Schedule insulation application after pressure testing systems and, where required, after installing and testing heat tracing. Insulation application may begin on segments that have satisfactory test results.

PART 2 - PRODUCTS

2.1 INSULATION MATERIALS

- A. Comply with requirements in "Piping Insulation Schedule, General," "Indoor Piping Insulation Schedule," "Outdoor, Aboveground Piping Insulation Schedule," and "Outdoor, Underground Piping Insulation Schedule" articles for where insulating materials shall be applied.
- B. Products shall not contain asbestos, lead, mercury, or mercury compounds.
- C. Products that come in contact with stainless steel shall have a leachable chloride content of less than 50 ppm when tested according to ASTM C 871.
- D. Insulation materials for use on austenitic stainless steel shall be qualified as acceptable according to ASTM C 795.
- E. Foam insulation materials shall not use CFC or HCFC blowing agents in the manufacturing process.

- F. Cellular Glass: Inorganic, incombustible, foamed or cellulated glass with annealed, rigid, hermetically sealed cells. Factory-applied jacket requirements are specified in "Factory-Applied Jackets" Article.
1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Pittsburgh Corning Corporation; Foamglas.
 - b. Engineer approved equal.
 2. Special-Shaped Insulation: ASTM C 552, Type III.
 3. Preformed Pipe Insulation without Jacket: Comply with ASTM C 552, Type II, Class 1.
 4. Preformed Pipe Insulation with Factory-Applied ASJ: Comply with ASTM C 552, Type II, Class 2.
 5. Factory fabricate shapes according to ASTM C 450 and ASTM C 585.
- G. Flexible Elastomeric Insulation: Closed-cell, sponge- or expanded-rubber materials. Comply with ASTM C 534, Type I for tubular materials.
1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Aeroflex USA, Inc.; Aerocel.
 - b. Armacell LLC; AP Armaflex.
 - c. K-Flex USA; Insul-Lock, Insul-Tube, and K-FLEX LS.
- H. Mineral-Fiber, Preformed Pipe Insulation:
1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Johns Manville; Micro-Lok.
 - b. Knauf Insulation; 1000-Degree Pipe Insulation.
 - c. Owens Corning; Fiberglas Pipe Insulation.
 2. Type I, 850 Deg F Materials: Mineral or glass fibers bonded with a thermosetting resin. Comply with ASTM C 547, Type I, Grade A, with factory-applied ASJ. Factory-applied jacket requirements are specified in "Factory-Applied Jackets" Article.

2.2 INSULATING CEMENTS

- A. Mineral-Fiber, Hydraulic-Setting Insulating and Finishing Cement: Comply with ASTM C 449.
1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Ramco Insulation, Inc.; Ramcote 1200 and Quik-Cote.
 - b. Engineer approved equal.

2.3 ADHESIVES

- A. Materials shall be compatible with insulation materials, jackets, and substrates and for bonding insulation to itself and to surfaces to be insulated, unless otherwise indicated.

- B. Cellular-Glass Adhesive: Two-component, thermosetting urethane adhesive containing no flammable solvents, with a service temperature range of minus 100 to plus 200 deg F.
1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Foster Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; 81-84.
 - b. Engineer approved equal.
 2. For indoor applications, adhesive shall have a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
- C. Flexible Elastomeric and Polyolefin Adhesive: Comply with MIL-A-24179A, Type II, Class I.
1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Aeroflex USA, Inc.; Aeroseal.
 - b. Armacell LLC; Armaflex 520 Adhesive.
 - c. Foster Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; 85-75.
 - d. K-Flex USA; R-373 Contact Adhesive.
 2. For indoor applications, adhesive shall have a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
- D. Mineral-Fiber Adhesive: Comply with MIL-A-3316C, Class 2, Grade A.
1. Products: Subject to compliance with requirements, [provide the following] [provide one of the following] [available products that may be incorporated into the Work include, but are not limited to, the following]:
 - a. Childers Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; CP-127.
 - b. Eagle Bridges - Marathon Industries; 225.
 - c. Foster Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; 85-60/85-70.
 - d. Mon-Eco Industries, Inc.; 22-25.
 2. For indoor applications, adhesive shall have a VOC content of 80 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
- E. ASJ Adhesive, and FSK Jacket Adhesive: Comply with MIL-A-3316C, Class 2, Grade A for bonding insulation jacket lap seams and joints.
1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Childers Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; CP-82.
 - b. Eagle Bridges - Marathon Industries; 225.

- c. Foster Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; 85-20.
 - d. Mon-Eco Industries, Inc.; 22-25.
- 2. For indoor applications, adhesive shall have a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

F. PVC Jacket Adhesive: Compatible with PVC jacket.

- 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Dow Corning Corporation; 739, Dow Silicone.
 - b. Johns Manville; Zeston Perma-Weld, CEEL-TITE Solvent Welding Adhesive.
 - c. P.I.C. Plastics, Inc.; Welding Adhesive.
 - d. Speedline Corporation; Polyco VP Adhesive.
- 2. For indoor applications, adhesive shall have a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

2.4 MASTICS

A. Materials shall be compatible with insulation materials, jackets, and substrates; comply with MIL-PRF-19565C, Type II.

- 1. For indoor applications, use mastics that have a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

B. Vapor-Barrier Mastic: Water based; suitable for indoor use on below-ambient services.

- 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Foster Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; 30-80/30-90.
 - b. Vimasco Corporation; 749.
- 2. Water-Vapor Permeance: ASTM E 96/E 96M, Procedure B, 0.013 perm at 43-mil dry film thickness.
- 3. Service Temperature Range: Minus 20 to plus 180 deg F.
- 4. Solids Content: ASTM D 1644, 58 percent by volume and 70 percent by weight.
- 5. Color: White.

C. Vapor-Barrier Mastic: Solvent based; suitable for outdoor use on below-ambient services.

- 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Childers Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; Encacel.
 - b. Eagle Bridges - Marathon Industries; 570.

- c. Foster Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; 60-95/60-96.
 - 2. Water-Vapor Permeance: ASTM F 1249, 0.05 perm at 30-mil dry film thickness.
 - 3. Service Temperature Range: Minus 50 to plus 220 deg F.
 - 4. Solids Content: ASTM D 1644, 33 percent by volume and 46 percent by weight.
 - 5. Color: White.
- D. Breather Mastic: Water based; suitable for indoor and outdoor use on above-ambient services.
- 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Childers Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; CP-10.
 - b. Eagle Bridges - Marathon Industries; 550.
 - c. Foster Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; 46-50.
 - d. Mon-Eco Industries, Inc.; 55-50.
 - e. Vimasco Corporation; WC-1/WC-5.
 - 2. Water-Vapor Permeance: ASTM F 1249, 1.8 perms at 0.0625-inch dry film thickness.
 - 3. Service Temperature Range: Minus 20 to plus 180 deg F.
 - 4. Solids Content: 60 percent by volume and 66 percent by weight.
 - 5. Color: White.

2.5 SEALANTS

A. Joint Sealants:

- 1. Joint Sealants for Cellular-Glass Products: Subject to compliance with requirements, provide one of the following:
 - a. Childers Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; CP-76.
 - b. Eagle Bridges - Marathon Industries; 405.
 - c. Foster Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; 30-45.
 - d. Mon-Eco Industries, Inc.; 44-05.
 - e. Pittsburgh Corning Corporation; Pittseal 444.
- 2. Materials shall be compatible with insulation materials, jackets, and substrates.
- 3. Permanently flexible, elastomeric sealant.
- 4. Service Temperature Range: Minus 100 to plus 300 deg F.
- 5. Color: White or gray.
- 6. For indoor applications, sealants shall have a VOC content of 420 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

B. FSK and Metal Jacket Flashing Sealants:

- 1. Products: Subject to compliance with requirements, provide one of the following:

- a. Childers Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; CP-76.
 - b. Eagle Bridges - Marathon Industries; 405.
 - c. Foster Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; 95-44.
 - d. Mon-Eco Industries, Inc.; 44-05.
 2. Materials shall be compatible with insulation materials, jackets, and substrates.
 3. Fire- and water-resistant, flexible, elastomeric sealant.
 4. Service Temperature Range: Minus 40 to plus 250 deg F.
 5. Color: Aluminum.
 6. For indoor applications, sealants shall have a VOC content of 420 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
- C. ASJ Flashing Sealants, and Vinyl, PVDC, and PVC Jacket Flashing Sealants:
1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Childers Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; CP-76.
 - b. Engineer approved equal.
 2. Materials shall be compatible with insulation materials, jackets, and substrates.
 3. Fire- and water-resistant, flexible, elastomeric sealant.
 4. Service Temperature Range: Minus 40 to plus 250 deg F (Minus 40 to plus 121 deg C).
 5. Color: White.
 6. For indoor applications, sealants shall have a VOC content of 420 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

2.6 FACTORY-APPLIED JACKETS

- A. Insulation system schedules indicate factory-applied jackets on various applications. When factory-applied jackets are indicated, comply with the following:
1. ASJ: White, kraft-paper, fiberglass-reinforced scrim with aluminum-foil backing; complying with ASTM C 1136, Type I.
 2. ASJ-SSL: ASJ with self-sealing, pressure-sensitive, acrylic-based adhesive covered by a removable protective strip; complying with ASTM C 1136, Type I.
 3. FSK Jacket: Aluminum-foil, fiberglass-reinforced scrim with kraft-paper backing; complying with ASTM C 1136, Type II.

2.7 FIELD-APPLIED FABRIC-REINFORCING MESH

- A. Woven Polyester Fabric: Approximately 1 oz./sq. yd. with a thread count of 10 strands by 10 strands/sq. in., in a Leno weave, for pipe.
1. Products: Subject to compliance with requirements, provide one of the following:

- a. Foster Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; Mast-A-Fab.
- b. Vimasco Corporation; Elastafab 894.

2.8 FIELD-APPLIED JACKETS

- A. Field-applied jackets shall comply with ASTM C 921, Type I, unless otherwise indicated.
- B. PVC Jacket: High-impact-resistant, UV-resistant PVC complying with ASTM D 1784, Class 16354-C; thickness as scheduled; roll stock ready for shop or field cutting and forming. Thickness is indicated in field-applied jacket schedules.
 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Johns Manville; Zeston.
 - b. P.I.C. Plastics, Inc.; FG Series.
 - c. Proto Corporation; LoSmoke.
 - d. Speedline Corporation; SmokeSafe.
 2. Adhesive: As recommended by jacket material manufacturer.
 3. Color: White.
 4. Factory-fabricated fitting covers to match jacket if available; otherwise, field fabricate.
 - a. Shapes: 45- and 90-degree, short- and long-radius elbows, tees, valves, flanges, unions, reducers, end caps, soil-pipe hubs, traps, mechanical joints, and P-trap and supply covers for lavatories.
- C. Aluminum Jacket: Comply with ASTM B 209, Alloy 3003, 3005, 3105, or 5005, Temper H-14.
 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Childers Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; Metal Jacketing Systems.
 - b. ITW Insulation Systems; Aluminum and Stainless Steel Jacketing.
 - c. RPR Products, Inc.; Insul-Mate.
 2. Sheet and roll stock ready for shop or field sizing.
 3. Finish and thickness are indicated in field-applied jacket schedules.
 4. Moisture Barrier for Indoor Applications: 3-mil- thick, heat-bonded polyethylene and kraft paper.
 5. Moisture Barrier for Outdoor Applications: 3-mil- thick, heat-bonded polyethylene and kraft paper.
 6. Factory-Fabricated Fitting Covers:
 - a. Same material, finish, and thickness as jacket.
 - b. Preformed 2-piece or gore, 45- and 90-degree, short- and long-radius elbows.
 - c. Tee covers.
 - d. Flange and union covers.
 - e. End caps.

- f. Beveled collars.
- g. Valve covers.
- h. Field fabricate fitting covers only if factory-fabricated fitting covers are not available.

2.9 TAPES

- A. ASJ Tape: White vapor-retarder tape matching factory-applied jacket with acrylic adhesive, complying with ASTM C 1136.

1. Products: Subject to compliance with requirements, provide one of the following:

- a. ABI, Ideal Tape Division; 428 AWF ASJ.
- b. Avery Dennison Corporation, Specialty Tapes Division; Fasson 0836.
- c. Compac Corporation; 104 and 105.
- d. Venture Tape; 1540 CW Plus, 1542 CW Plus, and 1542 CW Plus/SQ.

- 2. Width: 3 inches.
- 3. Thickness: 11.5 mils.
- 4. Adhesion: 90 ounces force/inch in width.
- 5. Elongation: 2 percent.
- 6. Tensile Strength: 40 lbf/inch in width.
- 7. ASJ Tape Disks and Squares: Precut disks or squares of ASJ tape.

- B. FSK Tape: Foil-face, vapor-retarder tape matching factory-applied jacket with acrylic adhesive; complying with ASTM C 1136.

1. Products: Subject to compliance with requirements, provide one of the following:

- a. ABI, Ideal Tape Division; 491 AWF FSK.
- b. Avery Dennison Corporation, Specialty Tapes Division; Fasson 0827.
- c. Compac Corporation; 110 and 111.
- d. Venture Tape; 1525 CW NT, 1528 CW, and 1528 CW/SQ.

- 2. Width: 3 inches.
- 3. Thickness: 6.5 mils.
- 4. Adhesion: 90 ounces force/inch in width.
- 5. Elongation: 2 percent.
- 6. Tensile Strength: 40 lbf/inch in width.
- 7. FSK Tape Disks and Squares: Precut disks or squares of FSK tape.

- C. PVC Tape: White vapor-retarder tape matching field-applied PVC jacket with acrylic adhesive; suitable for indoor and outdoor applications.

1. Products: Subject to compliance with requirements, provide one of the following:

- a. ABI, Ideal Tape Division; 370 White PVC tape.
- b. Compac Corporation; 130.
- c. Venture Tape; 1506 CW NS.

2. Width: 2 inches.
3. Thickness: 6 mils.
4. Adhesion: 64 ounces force/inch in width.
5. Elongation: 500 percent.
6. Tensile Strength: 18 lbf/inch in width.

D. Aluminum-Foil Tape: Vapor-retarder tape with acrylic adhesive.

1. Products: Subject to compliance with requirements, provide one of the following:
 - a. ABI, Ideal Tape Division; 488 AWF.
 - b. Avery Dennison Corporation, Specialty Tapes Division; Fasson 0800.
 - c. Compac Corporation; 120.
 - d. Venture Tape; 3520 CW.
2. Width: 2 inches.
3. Thickness: 3.7 mils.
4. Adhesion: 100 ounces force/inch in width.
5. Elongation: 5 percent.
6. Tensile Strength: 34 lbf/inch in width.

2.10 SECUREMENTS

- A. Aluminum Bands: ASTM B 209, Alloy 3003, 3005, 3105, or 5005; Temper H-14, 0.020 inch thick, 3/4 inch wide with wing seal or closed seal.
1. Products: Subject to compliance with requirements, provide one of the following:
 - a. ITW Insulation Systems; Gerrard Strapping and Seals.
 - b. RPR Products, Inc.; Insul-Mate Strapping and Seals.

2.11 PROTECTIVE SHIELDING GUARDS

A. Protective Shielding Pipe Covers:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Engineered Brass Company.
 - b. Insul-Tect Products Co.; a subsidiary of MVG Molded Products.
 - c. McGuire Manufacturing.
 - d. Plumberex.
 - e. Truebro; a brand of IPS Corporation.
 - f. Zurn Industries, LLC; Tubular Brass Plumbing Products Operation.
2. Description: Manufactured plastic wraps for covering plumbing fixture hot- and cold-water supplies and trap and drain piping. Comply with Americans with Disabilities Act (ADA) requirements.

B. Protective Shielding Piping Enclosures:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Truebro; a brand of IPS Corporation.
 - b. Zurn Industries, LLC; Tubular Brass Plumbing Products Operation.
2. Description: Manufactured plastic enclosure for covering plumbing fixture hot- and cold-water supplies and trap and drain piping. Comply with ADA requirements.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Surface Preparation: Clean and dry surfaces to receive insulation. Remove materials that will adversely affect insulation application.
- B. Coordinate insulation installation with the trade installing heat tracing. Comply with requirements for heat tracing that apply to insulation.
- C. Mix insulating cements with clean potable water; if insulating cements are to be in contact with stainless-steel surfaces, use demineralized water.

3.2 GENERAL INSTALLATION REQUIREMENTS

- A. Install insulation materials, accessories, and finishes with smooth, straight, and even surfaces; free of voids throughout the length of piping including fittings, valves, and specialties.
- B. Coordinate with heat trace installation.**
- C. Install insulation materials, forms, vapor barriers or retarders, jackets, and thicknesses required for each item of pipe system as specified in insulation system schedules.
- D. Install accessories compatible with insulation materials and suitable for the service. Install accessories that do not corrode, soften, or otherwise attack insulation or jacket in either wet or dry state.
- E. Install insulation with longitudinal seams at top and bottom of horizontal runs.
- F. Install multiple layers of insulation with longitudinal and end seams staggered.
- G. Do not weld brackets, clips, or other attachment devices to piping, fittings, and specialties.
- H. Keep insulation materials dry during application and finishing.
- I. Install insulation with tight longitudinal seams and end joints. Bond seams and joints with adhesive recommended by insulation material manufacturer.
- J. Install insulation with least number of joints practical.

- K. Where vapor barrier is indicated, seal joints, seams, and penetrations in insulation at hangers, supports, anchors, and other projections with vapor-barrier mastic.
 - 1. Install insulation continuously through hangers and around anchor attachments.
 - 2. For insulation application where vapor barriers are indicated, extend insulation on anchor legs from point of attachment to supported item to point of attachment to structure. Taper and seal ends at attachment to structure with vapor-barrier mastic.
 - 3. Install insert materials and install insulation to tightly join the insert. Seal insulation to insulation inserts with adhesive or sealing compound recommended by insulation material manufacturer.
 - 4. Cover inserts with jacket material matching adjacent pipe insulation. Install shields over jacket, arranged to protect jacket from tear or puncture by hanger, support, and shield.
- L. Apply adhesives, mastics, and sealants at manufacturer's recommended coverage rate and wet and dry film thicknesses.
- M. Install insulation with factory-applied jackets as follows:
 - 1. Draw jacket tight and smooth.
 - 2. Cover circumferential joints with 3-inch- wide strips, of same material as insulation jacket. Secure strips with adhesive and outward clinching staples along both edges of strip, spaced 4 inches o.c.
 - 3. Overlap jacket longitudinal seams at least 1-1/2 inches. Install insulation with longitudinal seams at bottom of pipe. Clean and dry surface to receive self-sealing lap. Staple laps with outward clinching staples along edge at 2 inches o.c.
 - a. For below-ambient services, apply vapor-barrier mastic over staples.
 - 4. Cover joints and seams with tape, according to insulation material manufacturer's written instructions, to maintain vapor seal.
 - 5. Where vapor barriers are indicated, apply vapor-barrier mastic on seams and joints and at ends adjacent to pipe flanges and fittings.
- N. Cut insulation in a manner to avoid compressing insulation more than 75 percent of its nominal thickness.
- O. Finish installation with systems at operating conditions. Repair joint separations and cracking due to thermal movement.
- P. Repair damaged insulation facings by applying same facing material over damaged areas. Extend patches at least 4 inches beyond damaged areas. Adhere, staple, and seal patches similar to butt joints.
- Q. For above-ambient services, do not install insulation to the following:
 - 1. Vibration-control devices.
 - 2. Testing agency labels and stamps.
 - 3. Nameplates and data plates.
 - 4. Cleanouts.

3.3 PENETRATIONS

- A. Insulation Installation at Roof Penetrations: Install insulation continuously through roof penetrations.
 - 1. Seal penetrations with flashing sealant.
 - 2. For applications requiring only indoor insulation, terminate insulation above roof surface and seal with joint sealant. For applications requiring indoor and outdoor insulation, install insulation for outdoor applications tightly joined to indoor insulation ends. Seal joint with joint sealant.
 - 3. Extend jacket of outdoor insulation outside roof flashing at least 2 inches below top of roof flashing.
 - 4. Seal jacket to roof flashing with flashing sealant.
- B. Insulation Installation at Underground Exterior Wall Penetrations: Terminate insulation flush with sleeve seal. Seal terminations with flashing sealant.
- C. Insulation Installation at Aboveground Exterior Wall Penetrations: Install insulation continuously through wall penetrations.
 - 1. Seal penetrations with flashing sealant.
 - 2. For applications requiring only indoor insulation, terminate insulation inside wall surface and seal with joint sealant. For applications requiring indoor and outdoor insulation, install insulation for outdoor applications tightly joined to indoor insulation ends. Seal joint with joint sealant.
 - 3. Extend jacket of outdoor insulation outside wall flashing and overlap wall flashing at least 2 inches.
 - 4. Seal jacket to wall flashing with flashing sealant.
- D. Insulation Installation at Interior Wall and Partition Penetrations (That Are Not Fire Rated): Install insulation continuously through walls and partitions.
- E. Insulation Installation at Fire-Rated Wall and Partition Penetrations: Install insulation continuously through penetrations of fire-rated walls and partitions.
 - 1. Comply with requirements in Section 078413 "Penetration Firestopping" for firestopping and fire-resistive joint sealers.
- F. Insulation Installation at Floor Penetrations:
 - 1. Pipe: Install insulation continuously through floor penetrations.
 - 2. Seal penetrations through fire-rated assemblies. Comply with requirements in Section 078413 "Penetration Firestopping."

3.4 GENERAL PIPE INSULATION INSTALLATION

- A. Requirements in this article generally apply to all insulation materials except where more specific requirements are specified in various pipe insulation material installation articles.
- B. Insulation Installation on Fittings, Valves, Strainers, Flanges, and Unions:

1. Install insulation over fittings, valves, strainers, flanges, unions, and other specialties with continuous thermal and vapor-retarder integrity unless otherwise indicated.
 2. Insulate pipe elbows using preformed fitting insulation or mitered fittings made from same material and density as adjacent pipe insulation. Each piece shall be butted tightly against adjoining piece and bonded with adhesive. Fill joints, seams, voids, and irregular surfaces with insulating cement finished to a smooth, hard, and uniform contour that is uniform with adjoining pipe insulation.
 3. Insulate tee fittings with preformed fitting insulation or sectional pipe insulation of same material and thickness as used for adjacent pipe. Cut sectional pipe insulation to fit. Butt each section closely to the next and hold in place with tie wire. Bond pieces with adhesive.
 4. Insulate valves using preformed fitting insulation or sectional pipe insulation of same material, density, and thickness as used for adjacent pipe. Overlap adjoining pipe insulation by not less than two times the thickness of pipe insulation, or one pipe diameter, whichever is thicker. For valves, insulate up to and including the bonnets, valve stuffing-box studs, bolts, and nuts. Fill joints, seams, and irregular surfaces with insulating cement.
 5. Insulate strainers using preformed fitting insulation or sectional pipe insulation of same material, density, and thickness as used for adjacent pipe. Overlap adjoining pipe insulation by not less than two times the thickness of pipe insulation, or one pipe diameter, whichever is thicker. Fill joints, seams, and irregular surfaces with insulating cement. Insulate strainers so strainer basket flange or plug can be easily removed and replaced without damaging the insulation and jacket. Provide a removable reusable insulation cover. For below-ambient services, provide a design that maintains vapor barrier.
 6. Insulate flanges and unions using a section of oversized preformed pipe insulation. Overlap adjoining pipe insulation by not less than two times the thickness of pipe insulation, or one pipe diameter, whichever is thicker.
 7. Cover segmented insulated surfaces with a layer of finishing cement and coat with a mastic. Install vapor-barrier mastic for below-ambient services and a breather mastic for above-ambient services. Reinforce the mastic with fabric-reinforcing mesh. Trowel the mastic to a smooth and well-shaped contour.
 8. For services not specified to receive a field-applied jacket except for flexible elastomeric and polyolefin, install fitted PVC cover over elbows, tees, strainers, valves, flanges, and unions. Terminate ends with PVC end caps. Tape PVC covers to adjoining insulation facing using PVC tape.
 9. Stencil or label the outside insulation jacket of each union with the word "union." Match size and color of pipe labels.
- C. Insulate instrument connections for thermometers, pressure gages, pressure temperature taps, test connections, flow meters, sensors, switches, and transmitters on insulated pipes. Shape insulation at these connections by tapering it to and around the connection with insulating cement and finish with finishing cement, mastic, and flashing sealant.
- D. Install removable insulation covers at locations indicated. Installation shall conform to the following:
1. Make removable flange and union insulation from sectional pipe insulation of same thickness as that on adjoining pipe. Install same insulation jacket as adjoining pipe insulation.

2. When flange and union covers are made from sectional pipe insulation, extend insulation from flanges or union long at least two times the insulation thickness over adjacent pipe insulation on each side of flange or union. Secure flange cover in place with stainless-steel or aluminum bands. Select band material compatible with insulation and jacket.
3. Construct removable valve insulation covers in same manner as for flanges, except divide the two-part section on the vertical center line of valve body.
4. When covers are made from block insulation, make two halves, each consisting of mitered blocks wired to stainless-steel fabric. Secure this wire frame, with its attached insulation, to flanges with tie wire. Extend insulation at least 2 inches over adjacent pipe insulation on each side of valve. Fill space between flange or union cover and pipe insulation with insulating cement. Finish cover assembly with insulating cement applied in two coats. After first coat is dry, apply and trowel second coat to a smooth finish.
5. Unless a PVC jacket is indicated in field-applied jacket schedules, finish exposed surfaces with a metal jacket.

3.5 INSTALLATION OF CELLULAR-GLASS INSULATION

A. Insulation Installation on Straight Pipes and Tubes:

1. Secure each layer of insulation to pipe with wire or bands and tighten bands without deforming insulation materials.
2. Where vapor barriers are indicated, seal longitudinal seams, end joints, and protrusions with vapor-barrier mastic and joint sealant.
3. For insulation with factory-applied jackets on above-ambient services, secure laps with outward clinched staples at 6 inches o.c.
4. For insulation with factory-applied jackets on below-ambient services, do not staple longitudinal tabs. Instead, secure tabs with additional adhesive as recommended by insulation material manufacturer and seal with vapor-barrier mastic and flashing sealant.

B. Insulation Installation on Pipe Flanges:

1. Install preformed pipe insulation to outer diameter of pipe flange.
2. Make width of insulation section same as overall width of flange and bolts, plus twice the thickness of pipe insulation.
3. Fill voids between inner circumference of flange insulation and outer circumference of adjacent straight pipe segments with cut sections of cellular-glass block insulation of same thickness as pipe insulation.
4. Install jacket material with manufacturer's recommended adhesive, overlap seams at least 1 inch, and seal joints with flashing sealant.

C. Insulation Installation on Pipe Fittings and Elbows:

1. Install preformed sections of same material as straight segments of pipe insulation when available. Secure according to manufacturer's written instructions.
2. When preformed sections of insulation are not available, install mitered sections of cellular-glass insulation. Secure insulation materials with wire or bands.

D. Insulation Installation on Valves and Pipe Specialties:

1. Install preformed sections of cellular-glass insulation to valve body.

2. Arrange insulation to permit access to packing and to allow valve operation without disturbing insulation.
3. Install insulation to flanges as specified for flange insulation application.

3.6 INSTALLATION OF FLEXIBLE ELASTOMERIC INSULATION

- A. Seal longitudinal seams and end joints with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.
- B. Insulation Installation on Pipe Flanges:
 1. Install pipe insulation to outer diameter of pipe flange.
 2. Make width of insulation section same as overall width of flange and bolts, plus twice the thickness of pipe insulation.
 3. Fill voids between inner circumference of flange insulation and outer circumference of adjacent straight pipe segments with cut sections of sheet insulation of same thickness as pipe insulation.
 4. Secure insulation to flanges and seal seams with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.
- C. Insulation Installation on Pipe Fittings and Elbows:
 1. Install mitered sections of pipe insulation.
 2. Secure insulation materials and seal seams with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.
- D. Insulation Installation on Valves and Pipe Specialties:
 1. Install preformed valve covers manufactured of same material as pipe insulation when available.
 2. When preformed valve covers are not available, install cut sections of pipe and sheet insulation to valve body. Arrange insulation to permit access to packing and to allow valve operation without disturbing insulation.
 3. Install insulation to flanges as specified for flange insulation application.
 4. Secure insulation to valves and specialties and seal seams with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.

3.7 INSTALLATION OF MINERAL-FIBER PREFORMED PIPE INSULATION

- A. Insulation Installation on Straight Pipes and Tubes:
 1. Secure each layer of preformed pipe insulation to pipe with wire or bands and tighten bands without deforming insulation materials.
 2. Where vapor barriers are indicated, seal longitudinal seams, end joints, and protrusions with vapor-barrier mastic and joint sealant.
 3. For insulation with factory-applied jackets on above-ambient surfaces, secure laps with outward clinched staples at 6 inches o.c.

4. For insulation with factory-applied jackets on below-ambient surfaces, do not staple longitudinal tabs. Instead, secure tabs with additional adhesive as recommended by insulation material manufacturer and seal with vapor-barrier mastic and flashing sealant.

B. Insulation Installation on Pipe Flanges:

1. Install preformed pipe insulation to outer diameter of pipe flange.
2. Make width of insulation section same as overall width of flange and bolts, plus twice the thickness of pipe insulation.
3. Fill voids between inner circumference of flange insulation and outer circumference of adjacent straight pipe segments with mineral-fiber blanket insulation.
4. Install jacket material with manufacturer's recommended adhesive, overlap seams at least 1 inch, and seal joints with flashing sealant.

C. Insulation Installation on Pipe Fittings and Elbows:

1. Install preformed sections of same material as straight segments of pipe insulation when available.
2. When preformed insulation elbows and fittings are not available, install mitered sections of pipe insulation, to a thickness equal to adjoining pipe insulation. Secure insulation materials with wire or bands.

D. Insulation Installation on Valves and Pipe Specialties:

1. Install preformed sections of same material as straight segments of pipe insulation when available.
2. When preformed sections are not available, install mitered sections of pipe insulation to valve body.
3. Arrange insulation to permit access to packing and to allow valve operation without disturbing insulation.
4. Install insulation to flanges as specified for flange insulation application.

3.8 FIELD-APPLIED JACKET INSTALLATION

A. Where FSK jackets are indicated, install as follows:

1. Draw jacket material smooth and tight.
2. Install lap or joint strips with same material as jacket.
3. Secure jacket to insulation with manufacturer's recommended adhesive.
4. Install jacket with 1-1/2-inch laps at longitudinal seams and 3-inch- wide joint strips at end joints.
5. Seal openings, punctures, and breaks in vapor-retarder jackets and exposed insulation with vapor-barrier mastic.

B. Where PVC jackets are indicated, install with 1-inch overlap at longitudinal seams and end joints. Seal with manufacturer's recommended adhesive.

1. Apply two continuous beads of adhesive to seams and joints, one bead under lap and the finish bead along seam and joint edge.

- C. Where metal jackets are indicated, install with 2-inch overlap at longitudinal seams and end joints. Overlap longitudinal seams arranged to shed water. Seal end joints with weatherproof sealant recommended by insulation manufacturer. Secure jacket with stainless-steel bands 12 inches o.c. and at end joints.

3.9 FINISHES

- A. Do not field paint aluminum or stainless-steel jackets.

3.10 FIELD QUALITY CONTROL

- A. Perform tests and inspections.
- B. Tests and Inspections:
 - 1. Inspect pipe, fittings, strainers, and valves, randomly selected by Architect, by removing field-applied jacket and insulation in layers in reverse order of their installation. Extent of inspection shall be limited to three locations of straight pipe, three locations of threaded fittings, three locations of welded fittings, two locations of threaded strainers, two locations of welded strainers, three locations of threaded valves, and three locations of flanged valves for each pipe service defined in the "Piping Insulation Schedule, General" Article.
- C. All insulation applications will be considered defective Work if sample inspection reveals noncompliance with requirements.

3.11 PIPING INSULATION SCHEDULE, GENERAL

- A. Acceptable preformed pipe and tubular insulation materials and thicknesses are identified for each piping system and pipe size range. If more than one material is listed for a piping system, selection from materials listed is Contractor's option.
- B. Items Not Insulated: Unless otherwise indicated, do not install insulation on the following:
 - 1. Drainage piping located in crawl spaces.
 - 2. Underground piping.
 - 3. Chrome-plated pipes and fittings unless there is a potential for personnel injury.

3.12 INDOOR PIPING INSULATION SCHEDULE

- A. Domestic Cold Water: Insulation shall be one of the following:
 - 1. Flexible Elastomeric: 1 inch thick.
 - 2. Cellular Glass: 1 inch thick.
- B. Domestic Hot and Recirculated Hot Water: Insulation shall be one of the following:
 - 1. Mineral-Fiber, Preformed Pipe Insulation, Type I: 1-1/2 inch thick.

2. Cellular Glass: 1-1/2 inch thick.

C. Stormwater and Overflow: Insulation shall be one of the following:

1. Flexible Elastomeric: 1/2 inch thick.
2. Mineral-Fiber, Preformed Pipe Insulation, Type I: 1/2 inch thick.

D. Roof Drain and Overflow Drain Bodies: Insulation shall be one of the following:

1. Flexible Elastomeric: 1/2 inch thick.
2. Mineral-Fiber, Preformed Pipe Insulation, Type I: 1/2 inch thick.

3.13 INDOOR, FIELD-APPLIED JACKET SCHEDULE

A. Install jacket over insulation material. For insulation with factory-applied jacket, install the field-applied jacket over the factory-applied jacket.

B. If more than one material is listed, selection from materials listed is Contractor's option.

C. Piping, Concealed:

1. None.

D. Piping, Exposed:

1. PVC: 20 mils thick.

3.14 OUTDOOR PIPING INSULATION SCHEDULE

A. Domestic Cold Water: Insulation shall be one of the following:

1. Flexible Elastomeric: 1-1/2 inch thick.
2. Cellular Glass: 1-1/2 inch thick.

B. Domestic Hot and Recirculated Hot Water: Insulation shall be one of the following:

1. Mineral-Fiber, Preformed Pipe Insulation, Type I: 1-1/2 inch thick.
2. Cellular Glass: 1-1/2 inch thick.

C. Stormwater and Overflow: Insulation shall be one of the following:

1. Flexible Elastomeric: 1/2 inch thick.
2. Mineral-Fiber, Preformed Pipe Insulation, Type I: 1/2 inch thick.

D. Roof Drain and Overflow Drain Bodies: Insulation shall be one of the following:

1. Flexible Elastomeric: 1/2 inch thick.
2. Mineral-Fiber, Preformed Pipe Insulation, Type I: 1/2 inch thick.

3.15 OUTDOOR, FIELD-APPLIED JACKET SCHEDULE

- A. Install jacket over insulation material. For insulation with factory-applied jacket, install the field-applied jacket over the factory-applied jacket. Coordinate with heat trace installation. Insulate pipe until 12" below grade.
- B. If more than one material is listed, selection from materials listed is Contractor's option.
- C. Piping, Exposed:
 - 1. Aluminum Jacket, Stucco Embossed: 0.02 inch thick.

END OF SECTION 22 07 19

SECTION 22 11 16 - DOMESTIC WATER PIPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Under-building-slab and aboveground domestic water pipes, tubes, and fittings inside buildings.

1.3 ACTION SUBMITTALS

- A. Product Data: For transition fittings and dielectric fittings.

1.4 INFORMATIONAL SUBMITTALS

- A. System purging and disinfecting activities report.
- B. Field quality-control reports.

PART 2 - PRODUCTS

2.1 PIPING MATERIALS

- A. Comply with requirements in "Piping Schedule" Article for applications of pipe, tube, fitting materials, and joining methods for specific services, service locations, and pipe sizes.
- B. Potable-water piping and components shall comply with NSF 14 and NSF 61. Plastic piping components shall be marked with "NSF-pw."

2.2 CPVC PIPING

- A. CPVC Pipe: ASTM F 441/F 441M, **Schedule 40.**

- 1. CPVC Socket Fittings: **ASTM F 438 for Schedule 40.**
 - 2. CPVC Threaded Fittings: ASTM F 437, Schedule 80.

B. CPVC Piping System: ASTM D 2846/D 2846M, SDR 11, pipe and socket fittings.

C. CPVC Tubing System: ASTM D 2846/D 2846M, SDR 11, tube and socket fittings.

2.3 PEX TUBE AND FITTINGS

A. PEX Distribution System: ASTM F 877, SDR 9 tubing.

B. Fittings for PEX Tube: ASTM F 1807, metal-insert type with copper or stainless-steel crimp rings and matching PEX tube dimensions.

C. Manifold: Multiple-outlet, plastic or corrosion-resistant-metal assembly complying with ASTM F 877; with plastic or corrosion-resistant-metal valve for each outlet.

2.4 PVC PIPE AND FITTINGS

A. PVC Pipe: ASTM D 1785, **Schedule 40.**

B. PVC Socket Fittings: **ASTM D 2466 for Schedule 40.**

C. PVC Schedule 80 Threaded Fittings: ASTM D 2464.

2.5 PIPING JOINING MATERIALS

A. Pipe-Flange Gasket Materials:

1. AWWA C110/A21.10, rubber, flat face, 1/8 inch (3.2 mm) thick or ASME B16.21, nonmetallic and asbestos free unless otherwise indicated.
2. Full-face or ring type unless otherwise indicated.

B. Metal, Pipe-Flange Bolts and Nuts: ASME B18.2.1, carbon steel unless otherwise indicated.

C. Solvent Cements for Joining CPVC Piping and Tubing: ASTM F 493.

1. CPVC solvent cement shall have a VOC content of 490 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
2. Adhesive primer shall have a VOC content of 550 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
3. Solvent cement and adhesive primer shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

D. Solvent Cements for Joining PVC Piping: ASTM D 2564. Include primer according to ASTM F 656.

1. PVC solvent cement shall have a VOC content of 510 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

2. Adhesive primer shall have a VOC content of 550 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
 3. Solvent cement and adhesive primer shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."
- E. Plastic, Pipe-Flange Gaskets, Bolts, and Nuts: Type and material recommended by piping system manufacturer unless otherwise indicated.

2.6 TRANSITION FITTINGS

A. General Requirements:

1. Same size as pipes to be joined.
2. Pressure rating at least equal to pipes to be joined.
3. End connections compatible with pipes to be joined.

B. Fitting-Type Transition Couplings: Manufactured piping coupling or specified piping system fitting.

C. Plastic-to-Metal Transition Fittings:

1. Manufacturer: Subject to compliance with requirements, provide comparable product by one of the following:
 - a. Charlotte Pipe and Foundry Company.
 - b. Harvel Plastics, Inc.
 - c. Spears Manufacturing Company.
2. Description:
 - a. **CPVC or PVC** one-piece fitting with manufacturer's Schedule 80 equivalent dimensions.

D. Plastic-to-Metal Transition Unions:

1. Manufacturers: Subject to compliance with requirements, provide comparable product by one of the following:
 - a. Colonial Engineering, Inc.
 - b. NIBCO Inc.
 - c. Spears Manufacturing Company.
2. Description:
 - a. **CPVC or PVC** four-part union.
 - b. Solvent-cement-joint **or threaded** plastic end.
 - c. Rubber O-ring.
 - d. Union nut.

PART 3 - EXECUTION

3.1 EARTHWORK

- A. Comply with requirements in Section 31 20 00 "Earth Moving" for excavating, trenching, and backfilling.

3.2 PIPING INSTALLATION

- A. Drawing plans, schematics, and diagrams indicate general location and arrangement of domestic water piping. Indicated locations and arrangements are used to size pipe and calculate friction loss, expansion, and other design considerations. Install piping as indicated unless deviations to layout are approved on coordination drawings.
- B. Install shutoff valve, hose-end drain valve, strainer, pressure gage, and test tee with valve inside the building at each domestic water-service entrance. Comply with requirements for pressure gages in Section 22 05 19 "Meters and Gages for Plumbing Piping" and with requirements for drain valves and strainers in Section 22 11 19 "Domestic Water Piping Specialties."
- C. Install shutoff valve immediately upstream of each dielectric fitting.
- D. Install water-pressure-reducing valves downstream from shutoff valves. Comply with requirements for pressure-reducing valves in Section 22 11 19 "Domestic Water Piping Specialties."
- E. Install domestic water piping level with 0.25 percent slope downward toward drain and plumb.
- F. Install piping concealed from view and protected from physical contact by building occupants unless otherwise indicated and except in equipment rooms and service areas.
- G. Install piping indicated to be exposed and piping in equipment rooms and service areas at right angles or parallel to building walls. Diagonal runs are prohibited unless specifically indicated otherwise.
- H. Install piping above accessible ceilings to allow sufficient space for ceiling panel removal, and coordinate with other services occupying that space.
- I. Install piping to permit valve servicing.
- J. Install nipples, unions, special fittings, and valves with pressure ratings the same as or higher than the system pressure rating used in applications below unless otherwise indicated.
- K. Install piping free of sags and bends.
- L. Install fittings for changes in direction and branch connections.
- M. Install thermometers on outlet piping from each water heater. Comply with requirements for thermometers in Section 22 05 19 "Meters and Gages for Plumbing Piping."

- N. Install sleeves for piping penetrations of walls, ceilings, and floors. Comply with requirements for sleeves specified in Section 22 05 17 "Sleeves and Sleeve Seals for Plumbing Piping."
- O. Install sleeve seals for piping penetrations of concrete walls and slabs. Comply with requirements for sleeve seals specified in Section 22 05 17 "Sleeves and Sleeve Seals for Plumbing Piping."
- P. Install escutcheons for piping penetrations of walls, ceilings, and floors. Comply with requirements for escutcheons specified in Section 22 05 18 "Escutcheons for Plumbing Piping."

3.3 JOINT CONSTRUCTION

- A. Ream ends of pipes and tubes and remove burrs.
- B. Remove scale, slag, dirt, and debris from inside and outside of pipes, tubes, and fittings before assembly.
- C. Threaded Joints: Thread pipe with tapered pipe threads according to ASME B1.20.1. Cut threads full and clean using sharp dies. Ream threaded pipe ends to remove burrs and restore full ID. Join pipe fittings and valves as follows:
 - 1. Apply appropriate tape or thread compound to external pipe threads.
 - 2. Damaged Threads: Do not use pipe or pipe fittings with threads that are corroded or damaged.
- D. Flanged Joints: Select appropriate asbestos-free, nonmetallic gasket material in size, type, and thickness suitable for domestic water service. Join flanges with gasket and bolts according to ASME B31.9.
- E. Joint Construction for Solvent-Cemented Plastic Piping: Clean and dry joining surfaces. Join pipe and fittings according to the following:
 - 1. Comply with ASTM F 402 for safe-handling practice of cleaners, primers, and solvent cements. Apply primer.
 - 2. CPVC Piping: Join according to ASTM D 2846/D 2846M Appendix.
 - 3. PVC Piping: Join according to ASTM D 2855.
- F. Joints for PEX Piping: Join according to ASTM F 1807.
- G. Joints for Dissimilar-Material Piping: Make joints using adapters compatible with materials of both piping systems.

3.4 TRANSITION FITTING INSTALLATION

- A. Install transition couplings at joints of dissimilar piping.
- B. Transition Fittings in Underground Domestic Water Piping:
 - 1. Fittings for NPS 1-1/2 and Smaller: Fitting-type coupling.
 - 2. Fittings for NPS 2 and Larger: Sleeve-type coupling.

- C. Transition Fittings in Aboveground Domestic Water Piping NPS 2 and Smaller: Plastic-to-metal transition fittings or unions.

3.5 HANGER AND SUPPORT INSTALLATION

- A. Comply with requirements for pipe hanger, support products, and installation in Section 22 05 29 "Hangers and Supports for Plumbing Piping and Equipment."

- 1. Install stainless-steel pipe hangers for horizontal piping in corrosive environments.

- 2. Install stainless-steel pipe support clamps for vertical piping in corrosive environments.

- 3. Vertical Piping: MSS Type 8 or 42, clamps.

- 4. Individual, Straight, Horizontal Piping Runs:

- a. 100 Feet and Less: MSS Type 1, adjustable, steel clevis hangers.

- b. Longer Than 100 Feet: MSS Type 43, adjustable roller hangers.

- c. Longer Than 100 Feet if Indicated: MSS Type 49, spring cushion rolls.

- 5. Multiple, Straight, Horizontal Piping Runs 100 Feet or Longer: MSS Type 44, pipe rolls. Support pipe rolls on trapeze.

- 6. Base of Vertical Piping: MSS Type 52, spring hangers.

- B. Support vertical piping and tubing at base and at each floor.

- C. Rod diameter may be reduced one size for double-rod hangers, to a minimum of 3/8 inch.

- D. Install vinyl-coated hangers for CPVC piping with the following maximum horizontal spacing and minimum rod diameters:

- 1. NPS 1 and Smaller: 36 inches with 3/8-inch rod.

- 2. NPS 1-1/4 to NPS 2 : 48 inches with 3/8-inch rod.

- 3. NPS 2-1/2 to NPS 3-1/2: 48 inches with 1/2-inch rod.

- 4. NPS 4 and NPS 5: 48 inches with 5/8-inch rod.

- E. Install supports for vertical CPVC piping every 60 inches for NPS 1 and smaller, and every 72 inches for NPS 1-1/4 and larger.

- F. Install vinyl-coated hangers for PEX piping with the following maximum horizontal spacing and minimum rod diameters:

- 1. NPS 1 and Smaller: 32 inches with 3/8-inch rod.

- G. Install hangers for vertical PEX piping every 48 inches.

- H. Install vinyl-coated hangers for PVC piping with the following maximum horizontal spacing and minimum rod diameters:

- 1. NPS 2 and Smaller: 48 inches with 3/8-inch rod.

- 2. NPS 2-1/2 to NPS 3-1/2: 48 inches with 1/2-inch rod.

- 3. NPS 4 and NPS 5: 48 inches with 5/8-inch rod.

- I. Install supports for vertical PVC piping every 48 inches.
- J. Support piping and tubing not listed in this article according to MSS SP-69 and manufacturer's written instructions.

3.6 CONNECTIONS

- A. Drawings indicate general arrangement of piping, fittings, and specialties.
- B. When installing piping adjacent to equipment and machines, allow space for service and maintenance.
- C. Connect domestic water piping to exterior water-service piping. Use transition fitting to join dissimilar piping materials.
- D. Connect domestic water piping to water-service piping with shutoff valve; extend and connect to the following:
 - 1. Water Heaters: Cold-water inlet and hot-water outlet piping in sizes indicated, but not smaller than sizes of water heater connections.
 - 2. Plumbing Fixtures: Cold- and hot-water-supply piping in sizes indicated, but not smaller than that required by plumbing code.
 - 3. Equipment: Cold- and hot-water-supply piping as indicated, but not smaller than equipment connections. Provide shutoff valve and union for each connection. Use flanges instead of unions for NPS 2-1/2 and larger.

3.7 IDENTIFICATION

- A. Identify system components. Comply with requirements for identification materials and installation in Section 22 05 53 "Identification for Plumbing Piping and Equipment."
- B. Label pressure piping with system operating pressure.

3.8 FIELD QUALITY CONTROL

- A. Perform the following tests and inspections:
 - 1. Piping Inspections:
 - a. Do not enclose, cover, or put piping into operation until it has been inspected and approved by authorities having jurisdiction.
 - b. During installation, notify authorities having jurisdiction at least one day before inspection must be made. Perform tests specified below in presence of authorities having jurisdiction:
 - 1) Roughing-in Inspection: Arrange for inspection of piping before concealing or closing in after roughing in and before setting fixtures.

- 2) Final Inspection: Arrange for authorities having jurisdiction to observe tests specified in "Piping Tests" Subparagraph below and to ensure compliance with requirements.
 - c. Re-inspection: If authorities having jurisdiction find that piping will not pass tests or inspections, make required corrections and arrange for re-inspection.
 - d. Reports: Prepare inspection reports and have them signed by authorities having jurisdiction.
2. Piping Tests:
- a. Fill domestic water piping. Check components to determine that they are not air bound and that piping is full of water.
 - b. Test for leaks and defects in new piping and parts of existing piping that have been altered, extended, or repaired. If testing is performed in segments, submit a separate report for each test, complete with diagram of portion of piping tested.
 - c. Leave new, altered, extended, or replaced domestic water piping uncovered and unconcealed until it has been tested and approved. Expose work that was covered or concealed before it was tested.
 - d. Cap and subject piping to static water pressure of 50 psig above operating pressure, without exceeding pressure rating of piping system materials. Isolate test source and allow it to stand for four hours. Leaks and loss in test pressure constitute defects that must be repaired.
 - e. Repair leaks and defects with new materials, and retest piping or portion thereof until satisfactory results are obtained.
 - f. Prepare reports for tests and for corrective action required.
- B. Domestic water piping will be considered defective if it does not pass tests and inspections.
- C. Prepare test and inspection reports.

3.9 ADJUSTING

- A. Perform the following adjustments before operation:
1. Close drain valves, hydrants, and hose bibbs.
 2. Open shutoff valves to fully open position.
 3. Open throttling valves to proper setting.
 4. Adjust balancing valves in hot-water-circulation return piping to provide adequate flow. Manually adjust ball-type balancing valves in hot-water-circulation return piping to provide hot-water flow in each branch. Adjust calibrated balancing valves to flows indicated.
 5. Remove plugs used during testing of piping and for temporary sealing of piping during installation.
 6. Remove and clean strainer screens. Close drain valves and replace drain plugs.
 7. Remove filter cartridges from housings and verify that cartridges are as specified for application where used and are clean and ready for use.
 8. Check plumbing specialties and verify proper settings, adjustments, and operation.

3.10 CLEANING

A. Clean and disinfect potable domestic water piping as follows:

1. Purge new piping and parts of existing piping that have been altered, extended, or repaired before using.
2. Use purging and disinfecting procedures prescribed by authorities having jurisdiction; if methods are not prescribed, use procedures described in either AWWA C651 or AWWA C652 or follow procedures described below:
 - a. Flush piping system with clean, potable water until dirty water does not appear at outlets.
 - b. Fill and isolate system according to either of the following:
 - 1) Fill system or part thereof with water/chlorine solution with at least 50 ppm of chlorine. Isolate with valves and allow to stand for 24 hours.
 - 2) Fill system or part thereof with water/chlorine solution with at least 200 ppm of chlorine. Isolate and allow to stand for three hours.
 - c. Flush system with clean, potable water until no chlorine is in water coming from system after the standing time.
 - d. Repeat procedures if biological examination shows contamination.
 - e. Submit water samples in sterile bottles to authorities having jurisdiction.

3.11 PIPING SCHEDULE

- A. Transition and special fittings with pressure ratings at least equal to piping rating may be used in applications below unless otherwise indicated.
- B. Flanges and unions may be used for aboveground piping joints unless otherwise indicated.
- C. Fitting Option: Extruded-tee connections and brazed joints may be used on aboveground copper tubing.
- D. Under-building-slab, domestic water piping, NPS 2 and smaller, shall be one of the following:

1. PVC, Schedule 40; socket fittings; and solvent-cemented joints.

- E. Aboveground domestic water piping, NPS 2 and smaller, shall be the following:

1. CPVC, Schedule 40; socket fittings; and solvent-cemented joints.

2. CPVC Tubing System: CPVC tube; CPVC socket fittings; and solvent-cemented joints. NPS 1-1/2 and NPS 2 CPVC pipe with CPVC socket fittings may be used instead of tubing.

3. PEX tube, NPS 1 and smaller; fittings for PEX tube; and crimped joints.

4. PVC, Schedule 40; socket fittings; and solvent-cemented joints.

- F. Aboveground domestic water piping, NPS 2-1/2 to NPS 4 shall be the following:

1. CPVC, Schedule 40; socket fittings; and solvent-cemented joints.

2. **PVC, Schedule 40; socket fittings; and solvent-cemented joints.**

3.12 VALVE SCHEDULE

- A. Drawings indicate valve types to be used. Where specific valve types are not indicated, the following requirements apply:
 - 1. Shutoff Duty: Use ball or gate valves for piping NPS 2 and smaller. Use butterfly, ball, or gate valves with flanged ends for piping NPS 2-1/2 and larger.
 - 2. Throttling Duty: Use ball or globe valves for piping NPS 2 and smaller. Use butterfly or ball valves with flanged ends for piping NPS 2-1/2 and larger.
 - 3. Hot-Water Circulation Piping, Balancing Duty: Memory-stop balancing valves.
 - 4. Drain Duty: Hose-end drain valves.
- B. Use check valves to maintain correct direction of domestic water flow to and from equipment.

END OF SECTION 22 11 16

SECTION 22 11 19 - DOMESTIC WATER PIPING SPECIALTIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Vacuum breakers.
 - 2. Backflow preventers
 - 3. Balancing valves.
 - 4. Temperature-actuated, water mixing valves.
 - 5. Hose bibbs.
 - 6. Wall hydrants.
 - 7. Water-hammer arresters.
 - 8. Trap-seal primer valves.
 - 9. Trap-seal primer systems.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings: For domestic water piping specialties.
 - 1. Include diagrams for power, signal, and control wiring.

1.4 INFORMATIONAL SUBMITTALS

- A. Field quality-control reports.

1.5 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For domestic water piping specialties to include in emergency, operation, and maintenance manuals.

PART 2 - PRODUCTS

2.1 GENERAL REQUIREMENTS FOR PIPING SPECIALTIES

- A. Potable-water piping and components shall comply with NSF 61.

2.2 PERFORMANCE REQUIREMENTS

- A. Minimum Working Pressure for Domestic Water Piping Specialties: 125 psig (860 kPa) unless otherwise indicated.

2.3 VACUUM BREAKERS

- A. Pipe-Applied, Atmospheric-Type Vacuum Breakers:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Watts; a division of Watts Water Technologies, Inc.; Watts Regulator Company.
 - b. Zurn Industries, LLC; Plumbing Products Group; Wilkins Water Control Products.
2. Standard: ASSE 1001.
3. Size: NPS 1/4 to NPS 3 (DN 8 to DN 80), as required to match connected piping.
4. Body: Bronze.
5. Inlet and Outlet Connections: Threaded.
6. Finish: Rough bronze.

- B. Hose-Connection Vacuum Breakers:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. MIFAB, Inc.
 - b. Watts; a division of Watts Water Technologies, Inc.; Watts Regulator Company.
 - c. Woodford Manufacturing Company; a division of WCM Industries, Inc.
 - d. Zurn Industries, LLC; Plumbing Products Group; Light Commercial Products.
 - e. Zurn Industries, LLC; Plumbing Products Group; Wilkins Water Control Products.
2. Standard: ASSE 1011.
3. Body: Bronze, nonremovable, with manual drain.
4. Outlet Connection: Garden-hose threaded complying with ASME B1.20.7.
5. Finish: Rough bronze.

2.4 BACKFLOW PREVENTERS

- A. Reduced-Pressure-Principle Backflow Preventers:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Watts; a division of Watts Water Technologies, Inc.; Watts Regulator Company.
 - b. Zurn Industries, LLC; Plumbing Products Group; Wilkins Water Control Products.
2. Standard: ASSE 1013.
3. Operation: Continuous-pressure applications.
4. Pressure Loss: 7 psig maximum, through middle third of flow range.
5. Body: Bronze for NPS 2 and smaller; steel with interior lining that complies with AWWA C550 or that is FDA approved for NPS 2-1/2 and larger.
6. End Connections: Threaded for NPS 2 and smaller; flanged for NPS 2-1/2 and larger.
7. Accessories:
 - a. Valves NPS 2 and Smaller: Ball type with threaded ends on inlet and outlet.
 - b. Valves NPS 2-1/2 and Larger: Outside-screw and yoke-gate type with flanged ends on inlet and outlet.
 - c. Air-Gap Fitting: ASME A112.1.2, matching backflow-preventer connection.

B. Backflow-Preventer Test Kits:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Watts; a division of Watts Water Technologies, Inc.; Watts Regulator Company.
 - b. Zurn Industries, LLC; Plumbing Products Group; Wilkins Water Control Products.
2. Description: Factory calibrated, with gages, fittings, hoses, and carrying case with test-procedure instructions.

2.5 BALANCING VALVES

A. Copper-Alloy Calibrated Balancing Valves:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Armstrong International, Inc.
 - b. Flo Fab Inc.
 - c. ITT Corporation; Bell & Gossett Div.
 - d. NIBCO Inc.
 - e. TAC.
 - f. TACO Incorporated.
 - g. Watts; a division of Watts Water Technologies, Inc.; Watts Regulator Company.
2. Type: Ball valve with two readout ports and memory-setting indicator.
3. Body: Brass.
4. Size: Same as connected piping, but not larger than NPS 2.
5. Accessories: Meter hoses, fittings, valves, differential pressure meter, and carrying case.

- B. Accessories: Meter hoses, fittings, valves, differential pressure meter, and carrying case.
- C. Memory-Stop Balancing Valves:
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Milwaukee Valve Company.
 - b. NIBCO Inc.
 - 2. Standard: MSS SP-110 for two-piece, copper-alloy ball valves.
 - 3. Pressure Rating: 400-psig minimum CWP.
 - 4. Size: NPS 2 or smaller.
 - 5. Body: Copper alloy.
 - 6. Port: Standard or full port.
 - 7. Ball: Chrome-plated brass.
 - 8. Seats and Seals: Replaceable.
 - 9. End Connections: Solder joint or threaded.
 - 10. Handle: Vinyl-covered steel with memory-setting device.

2.6 TEMPERATURE-ACTUATED, WATER MIXING VALVES

- A. Primary, Thermostatic, Water Mixing Valves:
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Lawler Manufacturing Company, Inc.
 - b. Leonard Valve Company.
 - c. Powers; a division of Watts Water Technologies, Inc.
 - d. Symmons Industries, Inc.
 - 2. Standard: ASSE 1017.
 - 3. Pressure Rating: 125 psig minimum unless otherwise indicated.
 - 4. Type: Exposed-mounted, thermostatically controlled, water mixing valve.
 - 5. Material: Bronze body with corrosion-resistant interior components.
 - 6. Connections: Threaded inlets and outlet.
 - 7. Accessories: Manual temperature control, check stops on hot- and cold-water supplies, and adjustable, temperature-control handle.
 - 8. Tempered-Water Setting: 110 deg F.
 - 9. Valve Finish: Rough bronze.
 - 10. Piping Finish: Copper.

2.7 OUTLET BOXES

- A. Clothes Washer Outlet Boxes:
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

- a. Acorn Engineering Company.
 - b. Guy Gray Manufacturing Co., Inc.
 - c. IPS Corporation.
 - d. Oatey.
 - e. Symmons Industries, Inc.
 - f. Watts; a division of Watts Water Technologies, Inc.; Watts Regulator Company.
 - g. Zurn Industries, LLC; Plumbing Products Group; Light Commercial Products.
2. Mounting: Recessed.
3. Material and Finish: Plastic box and faceplate.
4. Faucet: Combination valved fitting or separate hot- and cold-water valved fittings complying with ASME A112.18.1. Include garden-hose thread complying with ASME B1.20.7 on outlets.
5. Supply Shutoff Fittings: NPS 1/2 gate, globe, or ball valves and NPS 1/2 copper, water tubing.
6. Drain: NPS 2 standpipe and P-trap for direct waste connection to drainage piping.
7. Inlet Hoses: Two 60-inch- long, rubber household clothes washer inlet hoses with female, garden-hose-thread couplings. Include rubber washers.
8. Drain Hose: One 48-inch- long, rubber household clothes washer drain hose with hooked end.

B. Icemaker Outlet Boxes:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Acorn Engineering Company.
 - b. IPS Corporation.
 - c. Oatey.
2. Mounting: Recessed.
3. Material and Finish: Plastic box and faceplate.
4. Faucet: Valved fitting complying with ASME A112.18.1. Include NPS 1/2 or smaller copper tube outlet.
5. Supply Shutoff Fitting: NPS 1/2 gate, globe, or ball valve and NPS 1/2 copper, water tubing.

2.8 HOSE BIBBS

A. Hose Bibbs:

1. Standard: ASME A112.18.1 for sediment faucets.
2. Body Material: Bronze.
3. Seat: Bronze, replaceable.
4. Supply Connections: NPS 1/2 or NPS 3/4 threaded or solder-joint inlet.
5. Outlet Connection: Garden-hose thread complying with ASME B1.20.7.
6. Pressure Rating: 125 psig.
7. Vacuum Breaker: Integral nonremovable, drainable, hose-connection vacuum breaker complying with ASSE 1011.
8. Finish for Equipment Rooms: Rough bronze, or chrome or nickel plated.

9. Finish for Service Areas: Rough bronze.
10. Finish for Finished Rooms: Chrome or nickel plated.
11. Operation for Equipment Rooms: Wheel handle or operating key.
12. Operation for Service Areas: Wheel handle.
13. Operation for Finished Rooms: Operating key.
14. Include operating key with each operating-key hose bibb.
15. Include wall flange with each chrome- or nickel-plated hose bibb.

2.9 WALL HYDRANTS

A. Nonfreeze Wall Hydrants:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Josam Company.
 - b. MIFAB, Inc.
 - c. Smith, Jay R. Mfg. Co.; Division of Smith Industries, Inc.
 - d. Watts Drainage Products.
 - e. Woodford Manufacturing Company; a division of WCM Industries, Inc.
 - f. Zurn Industries, LLC; Plumbing Products Group; Light Commercial Products.
2. Standard: ASME A112.21.3M for concealed-outlet, self-draining wall hydrants.
3. Pressure Rating: 125 psig.
4. Operation: Loose key.
5. Casing and Operating Rod: Of length required to match wall thickness. Include wall clamp.
6. Inlet: NPS 3/4 or NPS 1.
7. Outlet: Concealed, with integral vacuum breaker and garden-hose thread complying with ASME B1.20.7.
8. Box: Deep, flush mounted with cover.
9. Box and Cover Finish: Polished nickel bronze.
10. Outlet: Exposed, with integral vacuum breaker and garden-hose thread complying with ASME B1.20.7.
11. Nozzle and Wall-Plate Finish: Polished nickel bronze.
12. Operating Keys(s): Two with each wall hydrant.

2.10 WATER-HAMMER ARRESTERS

A. Water-Hammer Arresters:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. AMTROL, Inc.
 - b. Josam Company.
 - c. MIFAB, Inc.
 - d. Sioux Chief Manufacturing Company, Inc.
 - e. Smith, Jay R. Mfg. Co.; Division of Smith Industries, Inc.

- f. Watts Drainage Products.
 - g. Zurn Industries, LLC; Plumbing Products Group; Specification Drainage Products.
- 2. Standard: ASSE 1010 or PDI-WH 201.
- 3. Type: Metal bellows.
- 4. Size: ASSE 1010, Sizes AA and A through F, or PDI-WH 201, Sizes A through F.

2.11 TRAP-SEAL PRIMER DEVICE

A. Supply-Type, Trap-Seal Primer Device:

- 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. MIFAB, Inc.
 - b. Precision Plumbing Products, Inc.
 - c. Sioux Chief Manufacturing Company, Inc.
 - d. Smith, Jay R. Mfg. Co.; Division of Smith Industries, Inc.
 - e. Watts; a division of Watts Water Technologies, Inc.; Watts Regulator Company.
- 2. Standard: ASSE 1018.
- 3. Pressure Rating: 125 psig minimum.
- 4. Body: Bronze.
- 5. Inlet and Outlet Connections: NPS 1/2 threaded, union, or solder joint.
- 6. Gravity Drain Outlet Connection: NPS 1/2 threaded or solder joint.
- 7. Finish: Chrome plated, or rough bronze for units used with pipe or tube that is not chrome finished.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install backflow preventers in each water supply to mechanical equipment and systems and to other equipment and water systems that may be sources of contamination. Comply with authorities having jurisdiction.
 - 1. Locate backflow preventers in same room as connected equipment or system.
 - 2. Install drain for backflow preventers with atmospheric-vent drain connection with air-gap fitting, fixed air-gap fitting, or equivalent positive pipe separation of at least two pipe diameters in drain piping and pipe-to-floor drain. Locate air-gap device attached to or under backflow preventer. Simple air breaks are unacceptable for this application.
 - 3. Do not install bypass piping around backflow preventers.
- B. Install water regulators with inlet and outlet shutoff valves and bypass with memory-stop balancing valve. Install pressure gages on inlet and outlet.
- C. Install balancing valves in locations where they can easily be adjusted.

- D. Install temperature-actuated, water mixing valves with check stops or shutoff valves on inlets and with shutoff valve on outlet.
 - 1. Install cabinet-type units recessed in or surface mounted on wall as specified.
- E. Install outlet boxes recessed in wall or surface mounted on wall. Install 2-by-4-inch fire-retardant-treated-wood blocking, wall reinforcement between studs. Comply with requirements for fire-retardant-treated-wood blocking in Section 06 10 00 "Rough Carpentry."
- F. Install water-hammer arresters in water piping according to PDI-WH 201.
- G. Install supply-type, trap-seal primer valves with outlet piping pitched down toward drain trap a minimum of 1 percent, and connect to floor-drain body, trap, or inlet fitting. Adjust valve for proper flow.
- H. Install drainage-type, trap-seal primer valves as lavatory trap with outlet piping pitched down toward drain trap a minimum of 1 percent, and connect to floor-drain body, trap, or inlet fitting.

3.2 CONNECTIONS

- A. Comply with requirements for ground equipment in Section 26 05 26 "Grounding and Bonding for Electrical Systems."
- B. Fire-retardant-treated-wood blocking is specified in Section 26 05 19 "Low-Voltage Electrical Power Conductors and Cables" for electrical connections.

3.3 FIELD QUALITY CONTROL

- A. Perform the following tests and inspections:
 - 1. Test each pressure vacuum breaker, reduced-pressure-principle backflow preventer according to authorities having jurisdiction and the device's reference standard.
- B. Domestic water piping specialties will be considered defective if they do not pass tests and inspections.
- C. Prepare test and inspection reports.

3.4 ADJUSTING

- A. Set field-adjustable pressure set points of water pressure-reducing valves.
- B. Set field-adjustable flow set points of balancing valves.
- C. Set field-adjustable temperature set points of temperature-actuated, water mixing valves.

END OF SECTION 22 11 19

SECTION 22 13 16 - SANITARY WASTE AND VENT PIPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Pipe, tube, and fittings.
 - 2. Specialty pipe fittings.

1.3 PERFORMANCE REQUIREMENTS

- A. Components and installation shall be capable of withstanding the following minimum working pressure unless otherwise indicated:
 - 1. Soil, Waste, and Vent Piping: 10-foot head of water.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated.

1.5 INFORMATIONAL SUBMITTALS

- A. Field quality-control reports.

1.6 QUALITY ASSURANCE

- A. Piping materials shall bear label, stamp, or other markings of specified testing agency.
- B. Comply with NSF/ANSI 14, "Plastics Piping Systems Components and Related Materials," for plastic piping components. Include marking with "NSF-dwv" for plastic drain, waste, and vent piping and "NSF-sewer" for plastic sewer piping.

PART 2 - PRODUCTS

2.1 PIPING MATERIALS

- A. Comply with requirements in "Piping Schedule" Article for applications of pipe, tube, fitting materials, and joining methods for specific services, service locations, and pipe sizes.

2.2 PVC PIPE AND FITTINGS

- A. Solid-Wall PVC Pipe: Schedule 40, ASTM D 2665, drain, waste, and vent.
- B. PVC Socket Fittings: ASTM D 2665, made to ASTM D 3311, drain, waste, and vent patterns and to fit Schedule 40 pipe.
- C. Adhesive Primer: ASTM F 656.
 - 1. Adhesive primer shall have a VOC content of 550 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
 - 2. Adhesive primer shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."
- D. Solvent Cement: ASTM D 2564.
 - 1. PVC solvent cement shall have a VOC content of 510 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
 - 2. Solvent cement shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

2.3 SPECIALTY PIPE FITTINGS

- A. Transition Couplings:
 - 1. General Requirements: Fitting or device for joining piping with small differences in OD's or of different materials. Include end connections same size as and compatible with pipes to be joined.
 - 2. Fitting-Type Transition Couplings: Manufactured piping coupling or specified piping system fitting.
 - 3. Shielded, Nonpressure Transition Couplings:
 - a. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1) Cascade Waterworks Mfg. Co.
 - 2) Mission Rubber Company; a division of MCP Industries, Inc.
 - b. Standard: ASTM C 1460.

- c. Description: Elastomeric or rubber sleeve with full-length, corrosion-resistant outer shield and corrosion-resistant-metal tension band and tightening mechanism on each end.
- 4. Pressure Transition Couplings:
 - a. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1) Cascade Waterworks Mfg. Co.
 - 2) Dresser, Inc.
 - 3) EBAA Iron, Inc.
 - 4) JCM Industries, Inc.
 - 5) Romac Industries, Inc.
 - 6) Smith-Blair, Inc.; a Sensus company.
 - 7) The Ford Meter Box Company, Inc.
 - 8) Viking Johnson.
 - b. Standard: AWWA C219.
 - c. Description: Metal, sleeve-type same size as, with pressure rating at least equal to, and ends compatible with, pipes to be joined.
 - d. Center-Sleeve Material: Manufacturer's standard.
 - e. Gasket Material: Natural or synthetic rubber.
 - f. Metal Component Finish: Corrosion-resistant coating or material.

B. Dielectric Fittings:

- 1. General Requirements: Assembly of copper alloy and ferrous materials with separating nonconductive insulating material. Include end connections compatible with pipes to be joined.
- 2. Dielectric Unions:
 - a. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1) Capitol Manufacturing Company.
 - 2) Central Plastics Company.
 - 3) Hart Industries International, Inc.
 - 4) Jomar International Ltd.
 - 5) Matco-Norca, Inc.
 - 6) McDonald, A. Y. Mfg. Co.
 - 7) Watts Regulator Co.; a division of Watts Water Technologies, Inc.
 - 8) Wilkins; a Zurn company.
 - b. Description:
 - 1) Standard: ASSE 1079.
 - 2) Pressure Rating: [125 psig (860 kPa) minimum at 180 deg F (82 deg C)] [150 psig (1035 kPa)] [250 psig (1725 kPa)].
 - 3) End Connections: Solder-joint copper alloy and threaded ferrous.

3. Dielectric Flanges:

- a. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

- 1) Capitol Manufacturing Company.
- 2) Central Plastics Company.
- 3) Matco-Norca, Inc.
- 4) Watts Regulator Co.; a division of Watts Water Technologies, Inc.
- 5) Wilkins; a Zurn company.

- b. Description:

- 1) Standard: ASSE 1079.
- 2) Factory-fabricated, bolted, companion-flange assembly.
- 3) Pressure Rating: 125 psig (860 kPa) minimum at 180 deg F (82 deg C).
- 4) End Connections: Solder-joint copper alloy and threaded ferrous; threaded solder-joint copper alloy and threaded ferrous.

4. Dielectric-Flange Insulating Kits:

- a. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

- 1) Advance Products & Systems, Inc.
- 2) Calpico, Inc.
- 3) Central Plastics Company.
- 4) Pipeline Seal and Insulator, Inc.

- b. Description:

- 1) Nonconducting materials for field assembly of companion flanges.
- 2) Pressure Rating: [150 psig (1035 kPa)] <Insert pressure>.
- 3) Gasket: Neoprene or phenolic.
- 4) Bolt Sleeves: Phenolic or polyethylene.
- 5) Washers: Phenolic with steel backing washers.

PART 3 - EXECUTION

3.1 PIPING INSTALLATION

- A. Drawing plans, schematics, and diagrams indicate general location and arrangement of piping systems. Indicated locations and arrangements were used to size pipe and calculate friction loss, expansion, pump sizing, and other design considerations. Install piping as indicated unless deviations to layout are approved on coordination drawings.
- B. Install piping in concealed locations unless otherwise indicated and except in equipment rooms and service areas.

- C. Install piping indicated to be exposed and piping in equipment rooms and service areas at right angles or parallel to building walls. Diagonal runs are prohibited unless specifically indicated otherwise.
- D. Install piping above accessible ceilings to allow sufficient space for ceiling panel removal.
- E. Install piping at indicated slopes.
- F. Install piping free of sags and bends.
- G. Install fittings for changes in direction and branch connections.
- H. Install piping to allow application of insulation.
- I. Make changes in direction for soil and waste drainage and vent piping using appropriate branches, bends, and long-sweep bends. Sanitary tees and short-sweep 1/4 bends may be used on vertical stacks if change in direction of flow is from horizontal to vertical. Use long-turn, double Y-branch and 1/8-bend fittings if two fixtures are installed back to back or side by side with common drain pipe. Straight tees, elbows, and crosses may be used on vent lines. Do not change direction of flow more than 90 degrees. Use proper size of standard increasers and reducers if pipes of different sizes are connected. Reducing size of drainage piping in direction of flow is prohibited.
- J. Lay buried building drainage piping beginning at low point of each system. Install true to grades and alignment indicated, with unbroken continuity of invert. Place hub ends of piping upstream. Install required gaskets according to manufacturer's written instructions for use of lubricants, cements, and other installation requirements. Maintain swab in piping and pull past each joint as completed.
- K. Install soil and waste drainage and vent piping at the following minimum slopes unless otherwise indicated:
 - 1. Building Sanitary Drain: 2 percent downward in direction of flow for piping NPS 3 and smaller; 2 percent downward in direction of flow for piping NPS 4 and larger.
 - 2. Horizontal Sanitary Drainage Piping: 2 percent downward in direction of flow.
 - 3. Vent Piping: 1 percent down toward vertical fixture vent or toward vent stack.
- L. Install aboveground PVC piping according to ASTM D 2665 and Section 3.1(B) of this Specification.
- M. Install underground PVC piping according to ASTM D 2321.
- N. Do not enclose, cover, or put piping into operation until it is inspected and approved by authorities having jurisdiction.
- O. Install sleeves for piping penetrations of walls, ceilings, and floors. Comply with requirements for sleeves specified in Section 22 05 17 "Sleeves and Sleeve Seals for Plumbing Piping."
- P. Install sleeve seals for piping penetrations of concrete walls and slabs. Comply with requirements for sleeve seals specified in Section 22 05 17 "Sleeves and Sleeve Seals for Plumbing Piping."

- Q. Install escutcheons for piping penetrations of walls, ceilings, and floors. Comply with requirements for escutcheons specified in Section 23 00 00 "Mechanical General."

3.2 JOINT CONSTRUCTION

- A. Plastic, Nonpressure-Piping, Solvent-Cement Joints: Clean and dry joining surfaces. Join pipe and fittings according to the following:
1. Comply with ASTM F 402 for safe-handling practice of cleaners, primers, and solvent cements.
 2. PVC Piping: Join according to ASTM D 2855 and ASTM D 2665 Appendixes.

3.3 SPECIALTY PIPE FITTING INSTALLATION

- A. Transition Couplings:
1. Install transition couplings at joints of piping with small differences in OD's.
 2. In Drainage Piping: Shielded, nonpressure transition couplings.
 3. In Aboveground Force Main Piping: Fitting-type transition couplings.
 4. In Underground Force Main Piping:
 - a. NPS 1-1/2 and Smaller: Fitting-type transition couplings.
 - b. NPS 2 and Larger: Pressure transition couplings.
- B. Dielectric Fittings:
1. Install dielectric fittings in piping at connections of dissimilar metal piping and tubing.
 2. Dielectric Fittings for NPS 2 and Smaller: Use dielectric unions.
 3. Dielectric Fittings for NPS 2-1/2 to NPS 4: Use dielectric flanges.

3.4 HANGER AND SUPPORT INSTALLATION

- A. Comply with requirements for seismic-restraint devices specified in Section 22 05 48 "Vibration and Seismic Controls for Plumbing Piping and Equipment."
- B. Comply with requirements for pipe hanger and support devices and installation specified in Section 22 05 29 "Hangers and Supports for Plumbing Piping and Equipment."
1. Install galvanized-steel pipe hangers for horizontal piping.
 2. Install galvanized-steel pipe support clamps for vertical piping.
 3. Vertical Piping: MSS Type 8 or Type 42, clamps.
 4. Install individual, straight, horizontal piping runs:
 - a. 100 Feet and Less: MSS Type 1, adjustable, steel clevis hangers.
 - b. Longer Than 100 Feet: MSS Type 43, adjustable roller hangers.
 - c. Longer Than 100 Feet if Indicated: MSS Type 49, spring cushion rolls.
 5. Multiple, Straight, Horizontal Piping Runs 100 Feet or Longer: MSS Type 44, pipe rolls. Support pipe rolls on trapeze.

- 6. Base of Vertical Piping: MSS Type 52, spring hangers.
- C. Support horizontal piping and tubing within 12 inches of each fitting, valve, and coupling.
- D. Support vertical piping and tubing at base and at each floor.
- E. Rod diameter may be reduced one size for double-rod hangers, with 3/8-inch minimum rods.
- F. Install hangers for PVC piping with the following maximum horizontal spacing and minimum rod diameters:
 - 1. NPS 1-1/2 and NPS 2: 48 inches with 3/8-inch rod.
 - 2. NPS 3: 48 inches with 1/2-inch rod.
 - 3. NPS 4: 48 inches with 5/8-inch rod.
 - 4. NPS 6 and NPS 8: 48 inches with 3/4-inch rod.
- G. Install supports for vertical PVC piping every 48 inches.
- H. Support piping and tubing not listed above according to MSS SP-69 and manufacturer's written instructions.

3.5 CONNECTIONS

- A. Drawings indicate general arrangement of piping, fittings, and specialties.
- B. Connect soil and waste piping to exterior sanitary sewerage piping. Use transition fitting to join dissimilar piping materials. Coordinate with civil site plans.
- C. Connect drainage and vent piping to the following:
 - 1. Plumbing Fixtures: Connect drainage piping in sizes indicated, but not smaller than required by plumbing code.
 - 2. Plumbing Fixtures and Equipment: Connect atmospheric vent piping in sizes indicated, but not smaller than required by authorities having jurisdiction.
 - 3. Plumbing Specialties: Connect drainage and vent piping in sizes indicated, but not smaller than required by plumbing code.
 - 4. Install test tees (wall cleanouts) in conductors near floor and floor cleanouts with cover flush with floor.
 - 5. Comply with requirements for backwater valves, cleanouts and drains specified in Section 22 13 19 "Sanitary Waste Piping Specialties."
 - 6. Equipment: Connect drainage piping as indicated. Provide shutoff valve if indicated and union for each connection. Use flanges instead of unions for connections NPS 2-1/2 and larger.
- D. Where installing piping adjacent to equipment, allow space for service and maintenance of equipment.
- E. Make connections according to the following unless otherwise indicated:
 - 1. Install unions, in piping NPS 2 and smaller, adjacent to each valve and at final connection to each piece of equipment.

2. Install flanges, in piping NPS 2-1/2 and larger, adjacent to flanged valves and at final connection to each piece of equipment.

3.6 IDENTIFICATION

- A. Identify exposed sanitary waste and vent piping. Comply with requirements for identification specified in Section 22 05 53 "Identification for Plumbing Piping and Equipment."

3.7 FIELD QUALITY CONTROL

- A. During installation, notify authorities having jurisdiction at least 24 hours before inspection must be made. Perform tests specified below in presence of authorities having jurisdiction.
 1. Roughing-in Inspection: Arrange for inspection of piping before concealing or closing-in after roughing-in and before setting fixtures.
 2. Final Inspection: Arrange for final inspection by authorities having jurisdiction to observe tests specified below and to ensure compliance with requirements.
- B. Re-inspection: If authorities having jurisdiction find that piping will not pass test or inspection, make required corrections and arrange for re-inspection.
- C. Reports: Prepare inspection reports and have them signed by authorities having jurisdiction.
- D. Test sanitary drainage and vent piping according to procedures of authorities having jurisdiction or, in absence of published procedures, as follows:
 1. Test for leaks and defects in new piping and parts of existing piping that have been altered, extended, or repaired. If testing is performed in segments, submit separate report for each test, complete with diagram of portion of piping tested.
 2. Leave uncovered and unconcealed new, altered, extended, or replaced drainage and vent piping until it has been tested and approved. Expose work that was covered or concealed before it was tested.
 3. Roughing-in Plumbing Test Procedure: Test drainage and vent piping except outside leaders on completion of roughing-in. Close openings in piping system and fill with water to point of overflow, but not less than 10-foot head of water. From 15 minutes before inspection starts to completion of inspection, water level must not drop. Inspect joints for leaks.
 4. Finished Plumbing Test Procedure: After plumbing fixtures have been set and traps filled with water, test connections and prove they are gastight and watertight. Plug vent-stack openings on roof and building drains where they leave building. Introduce air into piping system equal to pressure of 1-inch wg. Use U-tube or manometer inserted in trap of water closet to measure this pressure. Air pressure must remain constant without introducing additional air throughout period of inspection. Inspect plumbing fixture connections for gas and water leaks.
 5. Repair leaks and defects with new materials and retest piping, or portion thereof, until satisfactory results are obtained.
 6. Prepare reports for tests and required corrective action.

3.8 CLEANING AND PROTECTION

- A. Clean interior of piping. Remove dirt and debris as work progresses.
- B. Protect drains during remainder of construction period to avoid clogging with dirt and debris and to prevent damage from traffic and construction work.
- C. Place plugs in ends of uncompleted piping at end of day and when work stops.
- D. Exposed PVC Piping: Protect plumbing vents exposed to sunlight with two coats of water-based latex paint.

3.9 PIPING SCHEDULE

- A. Flanges and unions may be used on aboveground pressure piping unless otherwise indicated.
- B. Aboveground, soil and waste piping NPS 4 and smaller shall be the following:
 - 1. Solid-wall PVC pipe, PVC socket fittings, and solvent-cemented joints.
 - 2. Dissimilar Pipe-Material Couplings: Shielded, nonpressure transition couplings.
- C. Aboveground, vent piping NPS 4 and smaller shall be the following:
 - 1. Solid-wall PVC pipe, PVC socket fittings, and solvent-cemented joints.
 - 2. Dissimilar Pipe-Material Couplings: Shielded, nonpressure transition couplings.
- D. Underground, soil, waste, and vent piping NPS 4 and smaller shall be the following:
 - 1. Service class, cast-iron soil piping; gaskets; and gasketed joints.
 - 2. Hubless, cast-iron soil pipe and fittings; cast-iron hubless-piping couplings; and coupled joints.
 - 3. Solid wall PVC pipe, PVC socket fittings, and solvent-cemented joints.
 - 4. Dissimilar Pipe-Material Couplings: Shielded, nonpressure transition couplings.

END OF SECTION 22 13 16

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SECTION 22 13 19 - SANITARY WASTE PIPING SPECIALTIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:

1. Cleanouts.
2. Floor drains.
3. Trench drains.
4. Air-admittance valves.
5. Roof flashing assemblies.
6. Through-penetration firestop assemblies.
7. Miscellaneous sanitary drainage piping specialties.
8. Flashing materials.

1.3 DEFINITIONS

- A. ABS: Acrylonitrile-butadiene-styrene plastic.
- B. FRP: Fiberglass-reinforced plastic.
- C. HDPE: High-density polyethylene plastic.
- D. PE: Polyethylene plastic.
- E. PP: Polypropylene plastic.
- F. PVC: Polyvinyl chloride plastic.

1.4 ACTION SUBMITTALS

- A. Shop Drawings: Show fabrication and installation details for frost-resistant vent terminals.
 1. Wiring Diagrams: Power, signal, and control wiring.
- B. Field quality-control test reports.

1.5 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For drainage piping specialties to include in emergency, operation, and maintenance manuals.

1.6 QUALITY ASSURANCE

- A. Drainage piping specialties shall bear label, stamp, or other markings of specified testing agency.
- B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- C. Comply with NSF 14, "Plastics Piping Components and Related Materials," for plastic sanitary piping specialty components.

1.7 COORDINATION

- A. Coordinate size and location of concrete bases. Cast anchor-bolt inserts into bases. Concrete, reinforcement, and formwork requirements are specified in Section 03 30 00 "Cast-in-Place Concrete."
- B. Coordinate size and location of roof penetrations.

1.8 EXTRA MATERIALS

- A. Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

PART 2 - PRODUCTS

2.1 CLEANOUTS

- A. Exposed Metal Cleanouts:
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Josam Company; Josam Div.
 - b. MIFAB, Inc.
 - c. Smith, Jay R. Mfg. Co.; Division of Smith Industries, Inc.
 - d. Watts Drainage Products Inc.
 - e. Zurn Plumbing Products Group; Specification Drainage Operation.
 - f. Josam Company; Blucher-Josam Div.
 - 2. Standard: ASME A112.36.2M for cast iron for cleanout test tee.

3. Size: Same as connected drainage piping
4. Body Material: As required to match connected piping.
5. Closure: Countersunk brass plug.
6. Closure Plug Size: Same as or not more than one size smaller than cleanout size.
7. Closure: Stainless-steel plug with seal.

B. Metal Floor Cleanouts:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Josam Company; Josam Div.
 - b. Sioux Chief Manufacturing Company, Inc.
 - c. Smith, Jay R. Mfg. Co.; Division of Smith Industries, Inc.
 - d. Watts Drainage Products Inc.
 - e. Zurn Plumbing Products Group; Specification Drainage Operation.
2. Standard: ASME A112.36.2M for threaded, adjustable housing cleanout.
3. Size: Same as connected branch.
4. Type: Heavy-duty, adjustable housing.
5. Body or Ferrule: Cast iron.
6. Closure: Brass plug with straight threads and gasket.
7. Adjustable Housing Material: Cast iron with threads.
8. Frame and Cover Material and Finish: Polished bronze.
9. Frame and Cover Shape: Round.
10. Top Loading Classification: Heavy Duty.
11. Riser: ASTM A 74, Cast-iron drainage pipe fitting and riser to cleanout.
12. Standard: ASME A112.3.1.
13. Size: Same as connected branch.
14. Housing: Stainless steel.
15. Closure: Stainless steel with seal.
16. Riser: Stainless-steel drainage pipe fitting to cleanout.

C. Cast-Iron Wall Cleanouts:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Josam Company; Josam Div.
 - b. MIFAB, Inc.
 - c. Smith, Jay R. Mfg. Co.; d of Smith Industries, Inc.
 - d. Watts Drainage Products Inc.
 - e. Zurn Plumbing Products Group; Specification Drainage Operation.
2. Standard: ASME A112.36.2M. Include wall access.
3. Size: Same as connected drainage piping.
4. Body: As required to match connected piping.
5. Closure: Countersunk brass plug.
6. Closure Plug Size: Same as or not more than one size smaller than cleanout size.
7. Wall Access: Round, flat, chrome-plated brass or stainless-steel cover plate with screw.

8. Wall Access: Round, nickel-bronze, copper-alloy, or stainless-steel wall-installation frame and cover.

2.2 FLOOR DRAINS

A. Cast-Iron Floor Drains:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Josam Company; Josam Div.
 - b. Smith, Jay R. Mfg. Co.; Division of Smith Industries, Inc.
 - c. Watts Drainage Products Inc.
 - d. Zurn Plumbing Products Group; Specification Drainage Operation.
2. Standard: ASME A112.6.3.
3. Pattern: Sanitary drain.
4. Body Material: Gray iron.
5. Outlet: Bottom.
6. Top Loading Classification: Heavy Duty.
7. Trap Features: Trap-seal primer valve drain connection.

2.3 TRENCH DRAINS

A. Trench Drains:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Josam Company; Josam Div.
 - b. Smith, Jay R. Mfg. Co.; Division of Smith Industries, Inc.
 - c. Watts Drainage Products Inc.
 - d. Zurn Plumbing Products Group; Specification Drainage Operation.
2. Standard: ASME A112.6.3 for trench drains.
3. Material: Ductile or gray iron.
4. Flange: Anchor.
5. Outlet: End.
6. Grate Material: Stainless steel.
7. Top Loading Classification: Extra Heavy-Duty.

2.4 AIR-ADMITTANCE VALVES

A. Fixture Air-Admittance Valves:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

- a. Oatey.
 - b. Studor, Inc.
2. Standard: ASSE 1051, Type A for single fixture or Type B for branch piping.
3. Housing: Plastic.
4. Operation: Mechanical sealing diaphragm.
5. Size: Same as connected fixture or branch vent piping.

2.5 ROOF FLASHING ASSEMBLIES

A. Roof Flashing Assemblies:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Acorn Engineering Company; Elmdor/Stoneman Div.
 - b. Thaler Metal Industries Ltd.
- B. Description: Manufactured assembly made of 4.0-lb/sq. ft., 0.0625-inch- thick, lead flashing collar and skirt extending at least 6 inches from pipe, with galvanized-steel boot reinforcement and counterflashing fitting.
 1. Open-Top Vent Cap: Without cap.
 2. Low-Silhouette Vent Cap: With vandal-proof vent cap.
 3. Extended Vent Cap: With field-installed, vandal-proof vent cap.

2.6 THROUGH-PENETRATION FIRESTOP ASSEMBLIES

A. Through-Penetration Firestop Assemblies:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. ProSet Systems Inc.
 - b. Engineer approved equal.
2. Standard: UL 1479 assembly of sleeve and stack fitting with firestopping plug.
3. Size: Same as connected soil, waste, or vent stack.
4. Sleeve: Molded PVC plastic, of length to match slab thickness and with integral nailing flange on one end for installation in cast-in-place concrete slabs.
5. Stack Fitting: ASTM A 48/A 48M, gray-iron, hubless-pattern, wye branch with neoprene O-ring at base and gray-iron plug in thermal-release harness. Include PVC protective cap for plug.
6. Special Coating: Corrosion resistant on interior of fittings.

2.7 MISCELLANEOUS SANITARY DRAINAGE PIPING SPECIALTIES

A. Deep-Seal Traps:

1. Description: Cast-iron or bronze casting, with inlet and outlet matching connected piping and cleanout trap-seal primer valve connection.
 2. Size: Same as connected waste piping.
 - a. NPS 2 (DN 50): 4-inch- minimum water seal.
 - b. NPS 2-1/2 (DN 65) and Larger: 5-inch- minimum water seal.
- B. Floor-Drain, Trap-Seal Primer Fittings:
1. Description: Cast iron, with threaded inlet and threaded or spigot outlet, and trap-seal primer valve connection.
 2. Size: Same as floor drain outlet with NPS 1/2 side inlet.
- C. Air-Gap Fittings:
1. Standard: ASME A112.1.2, for fitting designed to ensure fixed, positive air gap between installed inlet and outlet piping.
 2. Body: Bronze or cast iron.
 3. Inlet: Opening in top of body.
 4. Outlet: Larger than inlet.
 5. Size: Same as connected waste piping and with inlet large enough for associated indirect waste piping.
- D. Sleeve Flashing Device:
1. Description: Manufactured, cast-iron fitting, with clamping device, that forms sleeve for pipe floor penetrations of floor membrane. Include galvanized-steel pipe extension in top of fitting that will extend 1 inch (25 mm) above finished floor and galvanized-steel pipe extension in bottom of fitting that will extend through floor slab.
 2. Size: As required for close fit to riser or stack piping.
- E. Stack Flashing Fittings:
1. Description: Counterflashing-type, cast-iron fitting, with bottom recess for terminating roof membrane, and with threaded or hub top for extending vent pipe.
 2. Size: Same as connected stack vent or vent stack.
- F. Vent Caps:
1. Description: Cast-iron body with threaded or hub inlet and vandal-proof design. Include vented hood and setscrews to secure to vent pipe.
 2. Size: Same as connected stack vent or vent stack.
- G. Frost-Resistant Vent Terminals:
1. Description: Manufactured or shop-fabricated assembly constructed of copper, lead-coated copper, or galvanized steel.
 2. Design: To provide 1-inch enclosed air space between outside of pipe and inside of flashing collar extension, with counterflashing.
- H. Expansion Joints:

1. Standard: ASME A112.21.2M.
2. Body: Cast iron with bronze sleeve, packing, and gland.
3. End Connections: Matching connected piping.
4. Size: Same as connected soil, waste, or vent piping.

2.8 FLASHING MATERIALS

- A. Lead Sheet: ASTM B 749, Type L51121, copper bearing, with the following minimum weights and thicknesses, unless otherwise indicated:
 1. General Use: 4.0-lb/sq. ft., 0.0625-inch thickness.
 2. Vent Pipe Flashing: 3.0-lb/sq. ft., 0.0469-inch thickness.
 3. Burning: 6-lb/sq. ft., 0.0938-inch thickness.
- B. Copper Sheet: ASTM B 152/B 152M, of the following minimum weights and thicknesses, unless otherwise indicated:
 1. General Applications: 12 oz./sq. ft.
 2. Vent Pipe Flashing: 8 oz./sq. ft.
- C. Zinc-Coated Steel Sheet: ASTM A 653/A 653M, with 0.20 percent copper content and 0.04-inch minimum thickness, unless otherwise indicated. Include G90 hot-dip galvanized, mill-phosphatized finish for painting if indicated.
- D. Fasteners: Metal compatible with material and substrate being fastened.
- E. Metal Accessories: Sheet metal strips, clamps, anchoring devices, and similar accessory units required for installation; matching or compatible with material being installed.
- F. Solder: ASTM B 32, lead-free alloy.
- G. Bituminous Coating: SSPC-Paint 12, solvent-type, bituminous mastic.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install backwater valves in building drain piping. For interior installation, provide cleanout deck plate flush with floor and centered over backwater valve cover, and of adequate size to remove valve cover for servicing.
- B. Install cleanouts in aboveground piping and building drain piping according to the following, unless otherwise indicated:
 1. Size same as drainage piping up to NPS 4. Use NPS 4 for larger drainage piping unless larger cleanout is indicated.
 2. Locate at each change in direction of piping greater than 45 degrees.
 3. Locate at minimum intervals of 50 feet for piping NPS 4 and smaller and 100 feet for larger piping.

4. Locate at base of each vertical soil and waste stack.
- C. For floor cleanouts for piping below floors, install cleanout deck plates with top flush with finished floor.
- D. For cleanouts located in concealed piping, install cleanout wall access covers, of types indicated, with frame and cover flush with finished wall.
- E. Install floor drains at low points of surface areas to be drained. Set grates of drains flush with finished floor, unless otherwise indicated.
 1. Position floor drains for easy access and maintenance.
 2. Set floor drains below elevation of surrounding finished floor to allow floor drainage. Set with grates depressed according to the following drainage area radii:
 - a. Radius, 30 Inches or Less: Equivalent to 1 percent slope, but not less than 1/4-inch total depression.
 - b. Radius, 30 to 60 Inches: Equivalent to 1 percent slope.
 - c. Radius, 60 Inches or Larger: Equivalent to 1 percent slope, but not greater than 1-inch total depression.
 3. Install floor-drain flashing collar or flange so no leakage occurs between drain and adjoining flooring. Maintain integrity of waterproof membranes where penetrated.
 4. Install individual traps for floor drains connected to sanitary building drain, unless otherwise indicated.
- F. Install trench drains at low points of surface areas to be drained. Set grates of drains flush with finished surface, unless otherwise indicated.
- G. Install fixture air-admittance valves on fixture drain piping.
- H. Install roof flashing assemblies on sanitary stack vents and vent stacks that extend through roof.
- I. Install flashing fittings on sanitary stack vents and vent stacks that extend through roof.
- J. Install deep-seal traps on all floor drains and other waste outlets.
- K. Install floor-drain, trap-seal primer fittings on inlet to all floor drains.
 1. Exception: Fitting may be omitted if trap has trap-seal primer connection.
 2. Size: Same as floor drain inlet.
- L. Install air-gap fittings on draining-type backflow preventers and on indirect-waste piping discharge into sanitary drainage system.
- M. Install sleeve flashing device with each riser and stack passing through floors with waterproof membrane.
- N. Install vent caps on each vent pipe passing through roof.
- O. Install frost-resistant vent terminals on each vent pipe passing through roof. Maintain 1-inch clearance between vent pipe and roof substrate.

- P. Install expansion joints on vertical stacks and conductors. Position expansion joints for easy access and maintenance.
- Q. Install frost-proof vent caps on each vent pipe passing through roof. Maintain 1-inch clearance between vent pipe and roof substrate.
- R. Install wood-blocking reinforcement for wall-mounting-type specialties.
- S. Install traps on plumbing specialty drain outlets. Omit traps on indirect wastes unless trap is indicated.

3.2 CONNECTIONS

- A. Comply with requirements in Section 22 13 16 "Sanitary Waste and Vent Piping" for piping installation requirements. Drawings indicate general arrangement of piping, fittings, and specialties.
- B. Install piping adjacent to equipment to allow service and maintenance.
- C. Ground equipment according to Section 26 05 26 "Grounding and Bonding for Electrical Systems."
- D. Connect wiring according to Section 26 05 19 "Low-Voltage Electrical Power Conductors and Cables."

3.3 FLASHING INSTALLATION

- A. Fabricate flashing from single piece unless large pans, sumps, or other drainage shapes are required. Join flashing according to the following if required:
 - 1. Lead Sheets: Burn joints of lead sheets 6.0-lb/sq. ft, 0.0938-inch thickness or thicker. Solder joints of lead sheets 4.0-lb/sq. ft., 0.0625-inch thickness or thinner.
 - 2. Copper Sheets: Solder joints of copper sheets.
- B. Install sheet flashing on pipes, sleeves, and specialties passing through or embedded in floors and roofs with waterproof membrane.
 - 1. Pipe Flashing: Sleeve type, matching pipe size, with minimum length of 10 inches, and skirt or flange extending at least 8 inches around pipe.
 - 2. Sleeve Flashing: Flat sheet, with skirt or flange extending at least 8 inches around sleeve.
 - 3. Embedded Specialty Flashing: Flat sheet, with skirt or flange extending at least 8 inches around specialty.
- C. Set flashing on floors and roofs in solid coating of bituminous cement.
- D. Secure flashing into sleeve and specialty clamping ring or device.
- E. Install flashing for piping passing through roofs with counterflashing or commercially made flashing fittings, according to Section 07 62 00 "Sheet Metal Flashing and Trim."

- F. Extend flashing up vent pipe passing through roofs and turn down into pipe, or secure flashing into cast-iron sleeve having calking recess.
- G. Fabricate and install flashing and pans, sumps, and other drainage shapes.

3.4 FIELD QUALITY CONTROL

- A. Tests and Inspections:
 - 1. Leak Test: After installation, charge system and test for leaks. Repair leaks and retest until no leaks exist.
 - 2. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

3.5 PROTECTION

- A. Protect drains during remainder of construction period to avoid clogging with dirt or debris and to prevent damage from traffic or construction work.
- B. Place plugs in ends of uncompleted piping at end of each day or when work stops.

END OF SECTION 22 13 19

SECTION 23 00 00 – MECHANICAL GENERAL

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.
- B. This is a Basic Mechanical Requirements Section. Provisions of this section apply to work of all Division 21, 22, and 23 sections (HVAC, Plumbing and Fire Protection).
- C. Review all other contract documents to be aware of conditions affecting work herein.
- D. All work under Division 23 shall be constructed in accordance with the codes listed herein. The design has been based on the requirements of these codes; and while it is not the responsibility of the Contractor to verify that all work called for complies with these codes, he shall be responsible for calling to the Architect/Engineer's attention any details or specifications that are not in conformance with these or other codes.
- E. Where code conflict exists, generally the most restrictive requirement applies. Comply with current code edition, unless noted.
 - 1. 2020 Florida Building Code.
 - 2. National Electric Code (NFPA 70).
 - 3. Life Safety Code (NFPA 101).
 - 4. Air Conditioning and Ventilating Systems (NFPA 90A).
 - 5. Standard for the Installation of Sprinkler Systems (NFPA 13).
 - 6. Handicapped Accessibility, ANSI A117.1 and Florida Statute Chapter 553, Part V.
- F. All mechanical materials, installation and systems shall meet the requirements of the following standards, including the latest addenda and amendments, to the extent referenced:
 - 1. Underwriters' Laboratories (UL)
 - 2. American National Standards Institution (ANSI)
 - 3. American Society of Testing Materials (ASTM)
 - 4. Air Conditioning and Refrigeration Institute (ARI)
 - 5. National Fire Protection Association (NFPA)
 - 6. National Electrical Manufacturers Association (NEMA)
 - 7. Sheet Metal and Air Conditioning Contractors' National Association SMACNA)
 - 8. American Society of Heating, Refrigeration, and Air Conditioning Engineers (ASHRAE)
 - 9. Air Movement and Control Association (AMCA)
- G. Codes or standards applying to a specific part of the work may be included in that section.
- H. Comply with regulations and codes of suppliers of utilities.

- I. Where no specific method or form of construction is called for in the contract documents, the Contractor shall comply with code requirements when carrying out such work.

1.2 CONTRACTORS QUALIFICATIONS

- A. General: Wherever the word "mechanical contractor", "sub-contractor" or "firm" is used in these sub-paragraphs, it shall mean the contractor/sub-contractor of record for the installations used for proficiency qualification.
- B. Location: The firm which performs the installation of the work under this section shall be one who maintains an established, experienced organization with a permanent, manned office within 50 miles from the project site location.
- C. HVAC Experience: The firm's proficiency in the installation, start-up, adjustment, and maintenance of air conditioning systems shall have been demonstrated by the successful performance of work as specified herein on at least three systems each with ducted air distribution, and hydronic and refrigerant piping of 25 tons capacity or greater with the school district of Santa Rosa County. The firm shall have been in business performing services as specified herein, for at least 5 years.
- D. Plumbing Experience: The firm's proficiency in the installation and adjustment of plumbing systems shall have been demonstrated by the successful performance of work as specified herein on at least three commercial or institutional buildings, each containing a minimum of 10 plumbing fixtures. The firm shall have been in business performing services as specified herein, for at least 5 years.

1.3 SUMMARY

- A. This Section includes the following:
 1. Piping materials and installation instructions common to most piping systems.
 2. Joining Materials.
 3. Transition fittings.
 4. Dielectric fittings.
 5. Flexible Connectors.
 6. Excavation and backfill.
 7. Mechanical demolition.
 8. Equipment installation requirements common to equipment sections.
 9. Painting and finishing.
 10. Concrete bases.
 11. Supports and anchorages.

1.4 DEFINITIONS

- A. Finished Spaces: Spaces other than mechanical and electrical equipment rooms, furred spaces, pipe and duct shafts, unheated spaces immediately below roof, spaces above ceilings, unexcavated spaces, crawlspaces, and tunnels.

- B. Exposed, Interior Installations: Exposed to view indoors. Examples include finished occupied spaces and mechanical equipment rooms.
- C. Exposed, Exterior Installations: Exposed to view outdoors or subject to outdoor ambient temperatures and weather conditions. Examples include rooftop locations.
- D. Concealed, Interior Installations: Concealed from view and protected from physical contact by building occupants. Examples include above ceilings and in duct shafts.
- E. Concealed, Exterior Installations: Concealed from view and protected from weather conditions and physical contact by building occupants but subject to outdoor ambient temperatures. Examples include installations within unheated shelters.
- F. The following are industry abbreviations for plastic materials:
 - 1. CPVC: Chlorinated polyvinyl chloride plastic.
 - 2. PE: Polyethylene plastic.
 - 3. PVC: Polyvinyl chloride plastic.
- G. The following are industry abbreviations for rubber materials:
 - 1. EPDM: Ethylene-propylene-diene terpolymer rubber.
 - 2. NBR: Acrylonitrile-butadiene rubber.
- H. Provide: Furnish and install, complete and ready for intended use.
- I. Furnish: Supply and deliver to project site, ready for subsequent requirements.
- J. Install: Operations at project site, including unloading, unpacking, assembly, erection, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning, and similar requirements.
- K. Permits and Fees: Contractor shall purchase all necessary permits, meters, and pay for any inspections required for his work and pay all fees and charges incidental thereto.
- L. Verification of Owner's Data: Prior to commencing any work the Contractor shall satisfy himself as to the accuracy of all data as indicated in these plans and specifications and/or as provided by the Owner. Should the Contractor discover any inaccuracies, errors, or omissions in the data, he shall immediately notify the Architect/Engineer in order that proper adjustments can be anticipated and ordered. Commencement by the Contractor of any work shall be held as an acceptance of the data by him after which time the Contractor has no claim against the Owner resulting from alleged errors, omissions or inaccuracies of the said data.
- M. Delivery and Storage of Materials: Materials delivered to site shall be inspected for damage, unloaded, and stored with a minimum of handling. All material shall be stored to provide protection from the weather and accidental damage.
- N. Extent of work is indicated by the drawings, schedules, and the requirements of the specifications. Singular references shall not be constructed as requiring only one device if multiple devices are shown on the drawings or are required for proper system operation.

1.5 FIELD MEASUREMENTS AND COORDINATION:

- A. The intent of the drawings and specifications is to obtain a complete and satisfactory installation. Separate divisional drawings and specifications shall not relieve the Contractor or subcontractors from full compliance of work of his trade indicated on any of the drawings or in any section of the specifications.
- B. Verify all field dimensions and locations of equipment to insure close, neat fit with other trades' work. Make use of all contract documents and approved shop drawings to verify exact dimension and locations.
- C. Coordinate work in this division with all other trades in proper sequence to insure that the total work is completed within contract time schedule and with a minimum cutting and patching.
- D. Locate all apparatus symmetrical with architectural elements. Install to exact height and locations when shown on architectural drawings. When locations are shown only on mechanical drawings, be guided by architectural details and conditions existing at job and correlate this work with that of others.
- E. Install work as required to fit structure, avoid obstructions, and retain clearance, headroom, openings and passageways. Cut no structural members without written approval.
- F. Carefully examine any existing conditions, piping, and premises. Compare drawings with existing conditions. Report any observed discrepancies. It shall be the Contractor's responsibility to properly coordinate the work and to identify problems in a timely manner. Written instructions will be issued to resolve discrepancies.
- G. Because of the small scale of the drawings, it is not possible to indicate all offsets and fittings or to locate every accessory. Drawings are essentially diagrammatic. Study carefully the sizes and locations of structural members, wall and partition locations, trusses, and room dimensions and take actual measurements on the job. Locate piping, ductwork, equipment and accessories with sufficient space for installing and servicing. Contractor is responsible for accuracy of his measurements and for coordination with all trades. Contractor shall not order materials or perform work without such verification. No extra compensation will be allowed because field measurements vary from the dimensions on the drawings. If field measurements show that equipment or piping cannot be fitted, the Architect/Engineer shall be consulted. Remove and relocate, without additional compensation, any item that is installed and is later found to encroach on space assigned to another use.
- H. Coordinate with the General Contractor for all cutting and patching. Contractors performing Division 23 work shall inform the General Contractor of all cutting and patching required prior to bidding and shall coordinate installation.

1.6 SUBMITTALS

- A. Coordination Drawings: Detail major elements, components, and systems of mechanical equipment and materials in relationship with other systems, installations, and building components. Drawings shall be prepared by the contractor using AutoCAD 2007 or higher. The Engineer will supply base floor plans only. All other work shall be by the contractor. Show space

requirements for installation and access. Indicate if sequence and coordination of installations are important to efficient flow of the Work. Include the following:

1. Planned piping layout, including valve and specialty locations and valve-stem movement.
 2. Planned ductwork layout, including dampers, elbows, etc.
 3. Clearances for installing and maintaining insulation.
 4. Clearances for servicing and maintaining equipment, accessories, and specialties, including space for disassembly required for periodic maintenance.
 5. Equipment and accessory service connections and support details.
 6. Exterior wall and foundation penetrations.
 7. Fire-rated wall and floor penetrations.
 8. Access panel and door locations.
 9. Sizes and location of required concrete pads and bases.
 10. Scheduling, sequencing, movement, and positioning of large equipment into building during construction.
 11. Floor plans, elevations, and details to indicate penetrations in floors, walls, and ceilings and their relationship to other penetrations and installations.
 12. Reflected ceiling plans to coordinate and integrate installation of air outlets and inlets, light fixtures, communication system components, sprinklers, and other ceiling-mounted items.
- B. Samples: Of color, lettering style and other graphic representation required for each identification material and device.
- C. When approved, the submittal control log and submittals shall be an addition to the specifications herewith, and shall be of equal force in that no deviation will be permitted except with the approval of the Architect/Engineer.
- D. Shop drawings, product literature, and other approval submittals will only be reviewed if they are submitted in full accordance with the General and Supplementary Conditions and Division 1 Specification sections and the following:
1. Submittals shall be properly organized in accordance with the approved submittal control log.
 2. Submittals shall not include items from more than one specification section in the same submittal package unless approved in the submittal control log.
 3. Submittals shall be properly identified by a cover sheet showing the project name, Architect and Engineer names, submittal control number, specification section, a list of products or item names with model numbers in the order they appear in the package, and spaces for approval stamps. A sample cover sheet is included at the end of this section.
 4. Submittals shall have been reviewed and approved by the General Contractor (or Prime Contractor). Evidence of this review and approval shall be an "Approved" stamp with a signature and date on the cover sheet.
 5. Submittals that include a series of fixtures or devices (such as plumbing fixtures or valves) shall be organized by the fixture number or valve type and be marked accordingly. Each fixture must include all items associated with that fixture regardless of whether or not those items are used on other fixtures.
 6. The design shown on the drawings supports the mechanical equipment basis of design specifications at the time of design. If mechanical equipment is submitted with different electrical, physical, capacity, etc. requirements, it shall be the responsibility of the mechanical contractor to resolve all required design changes (wire and conduit size, type

of disconnect or overload protection, point(s) of connection, ductwork modifications, etc.) and clearly show the new design on the mechanical submittal with a written statement that this change will be provided at no additional cost. Mechanical submittals made with no written reference to the electrical design will be presumed to work with the electrical design. Any corrections required will be at no additional cost.

- E. If the shop drawings show variation from the requirements of contract because of standard shop practice or other reasons, the Contractor shall make specific mention of such variation in writing in his letter of transmittal and on the submittal cover sheet in order that, if acceptable, Contractor will not be relieved of the responsibility for executing the work in accordance with the contract.
- F. Review of shop drawings, product literature, catalog data, or schedules shall not relieve the Contractor from responsibility for deviations from contract drawings or specifications, unless he has in writing called to the attention of the Architect/Engineer each such deviation in writing at the time of submission, nor shall it relieve him from responsibility for errors of any sort in shop drawings, product literature, catalog data, or schedules. Any feature or function specified but not mentioned in the submittal shall be assumed to be included per the specification.
- G. Submit shop drawings as called for in other sections after award of the contract and before any material is ordered or fabricated. Shop drawings shall consist of plans, sections, elevations and details to scale (not smaller than 1/4" per foot), with dimensions clearly showing the installation. Direct copies of small scale project drawings issued to the Contractor are not acceptable. Drawings shall take into account equipment furnished under other sections and shall show space allotted for it. Include construction details and materials. NOTE: Failure of the Contractor to provide this information during the shop drawings phase shall make the Contractor responsible for all changes to achieve compliance with the Contract Documents without additional compensation.
- H. Test Reports and Verification Submittals: Submit test reports, certifications and verification letters as called for in other sections. Contractor shall coordinate the required testing and documentation of system performance such that sufficient time exists to prepare the reports, submit the reports, review the reports and take corrective action within the scheduled contract time.
- I. O&M Data Submittals: Submit Operation and Maintenance data as called for in other sections. When a copy of approval submittals is included in the O&M Manual, only the final Approved or Approved as Noted copy shall be used. Contractor shall organize these data in the O&M Manuals tabbed by specification number. Prepare O&M Manuals as required by Division 1 and as described herein. Submit manuals at the Substantial Completion inspection.

1.6 QUALITY ASSURANCE

- A. Steel Support Welding: Qualify processes and operators according to AWS D1.1, "Structural Welding Code-Steel."
- B. Comply with ASME A13.1 for lettering size, length of color field, colors, and viewing angles of identification devices.

- C. Steel Pipe Welding: Qualify processes and operators according to ASME Boiler and Pressure Vessel Code: Section IX, "Welding and Brazing Qualifications."
- D. Comply with provisions in ASME B31 Series, "Code for Pressure Piping."
- E. Certify that each welder has passed AWS qualification tests for welding processes involved and that certification is current.
- F. The design and layout shown on the drawings are based on the Manufacturers listed in the Division 23 specifications. If equipment other than that of the Manufacturers indicated is submitted to the Engineer for consideration as an equal, it shall be the responsibility of the Manufacturer requesting approval to submit with the request a revised drawing(s) of the mechanical equipment layouts acceptable to the Engineer. These revised drawings shall show the proposed location(s) of the alternate unit(s) and the area required for withdrawal space of replacement or serviceable components. These drawings shall also show clearances of adjacent equipment and the service area required by that equipment.
- G. Equipment Selection: Equipment of differing electrical characteristics, physical dimensions and/or weights, capacities, and ratings may be furnished provided such proposed equipment is approved in writing and connecting mechanical, electrical, structural, and architectural services (such as circuit breakers, conduit, motors, bases, equipment pads, and equipment spaces) are adjusted by the contractor accordingly. The additional costs resulting from these modifications shall be the responsibility of the Contractor and no costs resulting from these modifications shall be passed to the Owner. If minimum energy ratings or efficiencies of equipment are specified, equipment must meet design and commissioning requirements.

1.7 COORDINATION

- A. Coordinate mechanical equipment installation with other building components.
- B. Arrange for pipe spaces, chases, slots, and openings in building structure during progress of construction, to allow for mechanical installations.
- C. Coordinate installation of required supporting devices and set sleeves in poured-in-place concrete and other structural components as they are constructed.
- D. Sequence, coordinate, and integrate installations of mechanical materials and equipment for efficient flow of the Work. Coordinate installation of large equipment requiring positioning before closing in building.
- E. Coordinate connection of mechanical systems with exterior underground and overhead utilities and services. Comply with requirements of governing regulations, franchised service companies, and controlling agencies.
- F. Coordinate requirements for access panels and doors for mechanical items requiring access that are concealed behind finished surfaces.
- G. Coordinate installation of identifying devices after completing covering and painting, if devices are applied to surfaces. Install identifying devices before installing acoustical ceilings and similar concealment.

- H. Refer to other Division 23 sections and/or drawings for specific requirements of the particular piping system being installed. Where another Division 23 section or the drawings conflict with requirements of this section, the other Division 23 section or the drawings shall take precedence over the general requirements herein.
- I. OSHA: Contractor employee worker protection for all trenching and excavation operations shall comply with 29 CFR 1926.650 Subpart P and all current OSHA requirements.

1.8 MULTI-DISCIPLINE COORDINATION

A. DIVISION 31, 32, AND 33 SITE WORK

- 1. Refer to Division Sitework for:
 - a. All water, sewer, and storm water piping greater than five feet from the building
 - b. Manholes and catch-basins.
 - c. Underground tanks and enclosures.
 - d. Site fire protection work.
- 2. The following work is part of Division 23:
 - a. All site heating hot water and chilled water piping.
 - b. Grease trap.

B. DIVISION 3 CONCRETE

- 1. Refer to Division 3, Concrete for:
 - a. Rough grouting in and around mechanical work.
 - b. Patching concrete cut to accommodate mechanical work.
- 2. The following is part of Division 23 work, complying with the requirements of Division 3
 - a. Curbs, foundations and pads for mechanical equipment.
 - b. Basins, sumps, and vaults of mechanical work.
 - c. Underground structural concrete to accommodate mechanical work.
 - d. Inertia bases.

C. DIVISION 4 MASONRY

- 1. Refer to Division 4, Masonry for:
 - a. Installation of access doors in walls.

D. DIVISION 5 METALS

- 1. Refer to Division 5, Metals for:

- a. Framing openings for mechanical equipment.
- 2. The following is part of Division 23 work.
 - a. Supports for mechanical work.

E. DIVISION 6 WOOD AND PLASTIC

- 1. Refer to Division 6, Wood for:
 - a. Framing openings for mechanical equipment

F. DIVISION 7 THERMAL AND MOISTURE PROTECTION

- 1. Refer to Division 7, Thermal and Moisture Protection for:
 - a. Installation of all roof curbs and roof supports for mechanical work.
 - b. Caulking and waterproofing of all wall and roof mounted mechanical work.
 - c. Providing all roof curbs and all vent flashing for metal roofs.
- 2. The following is part of Division 23 work, complying with the requirements of Division 7.
 - a. Fire barrier penetration seals.
 - b. Installation of louver and water proofing. Coordinate with architectural.

G. DIVISION 8 DOORS AND WINDOWS

- 1. Refer to Division 8, Doors & Windows for:
 - a. Installation of all door grilles.
 - b. Providing all undercuts

H. DIVISION 9 FINISHES

- 1. Refer to Division 9, Finishes for:
 - a. Painting exposed ductwork, piping, and equipment.
 - b. Painting structural metal and concrete for mechanical work.
 - c. Painting door grilles and access panels.
 - d. Painting color-coded mechanical work indicated for continuous painting. See color schedule in Division 23 section, "Mechanical Identification".
 - e. Installation of access doors in gypsum drywall.
 - f. Colors shall be selected by the Architect for all painting of exposed mechanical work in occupied spaces, unless specified herein. Do not paint insulated or jacketed surfaces.

2. Perform the following as part of Division 23 work:

- a. Touch up painting of factory finishes.
- b. Painting of all hangers.

I. DIVISION 10 SPECIALTIES

1. Refer to Division 10, Specialties for:

- a. Fire extinguishers and fire extinguisher cabinets and accessories.

J. DIVISION 11 EQUIPMENT

1. Refer to Division 11, Equipment for:

- a. Equipment for all food service equipment to be provided. This includes the cooking hoods with fire suppression, dishwasher hoods, dishwasher booster heaters, and food preparation/cleanup equipment.
- b. Equipment for all laboratory equipment including cabinets, casework, student stations, demonstration desks, safety stations, eyewashes, and all related fixtures, fittings, and trim.

2. Provide the following as part of Division 23 work:

- a. All ducts, connections, and related devices to make kitchen hoods operational.
- b. All trim including faucets, waste connections, drain traps, vents, valves, piping, flashing, fittings, strainers, and other materials necessary to make equipment operational. Provide rough-in for all equipment. Provide final connections for all equipment.
- c. All fixtures specified in Contract Documents.
- d. All automatic gas valves for shutoff of gas to cooking appliances when fire suppression system activates. Coordinate type of valve with fire suppression system supplier.
- e. All trim not furnished by Division 11 including drains, wastes, continuous wastes, tailpieces, traps and similar devices necessary to make fixtures operational. Provide rough-in for all fixtures. Provide final connections for all fixtures. Provide all fixtures specified in Contract Documents.

K. DIVISION 26 ELECTRICAL

- 1. Mechanical contractor shall coordinate the exact electrical requirements of all mechanical equipment being provided with the electrical contractor. Where approval submittals are required, this coordination shall be accomplished prior to making the submittals. The electrical design shown on the drawings supports the mechanical equipment basis of design. If mechanical equipment is submitted with different electrical requirements, it is the responsibility of the mechanical contractor to resolve all required electrical design

changes (wire and conduit size, type of disconnect or overload protection, point(s) of connection, etc.) and clearly show the new electrical design on the mechanical submittal with a written statement that this design will be provided at no additional cost. Mechanical submittals made with no written reference to the electrical design will be presumed to work with the electrical design. Any corrections required will be at no additional cost.

2. Mechanical contractor shall provide all HVAC control wiring including the Energy Management Control system sensors, alarms, and input/output signals and all relays, interlocks, warning lights, and control devices, complying with the requirements of Division 26. The intent is for the mechanical contractor to be responsible for the entire HVAC control system, including point-to-point wiring and connections.
3. Electrical contractor shall provide disconnect switches, starters, and contactors for mechanical equipment unless specifically noted as being furnished as part of mechanical equipment.
4. Electrical contractor shall provide all power wiring, raceway and devices, and make final electrical connections to all mechanical equipment, switches, starters, contactors, controllers, and similar equipment.
5. All duct-mounted smoke detectors shall be furnished and wired by the electrical contractor and installed by the mechanical contractor.

PART 2 - PRODUCTS

2.1 EQUIPMENT AND MATERIALS

- A. All materials shall be new or Owner-supplied reused as shown on the drawings, the best of their respective kinds, suitable for the conditions and duties imposed on them at the building and shall be of reputable manufacturers. The description, characteristics, and requirements of materials to be used shall be in accordance with qualifying conditions established in the following sections.
- B. All equipment and materials shall be new and the most suitable grade for the purpose intended. Equipment furnished under this division shall be the product of a manufacturer regularly engaged in the manufacture of such items for a period of three years. Where practical, all of the components shall be products of a single manufacturer in order to provide proper coordination and responsibility. Where required, Contractor shall furnish proof of installation of similar units or equipment.
- C. Each item of equipment shall bear a name plate showing the manufacturer's name, trade name, model number, serial number, ratings and other information necessary to fully identify it. This plate shall be permanently mounted in a prominent location and shall not be concealed, insulated or painted.
- D. The label of the approving agency, such as UL, IBR, ASME, ARI, AMCA, by which a standard has been established for the particular item shall be in full view.

- E. The equipment shall be essentially the standard product of a manufacturer regularly engaged in the production of such equipment and shall be a product of the manufacturer's latest design.
- F. A service organization with personnel and spare parts shall be available within two hours for each type of equipment furnished.
- G. Install in accordance with manufacturer's recommendations. Place in service by a factory trained representative where required.
- H. Materials and equipment are specified herein by a single or by multiple manufacturers to indicate quality, material and type of construction desired. Manufacturer's products shown on the drawings have been used as basis for design; it shall be the Contractor's responsibility to ascertain that alternate manufacturer's products, or the particular products of named manufacturers, meet the detailed specifications and that size and arrangement of equipment are suitable for installation.
- I. Model Numbers: Catalog numbers and model numbers indicated in the drawings and specifications are used as a guide in the selection of the equipment and are only listed for the contractor's convenience. The contractor shall determine the actual model numbers for ordering materials in accordance with the written description of each item and with the intent of the drawings and specifications.

2.2 REQUESTS FOR SUBSTITUTION

- A. Where a particular system, product or material is specified by name, consider it as standard basis for bidding, and base proposal on the particular system, product or material specified.
- B. Requests by Contractor for substitution will be considered only when reasonable, timely, fully documented, and qualifying under one or more of the following circumstances.
 - 1. Required product cannot be supplied in time for compliance with Contract time requirements.
 - 2. Required product is not acceptable to governing authority, or determined to be non-compatible, or cannot be properly coordinated, warranted or insured, or has other recognized disability as certified by Contractor.
 - 3. Substantial cost advantage is offered Owner after deducting offsetting disadvantages including delays, additional compensation for redesign, investigation, evaluation and other necessary services and similar considerations.
- C. All requests for substitution shall contain a "Comparison Schedule" and clearly and specifically indicate any and all differences or omissions between the product specified as the basis of design and the product proposed for substitution. Differences shall include but shall not be limited to data as follows for both the specified and substituted products:
 - 1. Principal of operation.
 - 2. Materials of construction or finishes.
 - 3. Thickness of gauge of materials.
 - 4. Weight of item.
 - 5. Deleted features or items.
 - 6. Added features or items.

7. Changes in other work caused by the substitution.
8. Performance curves.

If the approved substitution contains differences or omissions not specifically called to the attention of the Architect/Engineer, the Owner reserves the right to require equal or similar features to be added to the substituted products (or to have the substituted products replaced) at the Contractor's expense.

2.3 EXCAVATION AND BACKFILL MATERIALS

- A. Sand: Clean, hard, uncoated grains free from organic matter or other deleterious substances. Sand for backfill shall be of a grade equal to mortar sand.
- B. Gravel: Clean, well graded hard stone or gravel, free from organic material. Size range to be from No. 4 screen retentions to 1".
- C. Earth: Fill free of clay, muck, stones, wood, roots or rubbish.
- D. Identification Tape: Polyethylene 6 inches wide, 0.004 inches thick, continuously printed with "CAUTION" in large letters and type of pipe below.
- E. Copper Identification Wire: 12-gauge.

PART 3 - EXECUTION

3.1 WORKMANSHIP

- A. All materials and equipment shall be installed and completed in a first-class workmanlike manner and in accordance with the best modern methods and practice. Any materials installed which do not present an orderly and reasonably neat and/or workmanlike appearance, or do not allow adequate space for maintenance, shall be removed and replaced when so directed by the Architect/Engineer.

3.2 COORDINATION

- A. The Contractor shall be responsible for full coordination of the mechanical systems with shop drawings of the building construction so the proper openings and sleeves or supports are provided for piping, ductwork, or other equipment passing through slabs or walls.
- B. Any additional steel supports required for the installation of any mechanical equipment, piping, or ductwork shall be furnished and installed under the section of the specifications requiring the additional supports.
- C. It shall be the Contractor's responsibility to see that all equipment such as valves, dampers, filters and such other apparatus or equipment that may require maintenance and operation are made easily accessible, regardless of the diagrammatic location shown on the drawings.
- D. All connections to fixtures and equipment shown on the drawings shall be considered diagrammatic unless otherwise indicated by detail. The actual connections shall be made to fully suit the requirements of each case and adequately provide for expansion and servicing.

- E. The contractor shall protect equipment, material, and fixtures at all times. He shall replace all equipment, material, and fixtures which are damaged as a result of inadequate protection.
- F. Prior to starting and during progress of work, examine work and materials installed by others as they apply to work in this division. Report conditions which will prevent satisfactory installation.
- G. Start of work will be construed as acceptance of suitability of work of others.
- H. Before any equipment is shut down for disconnecting or tie-ins, arrangements shall be made with the Architect/Engineer and this work shall be done at the time best suited to the Owner. This will typically be on weekends and/or holidays and/or after normal working hours. Services shall be restored the same day unless prior arrangements are made. All overtime or premium costs associated with this work shall be included in the base bid.
- I. Provide all required temporary valves, piping, ductwork, equipment and devices as required. Maintain temporary services to areas as required. Remove all temporary material and equipment on completion of work unless Engineer concurs that such material and equipment would be beneficial to the Owner on a permanent basis.
- J. Notify General Contractor to do all cutting and patching of all holes, chases, sleeves, and other openings required for installation of equipment furnished and installed under this section. Utilize experienced trades for cutting and patching. Obtain permission from Architect/Engineer before cutting any structural items.
- K. Bolt equipment directly to concrete pads or vibration isolators as required, using hot-dipped galvanized anchor bolts, nuts and washers. Level equipment.
- L. Touch-up factory finishes on equipment located inside and outside shall be done under Division 23. Obtain matched color coatings from the manufacturer and apply as directed. If corrosion is found during inspection on the surface of any equipment, clean, prime, and paint, as required.
- M. Thoroughly clean all exposed parts of apparatus and equipment of cement, plaster, and other materials and remove all oil and grease spots. Repaint or touch up as required to look like new. During progress of work, contractor is to carefully clean up and leave premises and all portions of building free from debris and in a clean and safe condition.
- N. Start each item of equipment in strict accordance with the manufacturer's instructions; or where noted under equipment specification, start-up shall be done by a qualified representative of the manufacturer. Alignment, lubrication, safety, and operating control shall be included in start-up check.
- O. Operate heating and cooling systems as required after initial startup to maintain temperature and humidity conditions to avoid freeze damage and warping or sagging of ceilings and carpet.

3.3 RECORD DRAWINGS

1. During the progress of the work the Contractor shall record on their field set of drawings the exact location, as installed, of all piping, ductwork, equipment, and other systems which are not installed exactly as shown on the contract drawings.
2. Upon completion of the work, record drawings shall be prepared as described in the General Conditions, Supplementary Conditions, and Division 1 sections.

3.4 ACCEPTANCE

1. Punch List: Submit written confirmation that all punch lists have been checked and the required work completed.
2. Instructions: At completion of the work, provide a competent and experienced person who is thoroughly familiar with project, for one day to instruct permanent operating personnel in operation of equipment and control systems. This is in addition to any specific equipment operation and maintenance training.
3. Operation and Maintenance Manuals: Furnish three complete manuals bound in ring binders with Table of Contents, organized, and tabbed by specification section. Manuals shall contain:
 - a. Detailed operating instructions and instructions for making minor adjustments.
 - b. Complete wiring and control diagrams.
 - c. Routine maintenance operations.
 - d. Manufacturer's catalog data, service instructions, and parts lists for each piece of operating equipment.
 - e. Copies of approved submittals.
 - f. Copies of all manufacturer's warranties.
 - g. Copies of test reports and verification submittals.
4. Record Drawings: Submit record drawings.
5. Control Diagrams: Frame under plastic and mount on equipment room wall.

3.5 MECHANICAL DEMOLITION

- A. Refer to Division 1 Sections and Contract Drawings for general demolition requirements and procedures.
- B. Disconnect, demolish, and remove mechanical systems, equipment, and components indicated to be removed.
- C. Piping to Be Removed: Remove portion of piping indicated to be removed and cap or plug remaining piping with same or compatible piping material.
- D. Piping to Be Abandoned in Place: Drain piping and cap or plug piping with same or compatible piping material.

- E. Ducts to Be Removed: Remove portion of ducts indicated to be removed and plug remaining ducts with same or compatible ductwork material.
- F. Ducts to Be Abandoned in Place: Cap or plug ducts with same or compatible ductwork material.
- G. Equipment to Be Removed: Disconnect and cap services and remove equipment.
- H. Equipment to Be Removed and Reinstalled: Disconnect and cap services and remove, clean, and store equipment; when appropriate, reinstall, reconnect, and make equipment operational.
- I. Equipment to Be Removed and Salvaged: Disconnect and cap services and remove equipment and deliver to Owner.

3.6 PIPING SYSTEMS - COMMON REQUIREMENTS

- A. Install piping according to the following requirements and Division 23 Sections specifying piping systems. Individual Division 23 piping Sections specify unique piping installation requirements
- B. Drawing plans, schematics, and diagrams indicate general location and arrangement of piping systems. Indicated locations and arrangements were used to size pipe and calculate friction loss, expansion, pump sizing, and other design considerations. Install piping as indicated unless deviations to layout are approved on Coordination Drawings.
- C. Install piping in concealed locations, unless otherwise indicated and except in equipment rooms and service areas.
- D. Install piping indicated to be exposed and piping in equipment rooms and service areas at right angles or parallel to building walls. Diagonal runs are prohibited unless specifically indicated otherwise.
- E. Install piping such that no piping passes over electrical panels.
- F. Refer to fire protection, plumbing and HVAC specifications for sleeve, sleeve seal system and escutcheon requirements.
- G. Install piping above accessible ceilings to allow sufficient space for ceiling panel removal.
- H. Install piping to permit valve servicing.
- I. Install piping at indicated slopes.
- J. Install piping free of sags and bends.
- K. Install fittings for changes in direction and branch connections.
- L. Install piping to allow application of insulation.

- M. Select system components with pressure rating equal to or greater than system operating pressure.
- N. Verify final equipment locations for roughing-in.
- O. Refer to equipment specifications in other Sections of these Specifications for roughing-in requirements.

3.7 EQUIPMENT INSTALLATION - COMMON REQUIREMENTS

- A. Install equipment to allow maximum possible headroom unless specific mounting heights are not indicated.
- B. Install equipment level and plumb, parallel and perpendicular to other building systems and components in exposed interior spaces, unless otherwise indicated.
- C. Install mechanical equipment to facilitate service, maintenance, and repair or replacement of components. Connect equipment for ease of disconnecting, with minimum interference to other installations. Extend grease fittings to accessible locations.
- D. Install equipment to allow right of way for piping installed at required slope.

3.8 PAINTING

- A. Apply paint to exposed uninsulated piping according to the following:
 - 1. Interior, Ferrous Piping: Use semigloss, acrylic-enamel finish. Include finish coat over enamel undercoat and primer.
 - 2. Interior, Galvanized-Steel Piping: Use semigloss, acrylic-enamel finish. Include two finish coats over galvanized metal primer.
 - 3. Interior, Ferrous Supports: Use semigloss, acrylic-enamel finish. Include finish coat over enamel undercoat and primer.
 - 4. Exterior, Ferrous Piping: Use semigloss, acrylic-enamel finish. Include two finish coats over rust-inhibitive metal primer.
 - 5. Exterior, Galvanized-Steel Piping: Use semigloss, acrylic-enamel finish. Include two finish coats over galvanized metal primer.
 - 6. Exterior, Ferrous Supports: Use semigloss, acrylic-enamel finish. Include two finish coats over rust-inhibitive metal primer.
- B. Do not paint piping specialties with factory-applied finish.
- C. Damage and Touchup: Repair marred and damaged factory-painted finishes with materials and procedures to match original factory finish.

3.9 CONCRETE BASES

- A. Construct concrete bases of dimensions indicated, but not less than 4 inches larger in both directions than supported unit. Follow supported equipment manufacturer's setting templates for

anchor bolt and tie locations. Use 3,000-psig, 28-day compressive-strength concrete and reinforcement.

3.10 ERECTION OF METAL SUPPORTS AND ANCHORAGES

- A. Cut, fit, and place miscellaneous metal supports accurately in location, alignment, and elevation to support and anchor mechanical materials and equipment
- B. Field Welding: Comply with AWS D1.1.

3.11 CUTTING AND PATCHING

- A. Cut, channel, chase, and drill floors, walls, partitions, ceilings, and other surfaces necessary for mechanical installations. Perform cutting by skilled mechanics of trades involved.
- B. Repair cut surfaces to match adjacent surfaces.

3.12 GROUTING

- A. Mix and install grout for mechanical equipment base bearing surfaces, pump and other equipment base plates, and anchors.
- B. Clean surfaces that will come into contact with grout.
- C. Provide forms as required for placement of grout.
- D. Avoid air entrapment during placement of grout.
- E. Place grout, completely filling equipment bases.
- F. Place grout on concrete bases and provide smooth bearing surface for equipment.
- G. Place grout around anchors.
- H. Cure placed grout.

3.13 EXCAVATION AND BACKFILL

- A. Ditching and Excavation: Shall be performed by hand wherever there is a possibility of encountering obstacles or any existing utility lines of any nature whatsoever. Where clear and unobstructed areas are to be excavated, appropriate machine excavation methods may be employed. Avoid use of machine excavators within the limits of the building lines.
- B. Bedding: Excavate to bottom grade of pipe to be installed, and shape bed of undisturbed earth to contour of pipe for a width of at least 50% of pipe diameter. If earth conditions necessitate excavation below grade of the pipe, such as due to the presence of clay, muck, or roots, subcut and bring bed up to proper elevation with clean, new sand (as described in paragraph 2.3), de-

posited in 6" layers and tamped. Notify Architect/Engineer if subcut exceeds 12", or if bed is of an unstable nature. In this case a 6" minimum layer of gravel will be required before sand bedding begins. Submit cost proposal if the earth conditions require subcut in excess of 12" or if gravel is required to achieve proper bedding.

- C. Placing: Pipe shall be carefully handled into place. Avoid knocking loose soil from the banks of the trench into the pipe bed. Rig heavier sections with nylon slings in lieu of wire rope to avoid crushing or chipping. Pipe which is handled with insulation in place, coated pipe, and jacketed pipe shall have special handling slings as required to prevent damage to the material.
- D. Backfilling: Deposit clean new sand (as described in paragraph 2.3) to 6" above the pipe and tamp. Then deposit sand or earth carefully in 6" layers, maintaining adequate side support, especially on nonferrous piping materials. Compact fill in 6" layers, using mechanical means, up to the top elevation of the pipe, and in 12" layers to rough or finish grade as required. Fine grade and restore surface to original condition.
- E. Special: Excavations shall be installed and maintained in satisfactory condition during the progress of the work. Subsurface structures are to be constructed in adequately sized excavations. De-watering equipment shall be installed and properly maintained where required. Shoring shall be employed in the event of unstable soil condition, and in all cases where required by OSHA regulations and necessary to protect materials and personnel from injury.
- F. Identification: Install identification tape directly above all underground piping, one tape for each pipe where multiple pipes are installed. Depth of tape shall be at least 6 inches below finished grade and 24" above buried pipe. Install copper wire above non-metallic pipes.
- G. Depth of Cover: Minimum cover for underground piping is two feet unless indicated otherwise.

END OF SECTION 23 00 00

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31 62 19 TIMBER PILES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes round timber piles.

1.2 UNIT PRICES

- A. Contract Sum: Base Contract Sum on number and dimensions of piles indicated from tip to cutoff, plus not less than 12 inches of overlength for cutting piles at cutoff elevations.
- B. Work of this Section is affected as follows:
 - 1. Additional payment for pile lengths in excess of that indicated, and credit for pile lengths less than that indicated, is calculated at unit prices stated in the Contract, based on net addition or deduction to total pile length as determined by Architect and measured to nearest 12 inches.
 - a. Additional payment for splices required to extend pile lengths in excess of that indicated is calculated at unit prices stated in the Contract.
 - 2. Unit prices include labor, materials, tools, equipment, and incidentals for furnishing, driving, cutting off, capping, and disposing of cutoffs.
 - 3. Test piles that become part of permanent foundation system are considered as an integral part of the Work.
 - 4. No payment is made for rejected piles, including piles driven out of tolerance, defective piles, or piles damaged during handling or driving.

1.3 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings: For timber piles. Show fabrication and installation details for piles, including details of driving shoes, tips or boots, and pile butt protection.

1.5 INFORMATIONAL SUBMITTALS

- A. Round timber pile treatment data.
- B. Pile-Driving Equipment Data: Include type, make, and rated energy range; weight of striking part of hammer; weight of drive cap; and, type, size, and properties of hammer cushion.
- C. Pile-driving records.
- D. Field quality-control reports.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Handle and store piles at Project site to prevent breaks, cuts, abrasions, or other physical damage and as required by AWWA M4. Do not drill holes or drive spikes or nails into pile below cutoff elevation.

PART 2 - PRODUCTS

2.1 TIMBER PILES

- A. Round Timber Piles: ASTM D 25, unused, clean peeled, one piece from butt to tip; of the following species and size basis:
 - 1. Species: Southern yellow pine.
 - 2. Size Basis: 8-inch tip and 6-inch tip as indicated and natural taper
- B. Pressure-treat round timber piles according to AWWA U1 as follows:
 - 1. Service Condition: UC4C Ground Contact, Extreme Duty
 - 2. Treatment: Waterborne preservative Chromated Copper Arsenate (CCA) must be used. No exceptions taken.

2.2 PILE ACCESSORIES

- A. Driving Shoes: Fabricate from ASTM A 1011/A 1011M, hot-rolled carbon-steel strip to suit pile-tip diameter.

2.3 FABRICATION

- A. Pile Tips: Cut and shape pile tips to accept driving shoes. Fit and fasten driving shoes to pile tips according to manufacturer's written instructions.

- B. Pile Butt: Trim pile butt and cut perpendicular to longitudinal axis of pile. Chamfer and shape butt to fit tightly to driving cap of hammer.
- C. Field-Applied Wood Preservative: Treat field cuts, holes, and other penetrations according to AWWPA M4.
- D. Pile-Length Markings: Mark each pile with horizontal lines at 12-inch intervals; label the distance from pile tip at 60-inch intervals. Maintain markings on piles until driven.

PART 3 - EXECUTION

3.1 DRIVING PILES

- A. General: Continuously drive piles to elevations or penetration resistance indicated. Establish and maintain axial alignment of leads and piles before and during driving.
- B. Heaved Piles: Redrive heaved piles to tip elevation at least as deep as original tip elevation with a driving resistance at least as great as original driving resistance.
- C. Driving Tolerances: Drive piles without exceeding the following tolerances, measured at pile heads:
 - 1. Location: 4 inches from location indicated after initial driving, and 6 inches after pile driving is completed.
 - 2. Plumb: Maintain 1 inch in 48 inches from vertical, or a maximum of 4 inches, measured when pile is aboveground in leads.
 - 3. Batter Angle: Maximum 1 inch in 48 inches from required angle, measured when pile is aboveground in leads.
- D. Withdraw damaged or defective piles and piles that exceed driving tolerances, and install new piles within driving tolerances. Fill holes left by withdrawn piles as directed by Architect.
- E. Cut off butts of driven piles square with pile axis except as indicated and at elevations indicated.
 - 1. Cover cut-off piling surfaces with minimum three coats of preservative treatment according to AWWPA M4.
- F. Pile-Driving Records: Maintain accurate driving records for each pile, compiled and attested to by a qualified professional engineer.

3.2 FIELD QUALITY CONTROL

- A. Testing Agency: Engage a qualified testing agency to perform tests and inspections.

B. Tests and Inspections:

1. Dynamic Pile Testing: High-strain dynamic monitoring shall be performed and reported according to ASTM D 4945 during initial driving and during restriking on five single piles of each diameter.

END OF SECTION

Mike Marshall, 2023

02 01 00 SUB-SURFACE INVESTIGATION

PART 1 GENERAL

1.01 RELATED DOCUMENTS:

The General Provision of the Contract, including bidding conditions and contractual conditions, apply to the work specified in this section.

1.02 SCOPE:

The geo-technical exploration, boring log and recommendation of the Soil Engineer is made a part of this specification.



REPORT OF GEOTECHNICAL EXPLORATION

**Tarpon Beach Facilities
Okaloosa County, Florida**

Tierra Project No. 4511-23-038

Prepared for:

**Sam Marshall Architects
325 S Palafox Street
Pensacola, Florida 32502
Attn: Mr. Mike Marshall, AIA, CSI**

Prepared by:

**Tierra, Inc.
1300 West Main Street
Pensacola, Florida 32502**

August 18, 2023



**1300 West Main Street • Pensacola, FL 32502
Phone (850) 462-8774 • Fax (850) 462-8784**

TIERRA

August 18, 2023

Sam Marshall Architects
325 S Palafox Street
Pensacola, Florida 32502
Attn: Mr. Mike Marshall, AIA, CSI

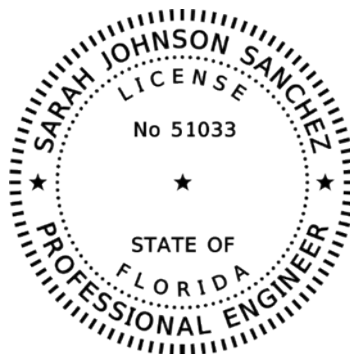
Subject: Tarpon Beach Facilities
Okaloosa County, Florida
Tierra Project No. 4511-23-038

Mr. Marshall:

Thank you for choosing Tierra, Inc. (Tierra) as your Geotechnical consultant. Per your authorization, we have completed the Geotechnical exploration for the subject project. The results of the study are discussed in this report.

Should you have any questions regarding the enclosed report or the project in general, please do not hesitate to contact us at (850) 462-8774.

Sincerely,
TIERRA, INC.



*THIS ITEM HAS BEEN DIGITALLY
SIGNED AND SEALED BY*

ON THE DATE ADJACENT TO THE SEAL

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TIERRA, INC.
1300 WEST MAIN STREET
PENSACOLA, FLORIDA 32502

SARAH JOHNSON SANCHEZ, P.E. NO. 51033

Mitchell L. Smith, PE
Principal Geotechnical Engineer
Florida License No. 43416

Sarah Johnson Sanchez, PE
Sr. Project Engineer
Florida License No. 51033



1300 West Main Street • Pensacola, FL 32502
Phone (850) 462-8774 • Fax (850) 462-8774

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APPENDIX A

Boring Location Plan and Soil Profiles

Table 1 – Summary of Falling Head Permeability Tests

Falling Head Permeability Test Results

1.0 PROJECT INFORMATION

1.1 Project Authorization

Authorization to proceed on this project was issued by Mr. Mike Marshall, Vice President with Sam Marshall Architects via acceptance of our Geotechnical Engineering Services Proposal 45-22-130 dated October 13, 2022. A formal contract has been executed between Tiera, Inc. and Sam Marshall Architects for these services.

1.2 Project Description

Based on the information provided, we understand that the development will include a new bathroom building on the south side of the site with two connecting pavilions on either side. The new bathroom/pavilions will be lightly loaded, timber pile supported structures established at/near existing site grades. A stormwater management facility (SMF) will be found beneath the paved parking north of the bathroom/pavilion structures.

If any of the project information noted above is incorrect or has changed, please inform Tierra so that we may amend the recommendations presented in this report, if necessary.

1.3 Purpose and Scope of Services

The purpose of this exploration was to evaluate the subsurface conditions present in the subject areas and to render timber pile foundation recommendations as well as parameters for stormwater drawdown analysis for the proposed SMF.

The exploration consisted of two (2) 35-foot deep Standard Penetration Test (SPT) borings to evaluate the subsurface conditions for the restrooms/pavilions and two (2) 7-foot deep auger borings in the proposed SMF area; laboratory soil testing including water content tests, wash #200 sieve tests, and falling head permeability tests; and a site visit, visual classification of the soil samples, and analysis by our engineering staff.

2.0 SITE AND SUBSURFACE CONDITIONS

2.1 Site Location and Description

The gulf front site is located on the south side of Scenic Highway 98 near the intersection of Tarpon Street in Okaloosa County, Florida. An aerial photograph depicting the site location is shown on the Boring Location Plan (Appendix A).

At the time of our exploration, the site was clear and relatively level. Based on review of the topographic survey provided, as well as the survey data on Google Earth, the north portion of the site is relatively level at/near EL +20 feet to EL +22 feet, and the property slopes downward to the south to near EL +7 feet.

2.2 Subsurface Conditions

The Boring Location Plan and the Soil Profiles of the borings drilled for this study can be found in Appendix A. The borings were field located and staked using a Garmin GPSMap 66ST Global Positioning System (GPS) unit with a reported accuracy of ± 1 meter. Therefore, the boring locations should be considered approximate.

We have estimated ground surface elevations at the boring locations using the topographic survey provided, as well as the topographic information provided in Google Earth. The subsurface conditions encountered will be discussed in general terms below.

The restroom/pavilion borings (B-1 and B-2) encountered the following idealized profile:

<u>Elevation (ft.)</u>	<u>Soil Description</u>
+20 to +5	Very loose to loose SAND (SP)
+5 to -20	Medium dense SAND (SP)

The SMF borings (SW-1 and SW-2) generally encountered sand from the ground surface (average EL +22 feet) to the bottom of the 7-foot deep borings.

The above subsurface descriptions are of a generalized nature, provided to highlight the major soil stratum encountered. The Soil Profiles should be reviewed for specific subsurface conditions at each boring location. The stratification shown on the Soil Profiles represents the subsurface conditions at the actual boring locations only, and variations in the subsurface conditions can and

may occur between boring locations and should therefore be expected. The stratification represents the approximate boundary between subsurface materials, and the transitions between strata may be gradual.

2.3 Groundwater Conditions

Groundwater was encountered in SPT borings B-1 and B-2 approximately 18 feet below existing grade at the time of drilling, which was during a period of above-normal seasonal rainfall. Based on the ground surface elevations at the boring locations estimated from the topographic survey and Google Earth, this corresponds to groundwater elevation of approximately +3 feet NAVD 88. Groundwater was not encountered in the SMF borings.

Groundwater levels will fluctuate with rainfall and tides and could vary several feet during typical seasonal fluctuations. Larger fluctuations are possible under severe weather conditions. We recommend that the Contractor determine the actual groundwater levels at the time of construction to determine potential impacts groundwater can/will have on construction procedures.

2.4 Laboratory Soil Testing

Laboratory soil testing consisted of water content tests, wash #200 sieve tests, and falling head permeability tests. The results of the water content and wash #200 sieve tests can be found on the Soil Profiles opposite the samples tested.

Falling head permeability tests were performed on remolded bulk samples of the sand soils encountered in the SMF borings. The densities to which the samples were remolded were based on the N_f values obtained from the nearby SPT borings. The results of the tests are summarized in Table 1 attached in Appendix A. The laboratory permeability test data sheets are attached in Appendix A.

3.0 EVALUATION AND RECOMMENDATIONS

3.1 General Comments

Based on our understanding of the proposed facility, the exploration encountered subsurface conditions that will provide adequate support for the proposed structure provided the recommendations presented in this report are followed.

The subsurface conditions encountered in the SMF borings are suitable for conventional dry treatment. Stormwater design parameters are presented in Section 3.5 below.

3.2 Timber Pile Foundation Recommendations

We have evaluated compression and tension pile capacities for 8-inch and 10-inch tip diameter timber piles to support the proposed restroom facility. Table 2 below shows allowable compression and tension capacities for driven timber piles with a tip elevation of -6 feet NAVD 88 (note – all elevations referenced to NAVD 88). The capacities presented in Table 2 assume a pile butt elevation of +18 feet, a ground surface elevation of +20 feet (assuming no scour), include a Factor of Safety of 2, and assume a pilot hole to elevation +10 feet to aide in standing the piles prior to driving.

TABLE 2 ALLOWABLE TIMBER PILE COMPRESSION & TENSION CAPACITIES		
Pile Size	Allowable Compression Capacity	Allowable Tension Capacity
8-inch Diameter Timber Pile	7 tons	4 tons
10-inch Diameter Timber Pile	10 tons	6 tons

3.3 Pile Group Action

No reductions of the individual pile capacities will be required if piles are spaced center-to-center a minimum of 3 times their width/diameter. If piles are spaced closer, our office should be notified so that pile capacity reductions can be evaluated.

3.4 Settlement

Settlements of driven pile foundations are typically small and should not be a concern on this project provided the piles are embedded as recommended herein. Pile head settlements should be on the order of ½ inch or less. Group settlements are estimated to be on the same order of magnitude for the expected lightly loaded structure.

3.5 Stormwater Management Facility Recommendations

The subsurface conditions encountered in the SMF auger borings are suitable for conventional dry treatment of stormwater runoff. Geotechnical parameters for analysis/design are presented below:

- **Effective Aquifer Thickness:** A confining unit, which would hydrogeologically define the thickness of the surficial aquifer, was not encountered to a depth of 45 feet below existing grade (the deepest boring drilled on the site). For the purposes of modeling, we recommend setting the bottom of the aquifer no deeper than the bottom of the boring elevation (EL -20 feet). Note that a shallower effective aquifer thickness for modeling a shallow SMF may be more appropriate given the expected minimal head, and a sensitivity analysis using this parameter is warranted.
- **Seasonal High Groundwater Level:** Groundwater was encountered at approximately EL +3 feet at the time of drilling. Given that the borings were drilled during a period of above-normal rainfall, we have estimated the “normal” SHWT to be at/near elevation +3 feet.
- **Vertical Permeability:** Vertical flow from the bottom of the SMF will be controlled by the vertical permeability of the soil immediately beneath the bottom of the SMF. Based on the results of the falling head permeability tests (Table 1), an average vertical permeability of 27.4 ft/day for Stratum 1 would be reasonable for modeling.
- **Horizontal Permeability:** Horizontal flow from the pond will be through the Stratum 1 soils. The horizontal permeability of Stratum 1 has been estimated based on the results of the vertical permeability tests and extensive experience with similar soils from field permeability tests. While horizontal permeabilities have generally been found to range from 3 to 10 times higher than vertical permeabilities of regional deposits, we recommend that a multiplier of 3 with a factor of safety of 2 be used for design (effectively, a 1.5 multiplier). Therefore, a K_h

value of 41.1 ft/day would be reasonable for modeling the Stratum 1 materials (27.4 ft/day x 1.5).

- **Effective Porosity:** Based on the fines contents of the soils encountered in the test borings, an effective porosity of 0.30 would be appropriate for modeling the Stratum 1 soils.

4.0 REPORT LIMITATIONS

The recommendations submitted are based on the available soil information obtained by Tierra, Inc. and design details furnished by Baskerville-Donovan for the subject project. If there are any revisions to the plans for this project or if deviations from the subsurface conditions noted in this report are encountered during construction, Tierra should be notified immediately to determine if changes in the foundation, or other, recommendations are required. If Tierra is not retained to perform these functions, we cannot be responsible for the impact of such conditions on the performance of the project.

The findings, recommendations, specifications, and professional advice contained herein have been made in accordance with generally accepted professional Geotechnical engineering practices in the local area.

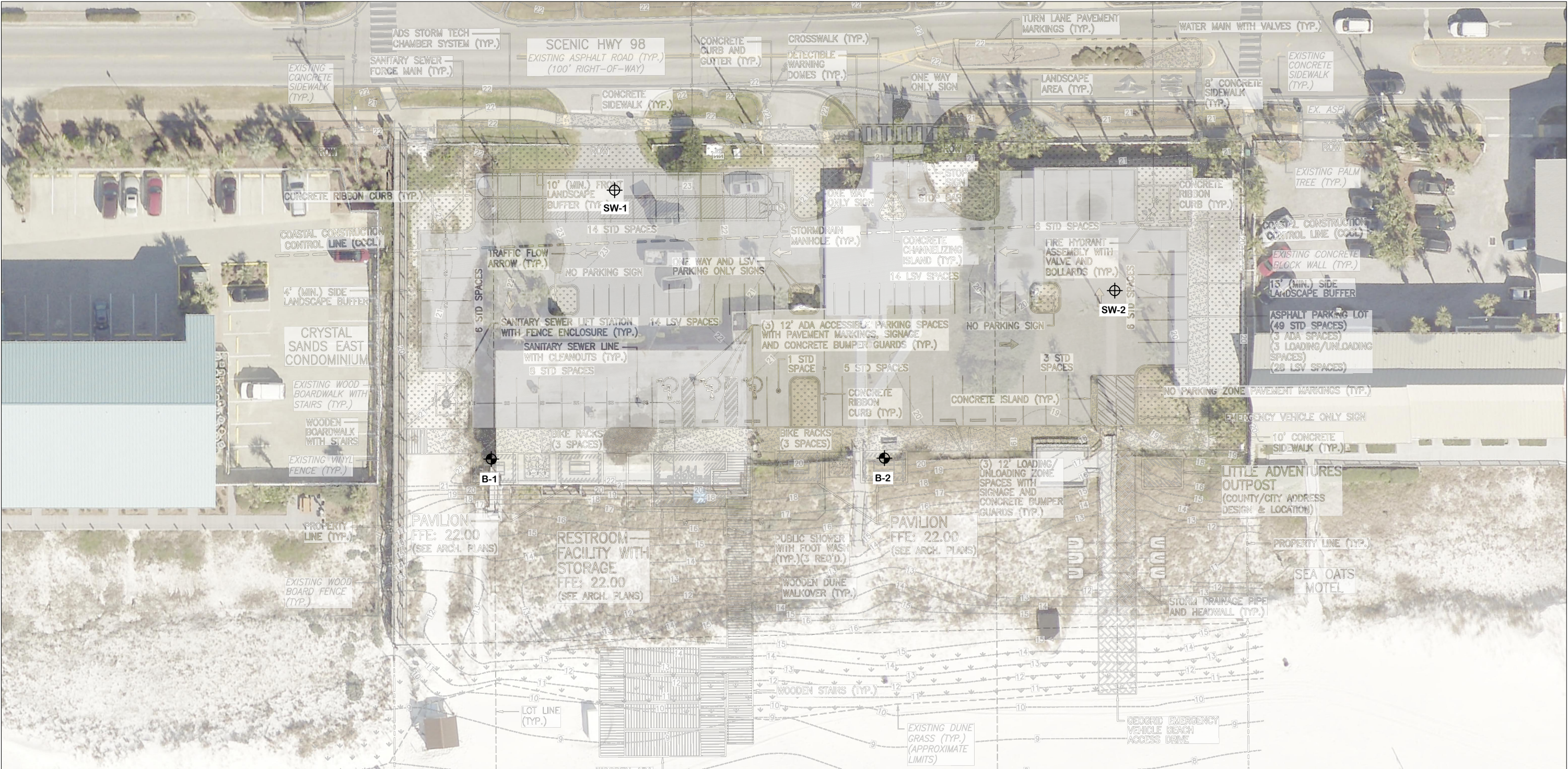
After the plans and specifications are more complete, the Geotechnical engineer should be provided the opportunity to review the final design plans and specifications to assure our engineering recommendations have been properly incorporated into the design documents. At that time, it may be necessary to submit supplementary recommendations. This report has been prepared for the exclusive use of Sam Marshall Architects for the specific application to the subject project.

APPENDIX A

Boring Location Plan and Soil Profiles

Table 1 – Summary of Falling Head Permeability Tests

Falling Head Permeability Test Results



NOTE: BASE MAP PROVIDED BY BASKERVILLE-DONOVAN, INC.

BORING LOCATION PLAN



LEGEND

- ⊕ APPROXIMATE LOCATION OF AUGER BORING
- ⊕ APPROXIMATE LOCATION OF SPT BORING

DRAWN BY:
SW
CHECKED BY:
SJS

APPROVED BY:
SJS
DATE:
AUG 2023

ENGINEER OF RECORD:
SARAH J. SANCHEZ, P.E.
FLORIDA LICENSE NO.:
51033



SCALE:
NOTED

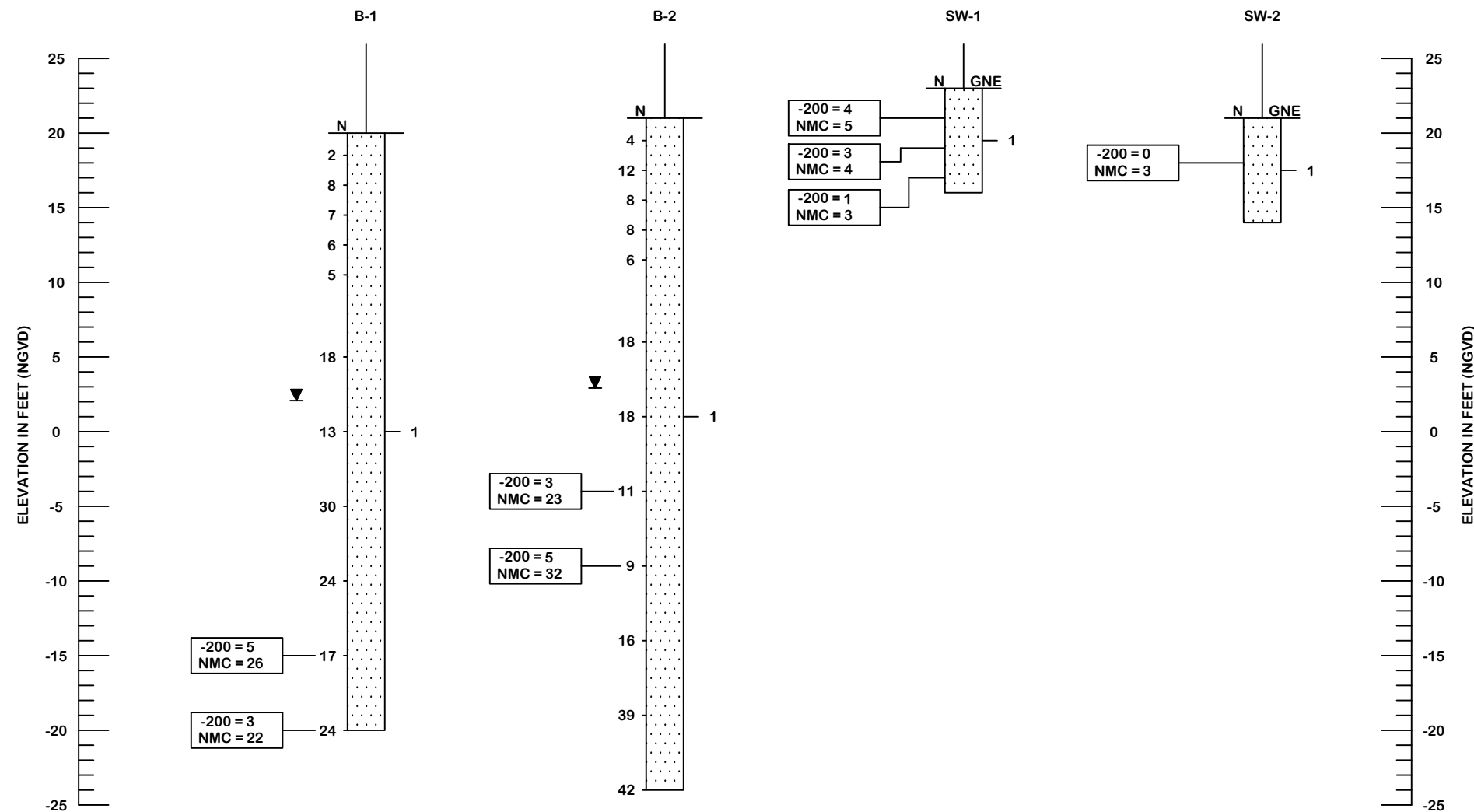
PROJECT NUMBER:
4511-23-038

GEOTECHNICAL ENGINEERING SERVICES
TARPON BEACH FACILITIES
OKALOOSA COUNTY, FLORIDA

SHEET 1

SOIL PROFILES

LEGEND



- 1 [Symbol] WHITE, GRAY, BROWN SAND (SP)
- ▼ GROUNDWATER LEVEL ENCOUNTERED DURING INVESTIGATION
- N SPT N-VALUE IN BLOWS/FOOT FOR 12 INCHES OF PENETRATION (UNLESS OTHERWISE NOTED)
- SP UNIFIED SOIL CLASSIFICATION SYSTEM (ASTM D 2488) GROUP SYMBOL AS DETERMINED BY VISUAL REVIEW AND LABORATORY TESTING ON SELECTED SAMPLES FOR CONFIRMATION OF VISUAL REVIEW.
- GNE GROUNDWATER TABLE NOT ENCOUNTERED
- 200 PERCENT PASSING #200 SIEVE
- NMC NATURAL MOISTURE CONTENT (%)
- NOTE: ELEVATIONS OBTAINED FROM GOOGLE EARTH

SAFETY HAMMER	
GRANULAR MATERIALS- RELATIVE DENSITY	SPT N-VALUE (BLOWS/FT.)
VERY LOOSE	LESS THAN 4
LOOSE	4 TO 10
MEDIUM	10 TO 30
DENSE	30 TO 50
VERY DENSE	GREATER THAN 50
SILTS AND CLAYS CONSISTENCY	SPT N-VALUE (BLOWS/FT.)
VERY SOFT	LESS THAN 2
SOFT	2 TO 4
FIRM	4 TO 8
STIFF	8 TO 15
VERY STIFF	15 TO 30
HARD	GREATER THAN 30

DRAWN BY:
SW

CHECKED BY:
SJS

APPROVED BY:
SJS

DATE:
AUG 2023

ENGINEER OF RECORD:
SARAH J. SANCHEZ, P.E.
FLORIDA LICENSE NO.:
51033



SCALE:
NOTED

PROJECT NUMBER:
4511-23-038

GEOTECHNICAL ENGINEERING SERVICES
TARPON BEACH FACILITIES
OKALOOSA COUNTY, FLORIDA

SHEET 2

TABLE 1
SUMMARY OF LABORATORY SOIL PERMEABILITY TESTS (FALLING HEAD METHOD)
TARPON BEACH FACILITIES
WALTON COUNTY, FLORIDA
TIERRA PROJECT NO. 4511-23-038

Soil Stratum Number ⁽¹⁾	Boring	Sample Elevation (ft. NAVD 88) ⁽²⁾	Sample Description	% Fines	Dry Density (pcf)	Vertical Permeability (ft/day)
1	SW-1	21 - 18	White, Gray, Brown SAND (SP)	3	104	15.7
1	SW-1	18 - 16	White, Gray, Brown SAND (SP)	1	102	26.5
1	SW-2	21 - 17	White, Gray, Brown SAND (SP)	0	97	40 ⁽³⁾

Notes: (1) See Soil Profiles (Appendix A).

(2) Ground surface elevations obtained from Google Earth

(3) Permeability value limited to 40 ft/day due to test method recommended limitations

FALLING HEAD PERMEABILITY TEST



Project Name: Tarpon Beach Facilities, Walton County, FL
Project Number: 4511-23-038 **Sample Location:** SW-1 @ 2.5 ft - 5 ft
Sample Description: White, Gray, Brown SAND (Stratum 1)
Remolded Compactive Effort: Standard **No. of Layers:** 3 **Blows Per Layer:** 15
Date: 8/14/2023 **Technician:** BC **Soil Classification:** SP

- Assumes:**
1. Standard Proctor Mold (L = 4.5 in.)
 2. 1/2 Inch Diameter Tubing

$$K_v = \frac{(2.3 \cdot a \cdot L) \log(h_1/h_2)}{(A) (\Delta t)}$$

where a = 1.267 cm (area of tube)
 L = 4.584 in. (height of soil sample)
 = 11.64336 cm (L = 4.5 in. for full mold)
 A = 12.57 sq. in. (area of Proctor mold)
 = 81.1 sq. cm

Head (ft)	Time (sec)		Avg. Time (sec)
	Run #1	Run #2	
7	0	0	0
6	4.5	4.4	4.5
5	10	10	10.0
4	17.4	17	17.2
3	26.9	36.6	31.8
2	40.5	40.1	40.3
1	64.1	63.7	63.9

h1	h2	Delta t (sec)	K _v (cm/sec)
7	1	63.9	5.5E-03
6	1	59.45	5.5E-03
7	2	40.3	5.6E-03

Average K _v =	5.6E-03 cm/sec
	15.7 ft/day

Remolded Test Sample Density

Can #	2R
Wt. Can + Wet Soil, g	416.0
Wt. Can + Dry Soil, g	398.6
Wt. of Water, g	17.4
Wt. of Can, g	259.3
Wt. of Dry Soil, g	139.3
Moisture Content, %	12.5%
Wt. Wet Soil + Mold, lbs.	8.4
Wt. of Mold, lbs.	4.5
Wt. of Wet Soil, lbs.	3.9
Wet Density, pcf	116.4
Dry Density, pcf	103.5

Fines Content of Test Sample

Can #	45
Wt. Can + Wet Soil, g	252.4
Wt. Can + Dry Soil, g	247.3
Wt. of Water, g	5.2
Wt. of Can, g	121.8
Wt. of Dry Soil, g	125.5
Wt. of Dry Sample After Washing + Can, g	243.8
Wt. of Soil Lost During Washing, g	3.4
Moisture Content, %	4.1%
Percent Fines, %	2.7%

FALLING HEAD PERMEABILITY TEST



Project Name: Tarpon Beach Facilities, Walton County, FL
Project Number: 4511-23-038 **Sample Location:** SW-1 @ 5 ft -7 ft
Sample Description: White, Gray, Brown SAND (Stratum 1) **Soil Classification:** SP
Remolded Compactive Effort: Standard **No. of Layers:** 3 **Blows Per Layer:** 15

Date: 8/14/2023

Technician: BC

- Assumes:**
1. Standard Proctor Mold (L = 4.5 in.)
 2. 1/2 Inch Diameter Tubing

$$K_v = \frac{(2.3 \cdot a \cdot L) \log(h_1/h_2)}{(A) (\Delta t)}$$

where a = 1.267 cm (area of tube)
 L = 4.584 in. (height of soil sample)
 = 11.64336 cm (L = 4.5 in. for full mold)
 A = 12.57 sq. in. (area of Proctor mold)
 = 81.1 sq. cm

Head (ft)	Time (sec)		Avg. Time (sec)
	Run #1	Run #2	
7	0	0	0
6	2.9	2.9	2.9
5	6.4	6.3	6.4
4	10.8	10.3	10.6
3	16.6	15.8	16.2
2	24.8	23.8	24.3
1	38.5	37.3	37.9

h1	h2	Delta t (sec)	K _v (cm/sec)
7	1	37.9	9.3E-03
6	1	35	9.3E-03
7	2	24.3	9.4E-03

Average K _v =	9.3E-03 cm/sec
	26.5 ft/day

Remolded Test Sample Density

Can #	1R
Wt. Can + Wet Soil, g	387.5
Wt. Can + Dry Soil, g	367.7
Wt. of Water, g	19.8
Wt. of Can, g	256.3
Wt. of Dry Soil, g	111.4
Moisture Content, %	17.8%
Wt. Wet Soil + Mold, lbs.	8.5
Wt. of Mold, lbs.	4.5
Wt. of Wet Soil, lbs.	4.0
Wet Density, pcf	119.7
Dry Density, pcf	101.6

Fines Content of Test Sample

Can #	46
Wt. Can + Wet Soil, g	243.4
Wt. Can + Dry Soil, g	239.4
Wt. of Water, g	4.0
Wt. of Can, g	120.2
Wt. of Dry Soil, g	119.2
Wt. of Dry Sample After Washing + Can, g	238.5
Wt. of Soil Lost During Washing, g	0.9
Moisture Content, %	3.4%
Percent Fines, %	0.8%

FALLING HEAD PERMEABILITY TEST



Project Name: Tarpon Beach Facilities, Walton County, FL
Project Number: 4511-23-038 **Sample Location:** SW-2 @ 0 ft - 4.25 ft
Sample Description: White, Gray, Brown SAND (Stratum 1)
Remolded Compactive Effort: Standard **No. of Layers:** 3 **Blows Per Layer:** 15
Date: 8/14/2023 **Technician:** BC **Soil Classification:** SP

- Assumes:**
1. Standard Proctor Mold (L = 4.5 in.)
 2. 1/2 Inch Diameter Tubing

$$K_v = \frac{(2.3 \cdot a \cdot L) \log (h_1/h_2)}{(A) (\Delta t)}$$

where a = 1.267 cm (area of tube)
 L = 4.584 in. (height of soil sample)
 = 11.64336 cm (L = 4.5 in. for full mold)
 A = 12.57 sq. in. (area of Proctor mold)
 = 81.1 sq. cm

Head (ft)	Time (sec)		Avg. Time (sec)
	Run #1	Run #2	
7	0	0	0
6	1.5	1.3	1.4
5	3.2	2.9	3.1
4	5.1	4.8	5.0
3	7.5	7.1	7.3
2	11	10.5	10.8
1	17	16.9	17.0

h1	h2	Delta t (sec)	K _v (cm/sec)
7	1	16.95	2.1E-02
6	1	15.55	2.1E-02
7	2	10.75	2.1E-02

Average K _v =	2.1E-02 cm/sec
	59.5 ft/day

Remolded Test Sample Density

Can #	2R
Wt. Can + Wet Soil, g	386.8
Wt. Can + Dry Soil, g	370.5
Wt. of Water, g	16.3
Wt. of Can, g	259.3
Wt. of Dry Soil, g	111.2
Moisture Content, %	14.7%
Wt. Wet Soil + Mold, lbs.	8.2
Wt. of Mold, lbs.	4.5
Wt. of Wet Soil, lbs.	3.7
Wet Density, pcf	111.0
Dry Density, pcf	96.8

Fines Content of Test Sample

Can #	47
Wt. Can + Wet Soil, g	251.0
Wt. Can + Dry Soil, g	246.8
Wt. of Water, g	4.2
Wt. of Can, g	120.4
Wt. of Dry Soil, g	126.4
Wt. of Dry Sample After Washing + Can, g	246.4
Wt. of Soil Lost During Washing, g	0.3
Moisture Content, %	3.4%
Percent Fines, %	0.3%