

Caswell Beach Dune Infiltration System: Successful Case Study for Innovative Coastal Resiliency Solutions

Marc T. Horstman, PE, PH, CFM
Project Manager



Located in
Brunswick County

Population:



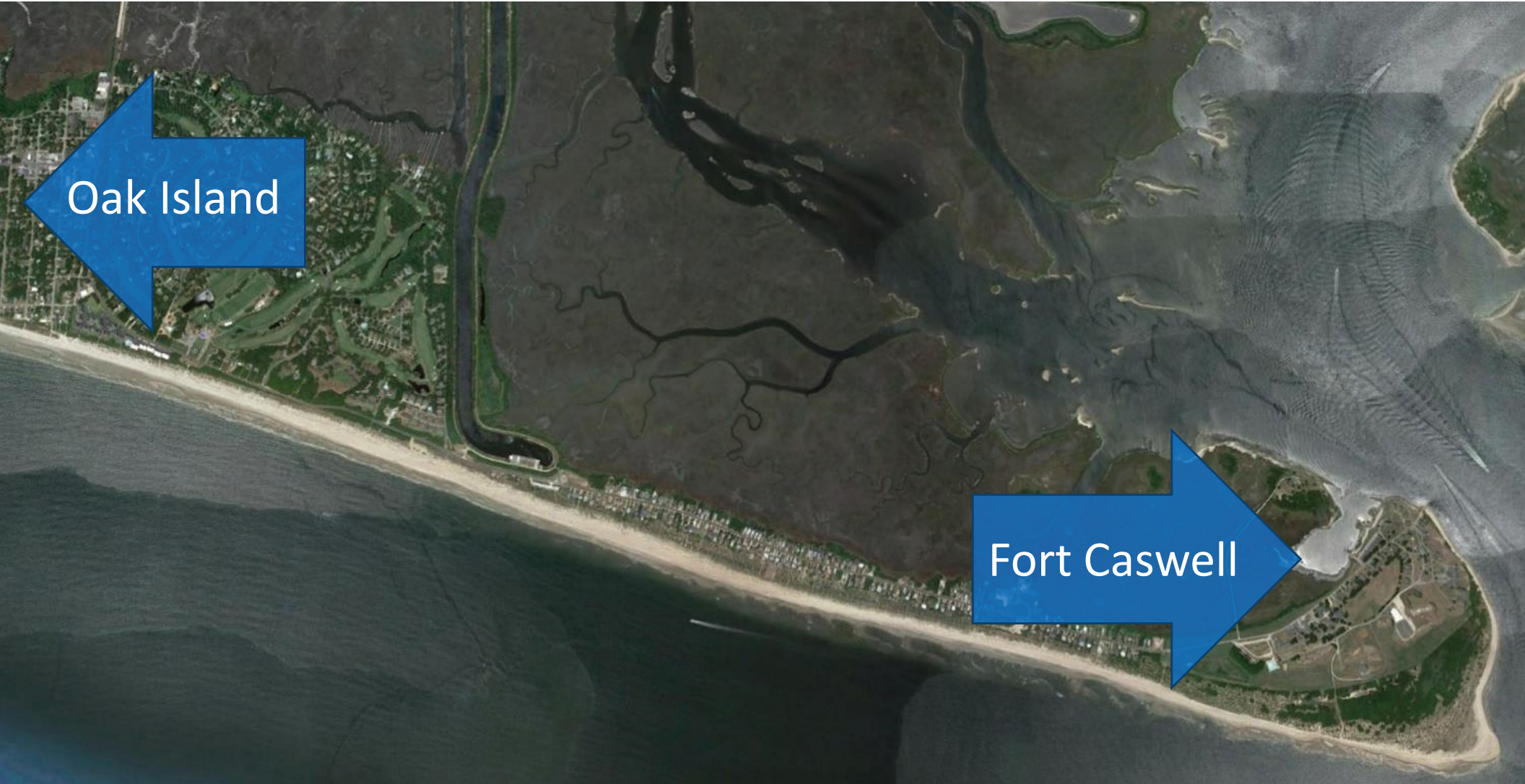
Year
round



Seasonal
peak

Home of the Oak Island
Lighthouse, a Coast Guard
Station, and NC Baptist
Assembly





Oak Island

Fort Caswell





EMERGENCY ACCESS ISSUES



6"

loss of vehicle control
and stalling

12"

vehicle floats

Severe storm events >6"

Moderate storm events <6"






Home > Local News > Bacteria levels lead to swimming alert at Carolina Beach

LOCAL NEWS NEW HANOVER

BACTERIA LEVELS LEAD TO SWIMMING ALERT AT CAROLINA BEACH

By WWAY News - July 6, 2017 12:00 AM



ATTENTION
SWIMMING IN THIS AREA
IS NOT RECOMMENDED.
BACTERIA TESTING
INDICATES LEVELS OF
CONTAMINATION THAT
MAY BE HAZARDOUS TO
YOUR HEALTH. THIS
ADVISORY AFFECTS
WATERS WITHIN 200'
OF THIS SIGN.

OFFICE OF THE STATE HEALTH DIRECTOR

NC STATE

EXTENSION

STUDY

Dune Infiltration Systems for Reducing Stormwater Discharge to Coastal Recreational Beaches

Flow

Site M
96%

Site K
80%

**Bacteria
Concentration**

98%

FIRST STEP: FEASIBILITY STUDY

Town of Caswell Beach
Caswell Beach Road Stormwater Management



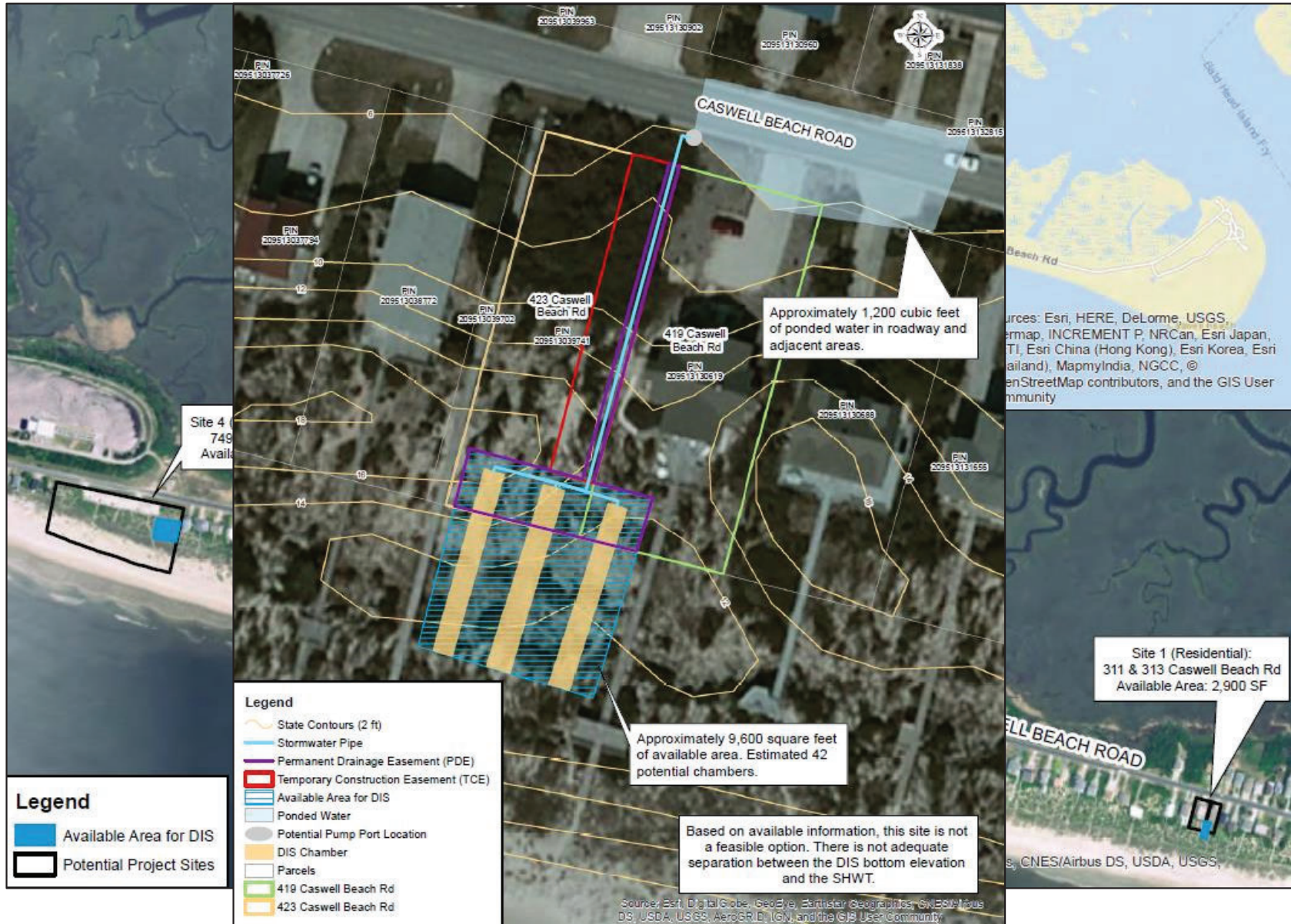
Dune Infiltration System Feasibility Project

Final Submittal
January 18, 2018

Prepared by
W. K. Dickson & Co., Inc.
Raleigh, NC
919-782-0495
NC License No. F-0374



WILL IT FIT WITH EXISTING SPACE?





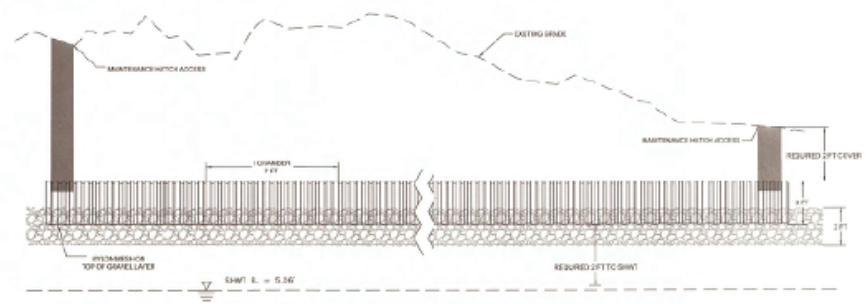


REVISION RECORD	DATE

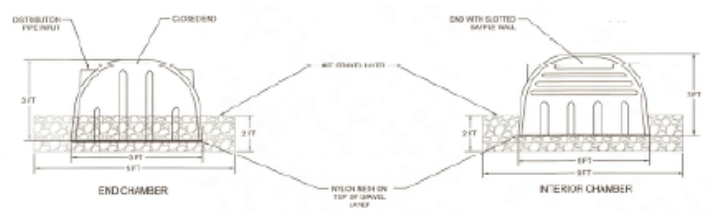
PROJECT NAME	CUMMILL BEACH BOLD DUNE INFILTRATION SYSTEM
DRAWING TITLE	DUNE INFILTRATION SYSTEM DETAILS

PROJECT NO.	20170190.06.PA
DATE	02/14/19
SCALE	AS SHOWN

FINAL DESIGN - NOT RELEASE FOR CONSTRUCTION



1 DUNE INFILTRATION PROFILE DETAIL
 NOT TO SCALE

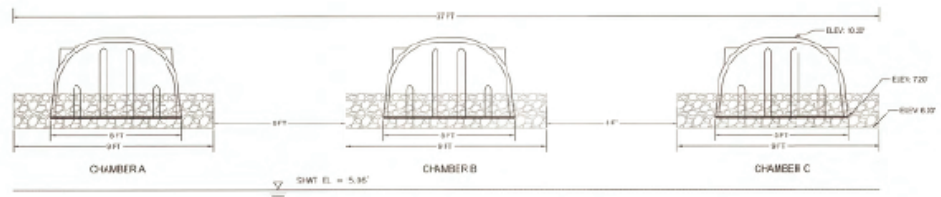


2 DUNE INFILTRATION CHAMBER DETAIL
 NOT TO SCALE

Inflow capacity: 1000 gpm

105 total chambers

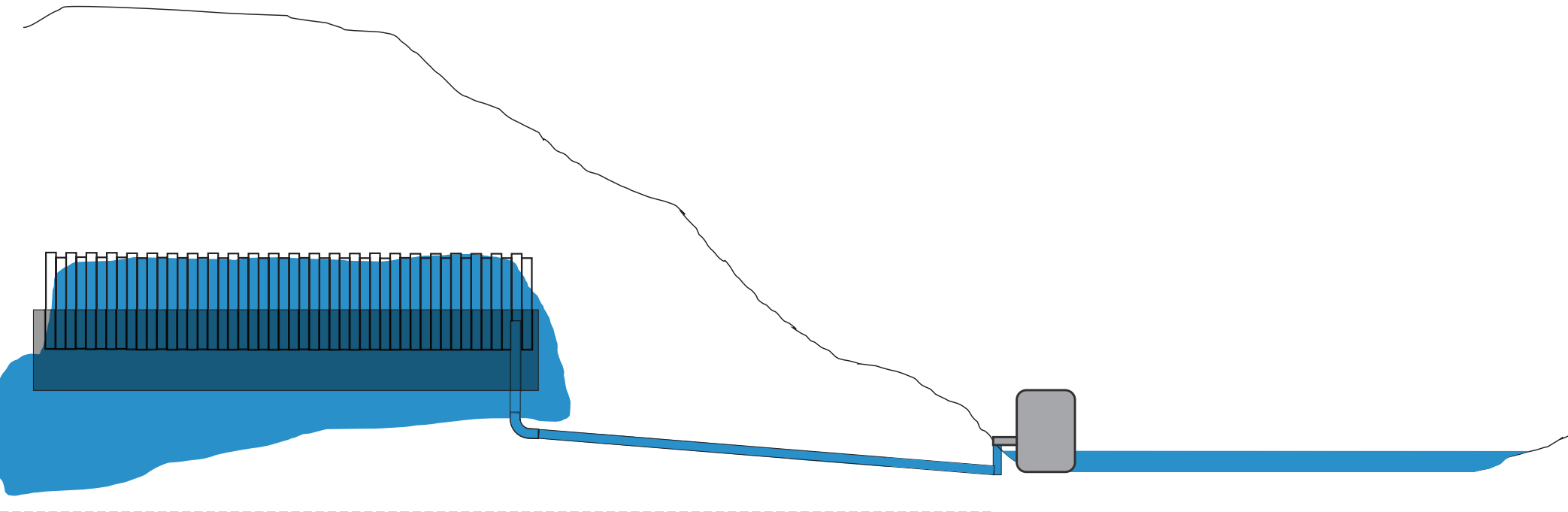
- DESIGN NOTE:**
- CHAMBER MANUFACTURER SHALL PROVIDE SHOP DRAWINGS INDICATING HOW THE FOLLOWING COMPONENTS SHALL BE INCLUDED:
 - DISTRIBUTION PIPE INPUT
 - MAINTENANCE HATCH ACCESS
 - CONNECTION OF CHAMBERS



3 DUNE INFILTRATION SECTION DETAIL
 NOT TO SCALE

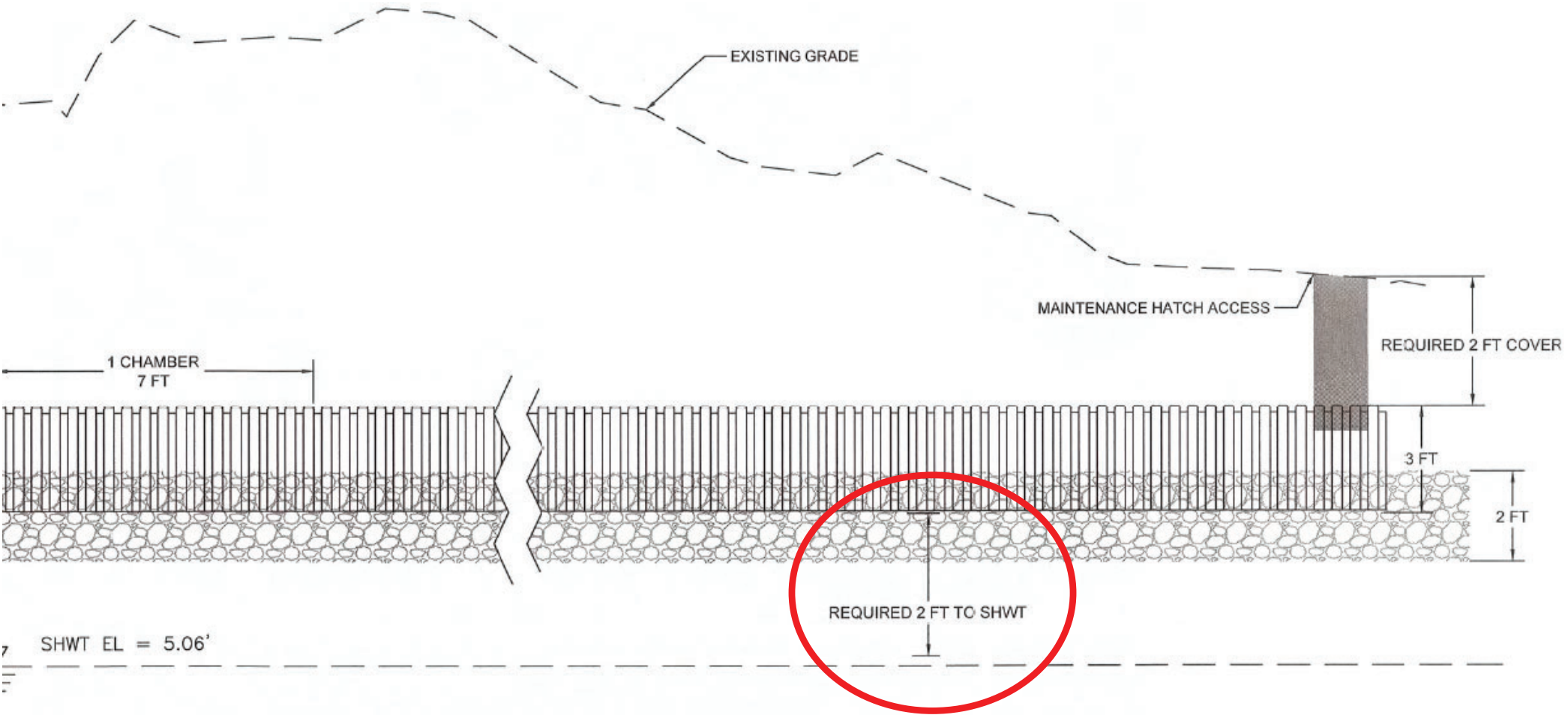
HOW IT WORKS

Caswell Beach Dune Infiltration System



Seasonally high water table

CONSIDERATIONS



1
9

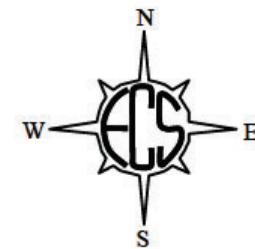
DUNE INFILTRATION PROFILE DETAIL

NOT TO SCALE

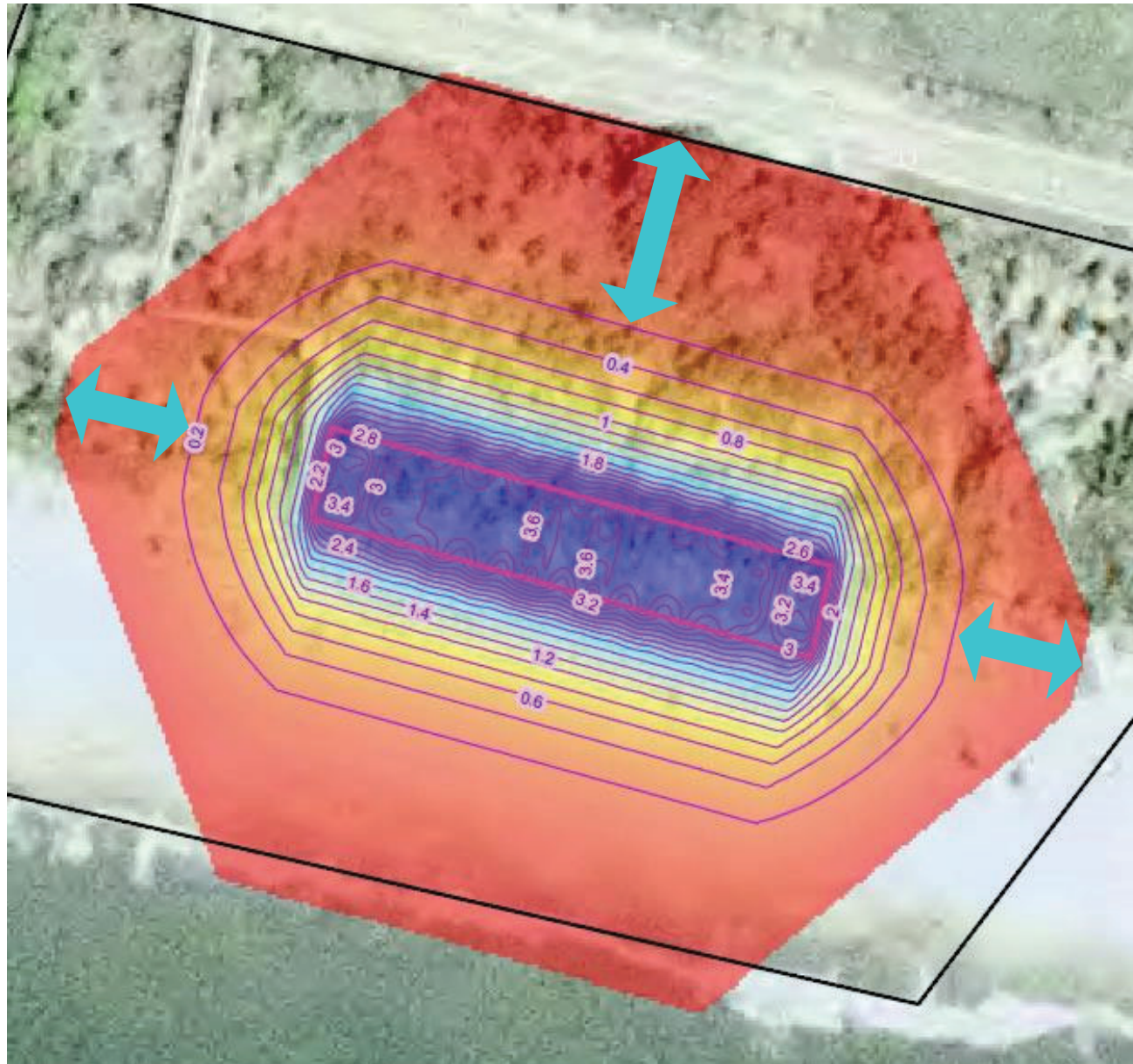
CONSIDERATIONS



Location	SHWT	Groundwater
B-1	82 inches	96 inches
B-2	84 inches	102 inches
B-3	66 inches	84 inches
B-4	80 inches	94 inches
B-5	90 inches	105 inches
B-6	82 inches	100 inches
B-7	80 inches	96 inches
B-8	82 inches	96 inches



CONSIDERATIONS



CONSIDERATIONS

WiRO for
Caswell Beach

VARIANCE CRC-VR-18-06
Permit Number CasB 18-01

CAMA MINOR DEVELOPMENT PERMIT

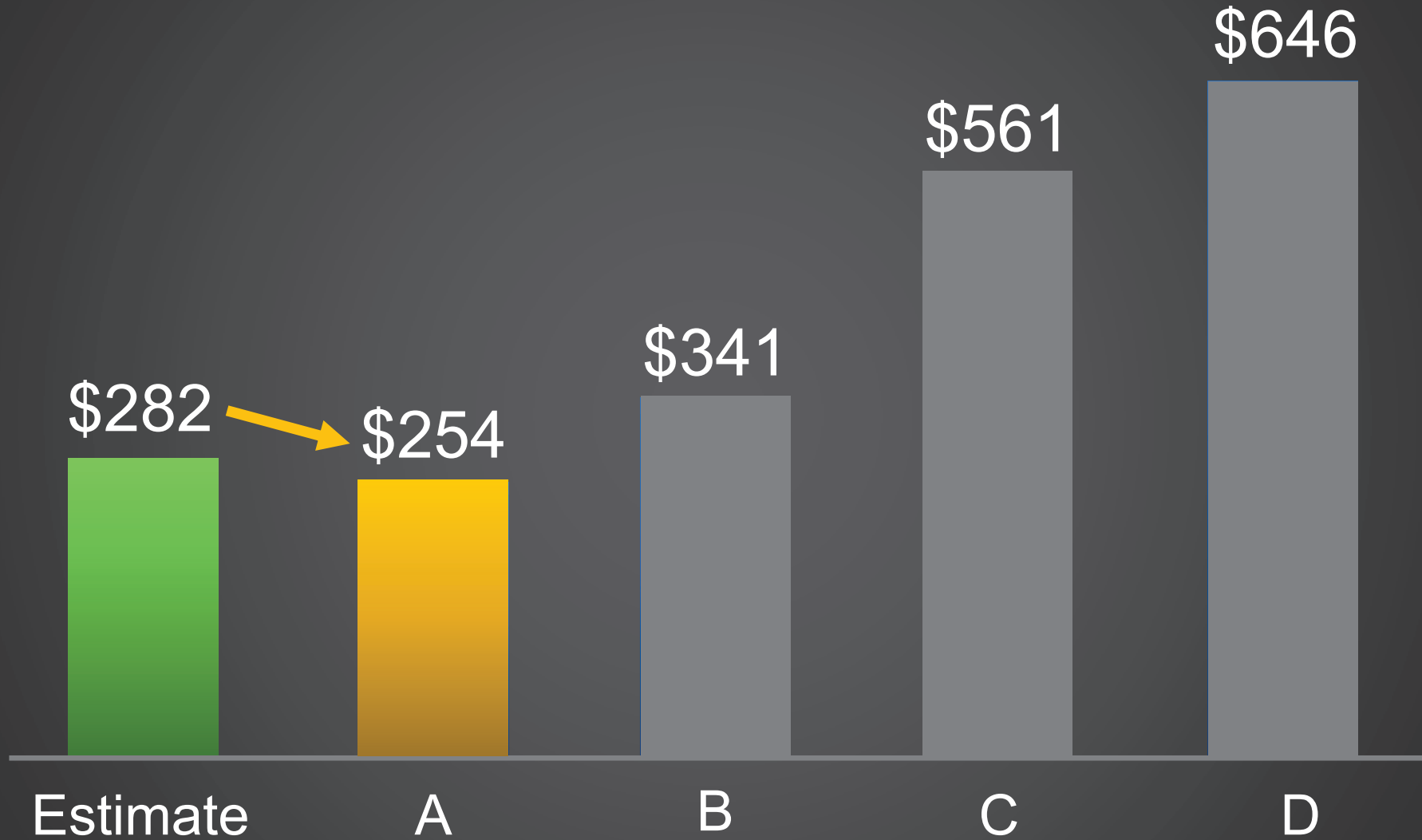


as authorized by the State of North Carolina, Department of Environment,
and Natural Resources and the Coastal Resources Commission for development
in an area of environment concern pursuant to Section 113A-118 of the
General Statutes, "Coastal Area Management"

So, what
about the
Cost?



Construction Bids (in thousands)







WATER • SEWER
NC & SC Licensed
HICKMAN
UTILITIES
STORM WATER CLEARING
Bladenboro, NC













CASWELL BEACH DUNE INFILTRATION SYSTEM







SOUTHPORT FIRE DEPT.

TANKER 373

Serving Our Community Since 1893

DIAL 911

CD1000

PRIME

godwin
a system based

24

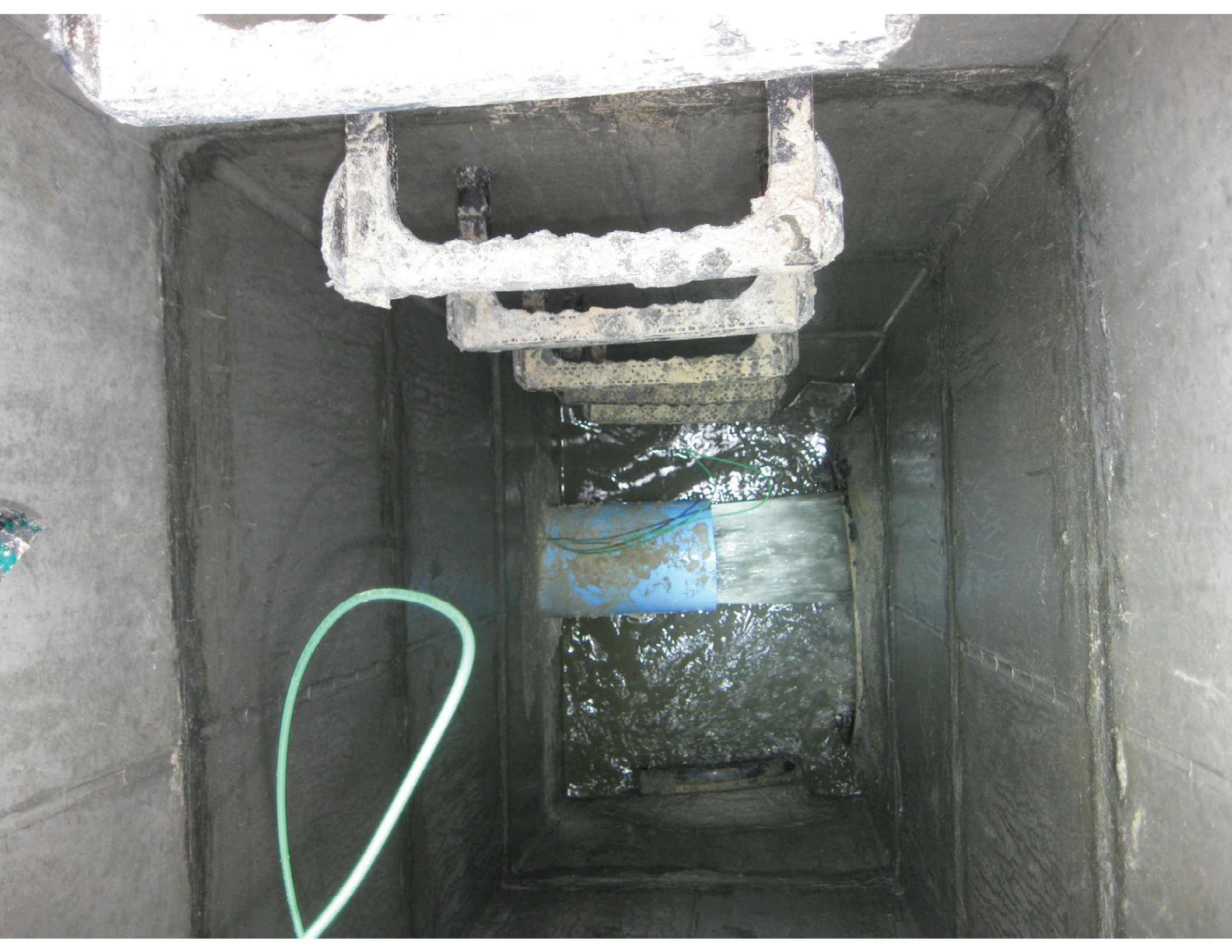
WWW.WORKS

SOUTHPORT FIRE DEPT.
2019 PURCHASE OF TAN

NAME	DATE	AMOUNT	TOTAL
CAPT. CHADLER	1/13/19	1,135	1,135
CONTRACTOR 1	1/13/19	1,135	2,270
CONTRACTOR 2	1/13/19	1,135	3,405
CONTRACTOR 3	1/13/19	1,135	4,540
CONTRACTOR 4	1/13/19	1,135	5,675
CONTRACTOR 5	1/13/19	1,135	6,810
CONTRACTOR 6	1/13/19	1,135	7,945
CONTRACTOR 7	1/13/19	1,135	9,080
CONTRACTOR 8	1/13/19	1,135	10,215
CONTRACTOR 9	1/13/19	1,135	11,350
CONTRACTOR 10	1/13/19	1,135	12,485
CONTRACTOR 11	1/13/19	1,135	13,620
CONTRACTOR 12	1/13/19	1,135	14,755
CONTRACTOR 13	1/13/19	1,135	15,890
CONTRACTOR 14	1/13/19	1,135	17,025
CONTRACTOR 15	1/13/19	1,135	18,160
CONTRACTOR 16	1/13/19	1,135	19,295
CONTRACTOR 17	1/13/19	1,135	20,430
CONTRACTOR 18	1/13/19	1,135	21,565
CONTRACTOR 19	1/13/19	1,135	22,700
CONTRACTOR 20	1/13/19	1,135	23,835
CONTRACTOR 21	1/13/19	1,135	24,970
CONTRACTOR 22	1/13/19	1,135	26,105
CONTRACTOR 23	1/13/19	1,135	27,240
CONTRACTOR 24	1/13/19	1,135	28,375
CONTRACTOR 25	1/13/19	1,135	29,510
CONTRACTOR 26	1/13/19	1,135	30,645
CONTRACTOR 27	1/13/19	1,135	31,780
CONTRACTOR 28	1/13/19	1,135	32,915
CONTRACTOR 29	1/13/19	1,135	34,050
CONTRACTOR 30	1/13/19	1,135	35,185
CONTRACTOR 31	1/13/19	1,135	36,320
CONTRACTOR 32	1/13/19	1,135	37,455
CONTRACTOR 33	1/13/19	1,135	38,590
CONTRACTOR 34	1/13/19	1,135	39,725
CONTRACTOR 35	1/13/19	1,135	40,860
CONTRACTOR 36	1/13/19	1,135	41,995
CONTRACTOR 37	1/13/19	1,135	43,130
CONTRACTOR 38	1/13/19	1,135	44,265
CONTRACTOR 39	1/13/19	1,135	45,400
CONTRACTOR 40	1/13/19	1,135	46,535
CONTRACTOR 41	1/13/19	1,135	47,670
CONTRACTOR 42	1/13/19	1,135	48,805
CONTRACTOR 43	1/13/19	1,135	49,940
CONTRACTOR 44	1/13/19	1,135	51,075
CONTRACTOR 45	1/13/19	1,135	52,210
CONTRACTOR 46	1/13/19	1,135	53,345
CONTRACTOR 47	1/13/19	1,135	54,480
CONTRACTOR 48	1/13/19	1,135	55,615
CONTRACTOR 49	1/13/19	1,135	56,750
CONTRACTOR 50	1/13/19	1,135	57,885
CONTRACTOR 51	1/13/19	1,135	59,020
CONTRACTOR 52	1/13/19	1,135	60,155
CONTRACTOR 53	1/13/19	1,135	61,290
CONTRACTOR 54	1/13/19	1,135	62,425
CONTRACTOR 55	1/13/19	1,135	63,560
CONTRACTOR 56	1/13/19	1,135	64,695
CONTRACTOR 57	1/13/19	1,135	65,830
CONTRACTOR 58	1/13/19	1,135	66,965
CONTRACTOR 59	1/13/19	1,135	68,100
CONTRACTOR 60	1/13/19	1,135	69,235
CONTRACTOR 61	1/13/19	1,135	70,370
CONTRACTOR 62	1/13/19	1,135	71,505
CONTRACTOR 63	1/13/19	1,135	72,640
CONTRACTOR 64	1/13/19	1,135	73,775
CONTRACTOR 65	1/13/19	1,135	74,910
CONTRACTOR 66	1/13/19	1,135	76,045
CONTRACTOR 67	1/13/19	1,135	77,180
CONTRACTOR 68	1/13/19	1,135	78,315
CONTRACTOR 69	1/13/19	1,135	79,450
CONTRACTOR 70	1/13/19	1,135	80,585
CONTRACTOR 71	1/13/19	1,135	81,720
CONTRACTOR 72	1/13/19	1,135	82,855
CONTRACTOR 73	1/13/19	1,135	83,990
CONTRACTOR 74	1/13/19	1,135	85,125
CONTRACTOR 75	1/13/19	1,135	86,260
CONTRACTOR 76	1/13/19	1,135	87,395
CONTRACTOR 77	1/13/19	1,135	88,530
CONTRACTOR 78	1/13/19	1,135	89,665
CONTRACTOR 79	1/13/19	1,135	90,800
CONTRACTOR 80	1/13/19	1,135	91,935
CONTRACTOR 81	1/13/19	1,135	93,070
CONTRACTOR 82	1/13/19	1,135	94,205
CONTRACTOR 83	1/13/19	1,135	95,340
CONTRACTOR 84	1/13/19	1,135	96,475
CONTRACTOR 85	1/13/19	1,135	97,610
CONTRACTOR 86	1/13/19	1,135	98,745
CONTRACTOR 87	1/13/19	1,135	99,880
CONTRACTOR 88	1/13/19	1,135	101,015
CONTRACTOR 89	1/13/19	1,135	102,150
CONTRACTOR 90	1/13/19	1,135	103,285
CONTRACTOR 91	1/13/19	1,135	104,420
CONTRACTOR 92	1/13/19	1,135	105,555
CONTRACTOR 93	1/13/19	1,135	106,690
CONTRACTOR 94	1/13/19	1,135	107,825
CONTRACTOR 95	1/13/19	1,135	108,960
CONTRACTOR 96	1/13/19	1,135	110,095
CONTRACTOR 97	1/13/19	1,135	111,230
CONTRACTOR 98	1/13/19	1,135	112,365
CONTRACTOR 99	1/13/19	1,135	113,500
CONTRACTOR 100	1/13/19	1,135	114,635



Godwin Pumps of America









ADDITIONAL RESOURCES

- Storm water Solutions: “Addressing Increasing Coastal Flooding with Dune Infiltration” ([Addressing Increasing Coastal Flooding with Dune Infiltration | SWS \(estormwater.com\)](#))
- How Does It Work? Dune Infiltration Systems ([Dune Infiltration Systems: How does it work? – YouTube](#))



THANK YOU!

Marc T. Horstman, PE, PH, CFM
Project Manager
mhorstman@wkdickson.com

www.wkdickson.com

