

**BONITA BEACH AND LOVERS KEY BEACH RENOURISHMENT
2018 ANNUAL MONITORING REPORT**



DEP Permit 0311811-001-JC

Prepared for:

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1 INTRODUCTION

In 2014, Lee County completed construction of the Bonita Beach and Lovers Key Beach Renourishment Project (Project). The contractor, Orion Marine Construction, Inc. (Orion), mobilized to the work site beginning June 4, 2014. Sand placement began at Bonita Beach on July 13, 2014 and was completed on September 30, 2014. Orion mobilized to Lovers Key and began sand placement on October 1, 2014. The Lovers Key beach fill was completed on December 2, 2014. Approximately 140,200 cubic yards and 342,400 cubic yards were excavated from the Borrow Areas and placed within the permitted limits of the Bonita Beach and Lovers Key beach fills, respectively. All work including final site clean-up and demobilization was completed on December 11, 2014. The post-construction survey was completed by Coastal Engineering Consultants, Inc. (CEC) on January 7, 2015 (CEC, 2015). The first annual monitoring survey was completed by CEC on July 1, 2016 (CEC, 2016). The second annual monitoring survey was completed by CEC on October 17-19, 2017 (CEC, 2018). A location map is presented in Figure 1.

This report summarizes the Project performance and presents the results of the third annual physical monitoring survey completed by CEC between June 28 and July 9, 2018. The physical monitoring survey was completed in accordance with the Physical Monitoring Plan (PMP) dated May 2012 as outlined in the Florida Department of Environmental Protection (FDEP) Permit No. 0311811-001-JC. The timing of PMP activities is presented in Table 1 below.

Table 1. Timing of Monitoring Activities.

Monitoring Activity	Pre-Con	Post-Con	1st Year Mon	2nd Year Mon	3rd Year Mon	5th Year Mon
Beach Profiles	✓	✓	✓	✓	✓	✓
Borrow Area Survey	✓	✓	✓	-	✓	✓
Big Hickory Pass Ebb Shoal	-	✓	✓	-	✓	✓
Sediment Analysis	-	✓	-	-	-	-
Report	-	✓	✓	✓	✓	✓

(-) Indicates data collection is not proposed for this time period.

It should be noted that due to the 2017 construction of the Big Carlos Pass Dredging Project (Permit No. 0332643-003-JN) located within this Project’s May 2012 PMP limits (R-205 to R-235), the Big Carlos Pass Project PMP was updated in November 2016 to include monitoring of the R-205 to R-210 segment. As a result, the shoreline change and beach volume change analyses between R-205 and R-210 are no longer included in the Lovers Key and Bonita Beach Monitoring Reports.

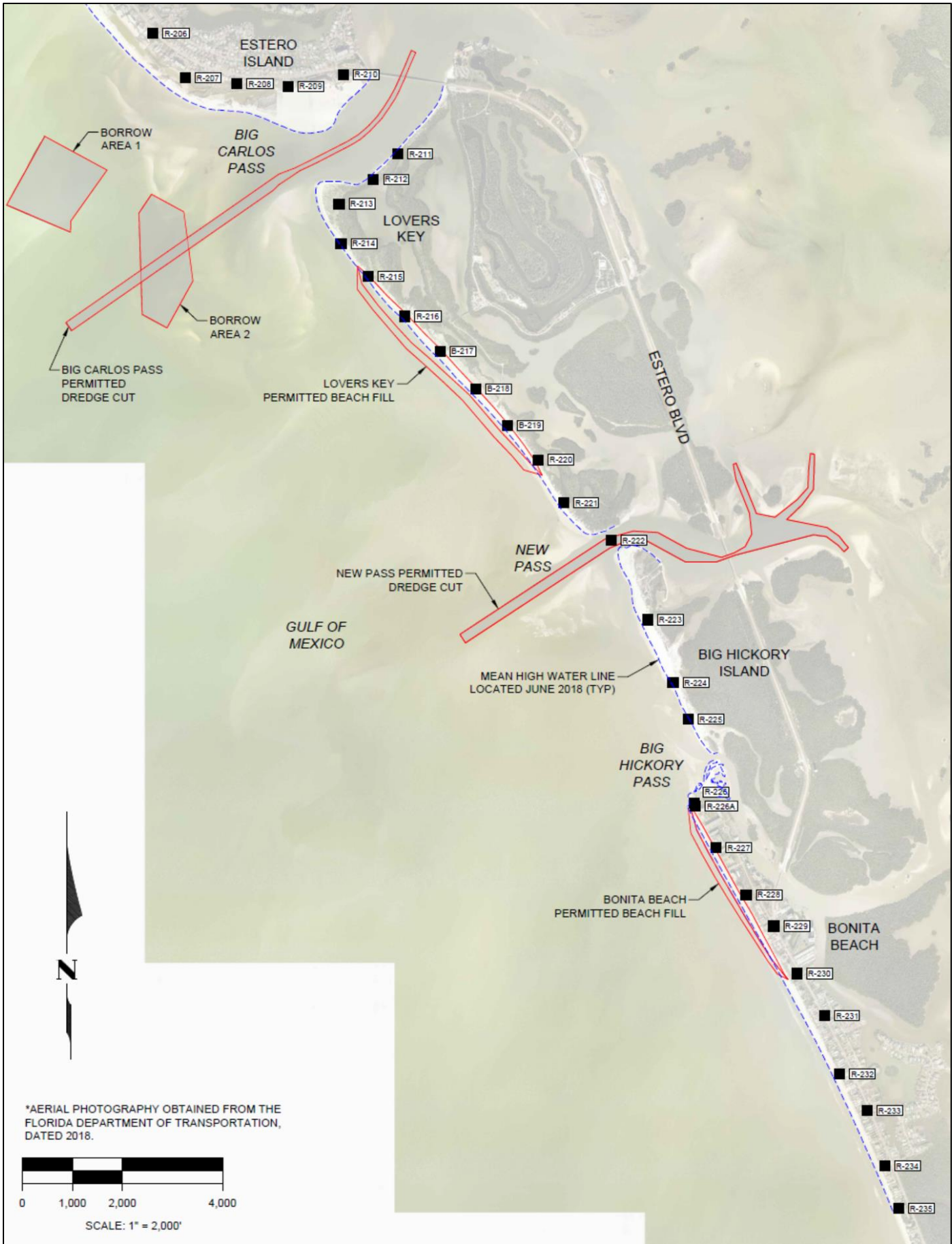


Figure 1. Location Map.

1.1 Bonita Beach Project History and Design

The original Bonita Beach restoration project took place in 1995 and the first maintenance nourishment was completed in May 2004. The 2004 maintenance design extended the shoreline seaward an average of 115 feet as measured from the surveyed 2001 shoreline with an anticipated design fill life of approximately 6 years. Design documentation from that effort did not indicate specific dimensions or fill quantities for a design minimum beach/berm or advance maintenance fill, although it is assumed that 115-foot width was based on some combination of a storm damage reduction berm buffered by sacrificial advanced maintenance. As part of the design of the Project, Coastal Technology Corporation (Coastal Tech) completed a review of the prior Bonita Beach project performance that indicated *additional* advanced fill was not warranted. Although there was a minor erosional ‘hotspot’ located at R-227, the previous maintenance project had generally performed as expected (Coastal Tech, 2012).

The Bonita Beach construction template proposed (Coastal Tech, 2012) generally consisted of:

- no separate dune feature
- a berm which ranges from 105 feet to 134 feet wide with
 - crest slope of 1 vertical to 200 horizontal (1V:200H)
 - seaward edge of top of berm crest elevation at +4.3 feet NAVD
 - seaward berm face slope of 15H:1V down to the existing profile (modified/flattened from prior 10H:1V design).

1.2 Lovers Key Project History and Design

The Lovers Key initial restoration project was completed in October 2004 as a construction contract extension of the first Bonita Beach maintenance project. The fill template included a 40-foot wide “design beach” width measured from the 2001 shoreline, a seaward slope of 15H:1V to the existing profile and advance maintenance fill placed seaward of the design beach intended to maintain the design beach for 8 years. The initial project generally performed as expected, except for an erosional ‘hotspot’ generally centered around R-216.5 where the shoreline had receded landward of the design beach (Coastal Tech, 2012).

The Lovers Key construction template proposed (Coastal Tech, 2012) generally consisted of:

- a small dune feature only at R-215 with an elevation of +4.9 feet NAVD
- berm design with:
 - width varying from 49 feet to 151 feet from pre-project MWH
 - crest slope of 1 vertical to 200 horizontal (1V:200H)
 - seaward edge of top of berm crest elevation at +2.9 feet NAVD
 - with a seaward berm face slope of 15H:1V down to the existing profile
 - additional “weighted” advanced maintenance volume centered roughly on R-217.

The Lovers Key full advanced maintenance volume was included in the Project design and in the required regulatory approvals, but the final volume placed was field adjusted at the time of construction based on actual pre-project beach conditions, the Project funds available following

receipt and evaluation of the construction bids, and the volume of sand available in the borrow areas.

1.3 Adjacent Coastal Projects

Between June 1 and September 29, 2017, Coastal Dredging Company Inc., dredged Big Carlos Pass and placed approximately 58,900 cubic yards of fill on Estero Island between approximately R-203 and R-205 (HME, 2018).

Between September 29 and October 30, 2017, the same Contractor dredged New Pass and placed approximately 68,300 cubic yards of fill on Big Hickory Island between R-222.5 and R-224.5.

2 SCOPE OF WORK

Beach Profiles: Establish temporary horizontal and vertical control, one-time, on the uplands within the Project. Conduct 3rd year beach profile monitoring surveys of the active beach zone along the shoreline at each reference monument (R monument) from R-211 to R-235. Additional profiles at half monuments within the Lovers Key fill limits (R-214.5 to R-220.5) and within the Bonita Beach fill limits (R-226A to R-230) will be included to provide increased detail on Project performance. Perform analyses of shoreline and volumetric change within the surveyed area in accordance with the agency approved plan.

Borrow Areas: Use traditional hydrographic survey methods to collect cross section data for Borrow Areas 1 and 2 in accordance with the agency approved plan.

Big Hickory Pass Ebb Tidal Shoal: Use traditional hydrographic survey methods to collect profile data for the Big Hickory Pass Ebb Tidal Shoal in accordance with the agency approved plan.

Physical Monitoring Report: Prepare and submit to the agencies the 3rd year Physical Monitoring Report within 90 days following completion of the 3rd year monitoring survey. The report shall include:

- signed and sealed survey report,
- analysis for patterns, trends, or changes between surveys and for cumulative changes over time,
- evaluation of the erosion and accretion rates occurring between the initial post-construction survey, 1st, 2nd and 3rd annual monitoring surveys; and an assessment of the volume of fill remaining within the Project area,
- comparative review of project performance to performance expectations and identification of adverse impacts attributable to the project.

3 EQUIPMENT AND QA/QC PROCEDURES

3.1 Survey Report

The Survey Report is presented in Appendix 1.

3.2 Equipment

The following equipment was utilized for the survey work performed by CEC.

Upland: CEC employed two Trimble R10 Real Time Kinematic (RTK) Global Positioning Systems (GPS) with GLONASS capability for the upland surveys along with a Trimble R8 base receiver installed on an established control point. These systems are capable of delivering RTK positions with coordinate accuracy of $\pm 10\text{mm} + 2\text{ppm}$. The standard 2-meter antenna rod allows for data collection seaward of the MHW line up to 5 feet deep while protecting the equipment from the elements.

Offshore: The CEC survey vessel used for this work was a 20-foot fiberglass hull powered by an outboard. An Innerspace 456 single beam echo sounder was used with a side mounted transducer. The GPS antenna was mounted directly above the transducer. A Trimble R8 GLONASS RTK GPS receiver was integrated with the on-board computer system. The HYPACK 2016 software package was the hydrographic guidance program utilized.

3.3 QA/QC Procedures

CEC employs an advanced QA/QC program to ensure work performed by us meets the FDEP accuracy standards. CEC upland field crews utilize RTK systems for data collection. CEC also incorporates the necessary equipment on the survey vessel to collect bathymetric survey data "Real-Time". To meet the specification calling for an approximate 50-foot overlap in data between the boat and the upland crew, CEC implements the following procedure. Utilizing "Real-Time" data collection, the boat crew immediately accounts for the tide correction, as well as the draft, and reports measured water depth in NAVD88 at each profile with the upland crew. This gives the upland crew, who simultaneously collects the upland and nearshore profile data, the necessary information to achieve the "overlap" specification.

Upland Data Collection: CEC mobilized one operator and GPS rover unit to collect survey data from the approximate MHW line landward while an additional operator and unit collected data just landward of MHW seaward to wading depth or approximately -5 feet NAVD88. The recorded data was maintained within tolerances of ± 3.00 feet horizontal and ± 0.16 feet vertical. QA/QC procedures were maintained by both comparison of values with higher accuracy and by repeat measurement.

The Trimble base station was setup on a suitable control point for GPS observations, either a point with provided GPS coordinates or a point with coordinates derived from observations performed during monumentation. The point designation, record coordinates, ellipsoidal height, GEIOD model and antenna height are logged in the field book. At least one check shot was recorded for each RTK rover on a point with known coordinates and GPS observations were collected on known previously established survey control points throughout the day to ensure the integrity of the data.

An electronic list of R-monument coordinates and profile azimuths was loaded into the rover units and measurements were recorded along the azimuth line at intervals no greater than 25 feet or wherever geographical features dictated. The measurements were taken landward along the azimuth line to a minimum of 150 feet landward of the R-monument or to the edge of a building or road, whichever is the most seaward. When possible, a measurement was taken on the R-monument. The extent of the vegetation line and prominent features such as seawalls were also noted in the data collection. The measurements were taken seaward along the azimuth line to a minimum depth of -5 feet NAVD88 or as far as conditions dictated, to maintain a minimum of 50 feet of overlap with the data being collected by the offshore survey crew. This data was then compiled and merged with the offshore data to produce the profile drawings.

Offshore Data Collection: All survey equipment was properly calibrated and operated in accordance with FDEP standards. Bar checks to calibrate the fathometer were performed periodically throughout the survey. Bathymetric survey data collection was conducted in calm seas. Maximum wave heights during the data collection period were less than 3 feet. The data was collected at intervals not exceeding 25 feet and at all grade breaks along the profile sufficient to accurately describe the bathymetry at the profile locations. The beach profile survey extended seaward to a minimum of 3,000 feet from MHW.

The vertical accuracy of the profile data meets or exceeds the GPS-derived heights (0.2 to 0.5 feet) standard. The horizontal positioning system accuracy of the data was within 2 feet and the off-line horizontal deviation was within 30 feet. Measure downs from a known point to the water's surface were taken periodically throughout the survey as a check for the tides measured by the RTK GPS as necessary.

Bathymetric survey data collection was performed as close in time as possible with the upland topographic survey data collection. This significantly increased efficiency by conducting the work with the same base station set-up. Safety was also increased by having both crews visible to each other at all times.

3.4 Data Reduction and Deliverables

For the beach profiles, the upland and offshore survey data sets were merged together using the HYPACK 2017 subroutines. The reduced data was converted to "xyz" and FDEP formats. The Survey Report is provided in Appendix 1. The "xyz" data file was imported into AutoCAD to generate individual profiles to the specified scale. The beach profiles, borrow area cross sections, and Big Hickory shoal cross sections are presented in Appendices 2, 3 and 4, respectively.

4 PHYSICAL MONITORING

4.1 Survey Dates

CEC conducted the monitoring survey of Lovers Key and Big Hickory Island on June 28, 2018. The monitoring survey of Bonita Beach was performed on July 6, 2018. The borrow area was surveyed on July 9, 2018.

4.2 Depth of Closure

The offshore depth beyond which the net sediment transport does not result in significant changes in mean water depth is known as the depth of closure. According to Birkemeier (1985), the depth of closure can be estimated as

$$h_c = 1.75H_e - 57.9 \left(\frac{H_e^2}{gT_e^2} \right)$$

where H_e is the effective wave height which is exceeded during only 12 hours per year, T_e is the associated period, and g is the acceleration due to gravity.

Wave data were obtained from the Wave Information Studies (WIS) project (Hubertz, 1992) which produces a high-quality online database of hindcast, nearshore wave conditions covering U.S. coastlines (<http://chl.erdc.usace.army.mil/>). The acquired data cover a 20-year period from January 1, 1980 through December 31, 1999. The time interval of the data is one hour. The above calculation yields a depth of closure of -11.2 feet NAVD88 for Big Hickory Island and Bonita Beach.

The Lovers Key beach profiles are shallower compared to those of Bonita Beach with much milder profile slopes due to the presence of the large Big Carlos Pass ebb shoal system sheltering these areas. From visual observations of the profiles, a distance of 500 feet seaward of MHW was established as the depth of closure for the purpose of computing volume changes for the monitoring requirements (CEC, 2016).

4.3 Beach Profiles

Appendix 2 presents the beach profiles measured at each R-monument for the 2014 pre-construction, 2015 post-construction, 2016 monitoring, 2017 monitoring, and 2018 monitoring surveys.

Table 2 presents the 2017 and 2018 monitoring survey shoreline positions at MHW (MHW = 0.3 feet NAVD88) and the shoreline changes that occurred between the surveys. The unweighted average shoreline change for individual beach segments was calculated based upon these changes. Figure 2 presents the permitted beach fill templates, 2015 post-construction, 2016 monitoring, 2017 monitoring and 2018 monitoring surveys relative to the 2014 pre-construction survey. It should be noted that the 2014 pre-construction survey was utilized as the baseline for comparative purposes. The design templates (without advanced maintenance) were specifically depicted for tracking fill diffusion and evolution over time in support of future funding requests and evaluating renourishment needs.

Table 3 presents the volumetric changes landward of MHW and Figure 3 presents the annualized volumetric change rate landward of MHW calculated by comparing the 2017 and 2018 monitoring surveys and annualizing the changes to be consistent with prior year monitoring reports. For the purpose of monitoring and reporting, the cell boundary was set equal to the 2018 MHW line. Table 4 presents the overall volumetric changes calculated to the depth of closure and Figure 4 presents the annualized volumetric change to the depth of closure for this period.

Table 5 presents the total beach fill placed landward of the post-construction MHW line utilizing the pre- and post-construction R-monument beach profile surveys. Table 6 presents the beach fill volume changes landward of the 2015 MHW line utilizing the post-construction and 2018 monitoring surveys. As this analysis was completed in support of the County's funding application to the Beach Management Funding Assistance Program, the cell boundary was set equal to the 2015 MHW line.

The Average End-Area method was used to compute volumetric changes. For parallel R-monument lines the perpendicular distance between R-the monument lines was used for the volumetric calculations. For non-parallel R-monument lines, the distance between the monument lines and their respective intersections with 2018 MHW was used for the volumetric calculations.

Additional half monuments were surveyed on Big Hickory Island (R-222.5, R-223.5, R-224.5), Big Hickory Pass (R-225.5) and Bonita Beach (R-225.5A, R-230.5) for future comparison and analysis. Volumetric changes landward of MHW and to the depth of closure were not computed for these monuments in this monitoring report. Their profiles are included in Appendix 2.

Table 2. 2017-2018 Shoreline Positions at MHW.

Mon.	2017 Position Monitoring (FT)	2018 Position Monitoring (FT)	Shoreline Change (FT)	Average** Change (FT)	Segment
R-211	65.3	68.1	2.9	3.3	Big Carlos Pass (South)
R-212	82.5	86.2	3.8		
R-213	459.3	489.9	30.7	19.7	Lovers Key North Adjacent Shoreline
R-214	11.9	21.7	9.9		
R-214.5	-0.2	18.4	18.6		
R-215	47.0	50.5	3.5		
R-215.5	106.4	107.2	0.8		
R-216	92.4	72.4	-20.0	-5.0	Lovers Key Beach Fill
R-216.5	155.1	145.8	-9.3		
R-217	141.8	123.1	-18.7		
R-217.5	219.1	221.0	1.9		
R-218	141.2	126.4	-14.8		
R-218.5	202.0	211.6	9.6		
R-219	99.7	90.4	-9.3		
R-219.5	126.8	140.7	13.9		
R-220	169.8	157.7	-12.0		
R-220.5	171.6	165.4	-6.2		
R-221	135.7	108.5	-27.2	-16.7	Lovers Key South Adjacent Shoreline
R-222	N/D	N/D	N/D	N/D	New Pass
R-223	150.3	151.8	1.5	-32.8	Big Hickory Island
R-224	123.8	32.6	-91.2		
R-225	-14.6	-23.3	-8.7		
R-226	90.9	103.3	12.4	12.4	Bonita Beach North Adjacent Shoreline
R-226A	148.5	157.3	8.8	4.9	Bonita Beach Fill
R-226.5	98.2	97.2	-1.0		
R-227	112.9	117.0	4.1		
R-227.5	104.6	109.3	4.7		
R-228	185.2	192.6	7.4		
R-228.5	385.2	397.2	12.0		
R-229	367.6	366.9	-0.8		
R-229.5	331.2	333.6	2.4		
R-230	301.2	307.3	6.1		
R-231	388.3	392.7	4.4		
R-232	133.4	142.2	8.7	8.8	Bonita Beach South Adjacent Shoreline
R-233	314.4	324.4	9.9		
R-234	190.0	201.3	11.3		
R-235	113.3	123.1	9.8		

*N/D = No data, profile does not cross MHW

**Average is unweighted

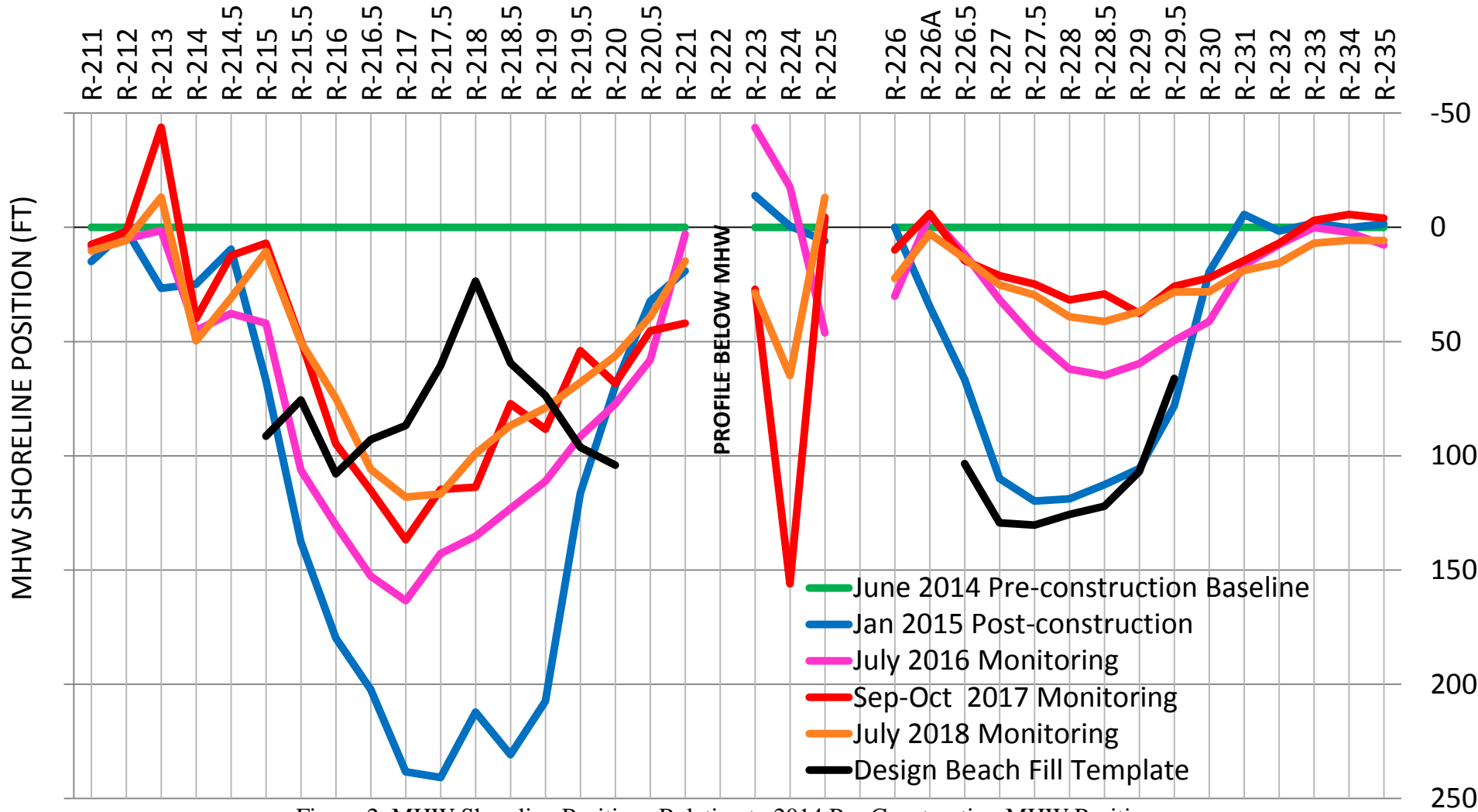
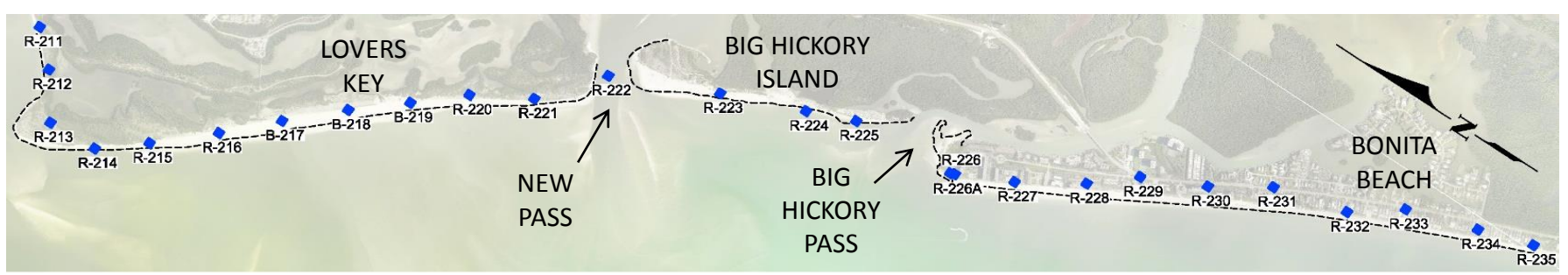


Figure 2. MHW Shoreline Positions Relative to 2014 Pre-Construction MHW Positions.

Table 3. 2017-2018 Volumetric Changes Above 2018 MHW.

	Monument	Area (YD ³ /FT)	Avg Area (YD ³ /FT)	Length (FT)	Volume (YD ³)	Total Volume Change (YD ³)
Big Carlos Pass (R-211 - R-212)						
LK North Adjacent Shoreline	R-213	2.9				2,409
			1.6	1083	1,740	
	R-214	0.3				
			1.2	405	479	
	R-214.5	2.0				
			0.4	457	191	
Lovers Key Beach Fill	R-215	-1.2				-1,585
			-1.6	540	-847	
	R-215.5	-2.0				
			-1.7	559	-929	
	R-216	-1.4				
			-2.0	462	-946	
	R-216.5	-2.7				
			-0.9	496	-428	
	R-217	1.0				
			0.0	513	-19	
	R-217.5	-1.1				
			-0.5	536	-247	
	R-218	0.2				
			0.0	528	1	
R-218.5	-0.1					
		1.0	440	457		
R-219	2.2					
		1.6	512	808		
R-219.5	0.9					
		1.4	398	565		
R-220	1.9					
LK South Adjacent Shoreline			1.6	501	817	1,913
	R-220.5	1.4				
			2.2	501	1,096	
	R-221	3.0				
New Pass (R-222)						
Big Hickory Island	R-223	-2.1				-564
			-0.3	1384	-433	
	R-224	1.4				
			0.3	817	226	
	R-225	-0.9				
			-0.5	200	-95	
	BHP-3	-0.1				
			-0.5	200	-97	
	BHP-4	-0.9				
			-0.6	200	-128	
BHP-5	-0.4					
		-0.2	200	-37		
BHP-6	0.0					
Big Hickory Pass						

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			1.6	200	320	
	BHP-8	5.2				
			4.5	200	903	
	BHP-9	3.9				
			1.3	363	467	
	R-226	-1.3				
Bonita Beach Fill			0.5	73	35	1,271
	R-226A	2.3				
			0.4	445	176	
	R-226.5	-1.5				
			-0.6	515	-332	
	R-227	0.2				
			0.0	519	2	
	R-227.5	-0.2				
			0.6	582	352	
	R-228	1.4				
			1.6	326	520	
	R-228.5	1.8				
			1.4	476	672	
	R-229	1.0				
		0.0	519	10		
R-229.5	-1.0					
		-0.3	504	-128		
R-230	0.5					
Bonita South Adjacent Shoreline			1.0	1035	1,064	5,537
	R-231	1.6				
			1.4	1190	1,686	
	R-232	1.2				
			0.5	873	456	
	R-233	-0.2				
			1.1	1130	1,187	
	R-234	2.3				
		1.3	910	1,145		
R-235	0.2					

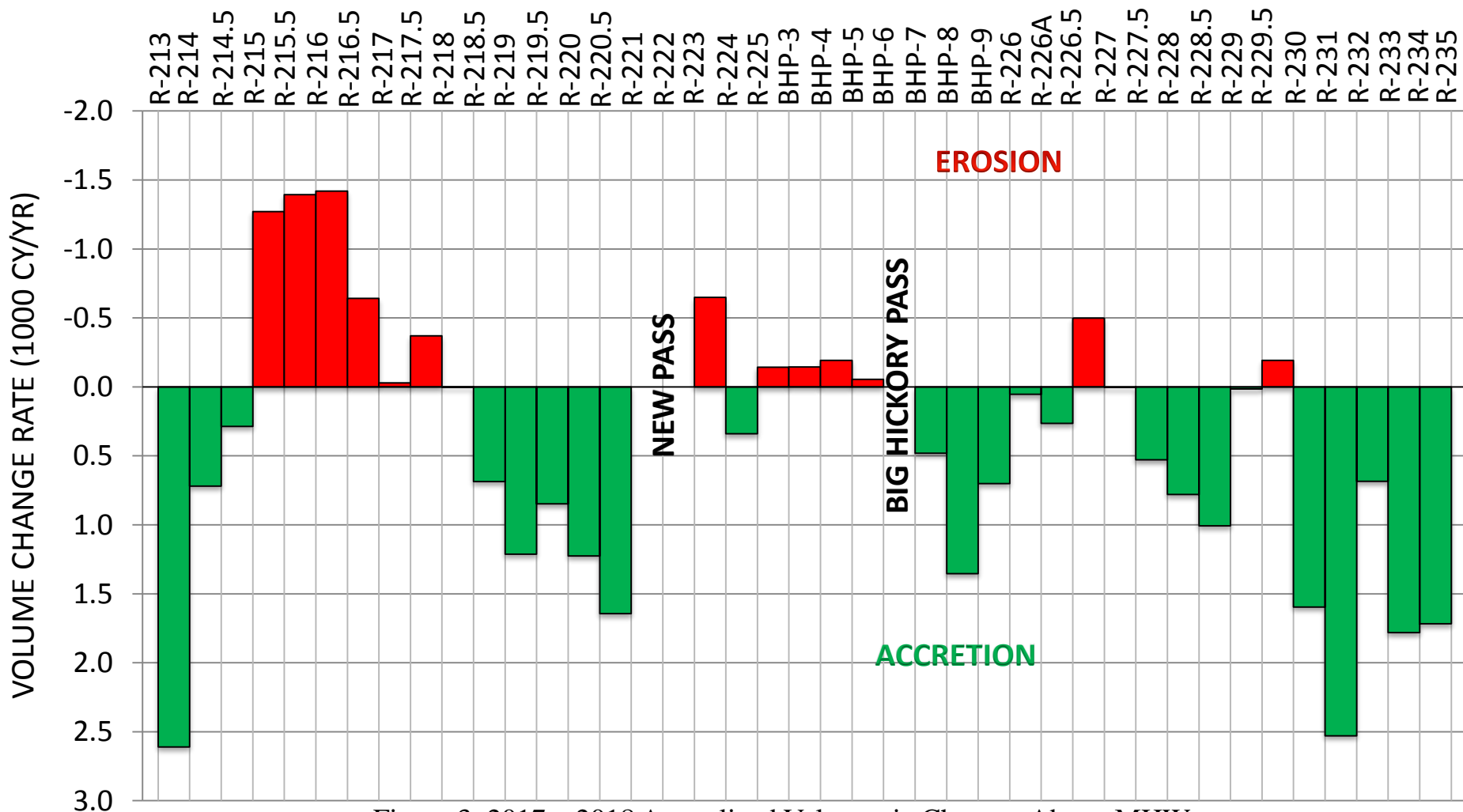
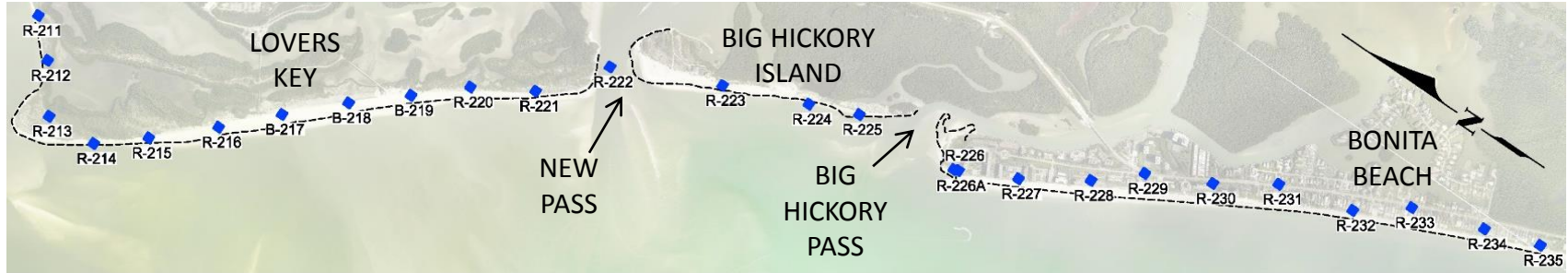


Figure 3. 2017 – 2018 Annualized Volumetric Changes Above MHW.

Table 4. 2017-2018 Volumetric Changes Above Depth of Closure.

	Monument	Area (YD ³ /FT)	Avg Area (YD ³ /FT)	Length (FT)	Volume (YD ³)	Total Volume Change (YD3)
Big Carlos Pass (R-211 - R-212)						
LK North Adjacent Shoreline	R-213	9.7				4,080
			4.0	1083	4,281	
	R-214	-1.8				
			0.2	405	77	
	R-214.5	2.1				
		-0.6	457	-278		
Lovers Key Beach Fill	R-215	-3.3				-38,428
			-3.7	540	-2,024	
	R-215.5	-4.2				
			-7.7	559	-4,282	
	R-216	-11.2				
			-9.9	462	-4,565	
	R-216.5	-8.6				
			-9.6	496	-4,741	
	R-217	-10.5				
			-8.3	513	-4,260	
	R-217.5	-6.1				
			-9.0	536	-4,849	
	R-218	-12.0				
			-10.5	528	-5,549	
	R-218.5	-9.0				
		-7.5	440	-3,315		
R-219	-6.1					
		-5.3	512	-2,712		
R-219.5	-4.5					
		-5.4	398	-2,130		
R-220	-6.2					
		-4.8	501	-2,428		
LK South Adjacent Shoreline	R-220.5	-3.5				-4,947
			-5.0	501	-2,518	
	R-221	-6.5				
New Pass (R-222)						
Big Hickory Island	R-223	-14.0				-8,541
			-7.1	1393	-9,887	
	R-224	-0.2				
			8.3	801	6,663	
	R-225	16.8				
			9.5	200	1,894	
	BHP-3	2.1				
			-4.9	200	-987	
	BHP-4	-12.0				
			-15.7	200	-3,134	
	BHP-5	-19.3				
		-15.5	200	-3,090		
BHP-6	-11.6					
Big Hickory Pass						

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			-8.4	200	-1,676		
	BHP-8	-4.8					
			-7.5	200	-1,500		
	BHP-9	-10.2					
			-6.9	363	-2,512		
Bonita Beach Fill	R-226	-3.6				-10,426	
			-3.2	73	-234		
	R-226A	-2.8					
			-5.0	447	-2,219		
	R-226.5	-7.1					
			-4.8	516	-2,457		
	R-227	-2.4					
			-2.5	519	-1,296		
	R-227.5	-2.6					
			-1.1	582	-653		
	R-228	0.4					
			0.3	326	110		
	R-228.5	0.3					
			-1.7	476	-814		
R-229	-3.7						
		-3.8	519	-1,980			
R-229.5	-3.9						
		-2.2	504	-1,117			
Bonita South Adjacent Shoreline			1.7	1032	1,716	13,406	
	R-231	3.8					
			3.2	1190	3,798		
	R-232	2.5					
			0.9	872	782		
	R-233	-0.7					
			2.9	1130	3,244		
	R-234	6.5					
		4.2	910	3,866			
	R-235	2.0					

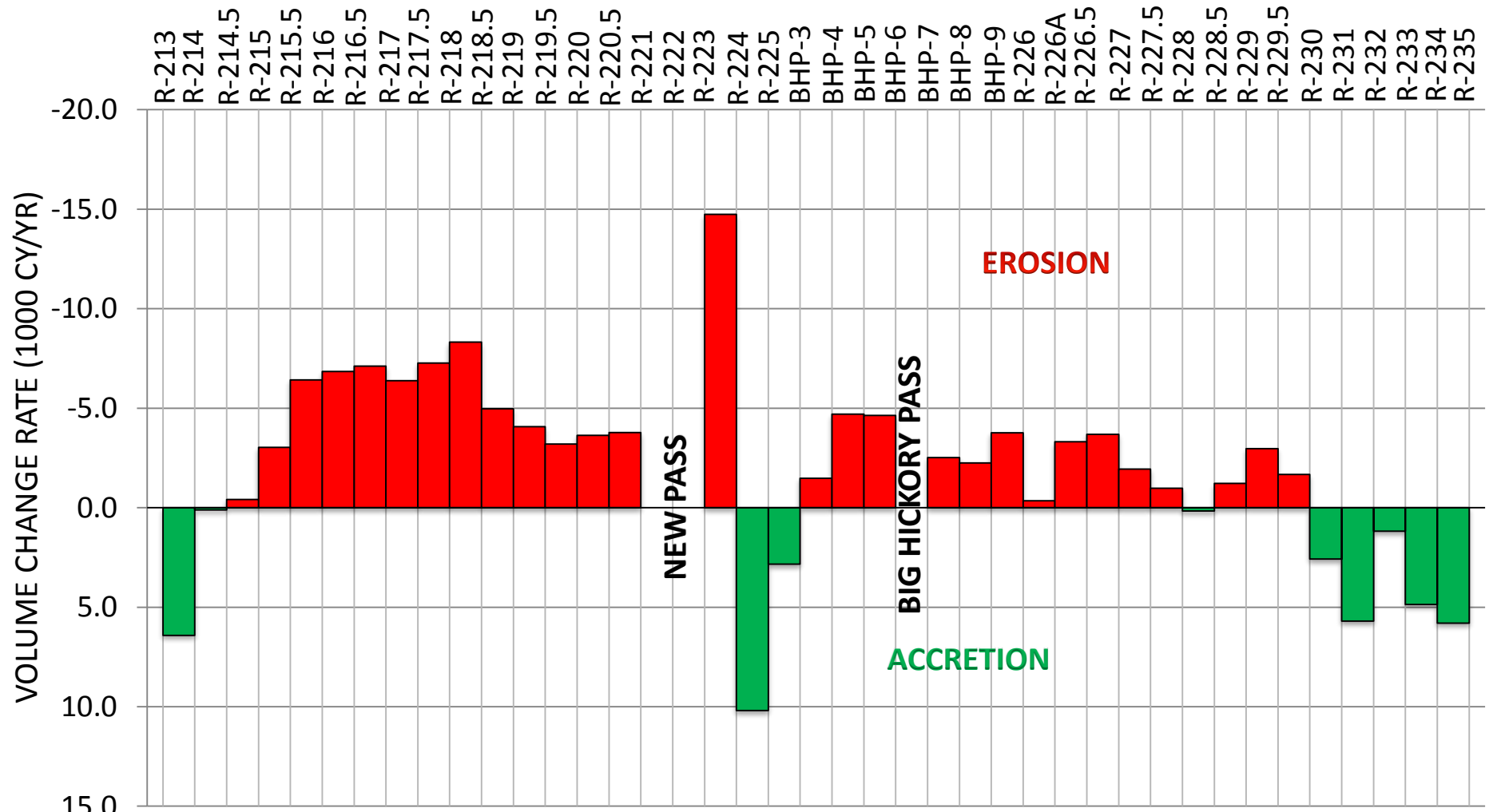
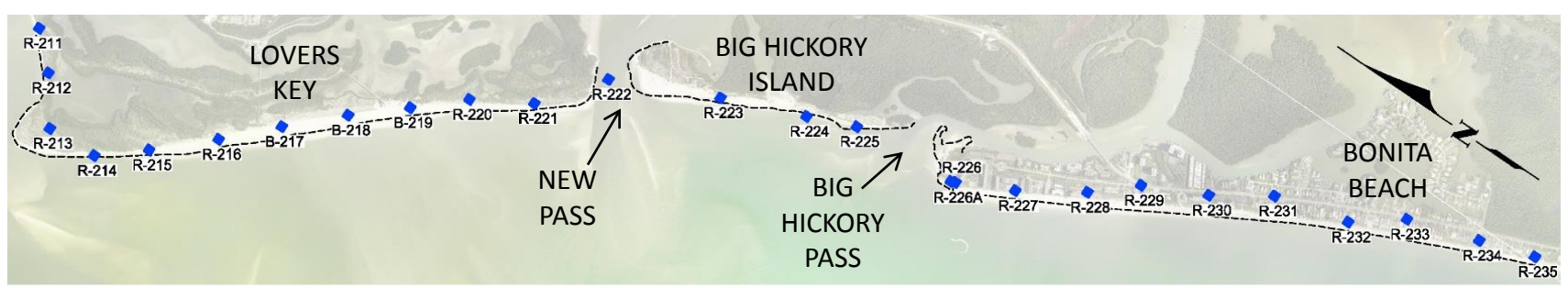


Figure 4. 2017 – 2018 Annualized Volumetric Changes Above Depth of Closure.

Table 5. 2014-2015 Total Beach Fill Placed Landward of 2015 MHW.

	Monument	Area (YD ³ /FT)	Avg Area (YD ³ /FT)	Length (FT)	Volume (YD ³)	
Lovers Key Beach Fill	R-215	17.9				250,119
			24.8	540	13,379	
	R-215.5	31.7				
			39.3	567	22,285	
	R-216	46.9				
			49.5	452	22,386	
	R-216.5	52.1				
			62.7	489	30,642	
	R-217	73.3				
			72.4	520	37,688	
	R-217.5	71.6				
			66.8	532	35,548	
	R-218	62.0				
			65.1	531	34,614	
	R-218.5	68.2				
			62.2	436	27,125	
	R-219	56.1				
		38.9	514	20,002		
R-219.5	21.7					
		16.4	392	6,449		
R-220	11.2					
Bonita Beach Fill	R-226A	4.7				98,380
			11.5	445	5,097	
	R-226.5	18.3				
			24.1	515	12,401	
	R-227	29.9				
			31.0	519	16,080	
	R-227.5	32.1				
			32.0	582	18,644	
	R-228	32.0				
			32.1	326	10,477	
	R-228.5	32.2				
			32.4	476	15,424	
	R-229	32.5				
			27.3	519	14,151	
R-229.5	22.1					
		12.1	504	6,105		
R-230	2.1					

Table 6. 2015-2018 Beach Fill Volume Changes Landward of 2015 MHW.

	Monument	Area (YD ³ /FT)	Avg Area (YD ³ /FT)	Length (FT)	Volume (YD ³)	
Lovers Key Beach Fill	R-215	-17.0				-120,670
			-18.1	540	-9,783	
	R-215.5	-19.3				
			-20.7	567	-11,754	
	R-216	-22.2				
			-22.0	452	-9,933	
	R-216.5	-21.7				
			-25.0	489	-12,208	
	R-217	-28.2				
			-29.1	520	-15,144	
	R-217.5	-30.0				
			-30.3	532	-16,138	
	R-218	-30.7				
			-37.1	531	-19,718	
	R-218.5	-43.5				
			-36.4	436	-15,893	
	R-219	-29.3				
		-17.2	514	-8,843		
R-219.5	-5.1					
		-3.2	392	-1,255		
R-220	-1.3					
Bonita Beach Fill	R-226A	-3.2				-67,078
			-7.9	445	-3,506	
	R-226.5	-12.6				
			-17.3	515	-8,932	
	R-227	-22.1				
			-23.4	519	-12,161	
	R-227.5	-24.7				
			-24.1	582	-14,026	
	R-228	-23.4				
			-22.4	326	-7,298	
	R-228.5	-21.3				
			-20.6	476	-9,817	
	R-229	-19.9				
			-16.5	519	-8,547	
R-229.5	-13.0					
		-5.5	504	-2,791		
R-230	2.0					

A summary of the shoreline and volumetric changes based on the comparisons between the 2017 and 2018 monitoring surveys at the R-monuments is presented below. Several of the Big Hickory Pass ebb shoal lines, presented in detail in Section 4.5, were included in the volumetric change analysis.

Big Carlos Pass: The segment extending from R-211 to R-212 is within Big Carlos Pass on its south side and therefore no volumetric analysis was performed. The shoreline advanced on average 3.3 feet between the 2017 and 2018 monitoring surveys.

Lovers Key North Adjacent Shoreline: The beach segment extending from R-213 to R-214.5 advanced on average approximately 19.7 feet between the 2017 and 2018 monitoring surveys. The range of shoreline advancement measured at MHW was approximately from 9.9 feet at R-214 to 30.7 feet at R-213. The total volume change was approximately 4,100 cubic yards of accretion above the depth of closure and approximately 2,400 cubic yards of accretion above MHW.

Lovers Key Beach Fill: The beach segment extending from R-214.5 to R-220 was constructed based upon the design template with the addition of advanced maintenance fill. The beach segment receded on average approximately 5.0 feet between the 2017 and 2018 monitoring surveys. The range of shoreline change measured at MHW was from approximately 20.0 feet of recession at R-216 to 13.9 feet of advancement at R-219.5. The total volume change was approximately 38,400 cubic yards of erosion above the depth of closure and approximately 1,600 cubic yards of erosion above MHW. Of the 250,100 cubic yards of beach fill that were placed above MHW, approximately 120,700 cubic yards eroded between the 2015 post-construction and 2018 monitoring survey indicating approximately 52% of the original beach fill placed above MHW remains.

Lovers Key South Adjacent Shoreline: The beach segment extending from R-220 to R-221 receded on average approximately 16.7 feet between the 2017 and 2018 monitoring surveys. The range of shoreline recession measured at MHW was approximately from 6.2 feet at R-220.5 to 27.2 feet at R-221. The total volume change was approximately 4,900 cubic yards of erosion above the depth of closure and approximately 1,900 cubic yards of accretion above MHW.

New Pass: The segment at R-222 is within New Pass and therefore no volumetric analysis was performed. The monument is located within the middle of the channel, so the profile does not reach MHW. Accordingly, shoreline change was not calculated.

Big Hickory Island Shoreline: The beach segment extending from R-223 to R-225 receded on average approximately 32.8 feet between the 2017 and 2018 monitoring surveys. The range of shoreline change measured at MHW was approximately from 91.2 feet of recession at R-224 to 1.5 feet of advancement at R-223. The total volume change was approximately 8,500 cubic yards of erosion above the depth of closure and approximately 600 cubic yards of erosion above MHW.

Bonita Beach North Adjacent Shoreline: The beach segment at R-226 advanced approximately 12.4 feet, when measured at MHW, between the 2017 and 2018 monitoring surveys. The total

volume change from Big Hickory Pass to R-226 was approximately 5,900 cubic yards of erosion above the depth of closure and approximately 1,700 cubic yards of accretion above MHW.

Bonita Beach Fill: The beach segment extending from R-226 to R-230 was constructed based upon the design template. The beach segment advanced on average approximately 4.9 feet between the 2017 and 2018 monitoring surveys. The range of shoreline change measured at MHW was approximately from 12.0 feet of advancement at R-228.5 to 1.0 feet of recession at R-226.5. The total volume change was approximately 10,400 cubic yards of erosion above the depth of closure and approximately 1,300 cubic yards of accretion above MHW. Of the 98,400 cubic yards of beach fill that were placed above MHW, approximately 67,100 cubic yards eroded between the 2015 post-construction and 2018 monitoring survey indicating approximately 32% of the original beach fill placed above MHW remains.

Bonita Beach South Adjacent Shoreline: The beach segment extending from R-230 to R-235 advanced on average approximately 8.8 feet between the 2017 and 2018 monitoring surveys. The range of shoreline advancement measured at MHW was from approximately 4.4 feet at R-231 to 11.3 feet at R-234. The total volume change was approximately 13,400 cubic yards of accretion above the depth of closure and approximately 5,500 cubic yards of accretion above MHW.

4.4 Borrow Areas

Appendix 3 presents the cross sections of Borrow Areas 1 and 2 for the 2015 post-construction, and 2016 and 2018 monitoring surveys, noting that the Borrow Areas survey was not required by the PMP in 2017. Figure 5 shows the layout for Borrow Areas 1 and 2. Tables 7 and 8 present the volume change within Borrow Areas 1 and 2, respectively, calculated from comparing the 2016 and 2018 monitoring surveys. Table 9 presents the volume remaining within the two borrow areas based on the 2018 monitoring survey. The cross sections for the end stations and points of inflection within the borrow area boundary employed in the volumetric change analysis were generated using interpolated survey data to more accurately model the borrow area.

Comparing the 2016 and 2018 monitoring surveys, the net volume change within Borrow Area 1 between Stations 5+87 and 27+74 was approximately 3,200 cubic yards of shoaling. Borrow Area 2 experienced approximately 22,400 cubic yards of shoaling. Based on the 2018 monitoring survey, the volume remaining within the permitted dredge templates for Borrow Areas 1 and 2 was approximately 156,500 cubic yards.

It should be noted that during the summer 2017 dredging of the Big Carlos Pass Channel, the dredge template of the Channel extended over Borrow Area 2 between Borrow Area Stations 12+50 and 22+50 (H&M, 2018).

Table 7. Volume Changes between 2016 and 2018 Surveys within Borrow Area 1.

Station	Area (YD ³ /FT)	Avg Area (YD ³ /FT)	Length (FT)	Volume (YD ³)
5+87	0.0			
		0.0	163	0
7+50	0.0			
		0.0	250	0
10+00	0.0			
		6.1	250	1,516
12+50	12.1			
		10.2	76	772
13+26	8.2			
		4.9	174	846
15+00	1.5			
		3.1	250	780
17+50	4.7			
		2.1	250	533
20+00	-0.4			
		2.7	250	678
22+50	5.9			
		2.4	250	611
25+00	-1.0			
		-9.4	250	-2,349
27+50	-17.8			
		-8.9	24	-214
27+74	0.0			
Total				3,173

Table 8. Volume Changes between 2016 and 2018 Surveys within Borrow Area 2.

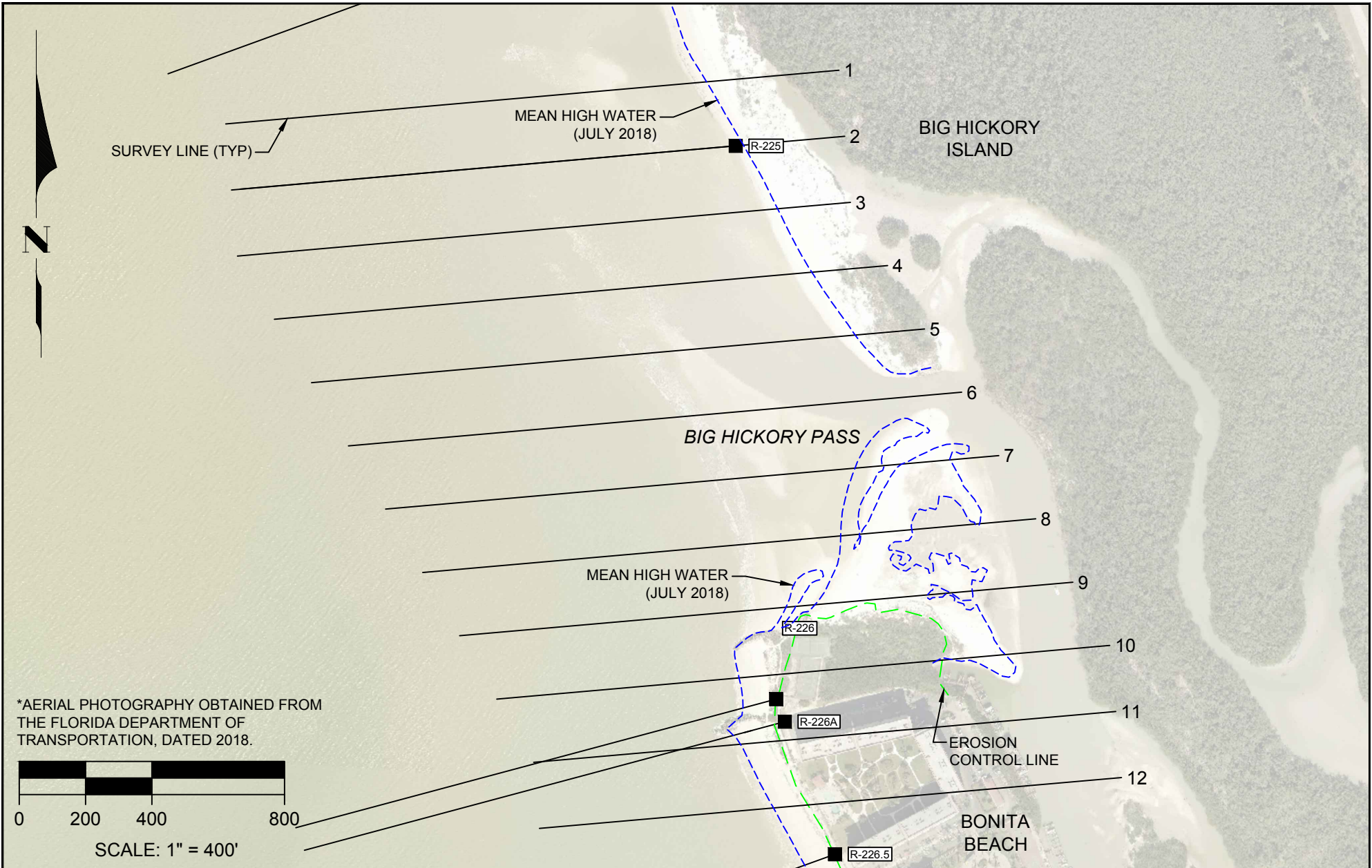
Station	Area (YD ³ /FT)	Avg Area (YD ³ /FT)	Length (FT)	Volume (YD ³)
5+87	-4.8			
		-4.5	163	-742
7+50	-4.3			
		0.1	250	27
10+00	4.5			
		5.2	250	1,304
12+50	5.9			
		5.1	76	388
13+26	4.3			
		5.1	174	887
15+00	5.9			
		10.5	250	2,615
17+50	15.0			
		4.5	250	1,126
20+00	-6.0			
		3.7	250	932
22+50	13.5			
		38.9	250	9,719
25+00	64.3			
		25.8	250	6,442
27+50	-12.7			
		-13.4	24	-321
27+74	-14.0			
Total				22,377

Table 9. Volume Remaining Within Borrow Areas 1 and 2 Based on 2018 Survey.

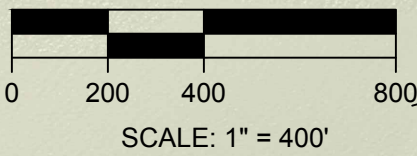
Station	Area (YD³/FT)	Avg Area (YD³/FT)	Length (FT)	Volume (YD³)
5+87	9.7			
		18.9	163	3,074
7+50	28.0			
		32.3	250	8,080
10+00	36.6			
		63.9	250	15,968
12+50	91.1			
		100.3	76	7,623
13+26	109.5			
		82.1	174	14,288
15+00	54.8			
		54.9	250	13,736
17+50	55.1			
		47.2	250	11,812
20+00	39.4			
		57.4	250	14,342
22+50	75.4			
		98.0	250	24,491
25+00	120.6			
		156.7	250	39,166
27+50	192.8			
		161.8	24	3,883
27+74	130.8			
Total				156,464

4.5 Big Hickory Pass Ebb Tidal Shoal

Appendix 4 presents the Big Hickory Pass Ebb Tidal Shoal cross-sections measured at the profile lines spaced 200 feet apart from R-225 to R-226 for the 2014 pre-construction, 2015 post-construction, and 2016, 2017, and 2018 monitoring surveys. The profile line locations are depicted in Figure 6.



*AERIAL PHOTOGRAPHY OBTAINED FROM THE FLORIDA DEPARTMENT OF TRANSPORTATION, DATED 2018.



SHEET OF
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www.coastalengineering.com
E-Mail: engcollier@cecifl.com

CLIENT: **LEE COUNTY**

TITLE: **Figure 6. Big Hickory Pass Profile Lines**

DATE:	1/24/2018	SCALE:	AS SHOWN
DRAWN:	SDB	F.B.	
CHECKED:	MTP	PG.	
SEC.	TWP.	RNG.	
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REF. NO.	18.079	NO.	DATE

NO.	DATE	BY	REVISION DESCRIPTION

4.6 Morphologic Changes

Figures 7 and 8 present elevation contour maps based on the 2017 and 2018 monitoring surveys, respectively. The morphologic changes that occurred between the two surveys are presented in Figure 9. The changes within the Big Carlos Pass inlet system ranged from 4 feet of scour to 5 feet of deposition. The Lovers Key fill area experienced nearshore erosion within a 1-to-2-foot range. The New Pass inlet system and its ebb shoal experienced mixed changes within ± 2 -to-3-foot range, mostly erosion on the north side of the pass and accretion on the south side of the pass. Big Hickory Island experienced nearshore and beach erosion within a 3-to-4-foot range. The Bonita Beach fill area experienced minor nearshore changes within a ± 1 -foot range.

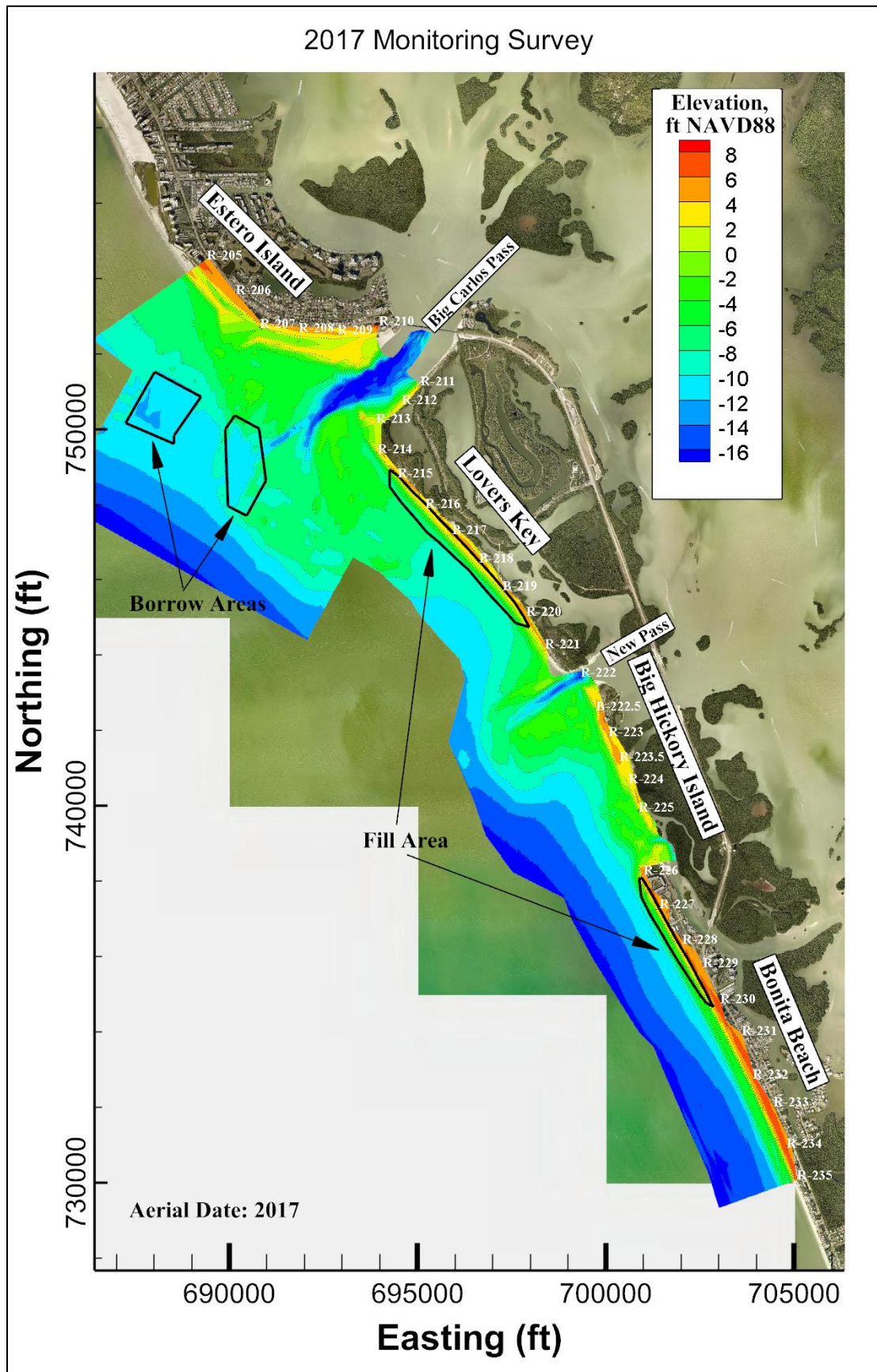


Figure 7. 2017 Monitoring Survey Contour Map.

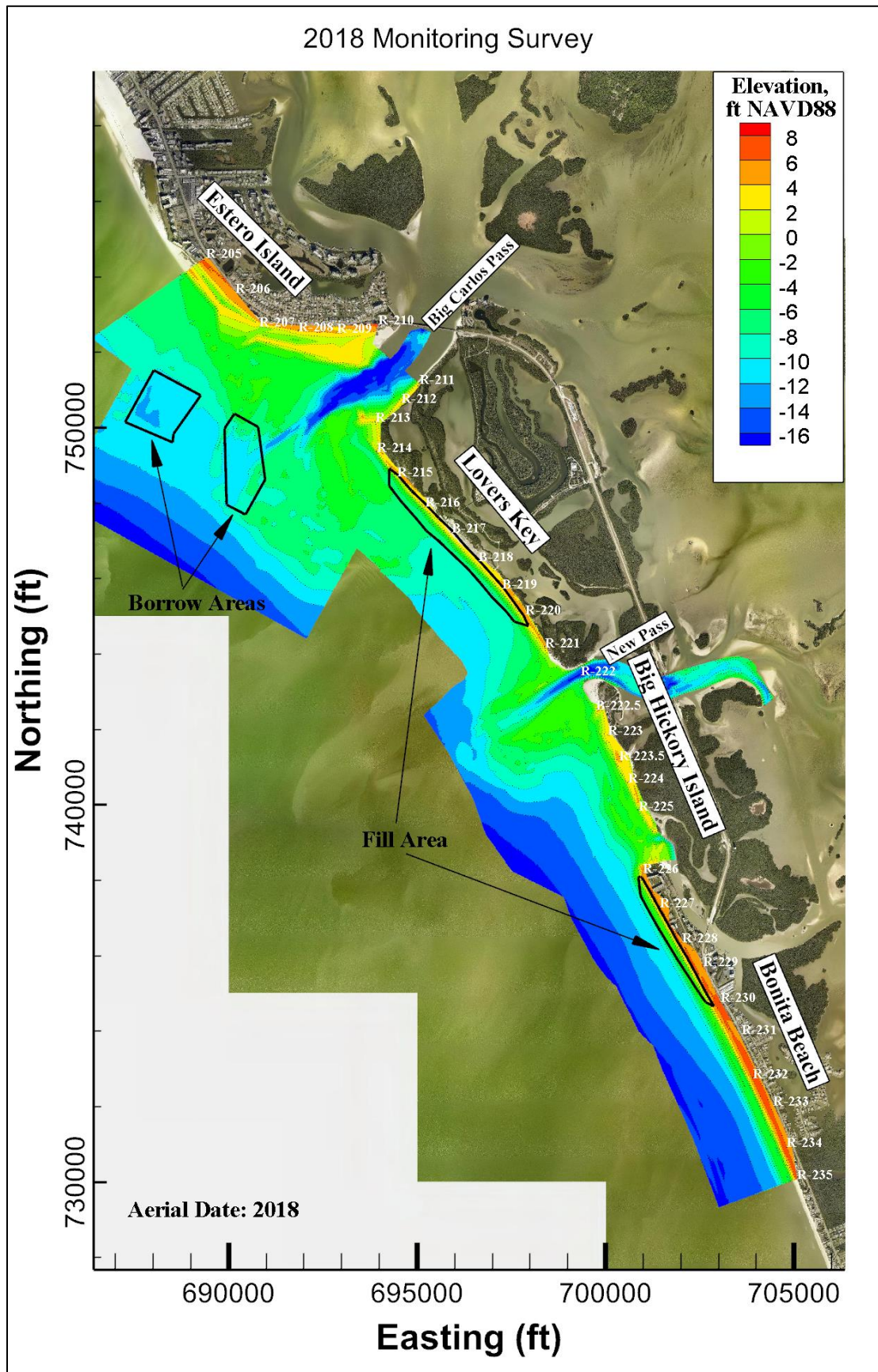


Figure 8. 2018 Monitoring Survey Contour Map.

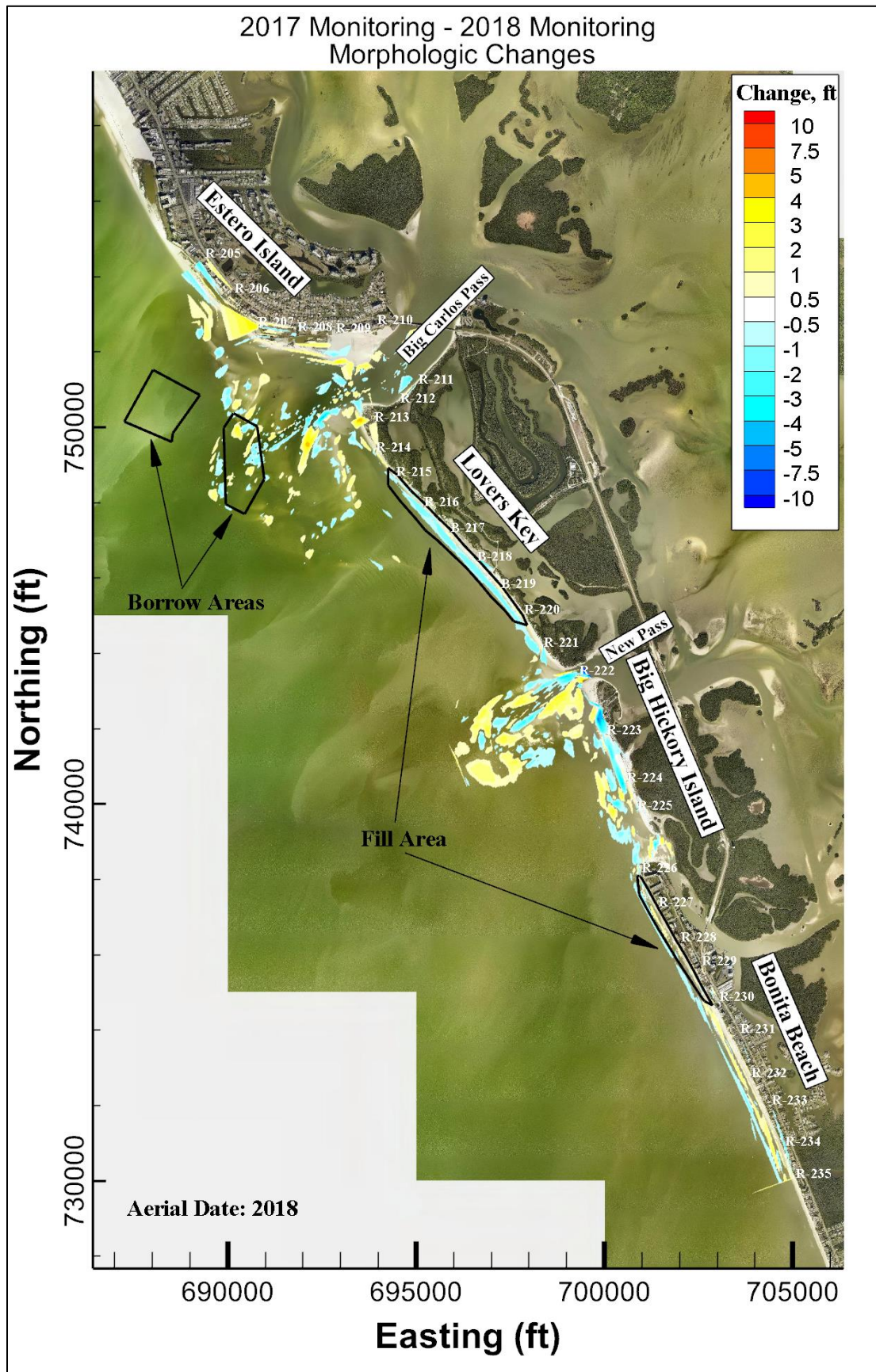


Figure 9. Morphologic Changes between 2017 and 2018 Monitoring Surveys.

5 CONCLUSION

This report describes the third-year annual monitoring results of the 2014 Bonita Beach and Lovers Key Beach Renourishment Project.

The information presented herein provides necessary data for both the County and FDEP to observe and assess, with quantitative measurements, the performance of the Project, any adverse effects which have occurred, and the need for any adjustments, modifications, or mitigative response to the Project. The monitoring process also provides the County and FDEP information necessary to plan, design, and optimize subsequent follow-up projects, potentially reducing the need for and costs of unnecessary work, as well as potentially reducing any environmental impacts that may have occurred or be expected. Based on the monitoring, there were no documented adverse impacts to the coastal system within the Project area.

Comparing the 2017 and 2018 monitoring surveys of the R-monuments, the entire monitoring area (R-211 to R-235) experienced a net loss, measured above depth of closure, of approximately 50,700 cubic yards. This loss is comprised of individual losses of approximately 39,200 cubic yards, 8,500 cubic yards, and 3,000 cubic yards within Lovers Key, Big Hickory Island, and the Bonita Beach segments, respectively.

Above MHW, the net change within the monitoring area was a gain of approximately 10,700 cubic yards. Lovers Key gained approximately 2,800 cubic yards, Big Hickory Island lost approximately 600 cubic yards, and Bonita Beach gained approximately 8,500 cubic yards.

Approximately 120,700 cubic yards eroded above MHW within the Lovers Key Beach Fill between the 2015 post-construction and 2018 monitoring surveys with approximately 52% of the original fill placed above MHW remaining on the beach.

Approximately 67,100 cubic yards eroded above MHW within Bonita Beach Fill between the 2015 post-construction and 2018 monitoring surveys with approximately 32% of the original fill placed above MHW remaining on the beach.

Comparing the 2016 and 2018 monitoring surveys of the Borrow Areas, the net volume change was approximately 26,500 cubic yards of shoaling. Based on the 2018 monitoring survey, the volume remaining within the Borrow Areas was approximately 156,500 cubic yards.

6 REFERENCES

Coastal Engineering Consultants, Inc. (CEC) 2015. "Bonita Beach and Lovers Key Beach Renourishment 2015 Physical Monitoring / Post Construction Report."

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APPENDIX 1
SURVEY REPORT



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2018 BONITA BEACH / LOVERS KEY ANNUAL MONITORING SURVEY

SURVEY REPORT

All Surveys were conducted utilizing multiple Trimble Real Time Kinematic (RTK) Global Positioning Systems (GPS). The Monitoring Survey of Lovers Key and Big Hickory Island was performed on June 28, 2018. The Monitoring Survey of Bonita Beach was performed on July 6, 2018. All GPS control during this survey was referenced from previously established Florida Department of Environmental Protection (FDEP) Bureau of Beaches and Coastal Systems (BBCS) and meets or exceeds Geospatial Positioning Accuracy Standards, Range VIII.

All "R monument" and intermediate beach profiles were collected on the State Plane Coordinate System Grid, Florida West Zone and survey data was collected along FDEP established grid bearings as outlined in the project Scope of Work. The horizontal and vertical datums were North American Datum (NAD) of 1983/2012 Adjustment and North American Vertical Datum (NAVD) of 1988, Geoid 2012A, respectively.

All survey control was established as part of the upland topographic survey control work, and conducted in accordance with the FDEP Monitoring Standards for Beach Erosion Control Projects. These surveys meet the requirements set forth in Chapter 5J-17 (F.A.C.) Florida Administrative Code. The following published FDEP vertical control was used during the surveys:

USGS E248 1965, PID No. AD1334, Elevation: 22.09 NAVD 1988
USGS D248 1965, PID No. AD1312, Elevation: 11.95 NAVD 1988

Equipment

Upland: CEC employed two Trimble Real Time Kinetic (RTK) GPS rover receivers with GLONASS capability systems for the upland surveys. These systems are capable of delivering RTK positions with coordinate accuracy of $\pm 10\text{mm} + 2\text{ppm}$. Wireless Bluetooth technology allows our surveyors to collect data seaward of the Mean High Water line in the "surf zone" up to 5 feet deep.

Offshore: The survey vessel used for this work was a 20-foot fiberglass hull powered by an outboard. An Innerspace 456 single beam echo sounder was used with a side mounted transducer. A Trimble R8 GPS antenna with GLONASS capability was installed on the side mount bracket directly above the transducer. The Trimble R8 receiver was integrated with the on-board computer system. Hypack 2017 software package was the hydrographic guidance program utilized.

QA/QC Procedures

CEC employs an advanced QA/QC program to ensure work performed by us meets the FDEP accuracy standards. CEC upland field crews utilize RTK systems for data collection. CEC also incorporates the necessary equipment on the survey vessel to collect bathymetric survey data "Real-Time". To meet the specification calling for an approximate 50-foot overlap in data between the boat and the upland crew, CEC

implements the following procedure. Utilizing "Real-Time" data collection, the boat crew immediately accounts for the tide correction, as well as the draft, and reports measured water depth in NAVD88 at each profile with the upland crew. This gives the upland crew, who simultaneously collects the upland and nearshore profile data, the necessary information to achieve the "overlap" specification.

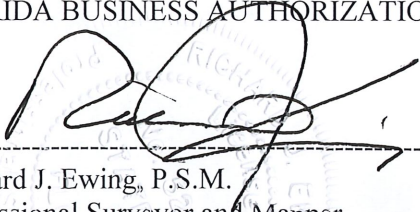
Upland Data Collection: CEC mobilized one operator and GPS rover unit to collect survey data from the approximate MHW line landward while an additional operator and unit collected data just landward of MHW seaward to wading depth or approximately -5 feet NAVD88. The recorded data was maintained within tolerances of ± 3.00 feet horizontal and ± 0.16 feet vertical. QA/QC procedures were maintained by both comparison of values with higher accuracy and by repeat measurement.

An electronic list of R-monument coordinates and profile azimuths was loaded into the rover units and measurements were recorded along the azimuth line at intervals no greater than 25 feet or wherever geographical features dictated. The measurements were taken landward along the azimuth line to a minimum of 150 feet landward of the R-monument or to the edge of a building or road, whichever is the most seaward. When possible, a measurement was taken on the R-monument. The extent of the vegetation line and prominent features such as seawalls were also noted in the data collection. The measurements were taken seaward along the azimuth line to a minimum depth of -5 feet NAVD88 or as far as conditions dictated, to maintain a minimum of 50 feet of overlap with the data being collected by the offshore survey crew. This data was then compiled and merged with the offshore data to produce the profile drawings.

Offshore Data Collection: All survey equipment was properly calibrated and operated in accordance with FDEP standards. Bar checks to calibrate the fathometer were performed periodically throughout the survey. Bathymetric survey data collection was conducted in calm seas. Maximum wave heights during the data collection period were less than 3 feet. The data was collected at intervals not exceeding 25 feet and at all grade breaks along the profile sufficient to accurately describe the bathymetry at the profile locations. The beach profile survey extended seaward to a minimum of 3,000 feet from MHW.

Bathymetric survey data collection was performed as close in time as possible with the upland topographic survey data collection.

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Richard J. Ewing, P.S.M.
 Professional Surveyor and Mapper
 Florida Certificate No. 5295

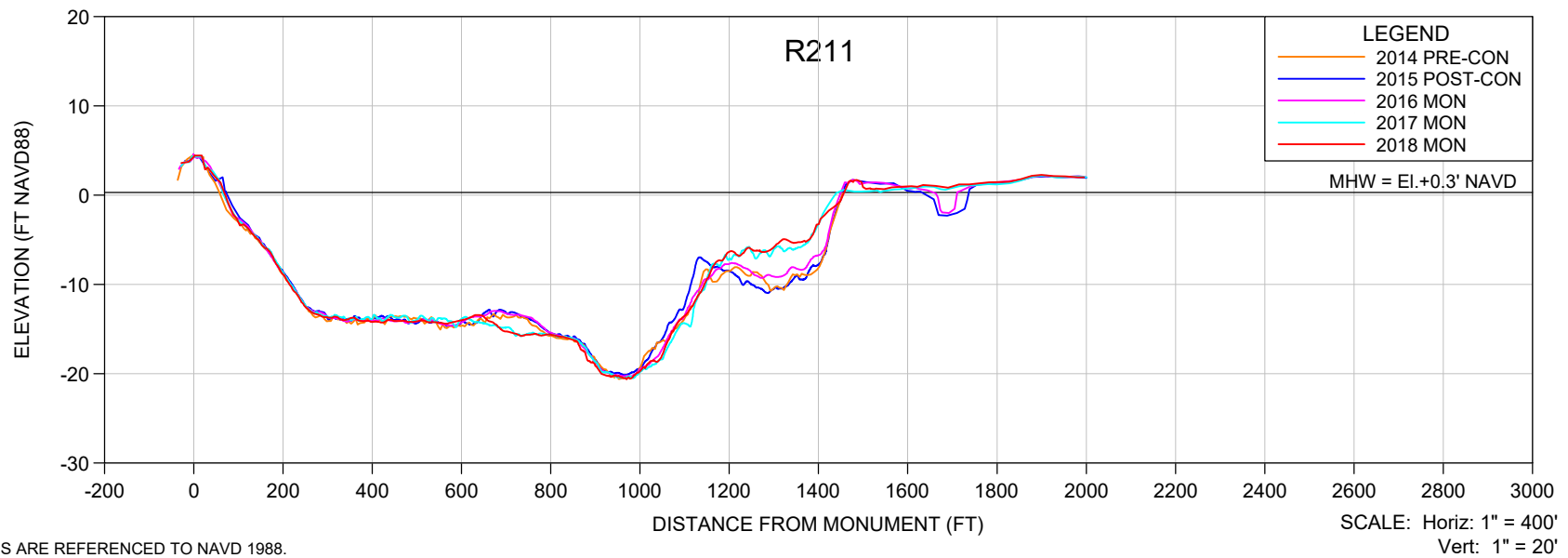
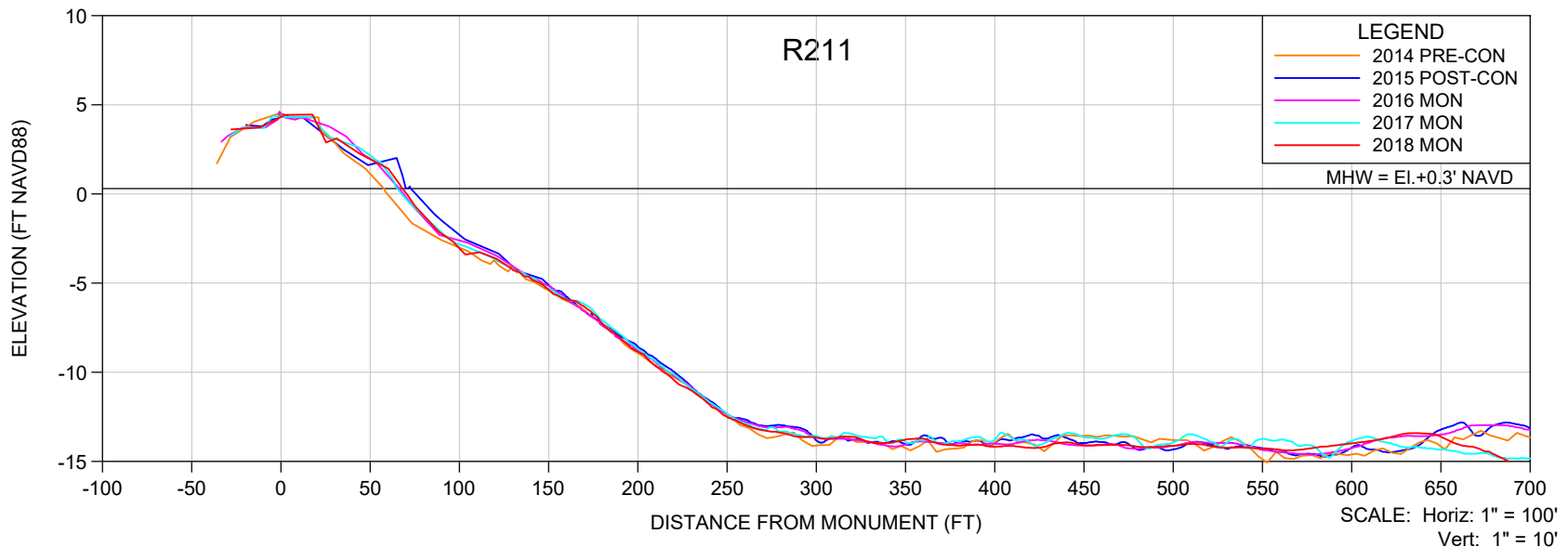
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APPENDIX 2

BEACH PROFILES



NOTES:

1. ELEVATIONS ARE REFERENCED TO NAVD 1988.
2. PROFILE DATA ARE FROM SURVEYS BY CEC.

SHEET 1
FILE NO.: 18079-R-211

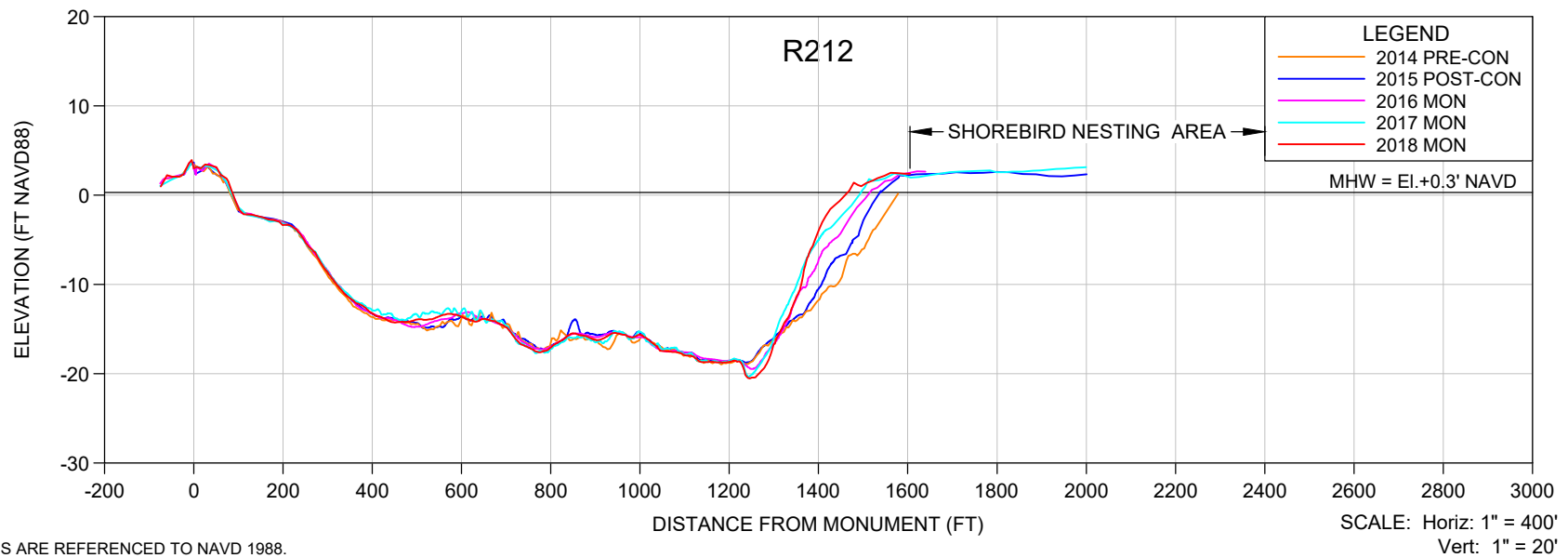
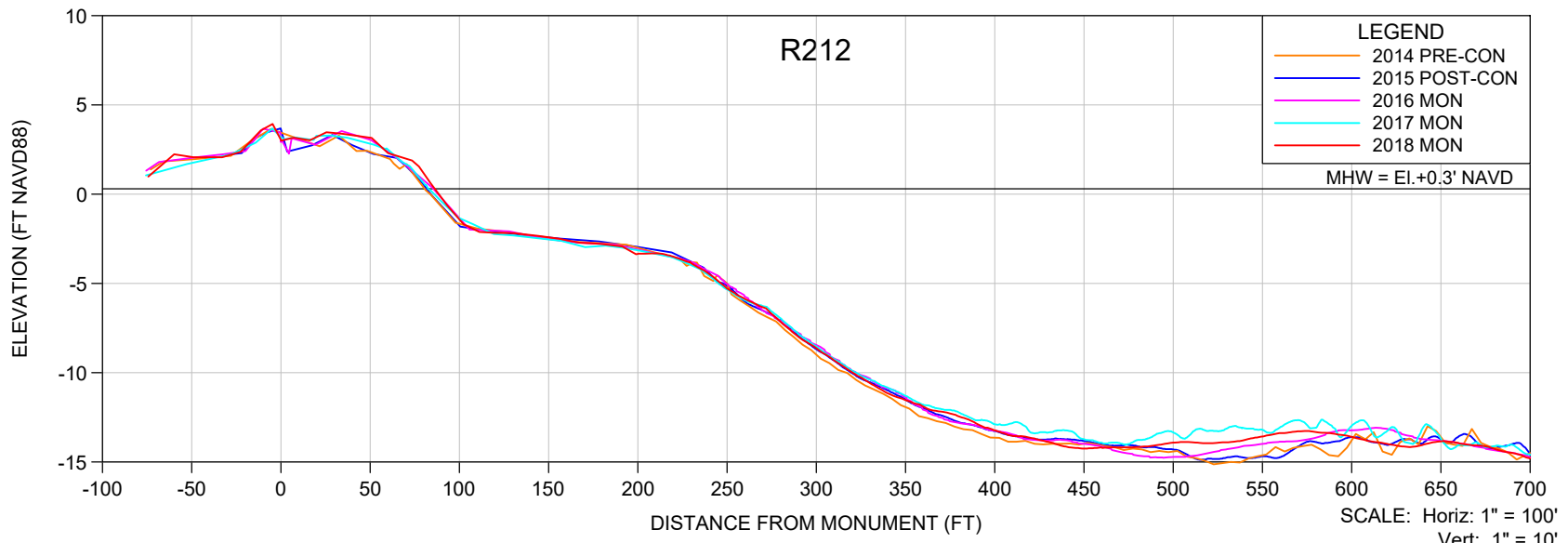
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E-Mail: engcollier@cecifl.com

CLIENT: **LEE COUNTY**
TITLE: **BONITA BEACH AND LOVERS KEY
R-211 MONITORING SURVEY**

DATE:	7/26/2018	SCALE:	AS SHOWN
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ACAD NO.	18079-Lovers Bonita Mon Profiles.dwg		
REF. NO.	18.079	NO.	DATE

NO.	DATE	BY	REVISION DESCRIPTION



- NOTES:**
- ELEVATIONS ARE REFERENCED TO NAVD 1988.
 - PROFILE DATA ARE FROM SURVEYS BY CEC.

SHEET 2
FILE NO.: 18079-R-212

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NAPLES, FLORIDA 34104

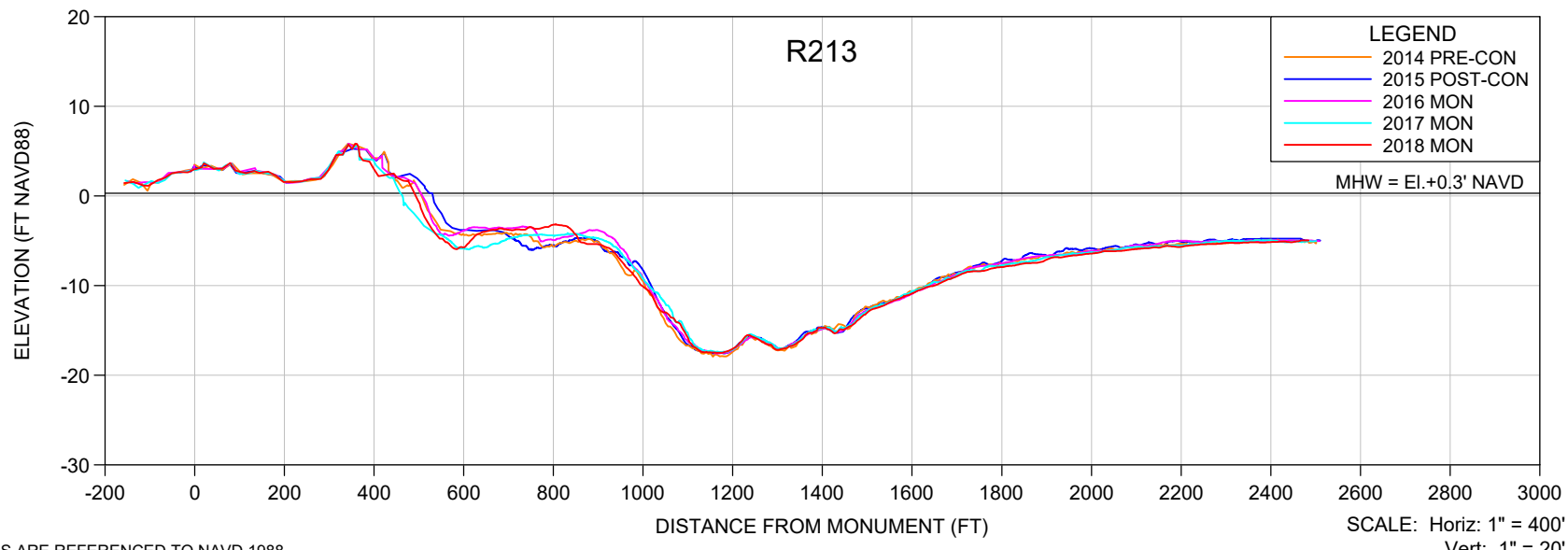
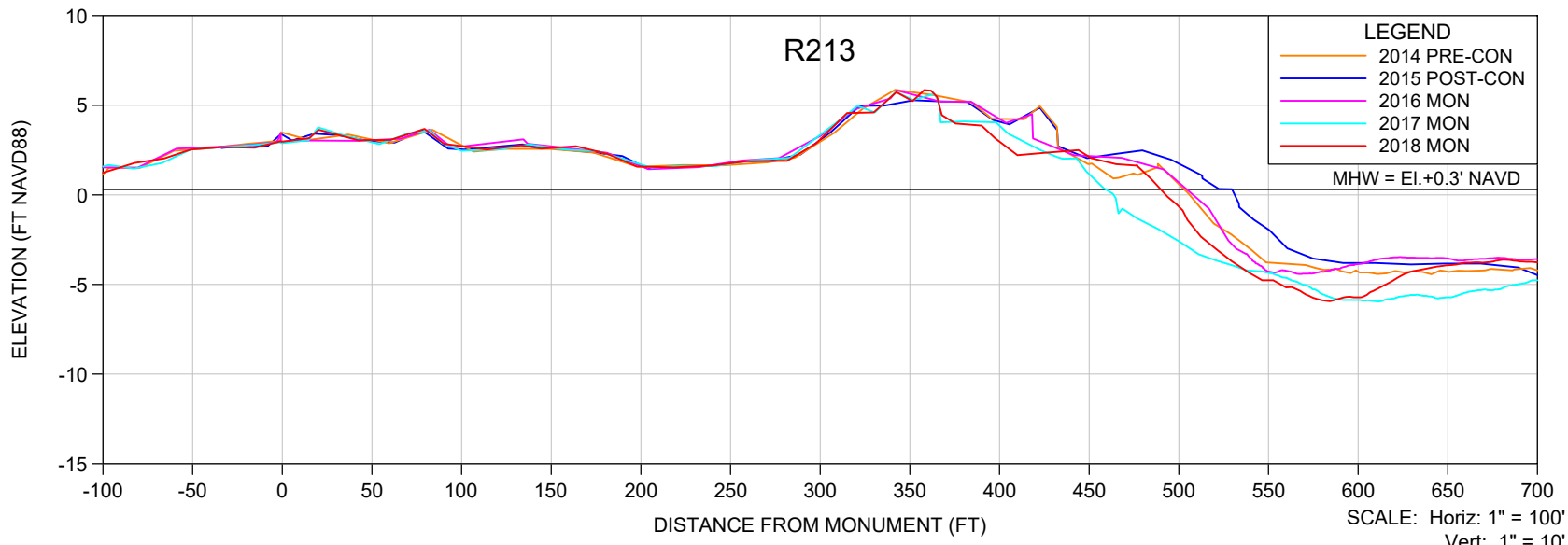
CIVIL ENGINEERING
SURVEY & MAPPING
COASTAL ENGINEERING
ENVIRONMENTAL
PLANNING SERVICES
PHONE: (239)643-2324
FAX: (239)643-1143
www.coastalengineering.com
E-Mail: engcollier@cecifl.com

CLIENT: **LEE COUNTY**


TITLE: **BONITA BEACH AND LOVERS KEY
R-212 MONITORING SURVEY**

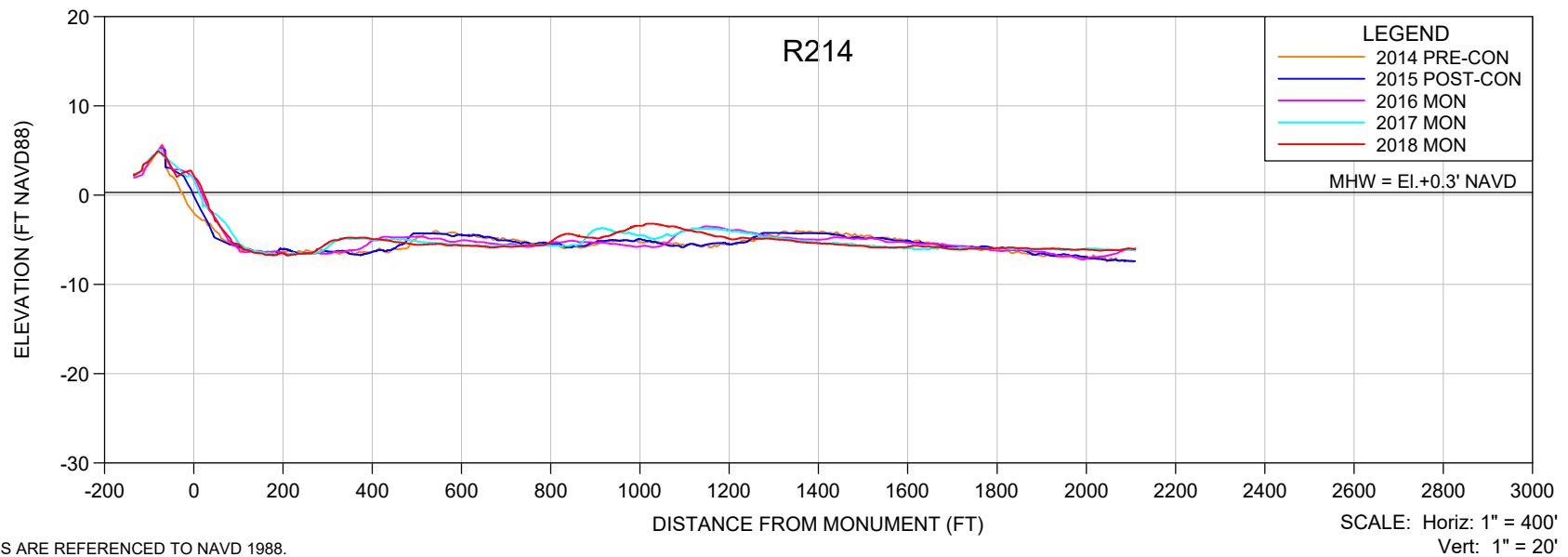
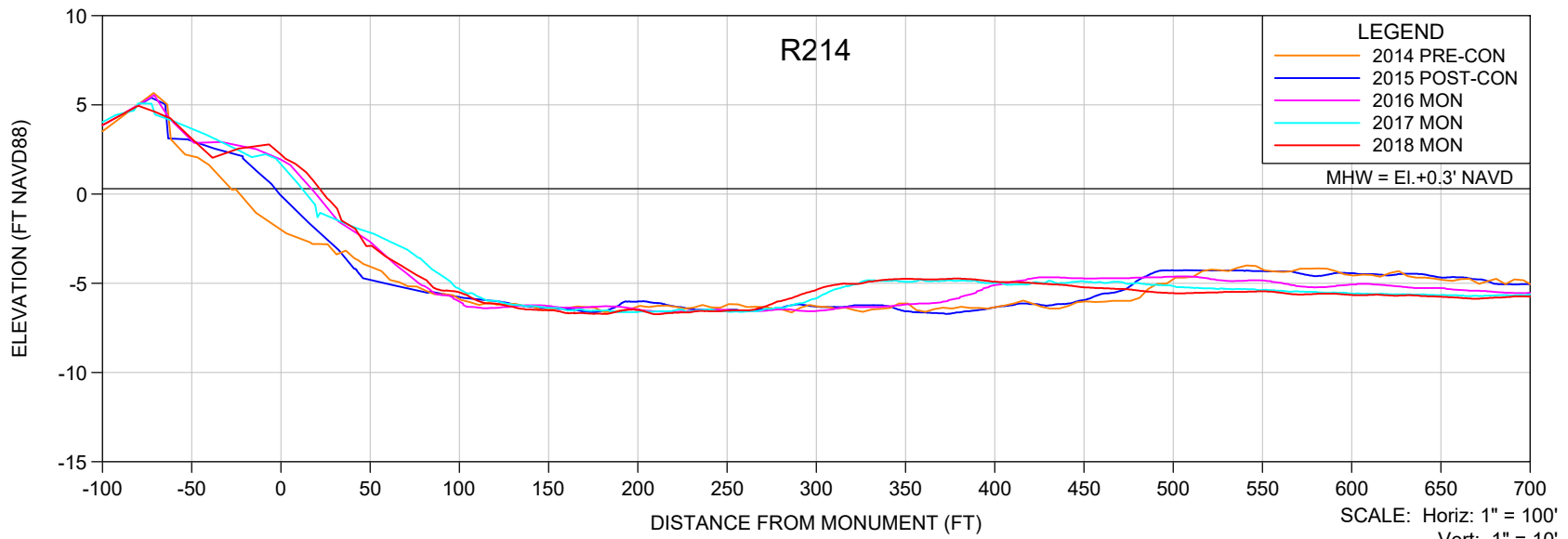
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SEC.	TWP.	RNG.	
ACAD NO.	18079-Lovers Bonita Mon Profiles.dwg		
REF. NO.	18.079	NO.	DATE

NO.	DATE	BY	REVISION DESCRIPTION



- NOTES:**
- ELEVATIONS ARE REFERENCED TO NAVD 1988.
 - PROFILE DATA ARE FROM SURVEYS BY CEC.

SHEET 3 FILE NO.: 18079-R-213	 COASTAL ENGINEERING CONSULTANTS INC. A CECI GROUP COMPANY Serving Florida Since 1977 3106 SOUTH HORSESHOE DRIVE NAPLES, FLORIDA 34104	CIVIL ENGINEERING SURVEY & MAPPING COASTAL ENGINEERING ENVIRONMENTAL PLANNING SERVICES PHONE: (239)643-2324 FAX: (239)643-1143 www.coastalengineering.com E-Mail: engcollier@cecifl.com	CLIENT:	LEE COUNTY			DATE:	7/26/2018	SCALE:	AS SHOWN					
			TITLE:	BONITA BEACH AND LOVERS KEY R-213 MONITORING SURVEY			DRAWN:	SDB	F.B.						
						CHECKED:	MTP	PG.							
						SEC.	TWP.	RNG.							
						ACAD NO	18079-Lovers Bonita Mon Profiles.dwg								
			REF. NO.	18.079			NO.	DATE	BY	REVISION DESCRIPTION					



NOTES:

1. ELEVATIONS ARE REFERENCED TO NAVD 1988.
2. PROFILE DATA ARE FROM SURVEYS BY CEC.

SHEET 4
FILE NO.: 18079-R-214

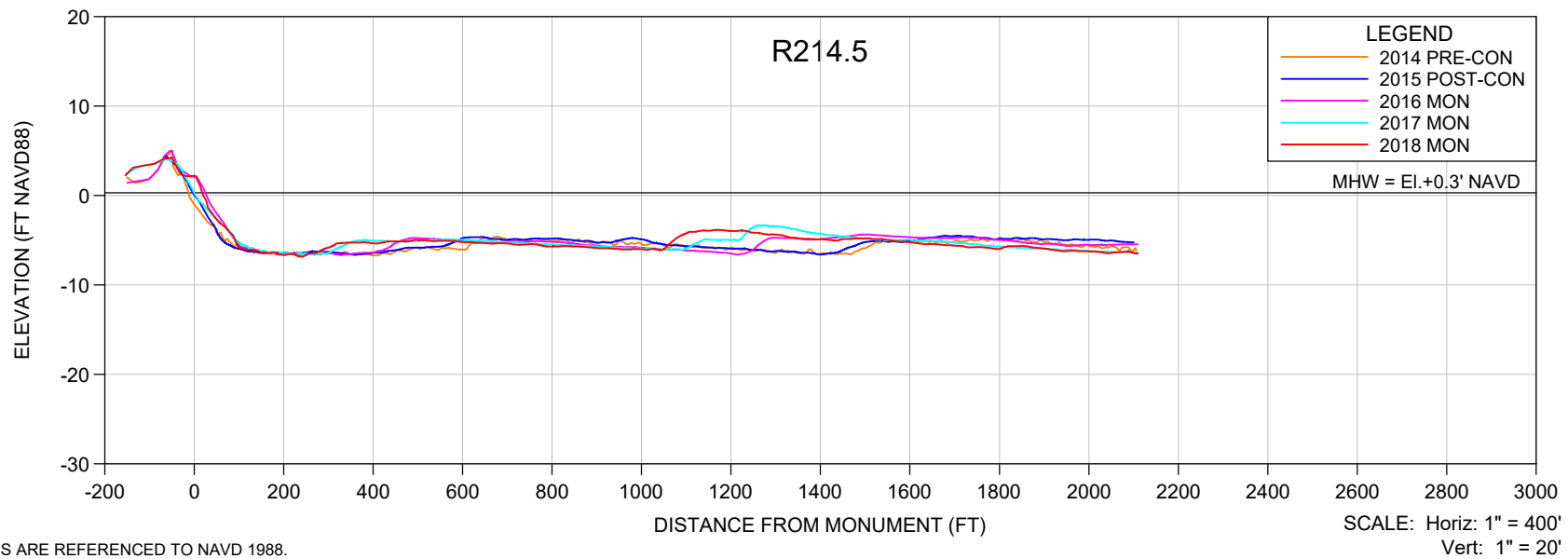
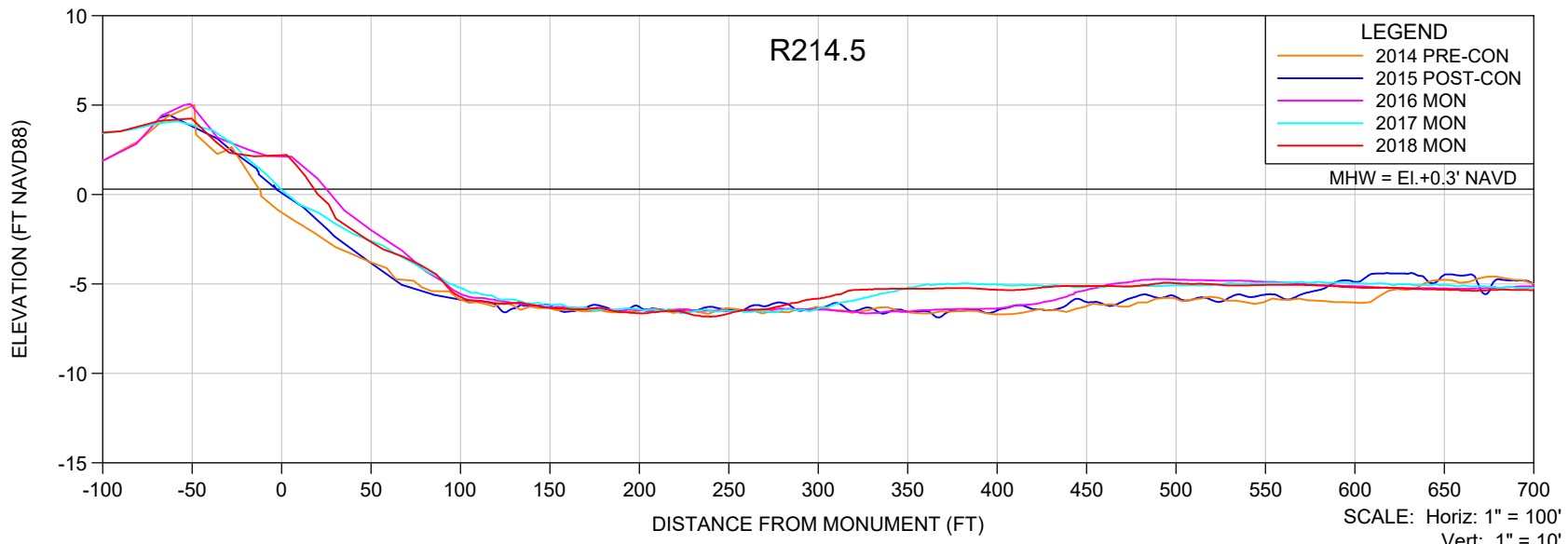
COASTAL ENGINEERING CONSULTANTS INC.
A CECI GROUP COMPANY
Serving Florida Since 1977
3106 SOUTH HORSESHOE DRIVE
NAPLES, FLORIDA 34104

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PLANNING SERVICES
PHONE: (239)643-2324
FAX: (239)643-1143
www.coastalengineering.com
E-Mail: engcollier@cecifl.com

CLIENT: **LEE COUNTY**
TITLE: **BONITA BEACH AND LOVERS KEY R-214 MONITORING SURVEY**

DATE:	7/26/2018	SCALE:	AS SHOWN
DRAWN:	SDB	F.B.	
CHECKED:	MTP	PG.	
SEC.	TWP.	RNG.	
ACAD NO.	18079-Lovers Bonita Mon Profiles.dwg		
REF. NO.	18.079	NO.	DATE

NO.	DATE	BY	REVISION DESCRIPTION



NOTES:

1. ELEVATIONS ARE REFERENCED TO NAVD 1988.
2. PROFILE DATA ARE FROM SURVEYS BY CEC.

SHEET 5
FILE NO.: 18079-R-214.5

COASTAL ENGINEERING CONSULTANTS INC.
A CECI GROUP COMPANY
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3106 SOUTH HORSESHOE DRIVE
NAPLES, FLORIDA 34104

CIVIL ENGINEERING
SURVEY & MAPPING
COASTAL ENGINEERING
ENVIRONMENTAL
PLANNING SERVICES

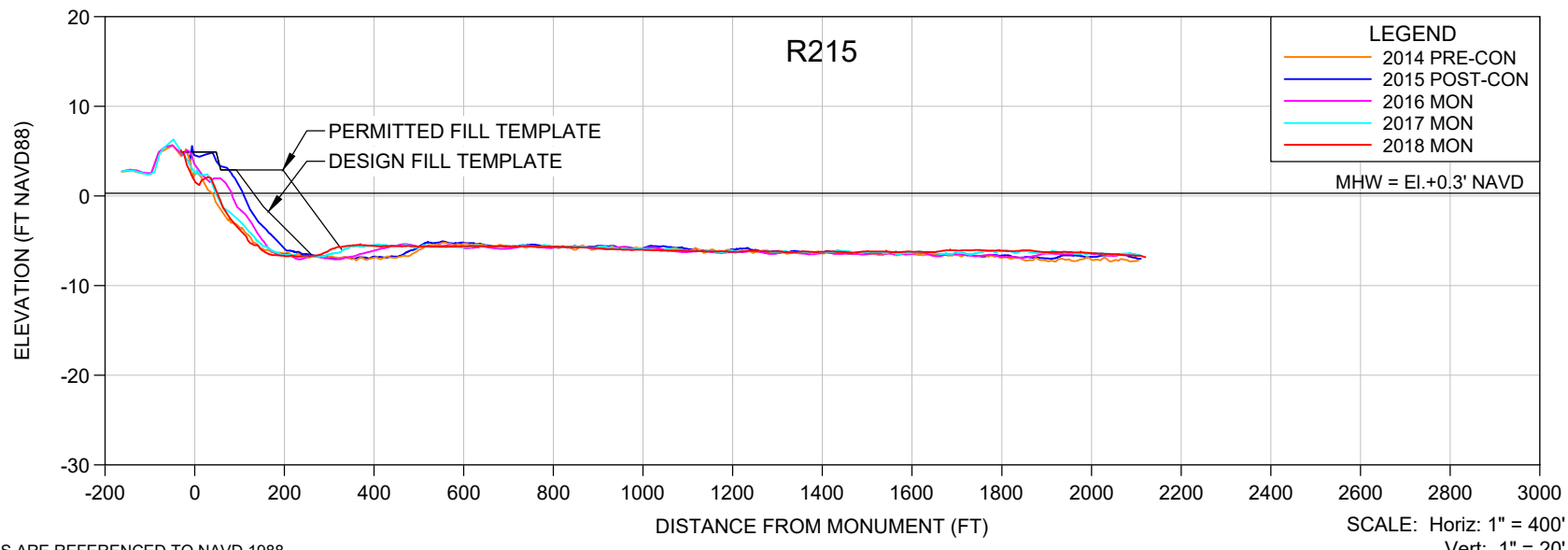
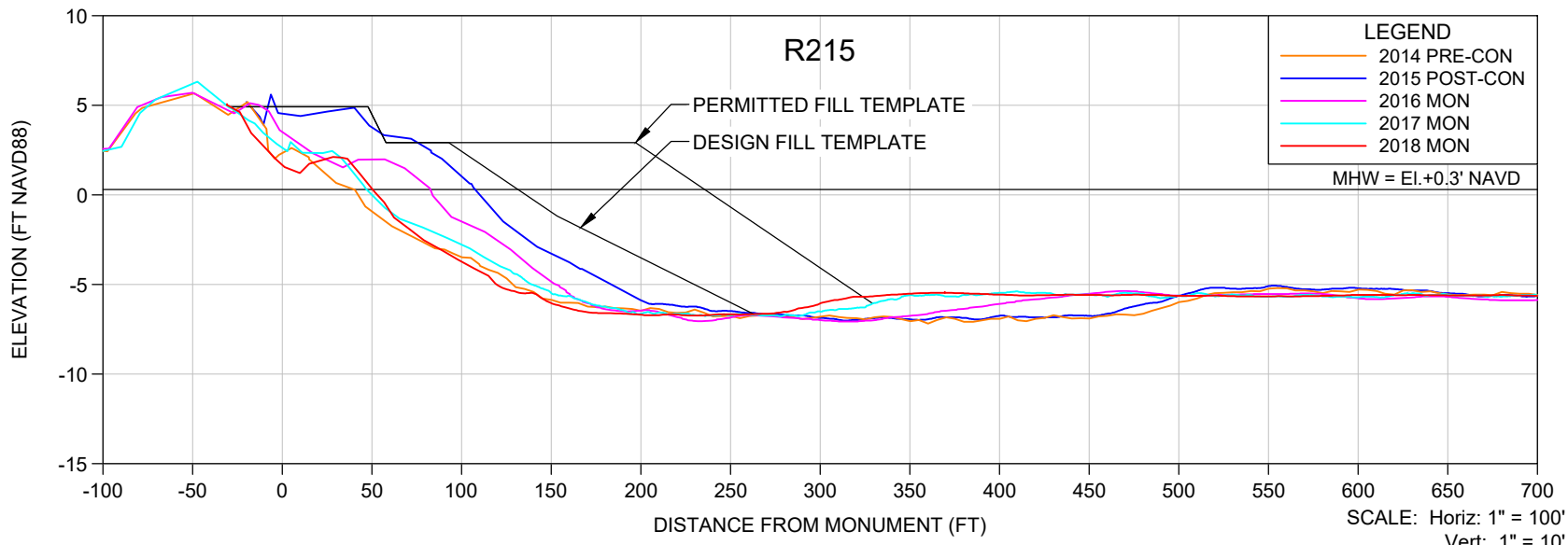
PHONE: (239)643-2324
FAX: (239)643-1143
www.coastalengineering.com
E-Mail: engcollier@cecifl.com

CLIENT: **LEE COUNTY**


TITLE: **BONITA BEACH AND LOVERS KEY R-214.5 MONITORING SURVEY**

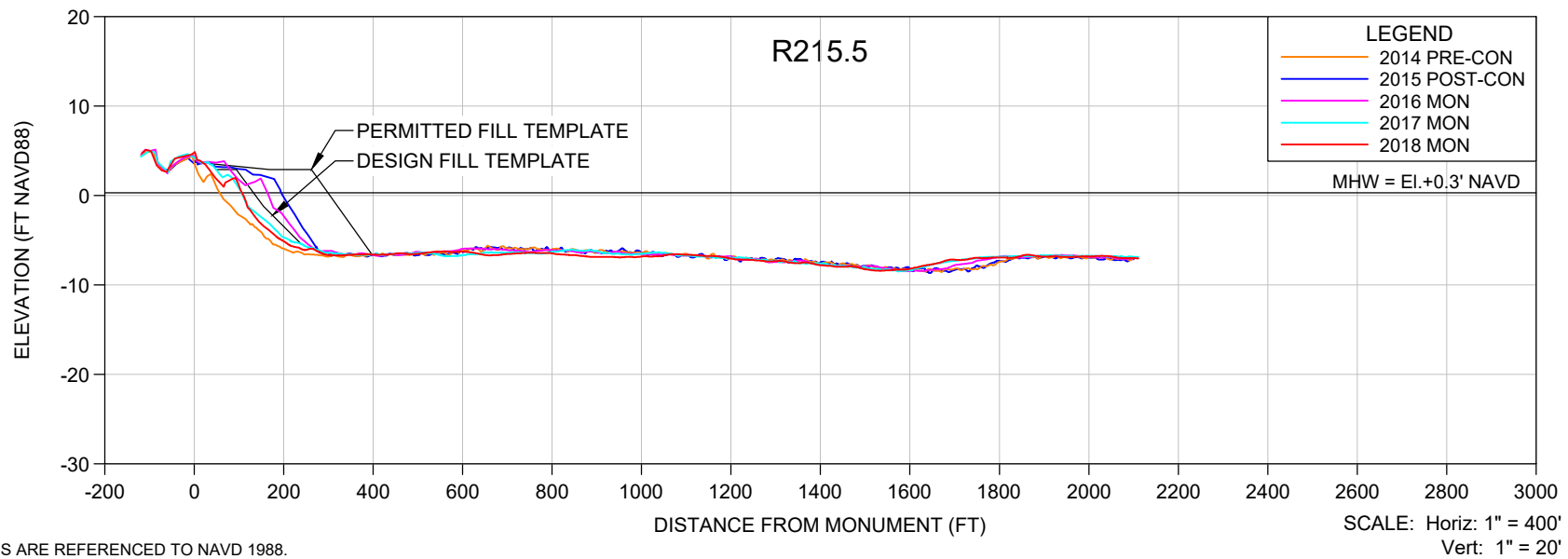
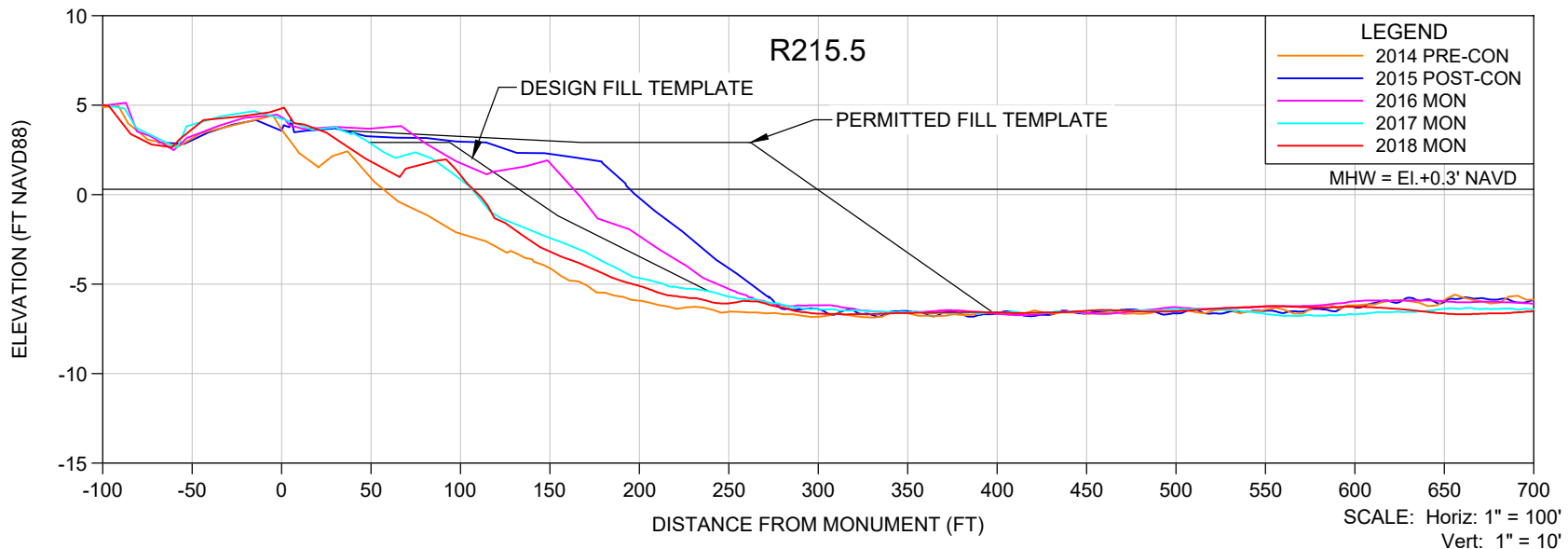
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SEC.	TWP.	RNG.	
ACAD NO	18079-Lovers Bonita Mon Profiles.dwg		
REF. NO.	18.079	NO.	DATE

NO.	DATE	BY	REVISION DESCRIPTION



NOTES:
 1. ELEVATIONS ARE REFERENCED TO NAVD 1988.
 2. PROFILE DATA ARE FROM SURVEYS BY CEC.

SHEET 6 FILE NO.: 18079-R-215	 COASTAL ENGINEERING CONSULTANTS INC. A CECI GROUP COMPANY Serving Florida Since 1977 3106 SOUTH HORSESHOE DRIVE NAPLES, FLORIDA 34104	CIVIL ENGINEERING SURVEY & MAPPING COASTAL ENGINEERING ENVIRONMENTAL PLANNING SERVICES PHONE: (239)643-2324 FAX: (239)643-1143 www.coastalengineering.com E-Mail: engcollier@cecifl.com	CLIENT:	LEE COUNTY			DATE:	7/26/2018	SCALE:	AS SHOWN					
			TITLE:	BONITA BEACH AND LOVERS KEY R-215 MONITORING SURVEY			DRAWN:	SDB	F.B.						
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						SEC.	TWP.	RNG.							
						ACAD NO	18079-Lovers Bonita Mon Profiles.dwg								
			REF. NO.	18.079	NO.	DATE	BY	REVISION DESCRIPTION							



NOTES:

1. ELEVATIONS ARE REFERENCED TO NAVD 1988.
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COASTAL ENGINEERING CONSULTANTS INC.
 A CECI GROUP COMPANY
 Serving Florida Since 1977
 3106 SOUTH HORSESHOE DRIVE
 NAPLES, FLORIDA 34104

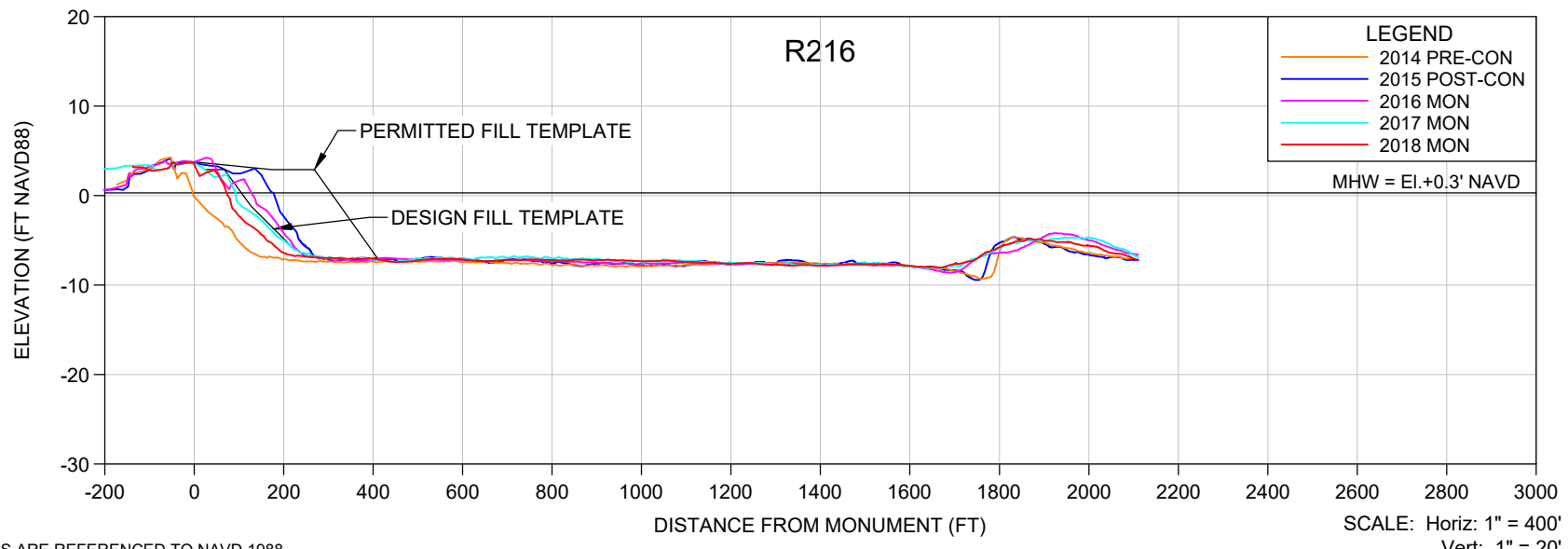
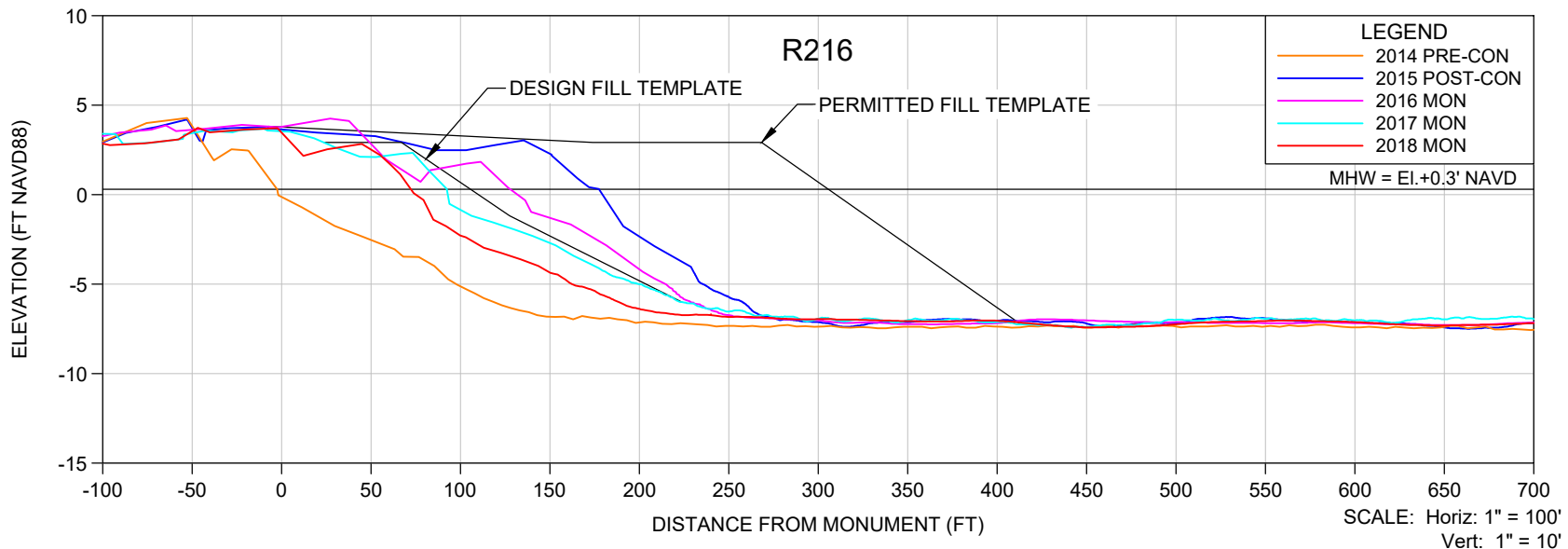
CIVIL ENGINEERING
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 PLANNING SERVICES
 PHONE: (239)643-2324
 FAX: (239)643-1143
 www.coastalengineering.com
 E-Mail: engcollier@cecifl.com

CLIENT: **LEE COUNTY**

TITLE: **BONITA BEACH AND LOVERS KEY R-215.5 MONITORING SURVEY**

DATE: 7/26/2018 SCALE: AS SHOWN
 DRAWN: SDB F.B.
 CHECKED: MTP PG.
 SEC. TWP. RNG.
 ACAD NO: 18079-Lovers Bonita Mon Profiles.dwg
 REF. NO. 18.079

NO.	DATE	BY	REVISION DESCRIPTION



- NOTES:**
- ELEVATIONS ARE REFERENCED TO NAVD 1988.
 - PROFILE DATA ARE FROM SURVEYS BY CEC.

SHEET 8
FILE NO.: 18079-R-216

COASTAL ENGINEERING CONSULTANTS INC.
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Serving Florida Since 1977

3106 SOUTH HORSESHOE DRIVE
NAPLES, FLORIDA 34104

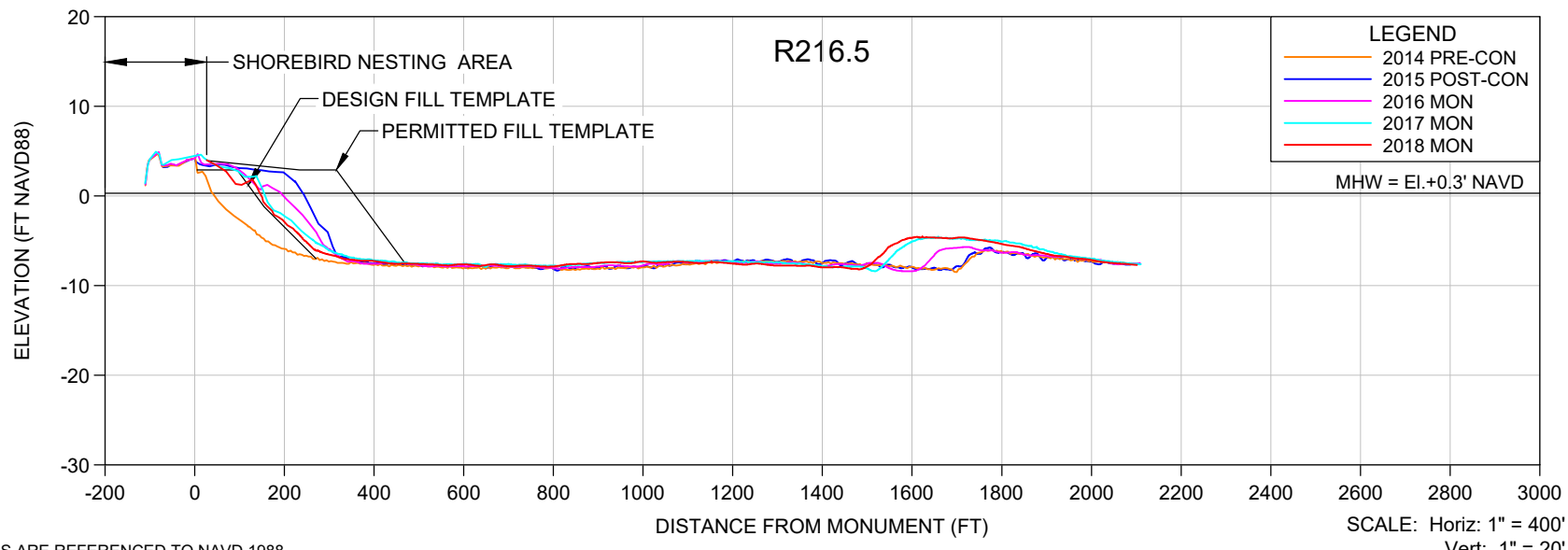
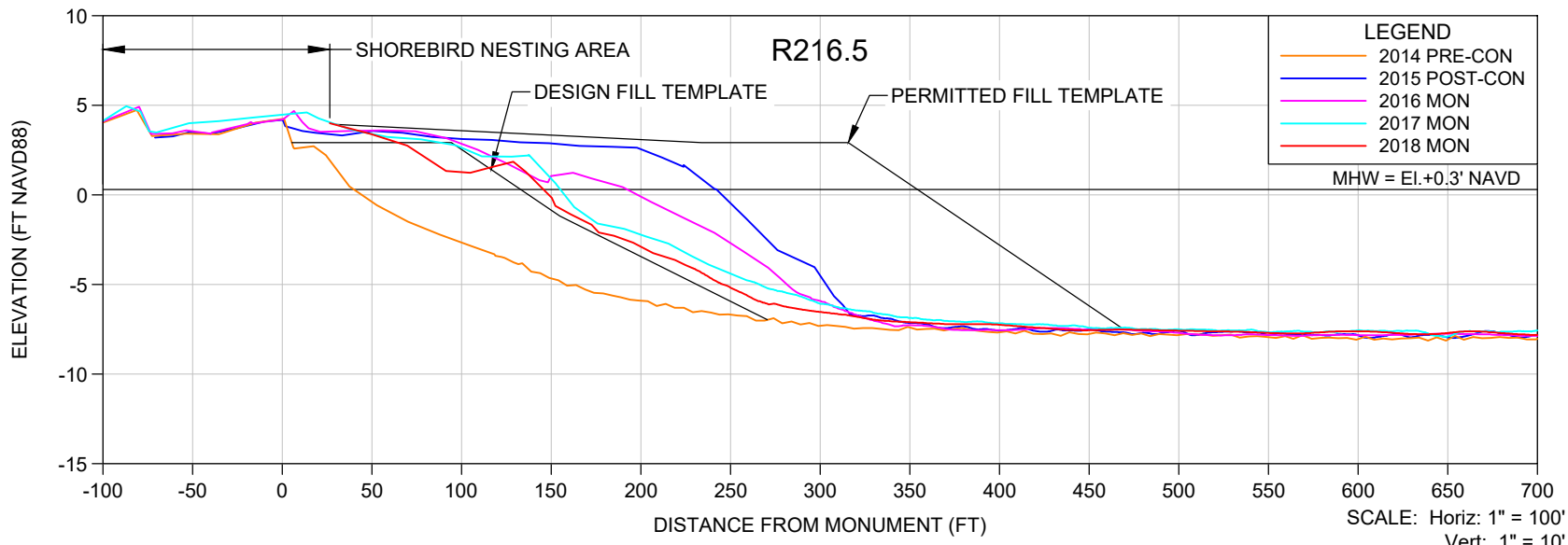
CIVIL ENGINEERING
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FAX: (239)643-1143
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E-Mail: engcollier@cecifl.com

CLIENT: **LEE COUNTY**

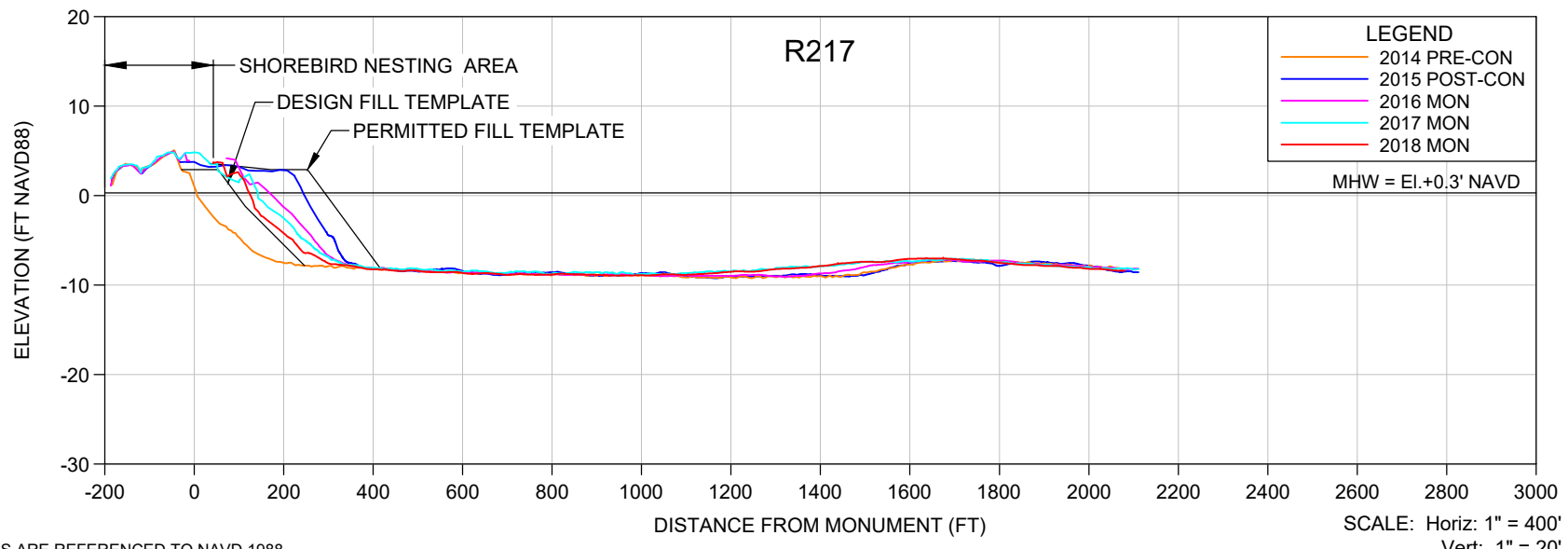
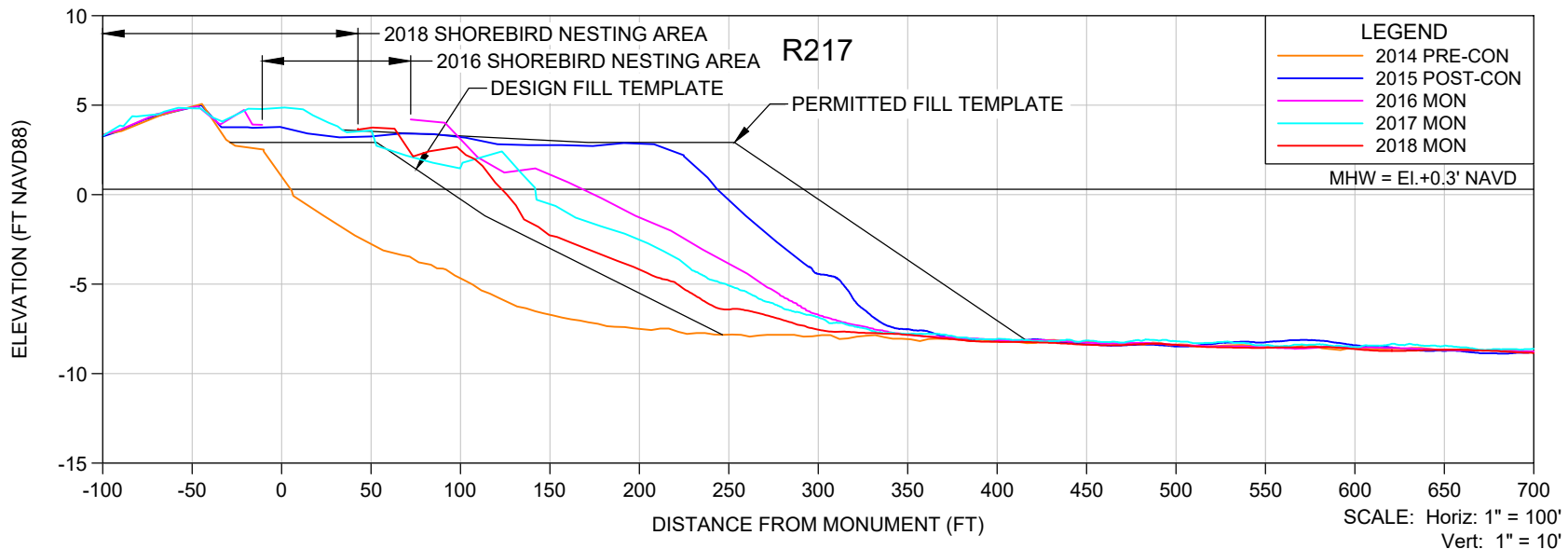
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DATE:	7/26/2018	SCALE:	AS SHOWN
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SEC.	TWP.	RNG.	
ACAD NO	18079-Lovers Bonita Mon Profiles.dwg		
REF. NO.	18.079	NO.	DATE
		BY	REVISION DESCRIPTION



- NOTES:**
- ELEVATIONS ARE REFERENCED TO NAVD 1988.
 - PROFILE DATA ARE FROM SURVEYS BY CEC.

SHEET 9 FILE NO.: 18079-R-216.5	<p>COASTAL ENGINEERING CONSULTANTS INC. A CECI GROUP COMPANY Serving Florida Since 1977 3106 SOUTH HORSESHOE DRIVE NAPLES, FLORIDA 34104</p>	<p>CIVIL ENGINEERING SURVEY & MAPPING COASTAL ENGINEERING ENVIRONMENTAL PLANNING SERVICES</p> <p>PHONE: (239)643-2324 FAX: (239)643-1143 www.coastalengineering.com E-Mail: engcollier@cecifl.com</p>	CLIENT:	LEE COUNTY			DATE:	7/26/2018	SCALE:	AS SHOWN					
			TITLE:	BONITA BEACH AND LOVERS KEY R-216.5 MONITORING SURVEY			DRAWN:	SDB	F.B.						
						CHECKED:	MTP	PG.							
						SEC.	TWP.	RNG.							
						ACAD NO:	18079-Lovers Bonita Mon Profiles.dwg								
			REF. NO.	18.079	NO.	DATE	BY	REVISION DESCRIPTION							



NOTES:

1. ELEVATIONS ARE REFERENCED TO NAVD 1988.
2. PROFILE DATA ARE FROM SURVEYS BY CEC.

SHEET NO. 18079-R-217

COASTAL ENGINEERING CONSULTANTS INC.
 A CECI GROUP COMPANY
 Serving Florida Since 1977
 3106 SOUTH HORSESHOE DRIVE
 NAPLES, FLORIDA 34104

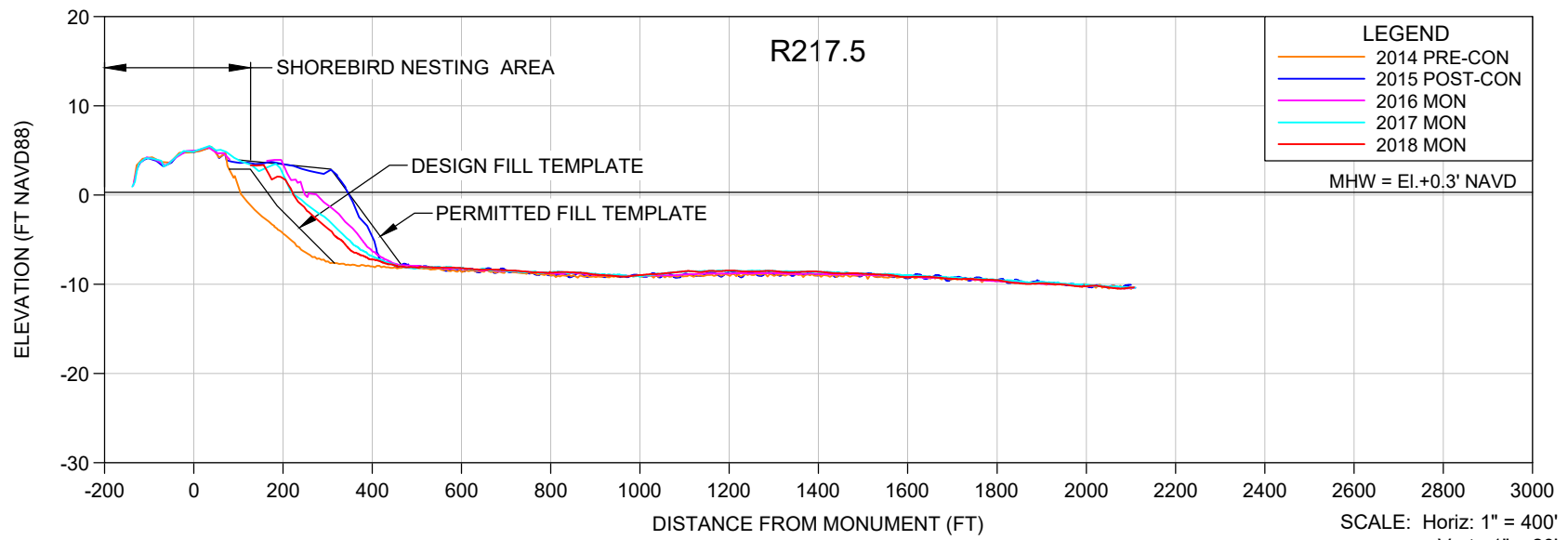
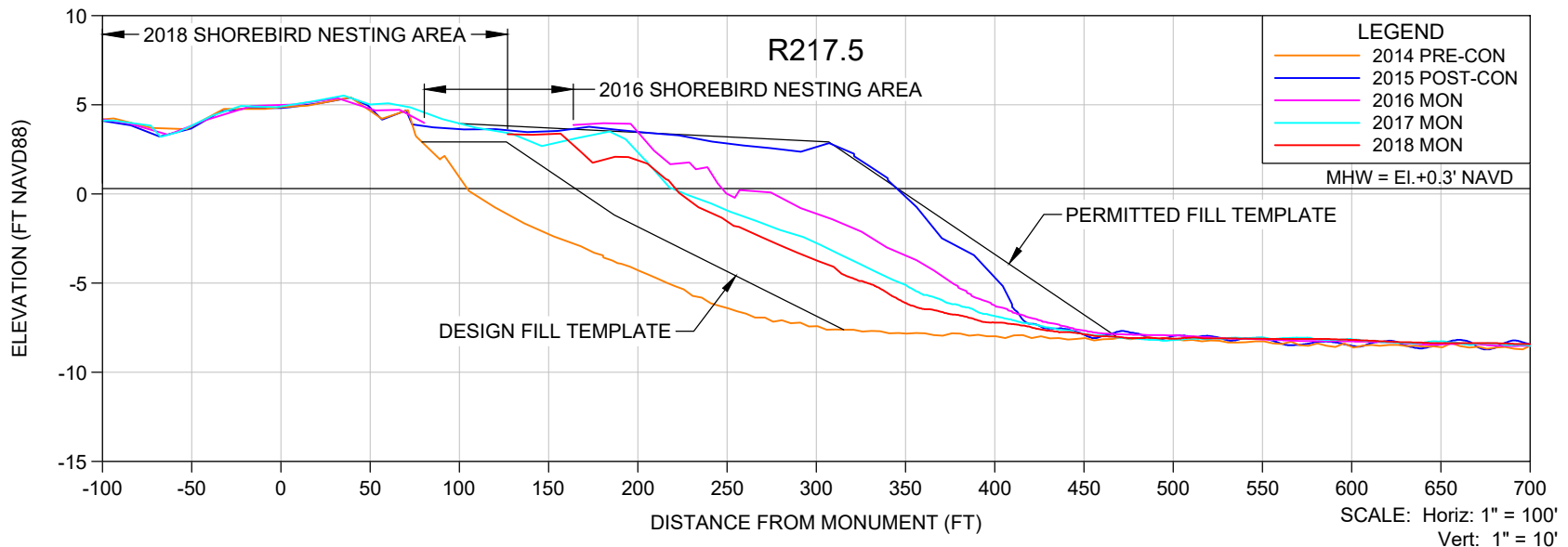
CIVIL ENGINEERING
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 PLANNING SERVICES
 PHONE: (239)643-2324
 FAX: (239)643-1143
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 E-Mail: engcollier@cecifl.com

CLIENT: **LEE COUNTY**

TITLE: **BONITA BEACH AND LOVERS KEY R-217 MONITORING SURVEY**

DATE:	7/26/2018	SCALE:	AS SHOWN
DRAWN:	SDB	F.B.	
CHECKED:	MTP	PG.	
SEC.	TWP.	RNG.	
ACAD NO	18079-Lovers Bonita Mon Profiles.dwg		
REF. NO.	18.079	NO.	DATE

NO.	DATE	BY	REVISION DESCRIPTION



NOTES:

1. ELEVATIONS ARE REFERENCED TO NAVD 1988.
2. PROFILE DATA ARE FROM SURVEYS BY CEC.

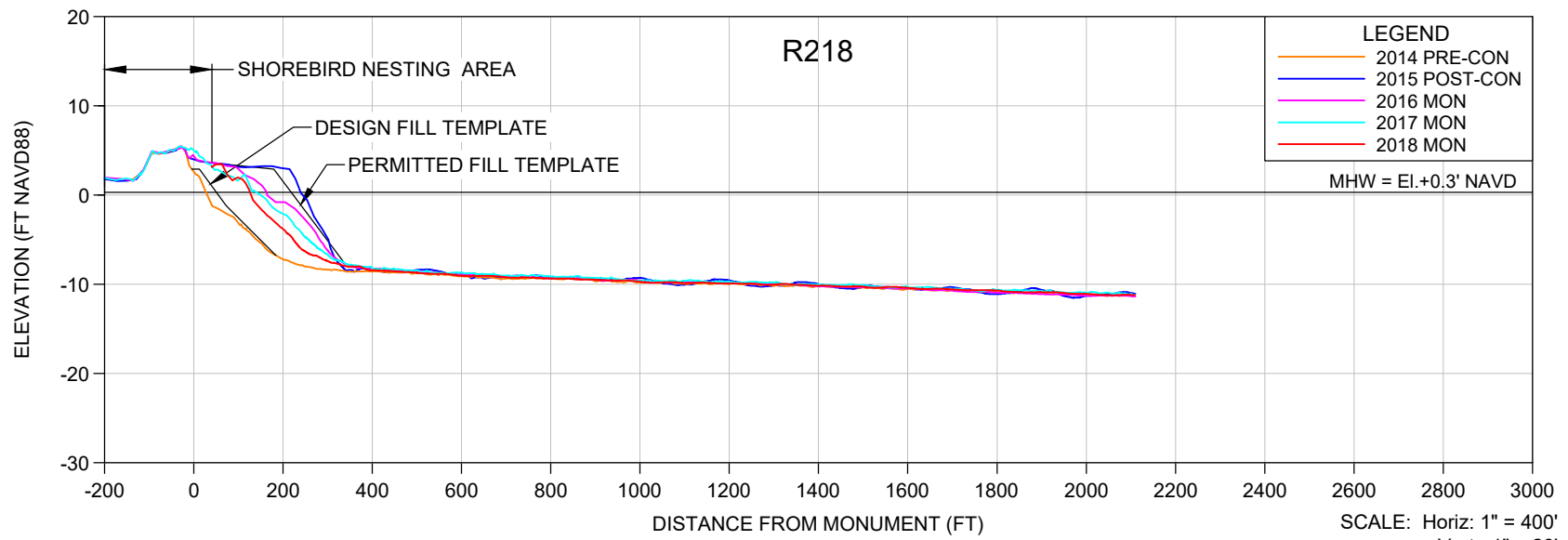
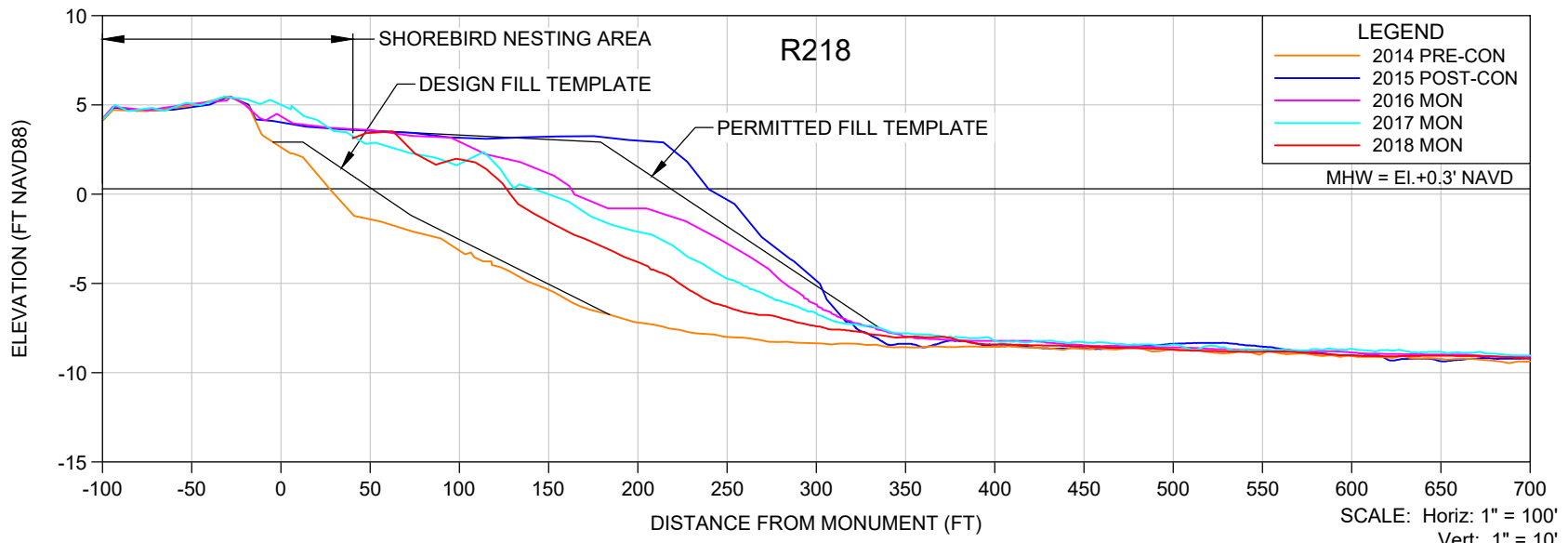
COASTAL ENGINEERING CONSULTANTS INC.
 A CECI GROUP COMPANY
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 3106 SOUTH HORSESHOE DRIVE
 NAPLES, FLORIDA 34104

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 E-Mail: engcollier@cecifl.com

CLIENT: **LEE COUNTY**
 TITLE: **BONITA BEACH AND LOVERS KEY R-217.5 MONITORING SURVEY**

DATE:	7/26/2018	SCALE:	AS SHOWN
DRAWN:	SDB	F.B.	
CHECKED:	MTP	PG.	
SEC.	TWP.	RNG.	
ACAD NO	18079-Lovers Bonita Mon Profiles.dwg		
REF. NO.	18.079	NO.	DATE

NO.	DATE	BY	REVISION DESCRIPTION



NOTES:

1. ELEVATIONS ARE REFERENCED TO NAVD 1988.
2. PROFILE DATA ARE FROM SURVEYS BY CEC.

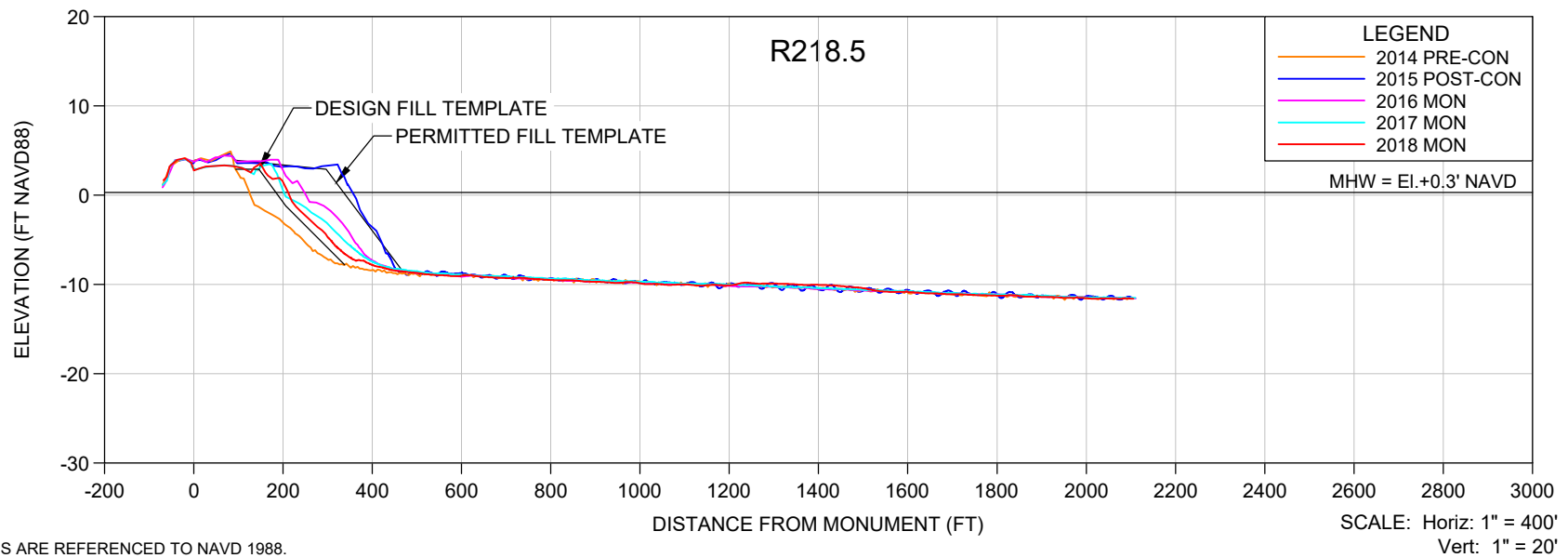
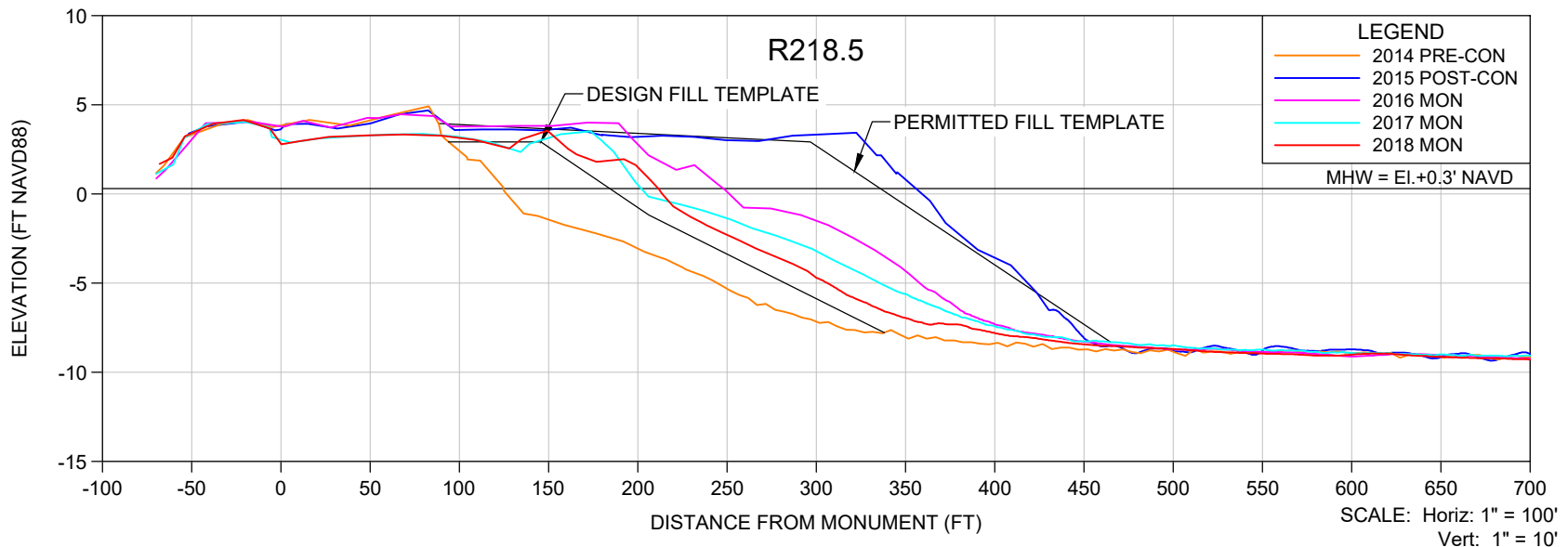
COASTAL ENGINEERING CONSULTANTS INC.
 A CECI GROUP COMPANY
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 3106 SOUTH HORSESHOE DRIVE
 NAPLES, FLORIDA 34104

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CLIENT: **LEE COUNTY**
 TITLE: **BONITA BEACH AND LOVERS KEY R-218 MONITORING SURVEY**

DATE: 7/26/2018 SCALE: AS SHOWN
 DRAWN: SDB F.B.
 CHECKED: MTP PG.
 SEC. TWP. RNG.
 ACAD NO: 18079-Lovers Bonita Mon Profiles.dwg
 REF. NO. 18.079

NO.	DATE	BY	REVISION DESCRIPTION



NOTES:

1. ELEVATIONS ARE REFERENCED TO NAVD 1988.
2. PROFILE DATA ARE FROM SURVEYS BY CEC.

SHEET 13
FILE NO.: 18079-B-218.5

COASTAL ENGINEERING CONSULTANTS INC.
A CECI GROUP COMPANY
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3106 SOUTH HORSESHOE DRIVE
NAPLES, FLORIDA 34104

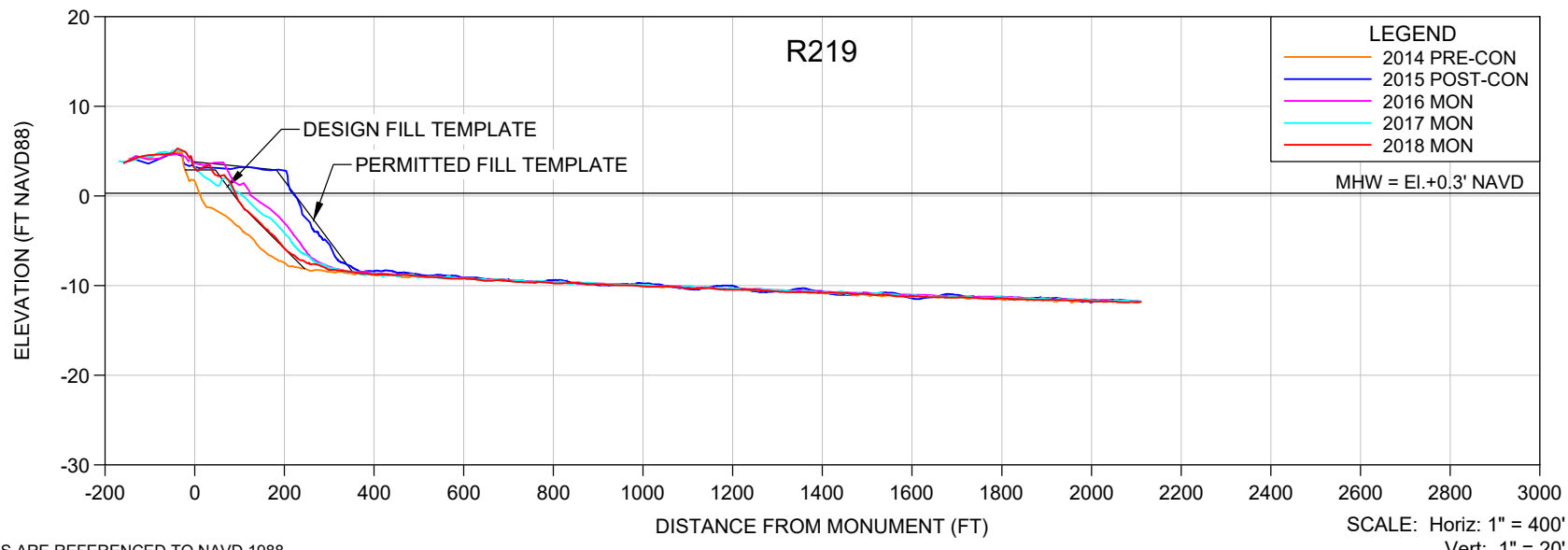
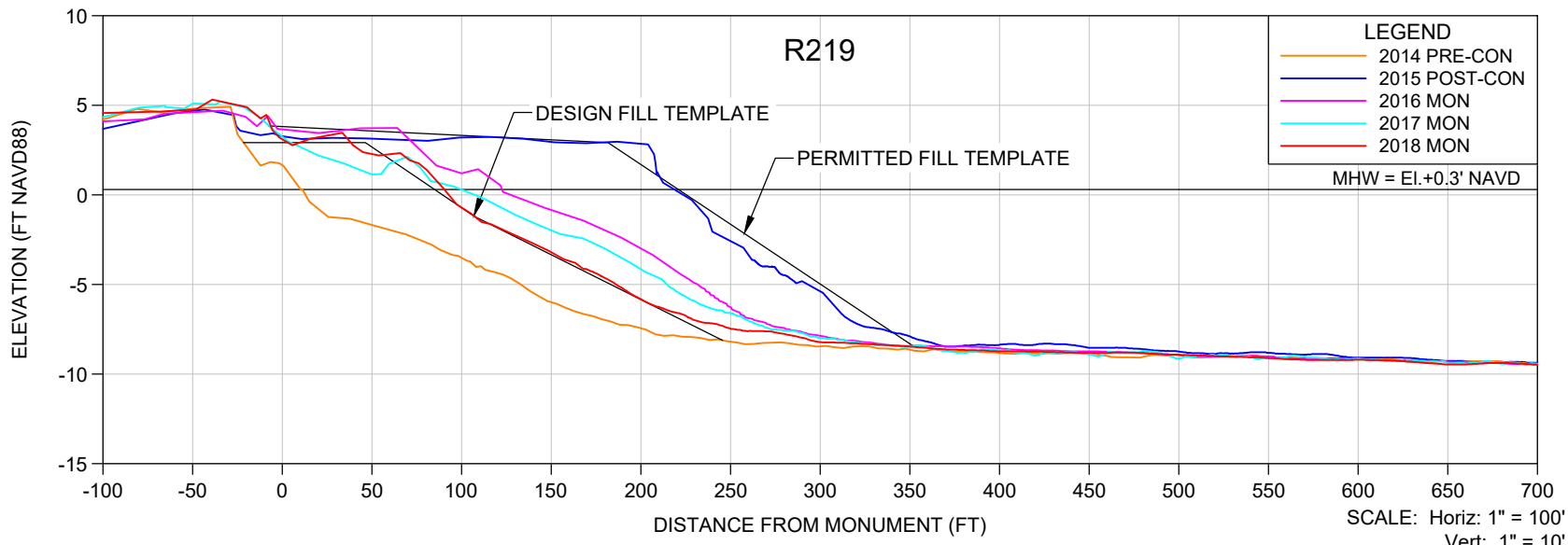
CIVIL ENGINEERING
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COASTAL ENGINEERING
ENVIRONMENTAL
PLANNING SERVICES

PHONE: (239)643-2324
FAX: (239)643-1143
www.coastalengineering.com
E-Mail: engcollier@cecifl.com

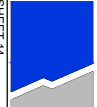
CLIENT: **LEE COUNTY**

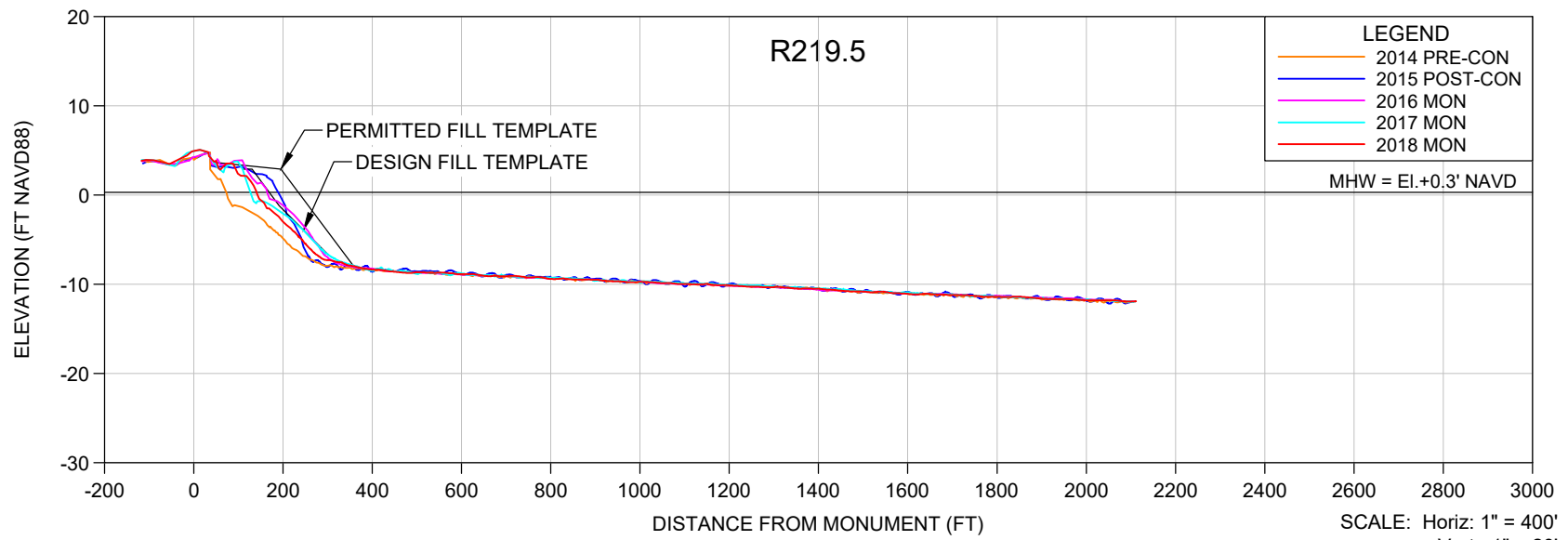
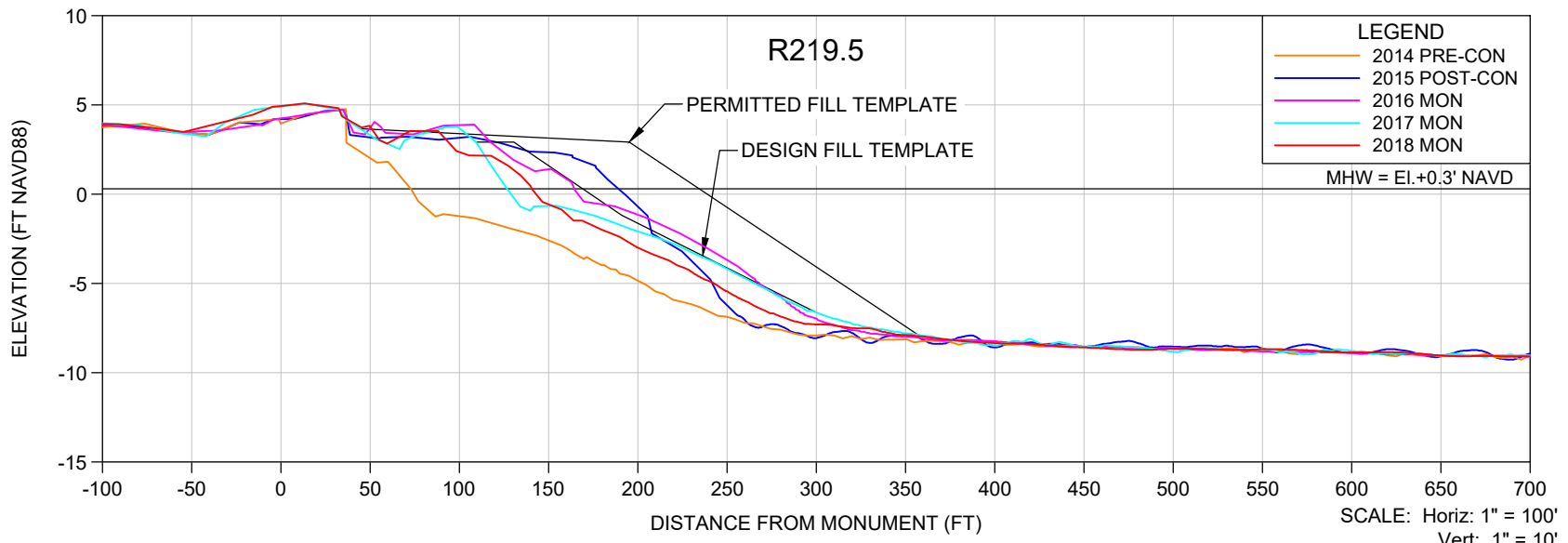
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DATE:	7/26/2018	SCALE:	AS SHOWN
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CHECKED:	MTP	PG.	
SEC.	TWP.	RNG.	
ACAD NO	18079-Lovers Bonita Mon Profiles.dwg		
REF. NO.	18.079	NO.	DATE
		BY	REVISION DESCRIPTION



- NOTES:**
- ELEVATIONS ARE REFERENCED TO NAVD 1988.
 - PROFILE DATA ARE FROM SURVEYS BY CEC.

SHEET 14 FILE NO.: 18079-R-219	 COASTAL ENGINEERING CONSULTANTS INC. A CECI GROUP COMPANY Serving Florida Since 1977 3106 SOUTH HORSESHOE DRIVE NAPLES, FLORIDA 34104	CIVIL ENGINEERING SURVEY & MAPPING COASTAL ENGINEERING ENVIRONMENTAL PLANNING SERVICES PHONE: (239)643-2324 FAX: (239)643-1143 www.coastalengineering.com E-Mail: engcollier@cecifl.com	CLIENT:	LEE COUNTY			DATE:	7/26/2018	SCALE:	AS SHOWN					
			TITLE:	BONITA BEACH AND LOVERS KEY R-219 MONITORING SURVEY			DRAWN:	SDB	F.B.						
						CHECKED:	MTP	PG.							
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						ACAD NO.	18079-Lovers Bonita Mon Profiles.dwg								
			REF. NO.	18.079	NO.	DATE	BY	REVISION DESCRIPTION							



NOTES:

1. ELEVATIONS ARE REFERENCED TO NAVD 1988.
2. PROFILE DATA ARE FROM SURVEYS BY CEC.

SHEET 15
FILE NO.: 18079-R-219.5

COASTAL ENGINEERING CONSULTANTS INC.
 A CECI GROUP COMPANY
 Serving Florida Since 1977
 3106 SOUTH HORSESHOE DRIVE
 NAPLES, FLORIDA 34104

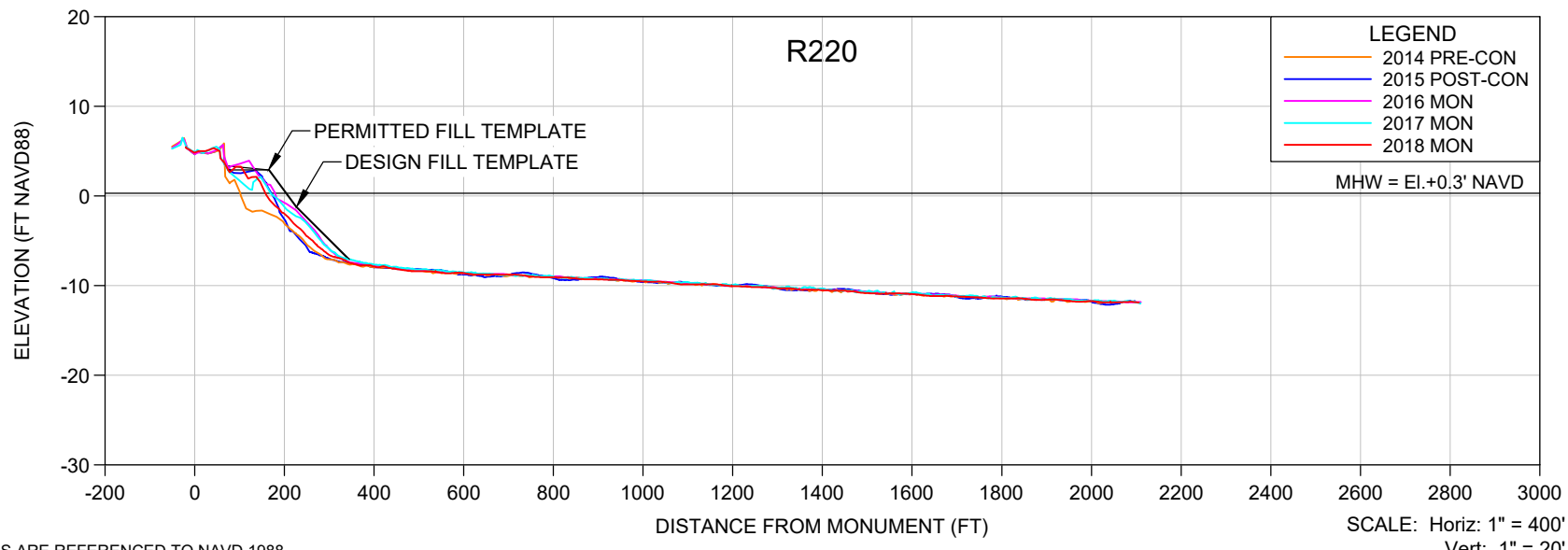
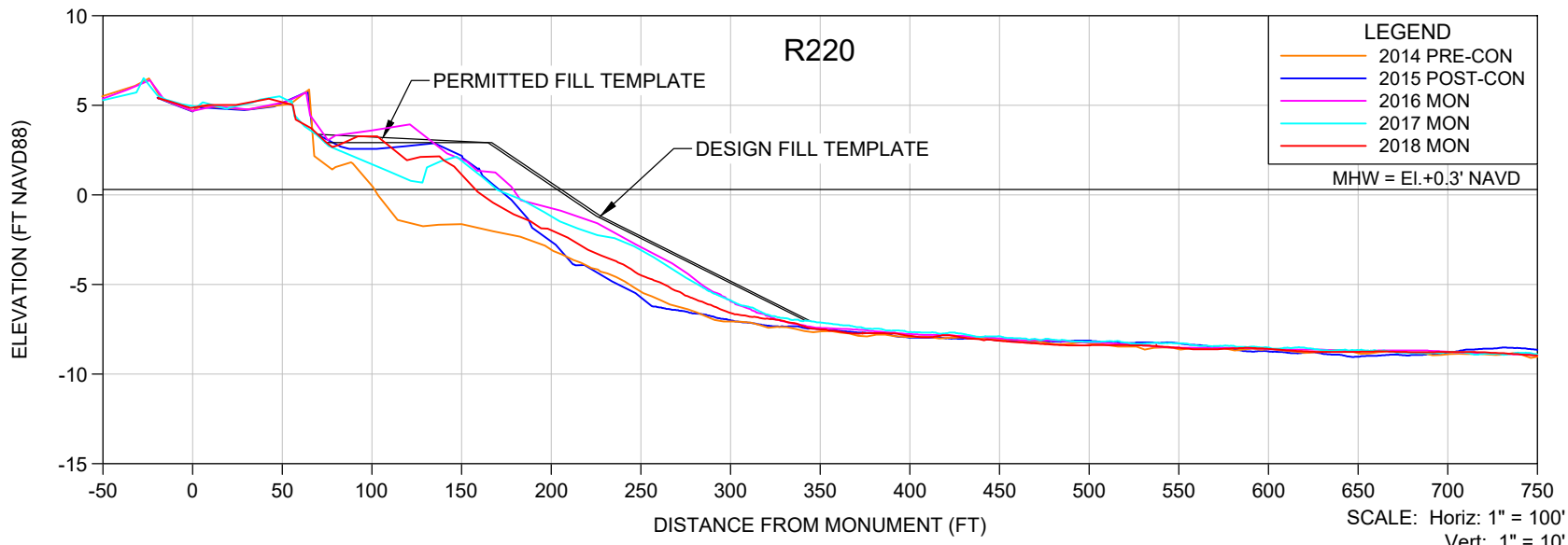
CIVIL ENGINEERING
 SURVEY & MAPPING
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 PHONE: (239)643-2324
 FAX: (239)643-1143
 www.coastalengineering.com
 E-Mail: engcollier@cecifl.com

CLIENT: **LEE COUNTY**

TITLE: **BONITA BEACH AND LOVERS KEY R-219.5 MONITORING SURVEY**

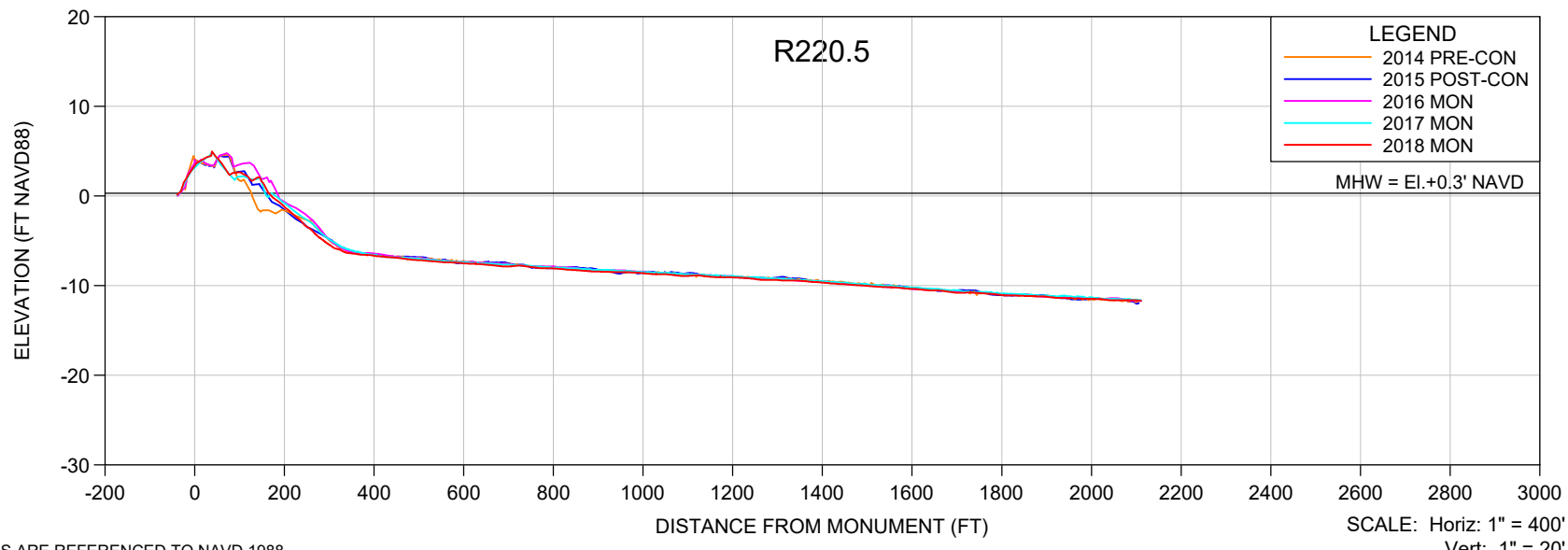
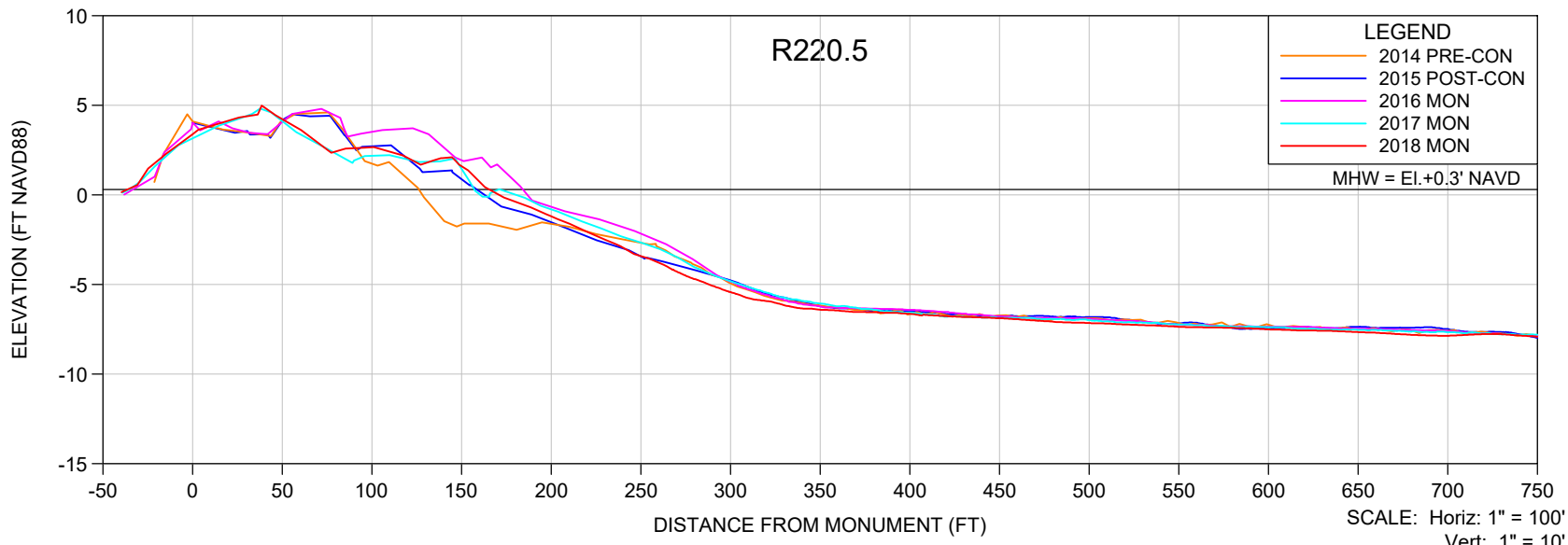
DATE:	7/26/2018	SCALE:	AS SHOWN
DRAWN:	SDB	F.B.	
CHECKED:	MTP	PG.	
SEC.	TWP.	RNG.	
ACAD NO.	18079-Lovers Bonita Mon Profiles.dwg		
REF. NO.	18.079	NO.	DATE

NO.	DATE	BY	REVISION DESCRIPTION




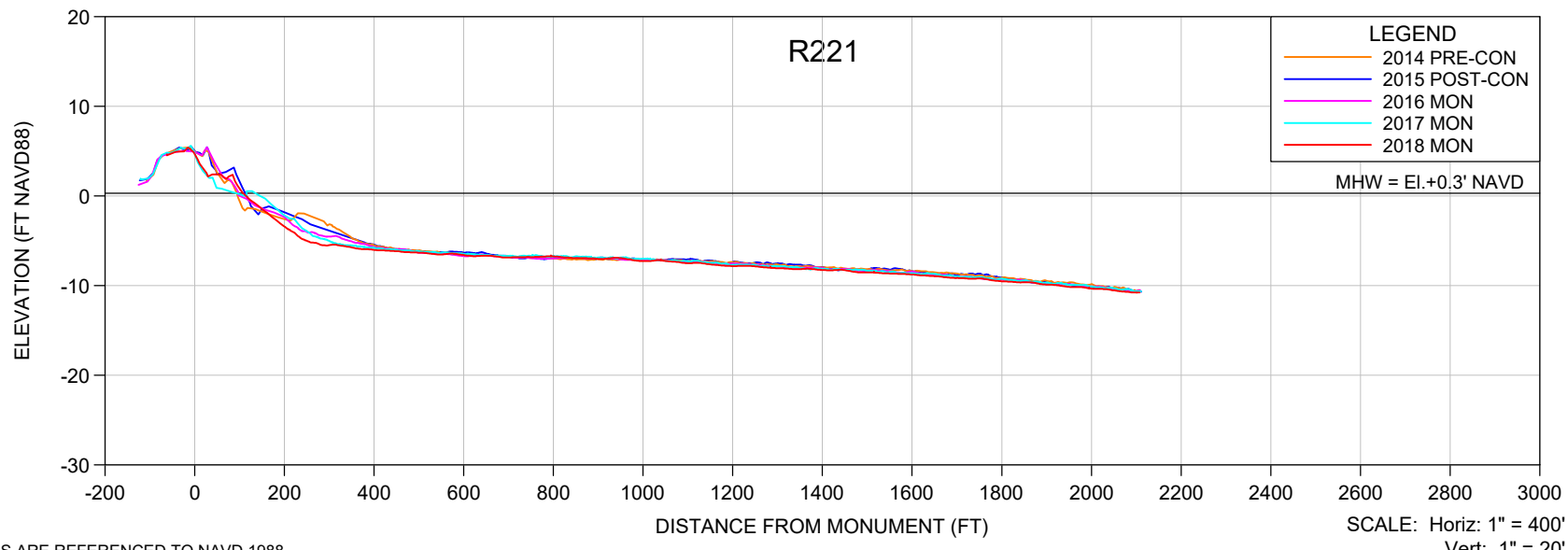
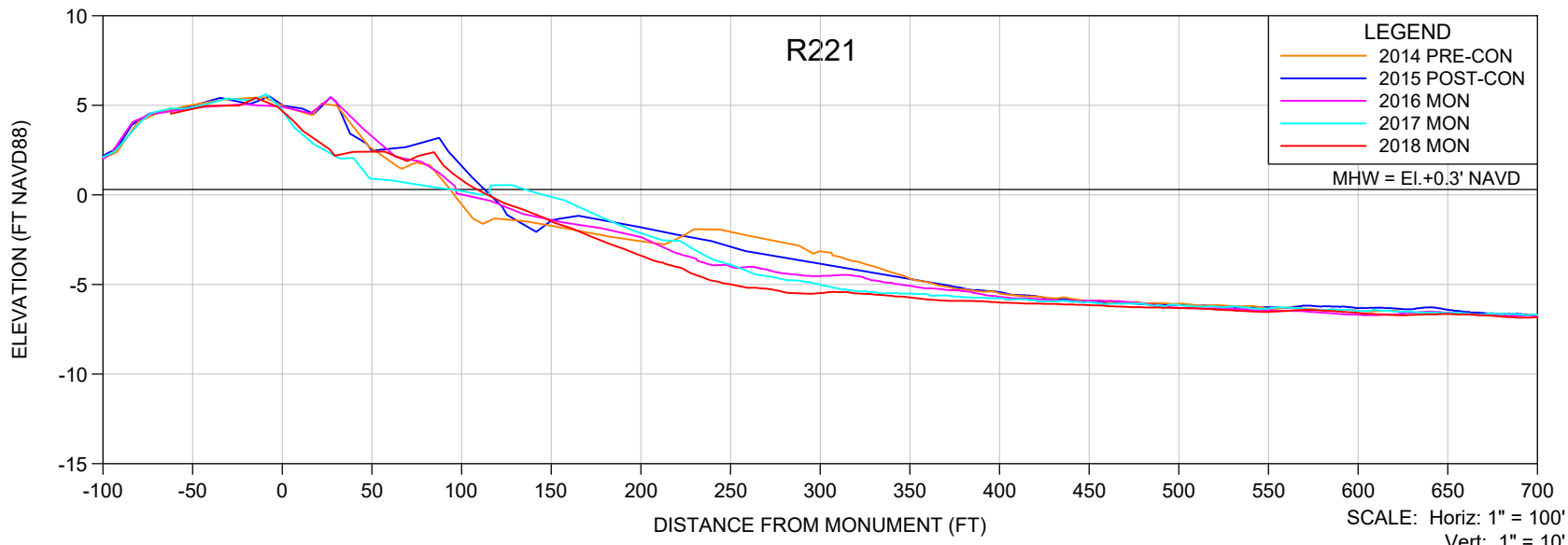
- NOTES:**
- ELEVATIONS ARE REFERENCED TO NAVD 1988.
 - PROFILE DATA ARE FROM SURVEYS BY CEC.

SHEET 16 FILE NO.: 18079-R-220	<p>COASTAL ENGINEERING CONSULTANTS INC. A CECI GROUP COMPANY Serving Florida Since 1977 3106 SOUTH HORSESHOE DRIVE NAPLES, FLORIDA 34104</p>	<p>CIVIL ENGINEERING SURVEY & MAPPING COASTAL ENGINEERING ENVIRONMENTAL PLANNING SERVICES</p> <p>PHONE: (239)643-2324 FAX: (239)643-1143 www.coastalengineering.com E-Mail: engcollier@cecifl.com</p>	CLIENT:	LEE COUNTY			DATE:	7/26/2018	SCALE:	AS SHOWN				
			TITLE:				BONITA BEACH AND LOVERS KEY R-220 MONITORING SURVEY			DRAWN:	SDB	F.B.		
				CHECKED:	MTP	PG.								
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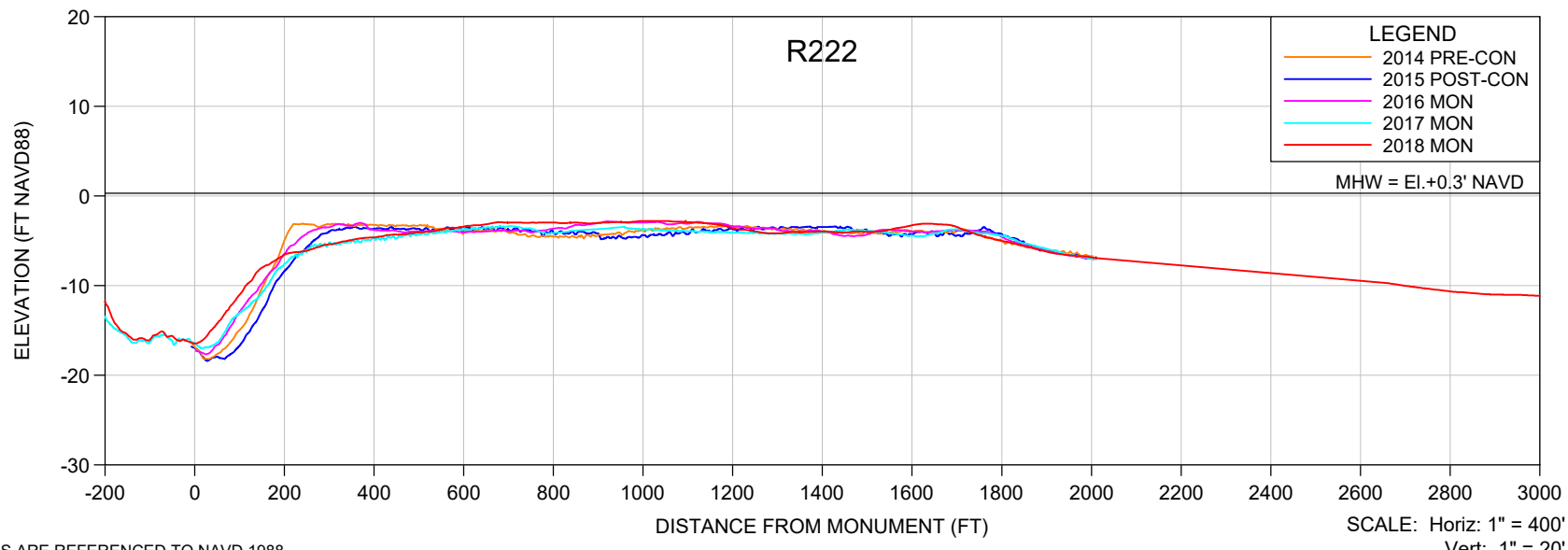
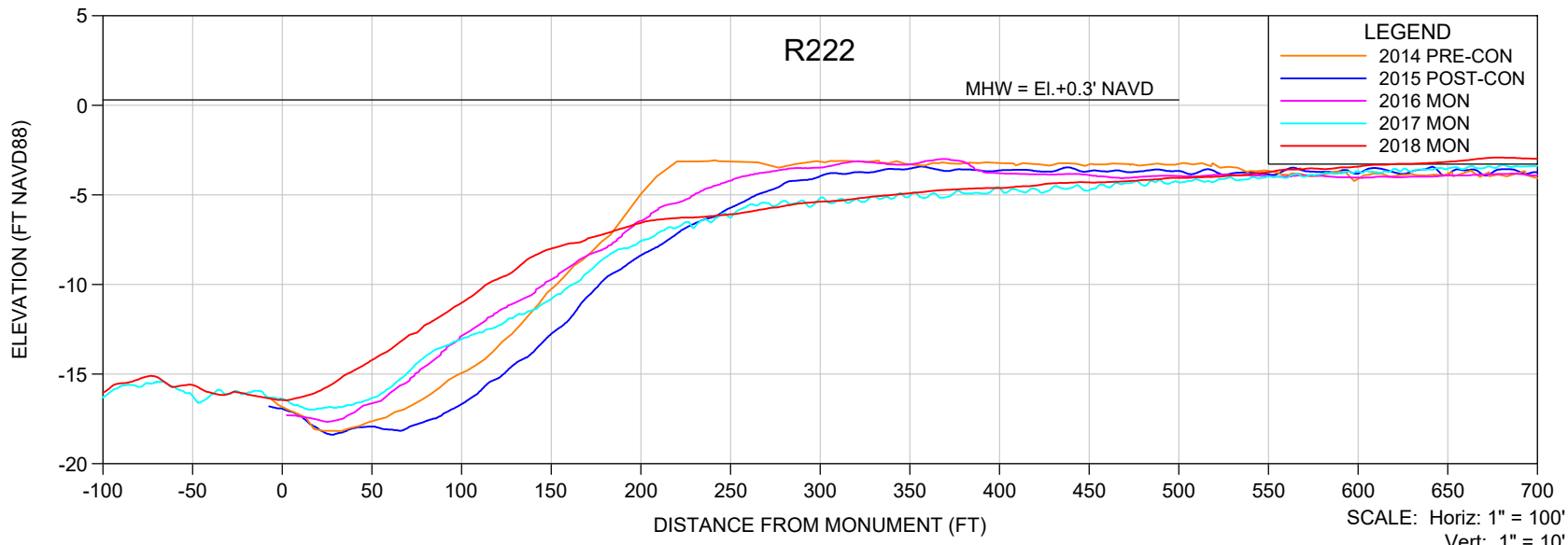
NOTES:
 1. ELEVATIONS ARE REFERENCED TO NAVD 1988.
 2. PROFILE DATA ARE FROM SURVEYS BY CEC.

SHEET 17 FILE NO.: 18079-R-220.5	 COASTAL ENGINEERING CONSULTANTS INC. A CECI GROUP COMPANY Serving Florida Since 1977 3106 SOUTH HORSESHOE DRIVE NAPLES, FLORIDA 34104	CIVIL ENGINEERING SURVEY & MAPPING COASTAL ENGINEERING ENVIRONMENTAL PLANNING SERVICES PHONE: (239)643-2324 FAX: (239)643-1143 www.coastalengineering.com E-Mail: engcollier@cecifl.com	CLIENT:	LEE COUNTY			DATE:	7/26/2018	SCALE:	AS SHOWN					
			TITLE:	BONITA BEACH AND LOVERS KEY R-220.5 MONITORING SURVEY			DRAWN:	SDB	F.B.						
						CHECKED:	MTP	PG.							
						SEC.	TWP.	RNG.							
						ACAD NO	18079-Lovers Bonita Mon Profiles.dwg								
			REF. NO.	18.079			NO.	DATE	BY	REVISION DESCRIPTION					



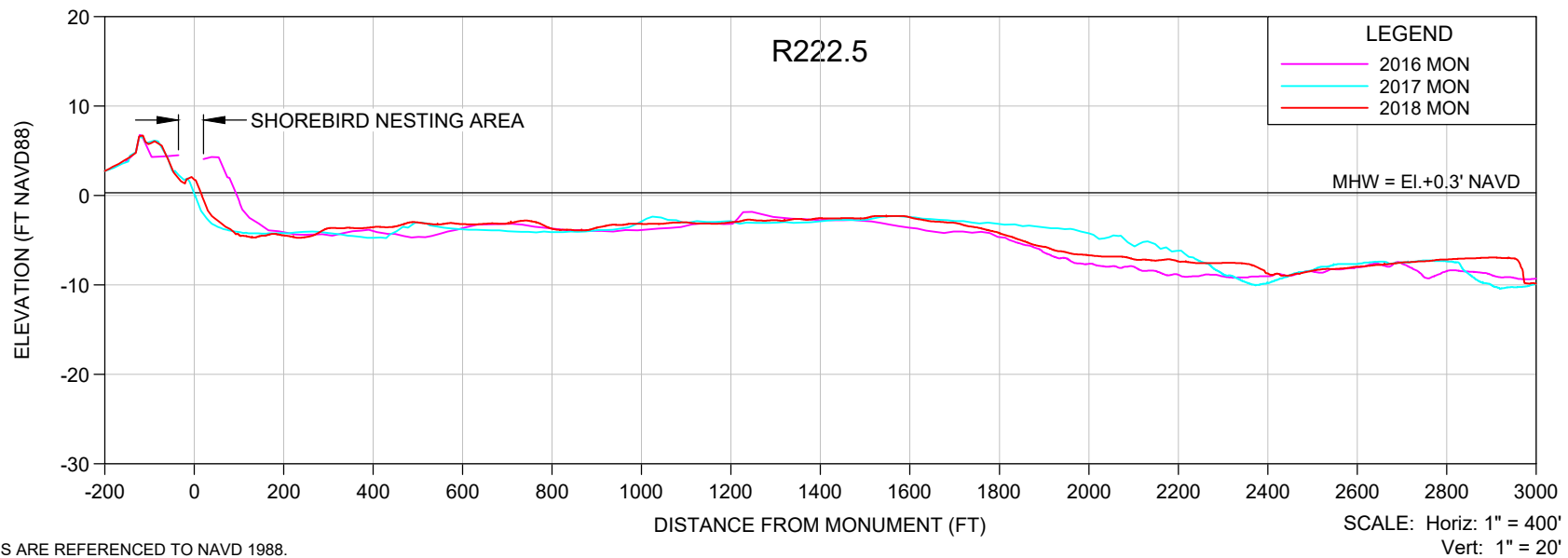
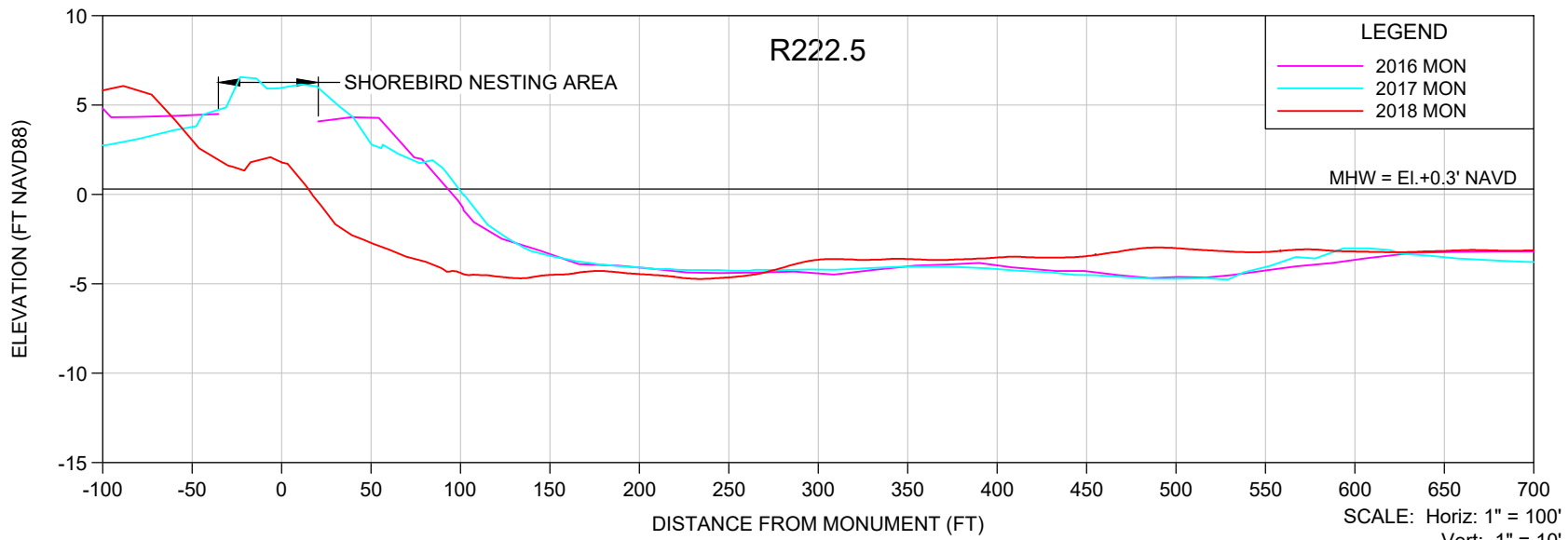
- NOTES:**
- ELEVATIONS ARE REFERENCED TO NAVD 1988.
 - PROFILE DATA ARE FROM SURVEYS BY CEC.

SHEET 18 FILE NO.: 18079-R-221	 COASTAL ENGINEERING CONSULTANTS INC. A CECI GROUP COMPANY Serving Florida Since 1977 3106 SOUTH HORSESHOE DRIVE NAPLES, FLORIDA 34104	CIVIL ENGINEERING SURVEY & MAPPING COASTAL ENGINEERING ENVIRONMENTAL PLANNING SERVICES PHONE: (239)643-2324 FAX: (239)643-1143 www.coastalengineering.com E-Mail: engcollier@cecifl.com	CLIENT:	LEE COUNTY			DATE:	7/26/2018	SCALE:	AS SHOWN					
			TITLE:	BONITA BEACH AND LOVERS KEY R-221 MONITORING SURVEY			DRAWN:	SDB	F.B.						
						CHECKED:	MTP	PG.							
						SEC.	TWP.	RNG.							
						ACAD NO	18079-Lovers Bonita Mon Profiles.dwg								
			REF. NO.	18.079			NO.	DATE	BY	REVISION DESCRIPTION					



- NOTES:**
- ELEVATIONS ARE REFERENCED TO NAVD 1988.
 - PROFILE DATA ARE FROM SURVEYS BY CEC.

SHEET 19 FILE NO.: 18079-R-222	<p>COASTAL ENGINEERING CONSULTANTS INC. A CECI GROUP COMPANY Serving Florida Since 1977 3106 SOUTH HORSESHOE DRIVE NAPLES, FLORIDA 34104</p>	<p>CIVIL ENGINEERING SURVEY & MAPPING COASTAL ENGINEERING ENVIRONMENTAL PLANNING SERVICES</p> <p>PHONE: (239)643-2324 FAX: (239)643-1143 www.coastalengineering.com E-Mail: engcollier@cecifl.com</p>	CLIENT:	LEE COUNTY			DATE:	7/26/2018	SCALE:	AS SHOWN	
			TITLE:	BONITA BEACH AND LOVERS KEY R-222 MONITORING SURVEY			DRAWN:	SDB	F.B.		
						CHECKED:	MTP	PG.			
						SEC.	TWP.	RNG.			
						ACAD NO:	18079-Lovers Bonita Mon Profiles.dwg				
			REF. NO.	18.079	NO.	DATE	BY	REVISION DESCRIPTION			



NOTES:

1. ELEVATIONS ARE REFERENCED TO NAVD 1988.
2. PROFILE DATA ARE FROM SURVEYS BY CEC.

SHEET 20
FILE NO.: 18079-R-222.5

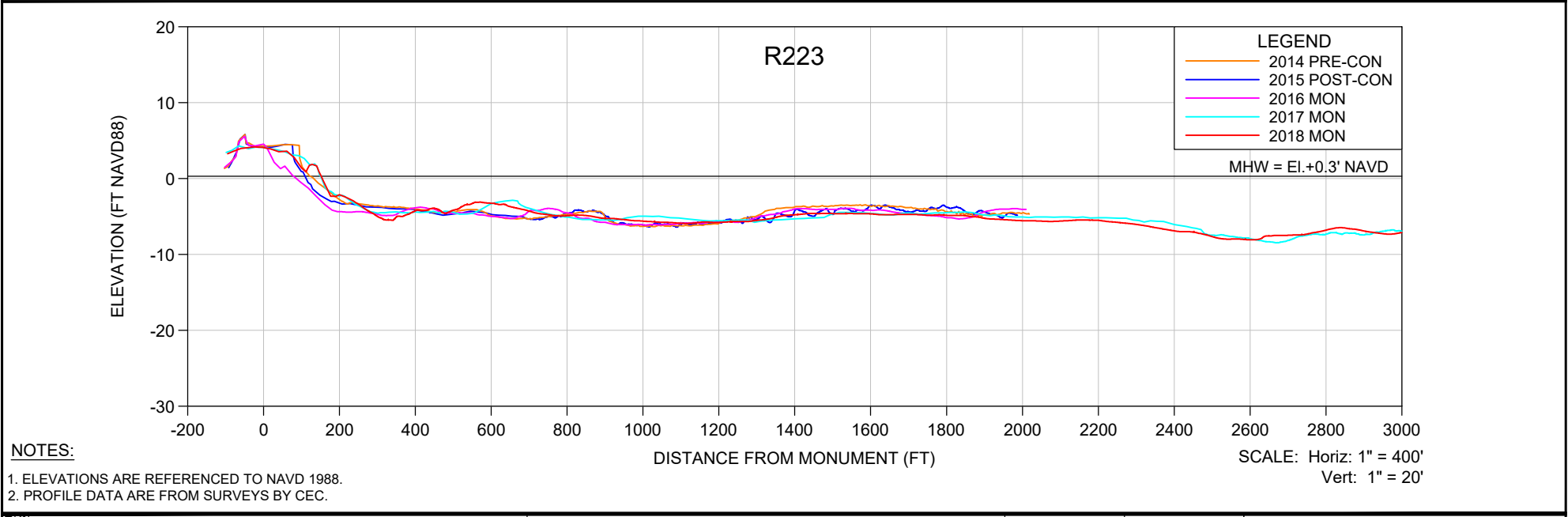
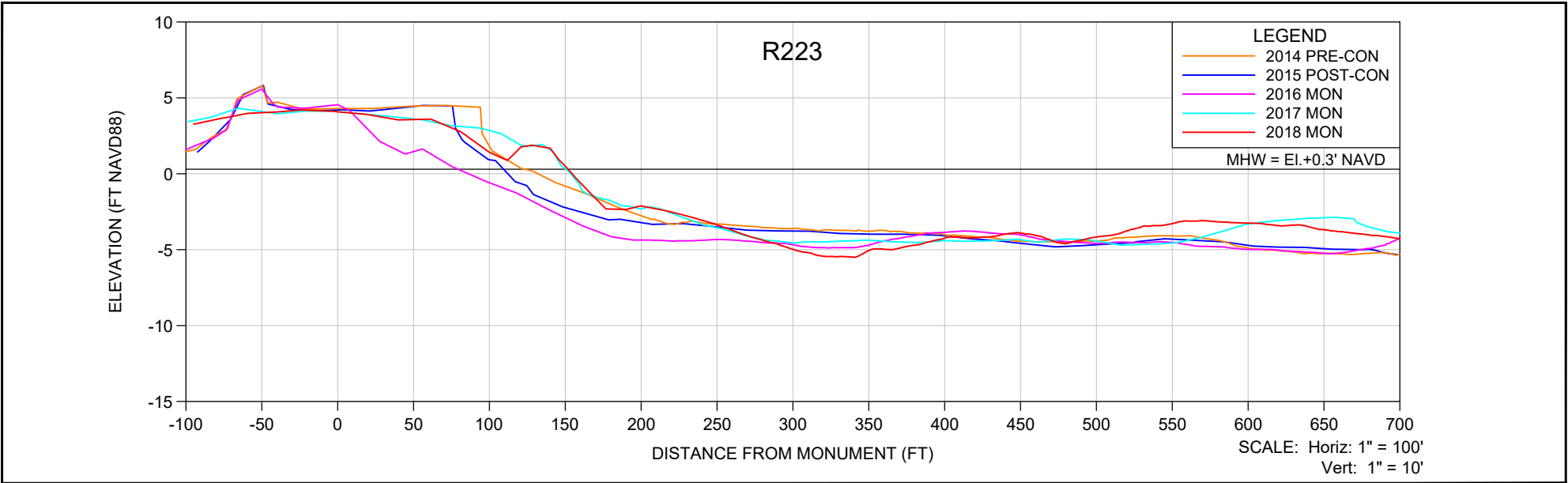
COASTAL ENGINEERING CONSULTANTS INC.
A CECI GROUP COMPANY
Serving Florida Since 1977
3106 SOUTH HORSESHOE DRIVE
NAPLES, FLORIDA 34104

CIVIL ENGINEERING
SURVEY & MAPPING
COASTAL ENGINEERING
ENVIRONMENTAL
PLANNING SERVICES
PHONE: (239)643-2324
FAX: (239)643-1143
www.coastalengineering.com
E-Mail: engcollier@cecifl.com

CLIENT: **LEE COUNTY**

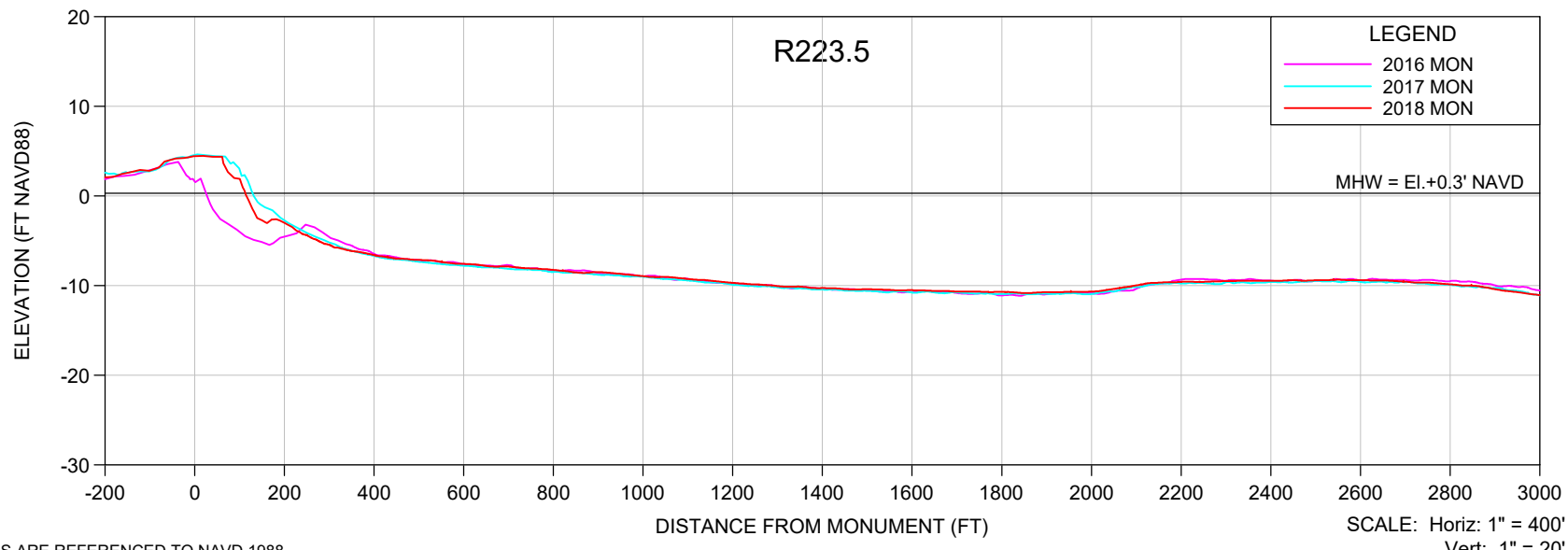
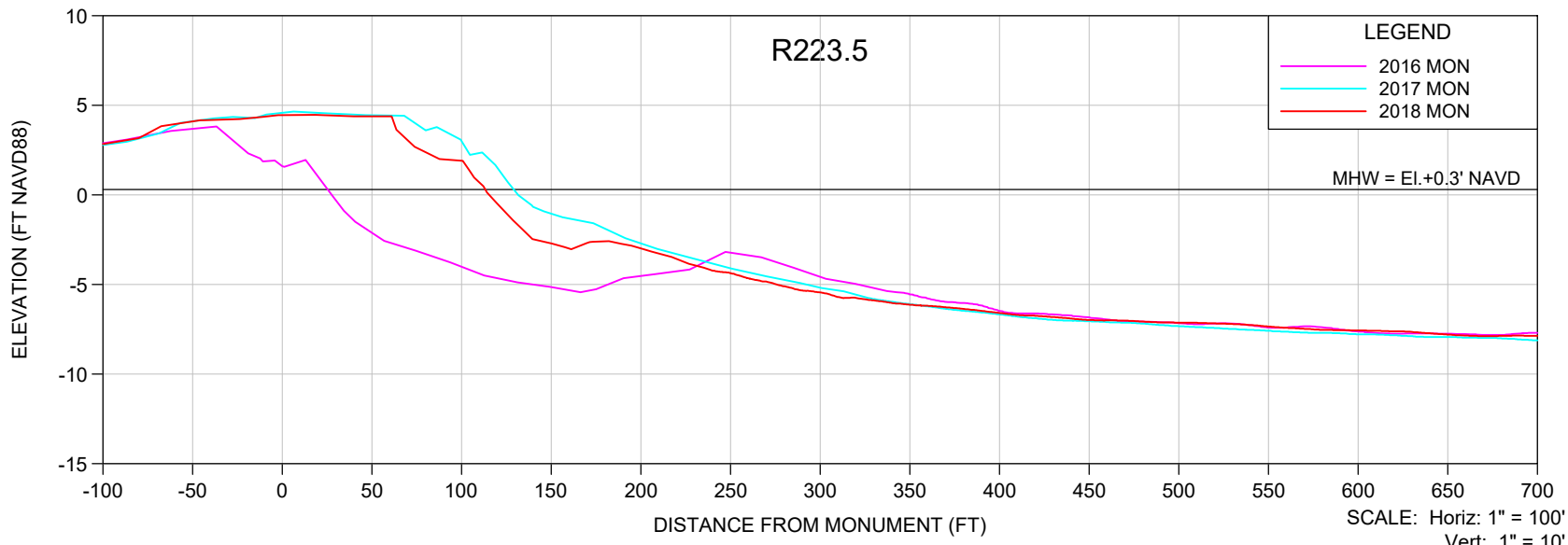
TITLE: **BONITA BEACH AND LOVERS KEY R-222.5 MONITORING SURVEY**

DATE:	7/26/2018	SCALE:	AS SHOWN
DRAWN:	SDB	F.B.	
CHECKED:	MTP	PG.	
SEC.	TWP.	RNG.	
ACAD NO.	18079-Lovers Bonita Mon Profiles.dwg		
REF. NO.	18.079	NO.	DATE
		BY	REVISION DESCRIPTION




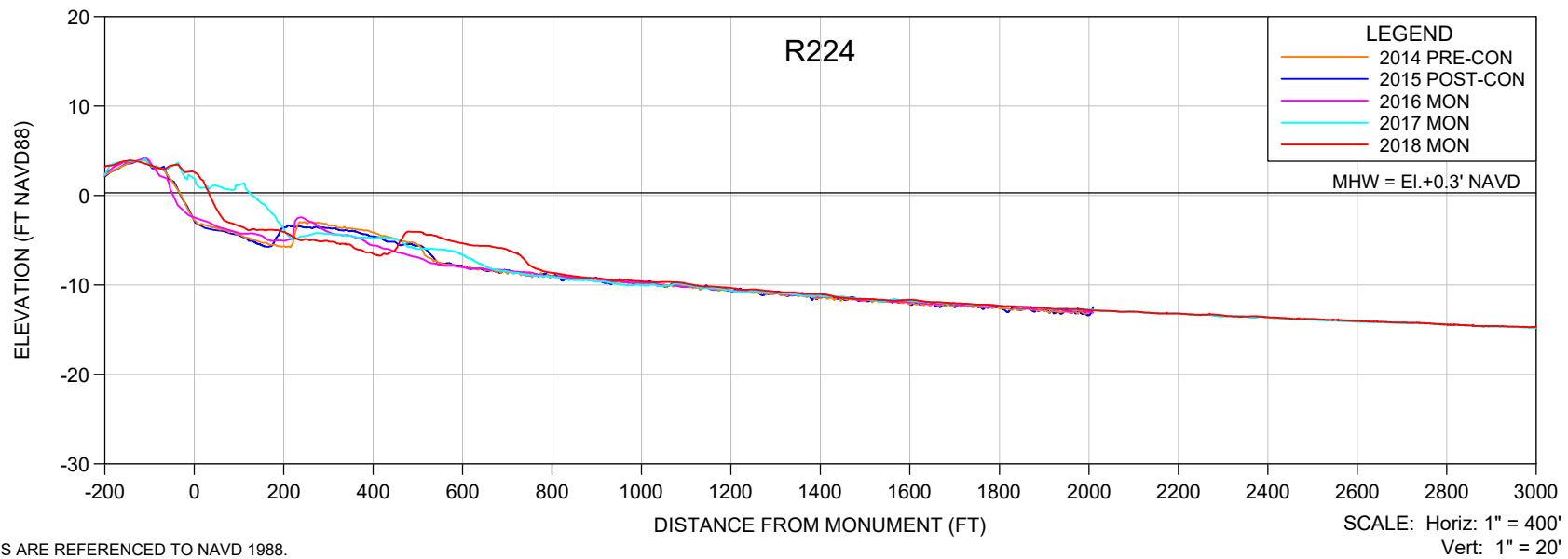
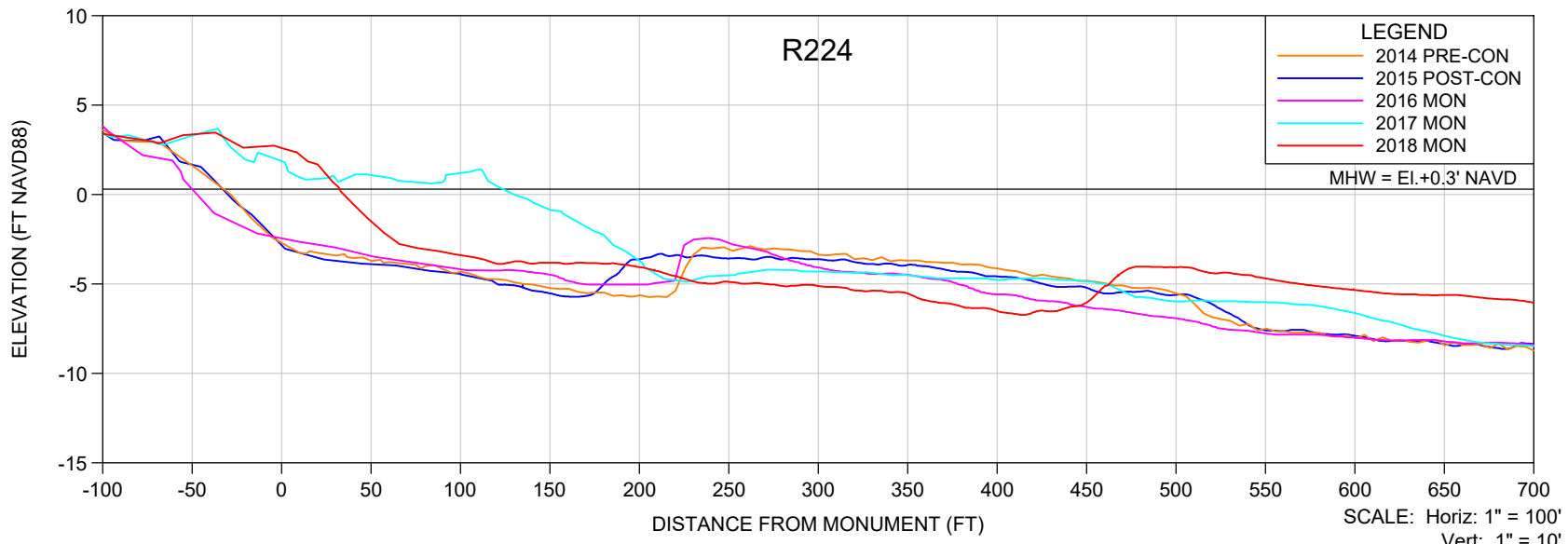
- NOTES:**
- ELEVATIONS ARE REFERENCED TO NAVD 1988.
 - PROFILE DATA ARE FROM SURVEYS BY CEC.

SHEET 21 FILE NO.: 18079-R-223	<p>COASTAL ENGINEERING CONSULTANTS INC. A CECI GROUP COMPANY Serving Florida Since 1977 3106 SOUTH HORSESHOE DRIVE NAPLES, FLORIDA 34104</p>	<p>CIVIL ENGINEERING SURVEY & MAPPING COASTAL ENGINEERING ENVIRONMENTAL PLANNING SERVICES</p> <p>PHONE: (239)643-2324 FAX: (239)643-1143 www.coastalengineering.com E-Mail: engcollier@cecifl.com</p>	CLIENT:	LEE COUNTY			DATE:	7/26/2018	SCALE:	AS SHOWN					
			TITLE:	BONITA BEACH AND LOVERS KEY R-223 MONITORING SURVEY			DRAWN:	SDB	F.B.						
						CHECKED:	MTP	PG.							
						SEC.	TWP.	RNG.							
						ACAD NO	18079-Lovers Bonita Mon Profiles.dwg								
			REF. NO.	18.079			NO.	DATE	BY	REVISION DESCRIPTION					



- NOTES:**
- ELEVATIONS ARE REFERENCED TO NAVD 1988.
 - PROFILE DATA ARE FROM SURVEYS BY CEC.

SHEET 22 FILE NO.: 18079-R-223	 COASTAL ENGINEERING CONSULTANTS INC. A CECI GROUP COMPANY Serving Florida Since 1977 3106 SOUTH HORSESHOE DRIVE NAPLES, FLORIDA 34104	CIVIL ENGINEERING SURVEY & MAPPING COASTAL ENGINEERING ENVIRONMENTAL PLANNING SERVICES PHONE: (239)643-2324 FAX: (239)643-1143 www.coastalengineering.com E-Mail: engcollier@cecifl.com	CLIENT:	LEE COUNTY	DATE:	7/26/2018	SCALE:	AS SHOWN				
			TITLE:	BONITA BEACH AND LOVERS KEY R-223.5 MONITORING SURVEY	DRAWN:	SDB	F.B.					
					CHECKED:	MTP	PG.					
					SEC.	TWP.	RNG.					
					ACAD NO	18079-Lovers Bonita Mon Profiles.dwg						
					REF. NO.	18.079	NO.	DATE	BY	REVISION DESCRIPTION		



- NOTES:**
- ELEVATIONS ARE REFERENCED TO NAVD 1988.
 - PROFILE DATA ARE FROM SURVEYS BY CEC.

SHEET 23
FILE NO.: 18079-R-224

COASTAL ENGINEERING CONSULTANTS INC.
A CECI GROUP COMPANY
Serving Florida Since 1977
3106 SOUTH HORSESHOE DRIVE
NAPLES, FLORIDA 34104

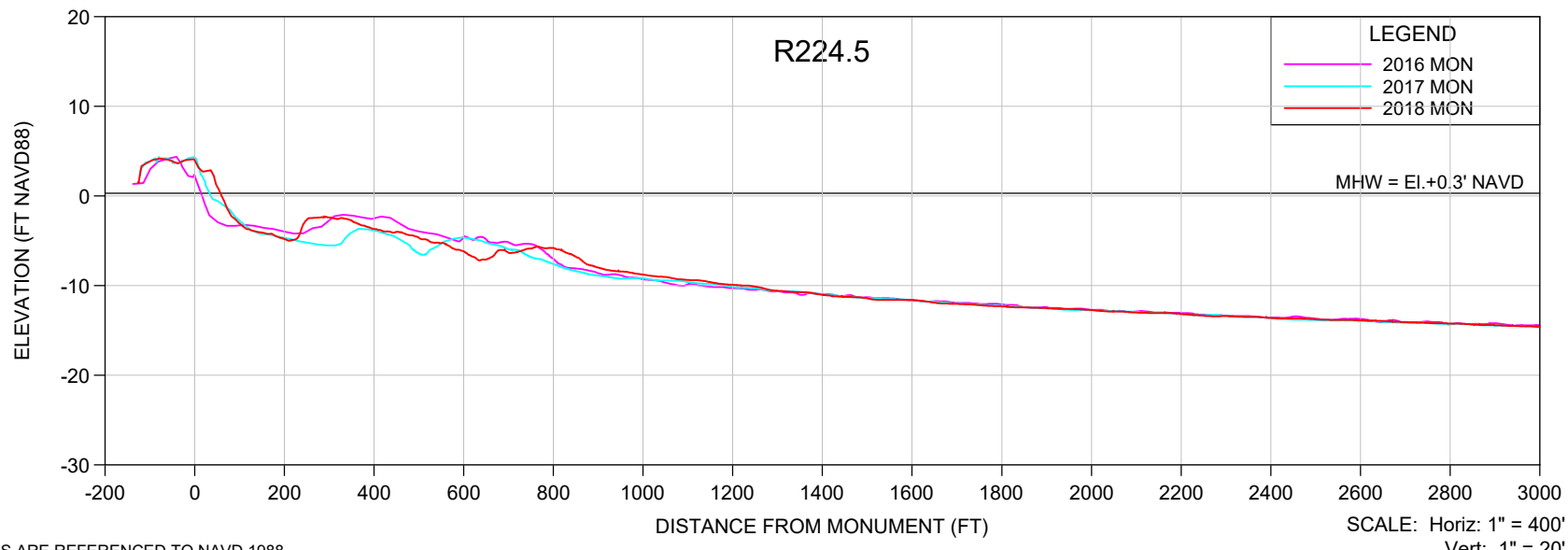
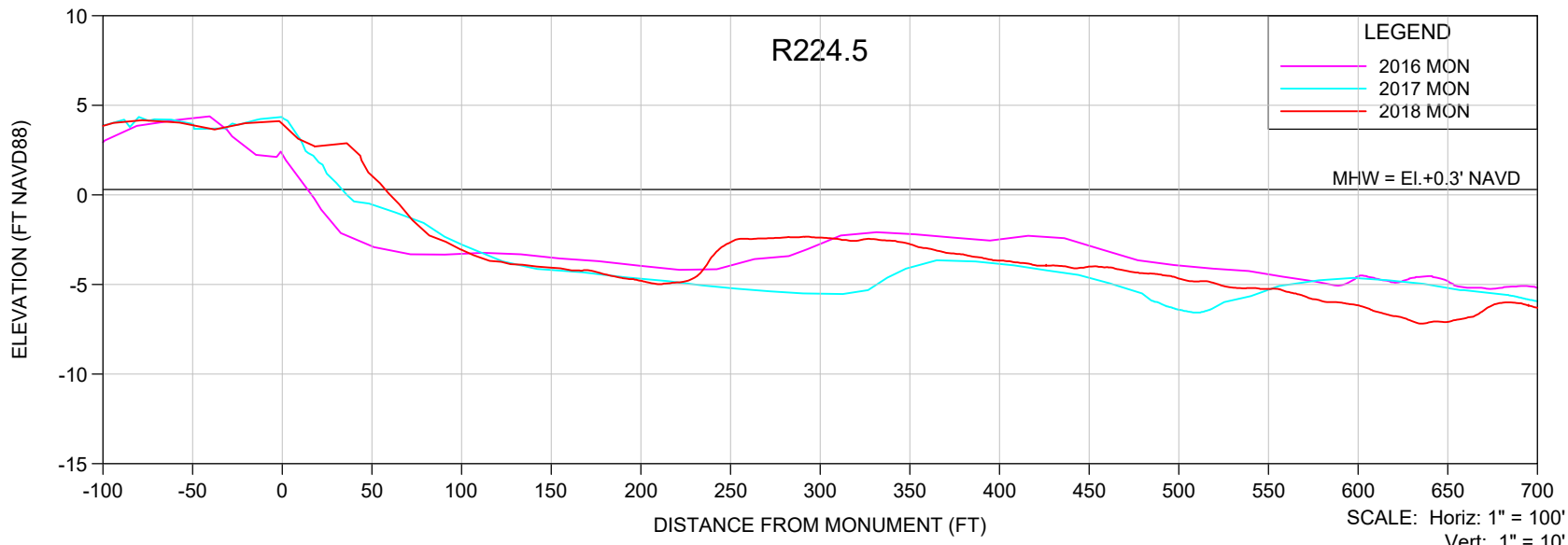
CIVIL ENGINEERING
SURVEY & MAPPING
COASTAL ENGINEERING
ENVIRONMENTAL
PLANNING SERVICES
PHONE: (239)643-2324
FAX: (239)643-1143
www.coastalengineering.com
E-Mail: engcollier@cecifl.com

CLIENT: **LEE COUNTY**


TITLE: **BONITA BEACH AND LOVERS KEY R-224 MONITORING SURVEY**

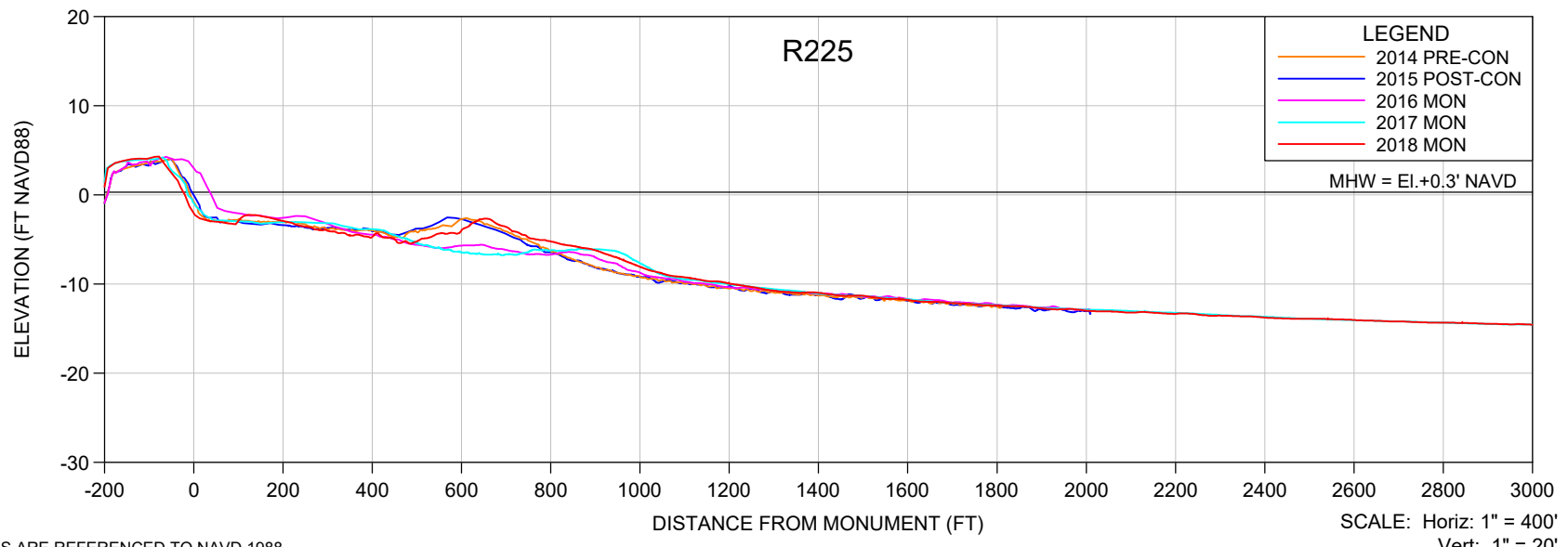
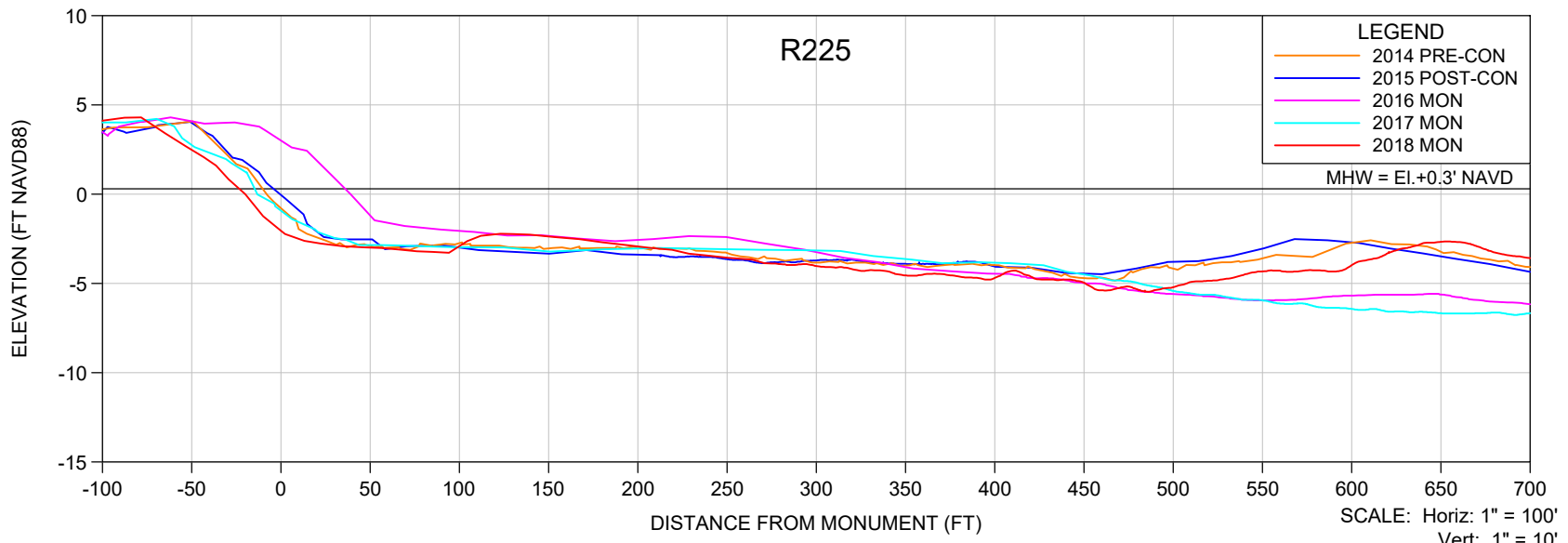
DATE:	7/26/2018	SCALE:	AS SHOWN
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CHECKED:	MTP	PG.	
SEC.	TWP.	RNG.	
ACAD NO.	18079-Lovers Bonita Mon Profiles.dwg		
REF. NO.	18.079	NO.	DATE

NO.	DATE	BY	REVISION DESCRIPTION



- NOTES:**
- ELEVATIONS ARE REFERENCED TO NAVD 1988.
 - PROFILE DATA ARE FROM SURVEYS BY CEC.

SHEET 24 FILE NO.: 18079-R-224.5	 COASTAL ENGINEERING CONSULTANTS INC. A CECI GROUP COMPANY Serving Florida Since 1977 3106 SOUTH HORSESHOE DRIVE NAPLES, FLORIDA 34104	CIVIL ENGINEERING SURVEY & MAPPING COASTAL ENGINEERING ENVIRONMENTAL PLANNING SERVICES PHONE: (239)643-2324 FAX: (239)643-1143 www.coastalengineering.com E-Mail: engcollier@cecifl.com	CLIENT:	LEE COUNTY			DATE:	7/26/2018	SCALE:	AS SHOWN					
			TITLE:	BONITA BEACH AND LOVERS KEY R-224.5 MONITORING SURVEY			DRAWN:	SDB	F.B.						
						CHECKED:	MTP	PG.							
						SEC.	TWP.	RNG.							
						ACAD NO	18079-Lovers Bonita Mon Profiles.dwg								
			REF. NO.				18.079				NO.	DATE	BY	REVISION DESCRIPTION	



NOTES:

- ELEVATIONS ARE REFERENCED TO NAVD 1988.
- PROFILE DATA ARE FROM SURVEYS BY CEC.

SHEET 25
FILE NO.: 18079-R-225

COASTAL ENGINEERING CONSULTANTS INC.
A CECI GROUP COMPANY
Serving Florida Since 1977
3106 SOUTH HORSESHOE DRIVE
NAPLES, FLORIDA 34104

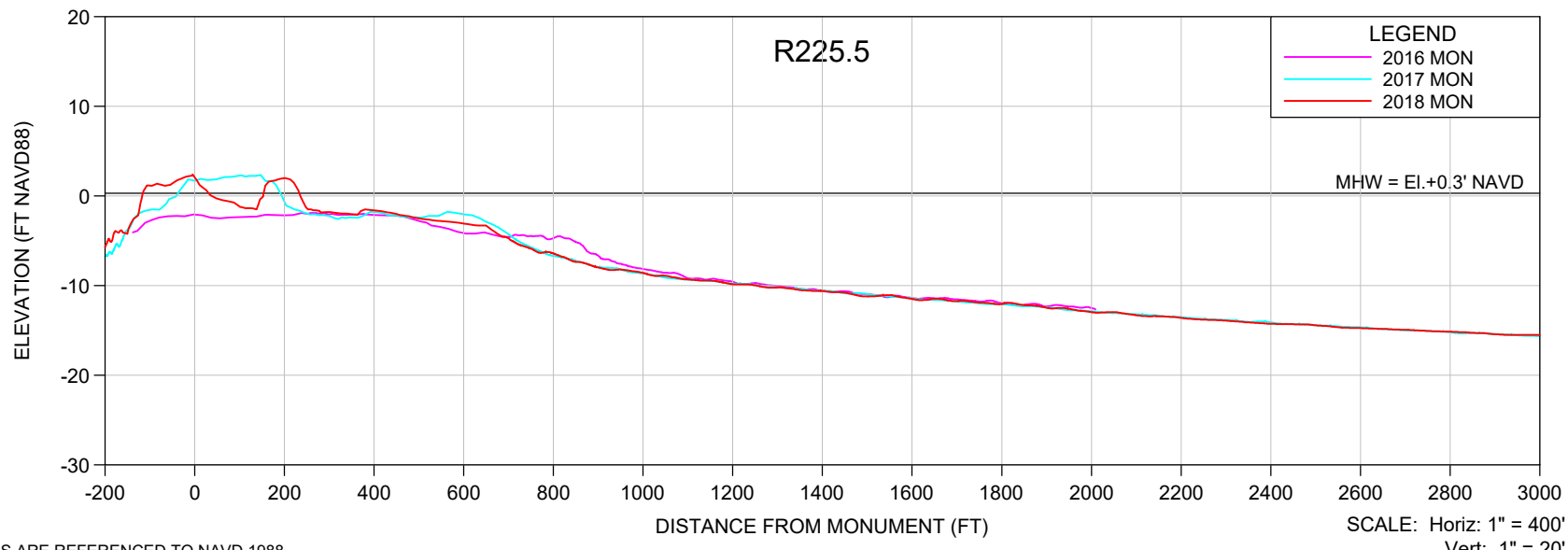
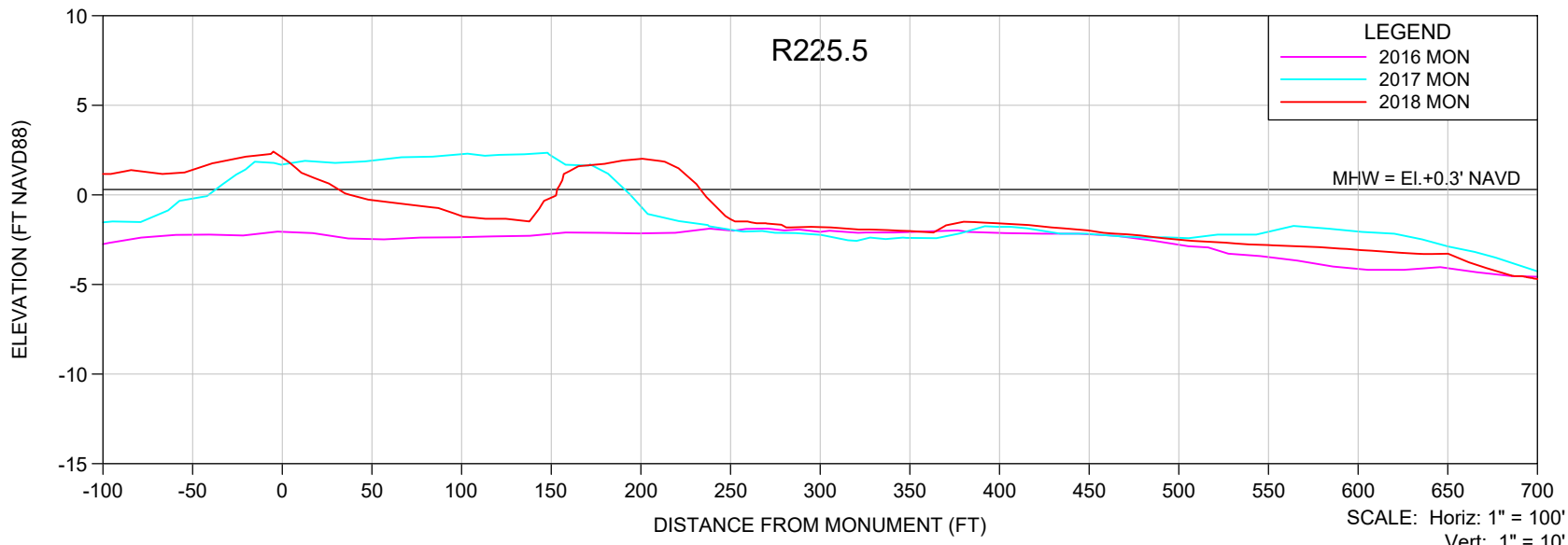
CIVIL ENGINEERING
SURVEY & MAPPING
COASTAL ENGINEERING
ENVIRONMENTAL
PLANNING SERVICES
PHONE: (239)643-2324
FAX: (239)643-1143
www.coastalengineering.com
E-Mail: engcollier@cecifl.com

CLIENT: **LEE COUNTY**


TITLE: **BONITA BEACH AND LOVERS KEY R-225 MONITORING SURVEY**

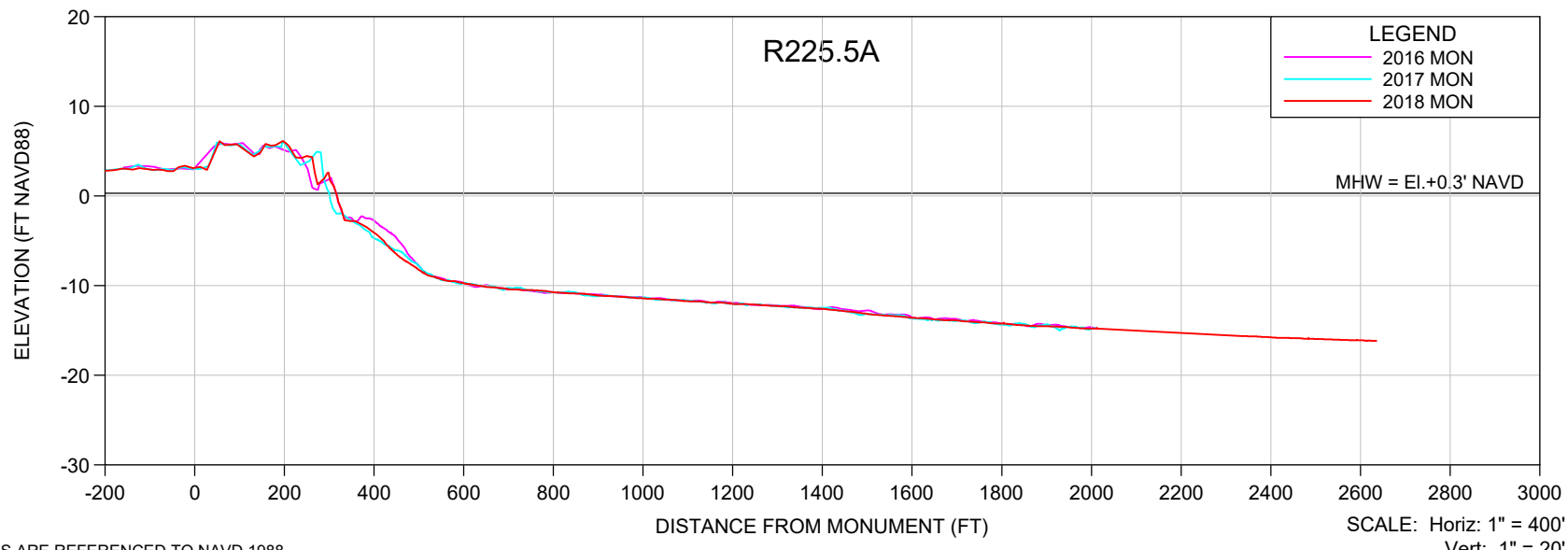
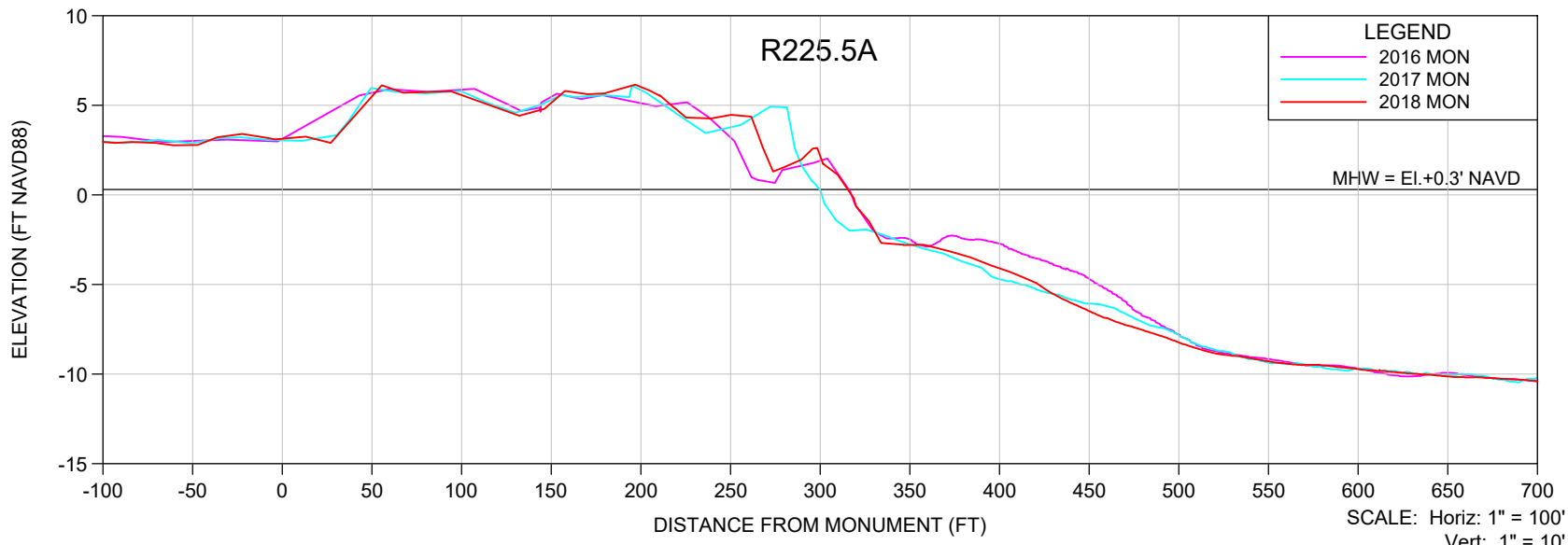
DATE:	7/26/2018	SCALE:	AS SHOWN
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CHECKED:	MTP	PG.	
SEC.	TWP.	RNG.	
ACAD NO	18079-Lovers Bonita Mon Profiles.dwg		
REF. NO.	18.079	NO.	DATE

NO.	DATE	BY	REVISION DESCRIPTION




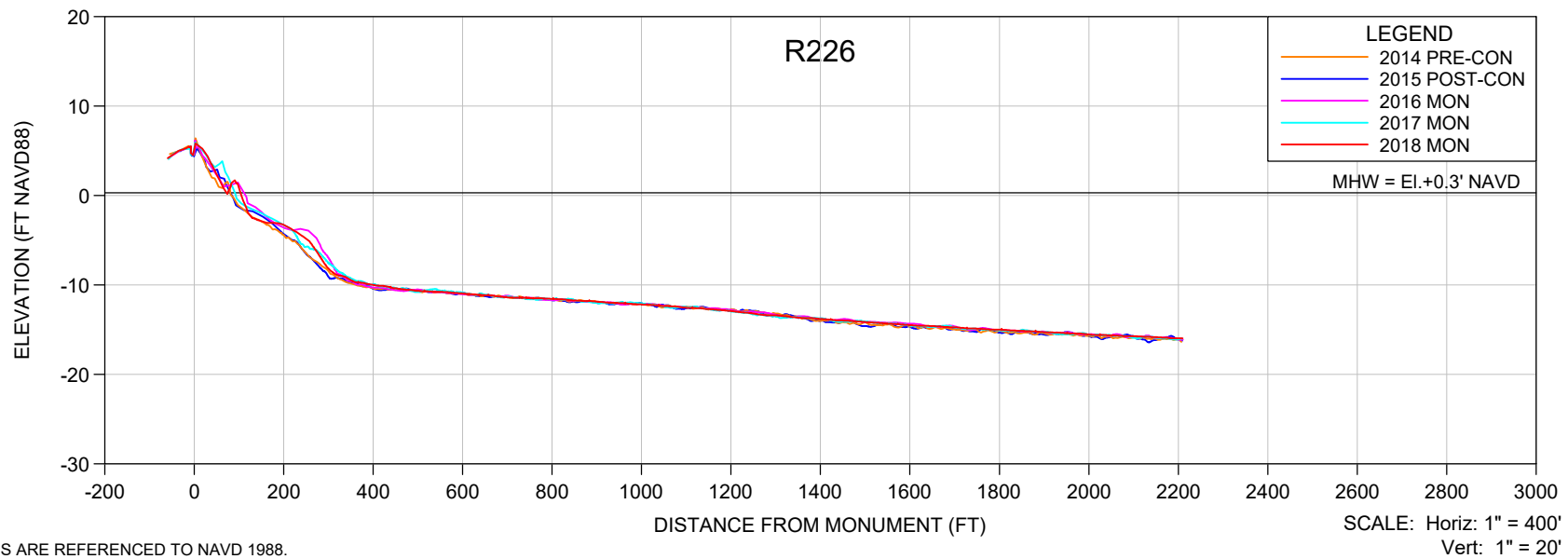
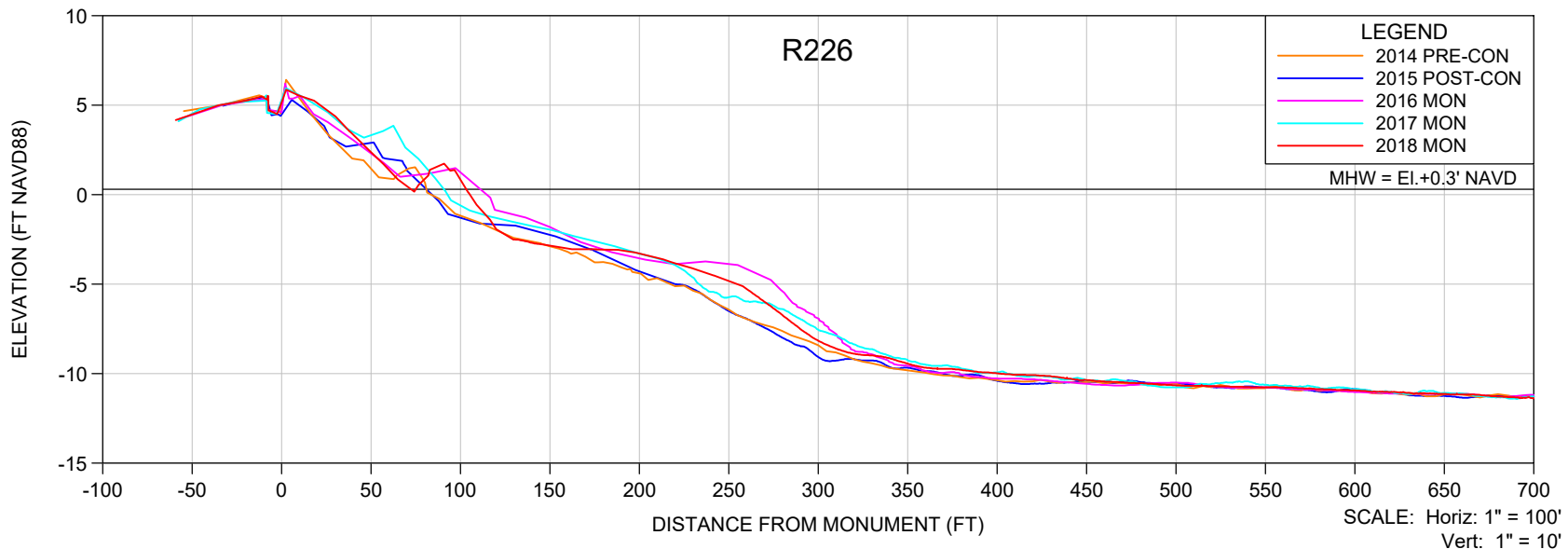
- NOTES:**
- ELEVATIONS ARE REFERENCED TO NAVD 1988.
 - PROFILE DATA ARE FROM SURVEYS BY CEC.

SHEET 26 FILE NO.: 18079-R-225.5	 COASTAL ENGINEERING CONSULTANTS INC. A CECI GROUP COMPANY Serving Florida Since 1977 3106 SOUTH HORSESHOE DRIVE NAPLES, FLORIDA 34104	CIVIL ENGINEERING SURVEY & MAPPING COASTAL ENGINEERING ENVIRONMENTAL PLANNING SERVICES PHONE: (239)643-2324 FAX: (239)643-1143 www.coastalengineering.com E-Mail: engcollier@cecifl.com	CLIENT:	LEE COUNTY			DATE:	7/26/2018	SCALE:	AS SHOWN					
			TITLE:	BONITA BEACH AND LOVERS KEY R-225.5 MONITORING SURVEY			DRAWN:	SDB	F.B.						
						CHECKED:	MTP	PG.							
						SEC.	TWP.	RNG.							
						ACAD NO	18079-Lovers Bonita Mon Profiles.dwg								
			REF. NO.	18.079			NO.	DATE	BY	REVISION DESCRIPTION					



- NOTES:**
1. ELEVATIONS ARE REFERENCED TO NAVD 1988.
 2. PROFILE DATA ARE FROM SURVEYS BY CEC.

SHEET 27 FILE NO.: 18079-R-225.5A	 COASTAL ENGINEERING CONSULTANTS INC. A CECI GROUP COMPANY Serving Florida Since 1977 3106 SOUTH HORSESHOE DRIVE NAPLES, FLORIDA 34104	CIVIL ENGINEERING SURVEY & MAPPING COASTAL ENGINEERING ENVIRONMENTAL PLANNING SERVICES PHONE: (239)643-2324 FAX: (239)643-1143 www.coastalengineering.com E-Mail: engcollier@cecifl.com	CLIENT:	LEE COUNTY			DATE:	7/26/2018	SCALE:	AS SHOWN					
			TITLE:	BONITA BEACH AND LOVERS KEY R-225.5A MONITORING SURVEY			DRAWN:	SDB	F.B.						
							CHECKED:	MTP	PG.						
							SEC.	TWP.	RNG.						
							ACAD NO	18079-Lovers Bonita Mon Profiles.dwg							
				REF. NO.		18.079	NO.	DATE	BY	REVISION DESCRIPTION					



- NOTES:**
- ELEVATIONS ARE REFERENCED TO NAVD 1988.
 - PROFILE DATA ARE FROM SURVEYS BY CEC.

SHEET 28
FILE NO.: 18079-R-228

COASTAL ENGINEERING CONSULTANTS INC.
A CECI GROUP COMPANY
Serving Florida Since 1977
3106 SOUTH HORSESHOE DRIVE
NAPLES, FLORIDA 34104

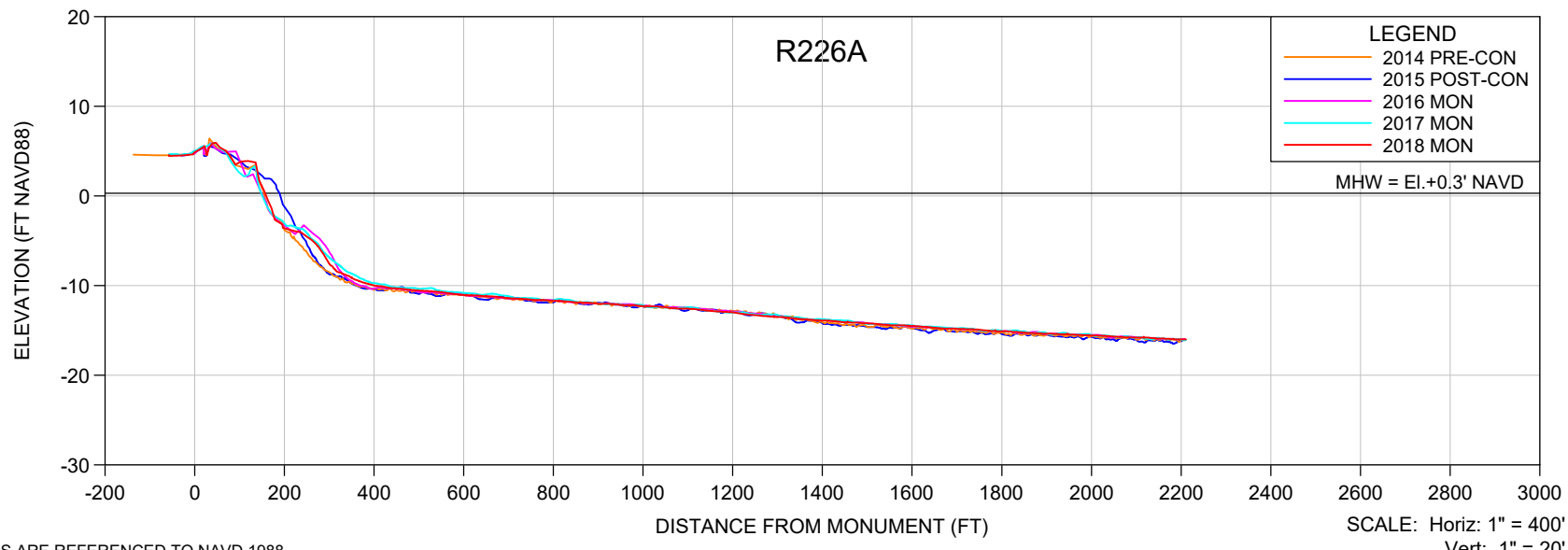
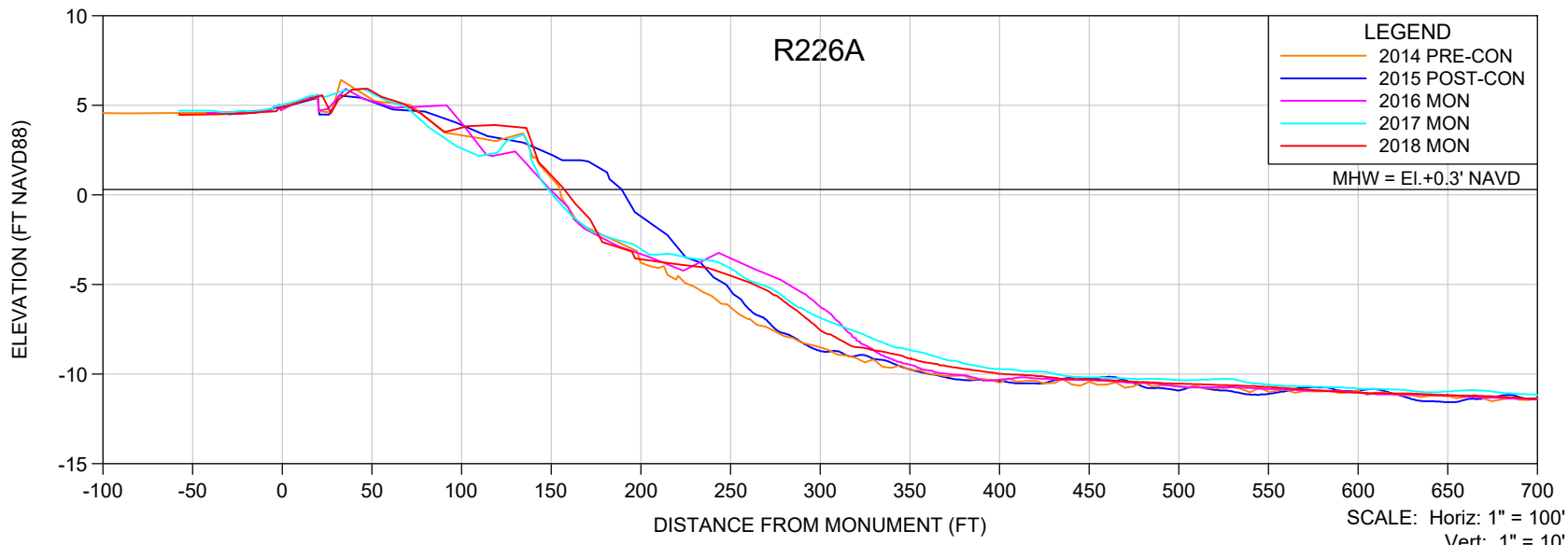
CIVIL ENGINEERING
SURVEY & MAPPING
COASTAL ENGINEERING
ENVIRONMENTAL
PLANNING SERVICES
PHONE: (239)643-2324
FAX: (239)643-1143
www.coastalengineering.com
E-Mail: engcollier@cecifl.com

CLIENT: **LEE COUNTY**

TITLE: **BONITA BEACH AND LOVERS KEY
R-226 MONITORING SURVEY**

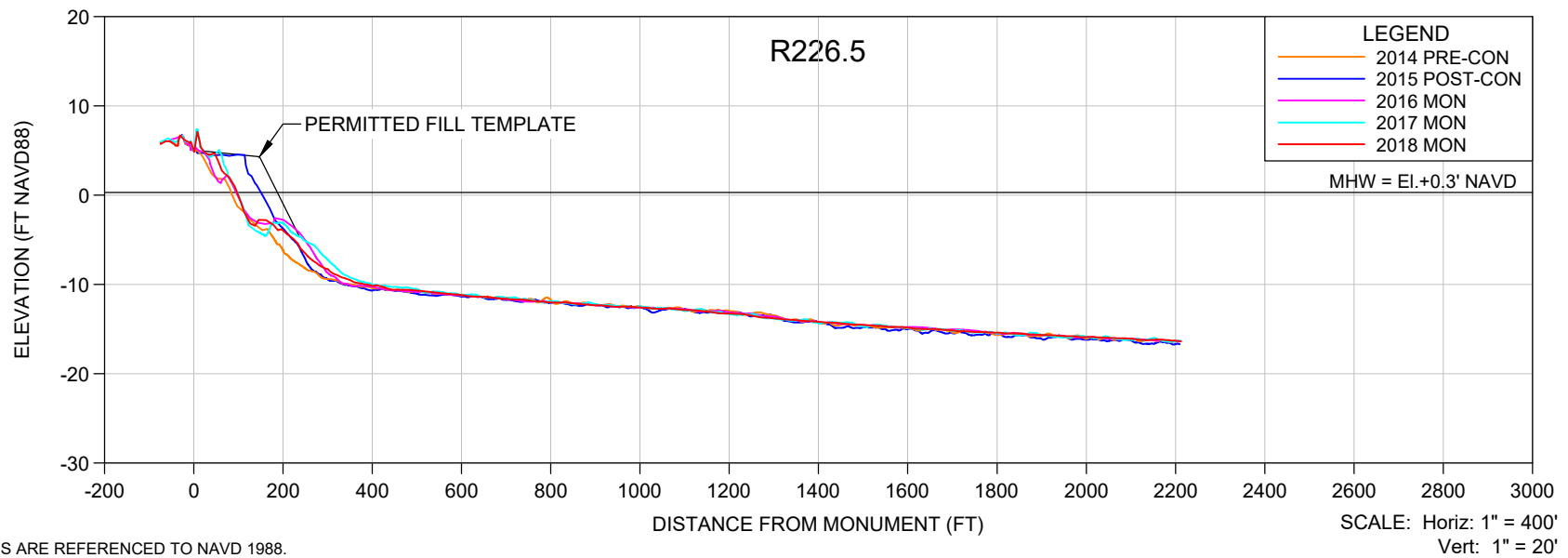
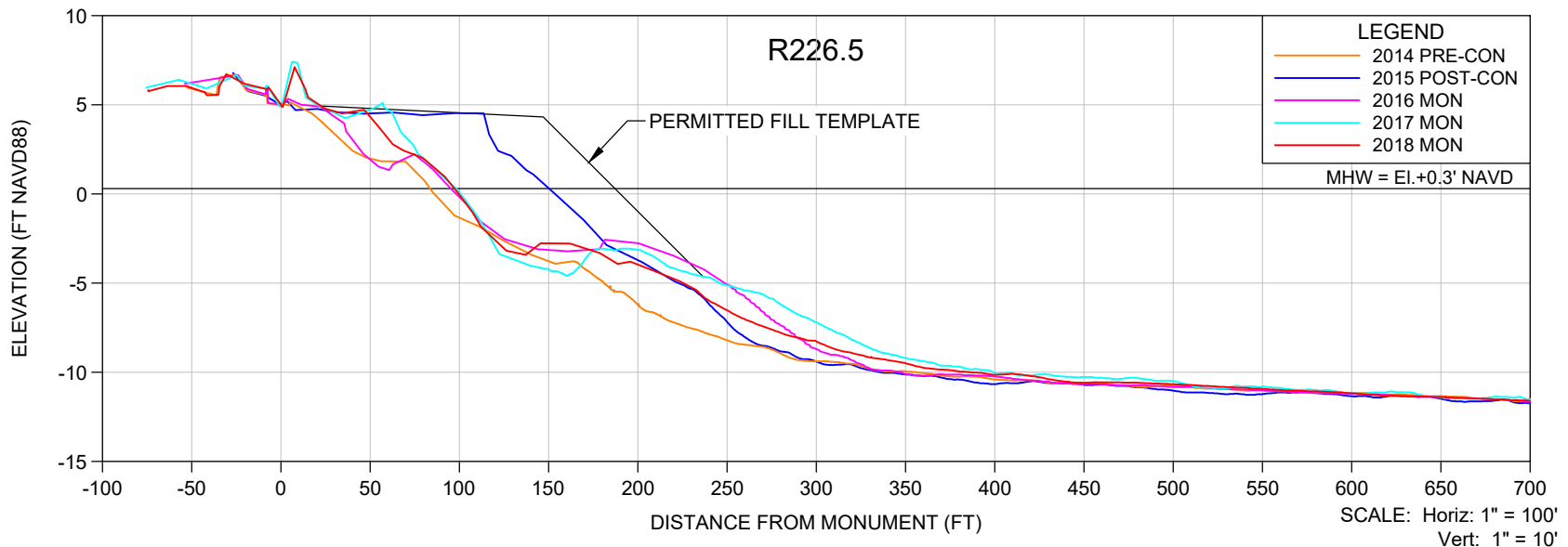
DATE:	7/26/2018	SCALE:	AS SHOWN
DRAWN:	SDB	F.B.	
CHECKED:	MTP	PG.	
SEC.	TWP.	RNG.	
ACAD NO.	18079-Lovers Bonita Mon Profiles.dwg		
REF. NO.	18.079	NO.	DATE

NO.	DATE	BY	REVISION DESCRIPTION



NOTES:
 1. ELEVATIONS ARE REFERENCED TO NAVD 1988.
 2. PROFILE DATA ARE FROM SURVEYS BY CEC.

SHEET 29 FILE NO.: 18079-R-226A	<p>COASTAL ENGINEERING CONSULTANTS INC. A CECI GROUP COMPANY Serving Florida Since 1977 3106 SOUTH HORSESHOE DRIVE NAPLES, FLORIDA 34104</p>	<p>CIVIL ENGINEERING SURVEY & MAPPING COASTAL ENGINEERING ENVIRONMENTAL PLANNING SERVICES</p> <p>PHONE: (239)643-2324 FAX: (239)643-1143 www.coastalengineering.com E-Mail: engcollier@cecifl.com</p>	CLIENT:	LEE COUNTY			DATE:	7/26/2018	SCALE:	AS SHOWN					
			TITLE:	BONITA BEACH AND LOVERS KEY R-226A MONITORING SURVEY			DRAWN:	SDB	F.B.						
						CHECKED:	MTP	PG.							
						SEC.	TWP.	RNG.							
						ACAD NO.	18079-Lovers Bonita Mon Profiles.dwg								
			REF. NO.	18.079			NO.	DATE	BY	REVISION DESCRIPTION					



NOTES:

1. ELEVATIONS ARE REFERENCED TO NAVD 1988.
2. PROFILE DATA ARE FROM SURVEYS BY CEC.

SHEET 30
FILE NO.: 18079-R-226.5

COASTAL ENGINEERING CONSULTANTS INC.
A CECI GROUP COMPANY
Serving Florida Since 1977

3106 SOUTH HORSESHOE DRIVE
NAPLES, FLORIDA 34104

CIVIL ENGINEERING
SURVEY & MAPPING
COASTAL ENGINEERING
ENVIRONMENTAL
PLANNING SERVICES

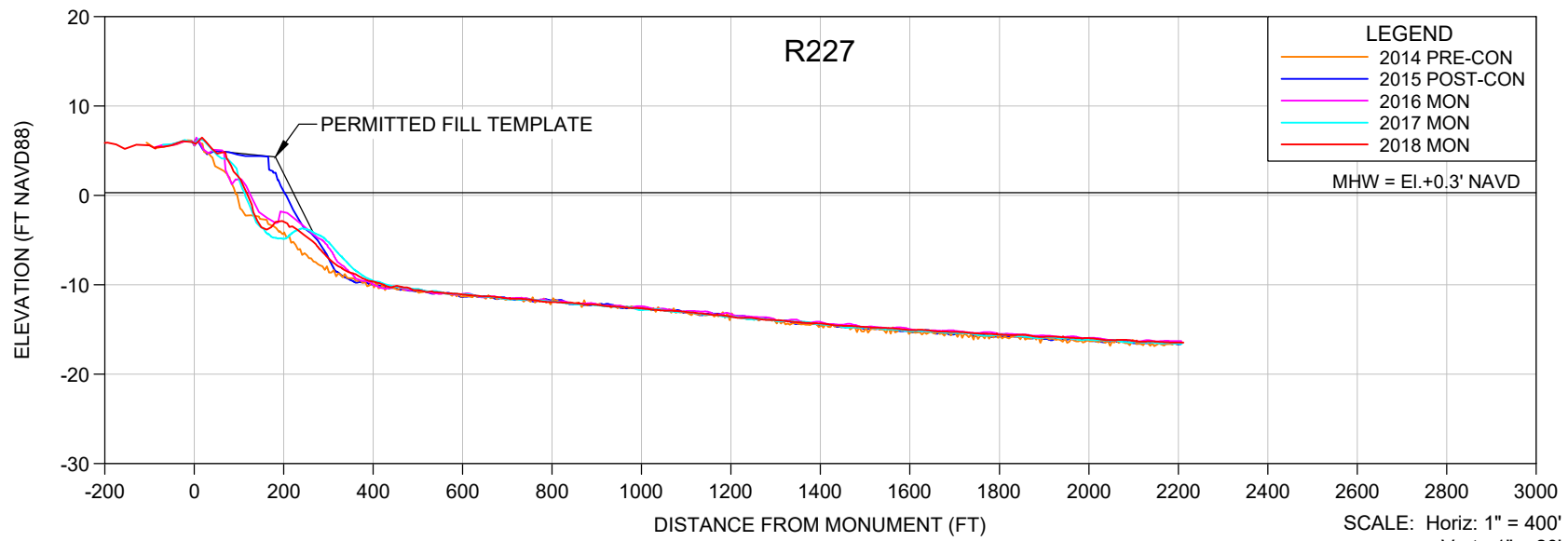
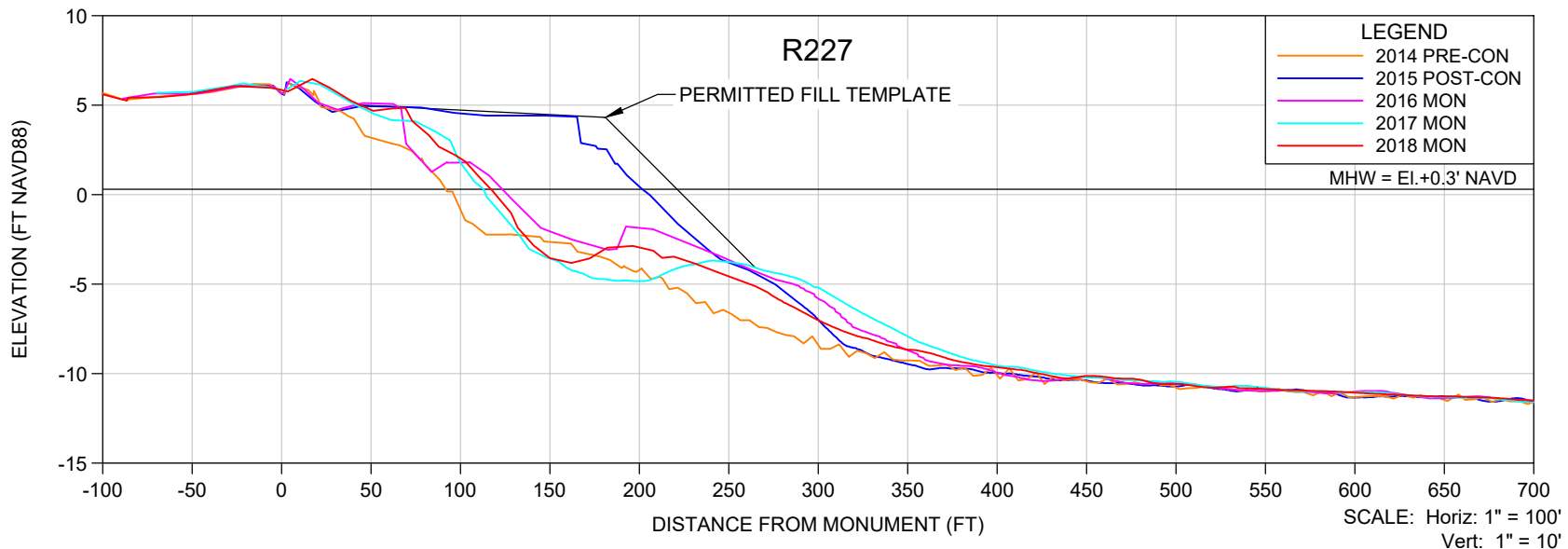
PHONE: (239)643-2324
FAX: (239)643-1143
www.coastalengineering.com
E-Mail: engcollier@cecifl.com

CLIENT: **LEE COUNTY**

TITLE: **BONITA BEACH AND LOVERS KEY R-226.5 MONITORING SURVEY**

DATE:	7/26/2018	SCALE:	AS SHOWN
DRAWN:	SDB	F.B.	
CHECKED:	MTP	PG.	
SEC.	TWP.	RNG.	
ACAD NO.	18079-Lovers Bonita Mon Profiles.dwg		
REF. NO.	18.079	NO.	DATE

NO.	DATE	BY	REVISION DESCRIPTION



- NOTES:**
- ELEVATIONS ARE REFERENCED TO NAVD 1988.
 - PROFILE DATA ARE FROM SURVEYS BY CEC.

SHEET 31
FILE NO.: 18079-R-227

COASTAL ENGINEERING CONSULTANTS INC.
A CECI GROUP COMPANY
Serving Florida Since 1977

3106 SOUTH HORSESHOE DRIVE
NAPLES, FLORIDA 34104

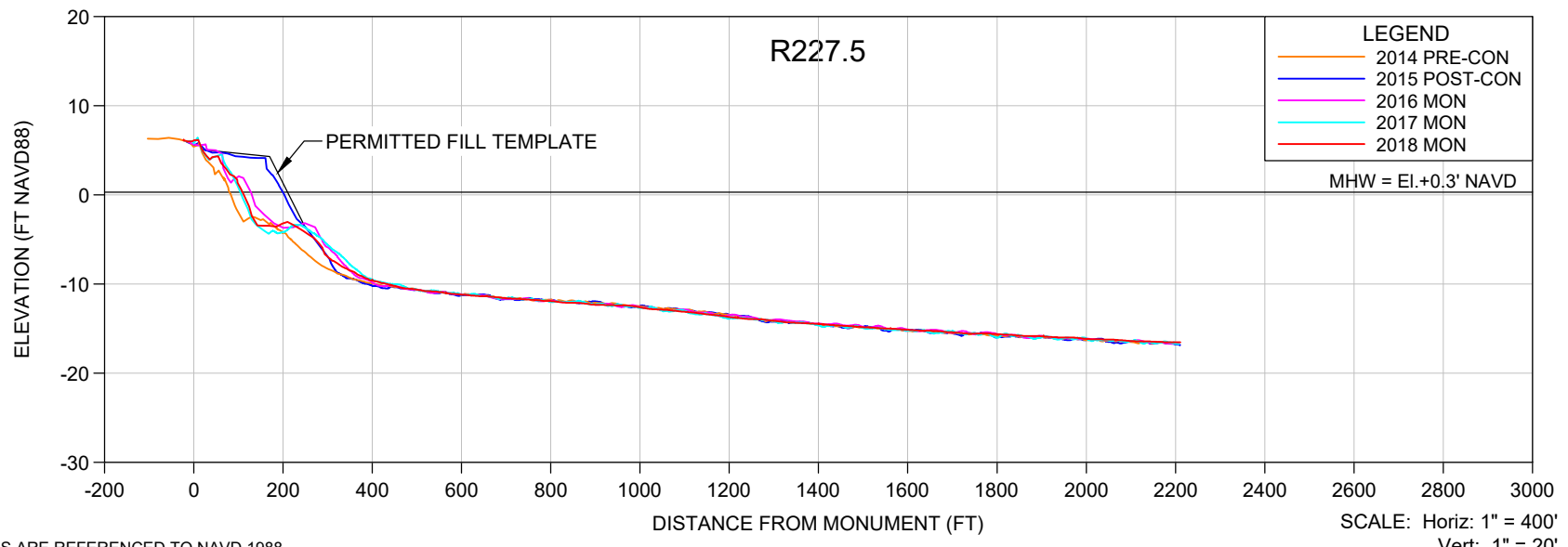
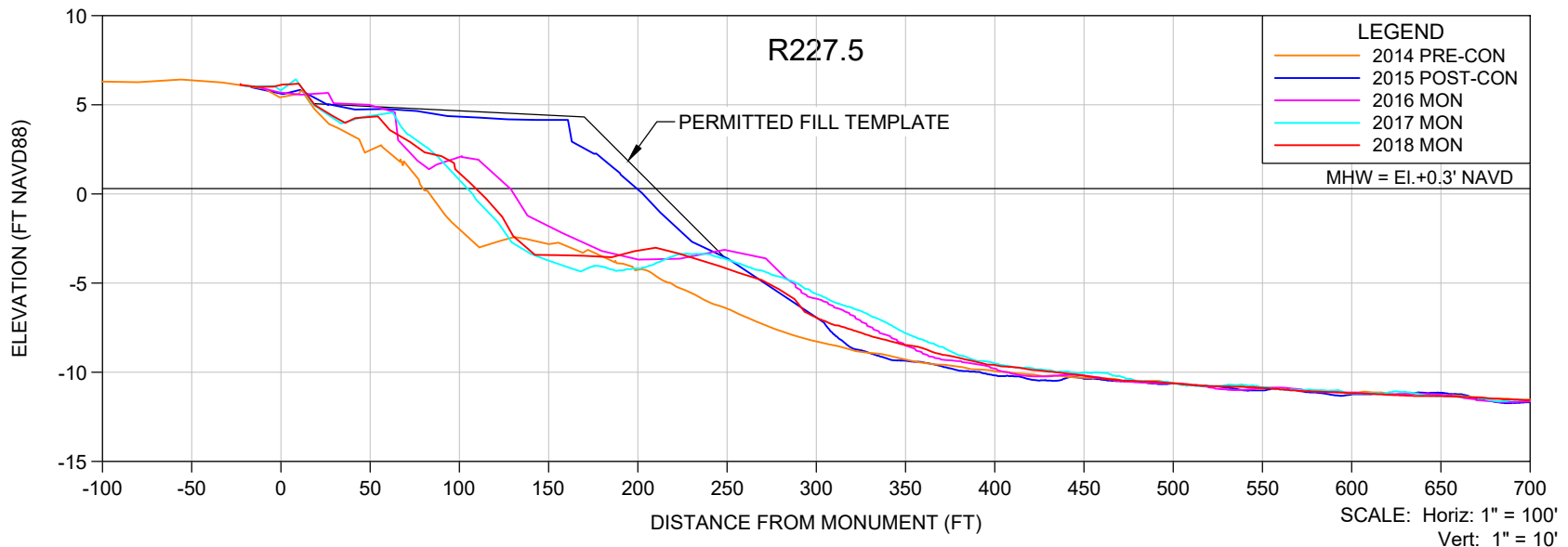
CIVIL ENGINEERING
SURVEY & MAPPING
COASTAL ENGINEERING
ENVIRONMENTAL
PLANNING SERVICES

PHONE: (239)643-2324
FAX: (239)643-1143
www.coastalengineering.com
E-Mail: engcollier@cecifl.com

CLIENT: **LEE COUNTY**

TITLE: **BONITA BEACH AND LOVERS KEY R-227 MONITORING SURVEY**

DATE:	7/26/2018	SCALE:	AS SHOWN
DRAWN:	SDB	F.B.	
CHECKED:	MTP	PG.	
SEC.	TWP.	RNG.	
ACAD NO.	18079-Lovers Bonita Mon Profiles.dwg		
REF. NO.	18.079	NO.	DATE
		BY	REVISION DESCRIPTION



NOTES:

1. ELEVATIONS ARE REFERENCED TO NAVD 1988.
2. PROFILE DATA ARE FROM SURVEYS BY CEC.

SHEET 32
FILE NO.: 18079-R-227.5

COASTAL ENGINEERING CONSULTANTS INC.
A CECI GROUP COMPANY
Serving Florida Since 1977
3106 SOUTH HORSESHOE DRIVE
NAPLES, FLORIDA 34104

CIVIL ENGINEERING
SURVEY & MAPPING
COASTAL ENGINEERING
ENVIRONMENTAL
PLANNING SERVICES

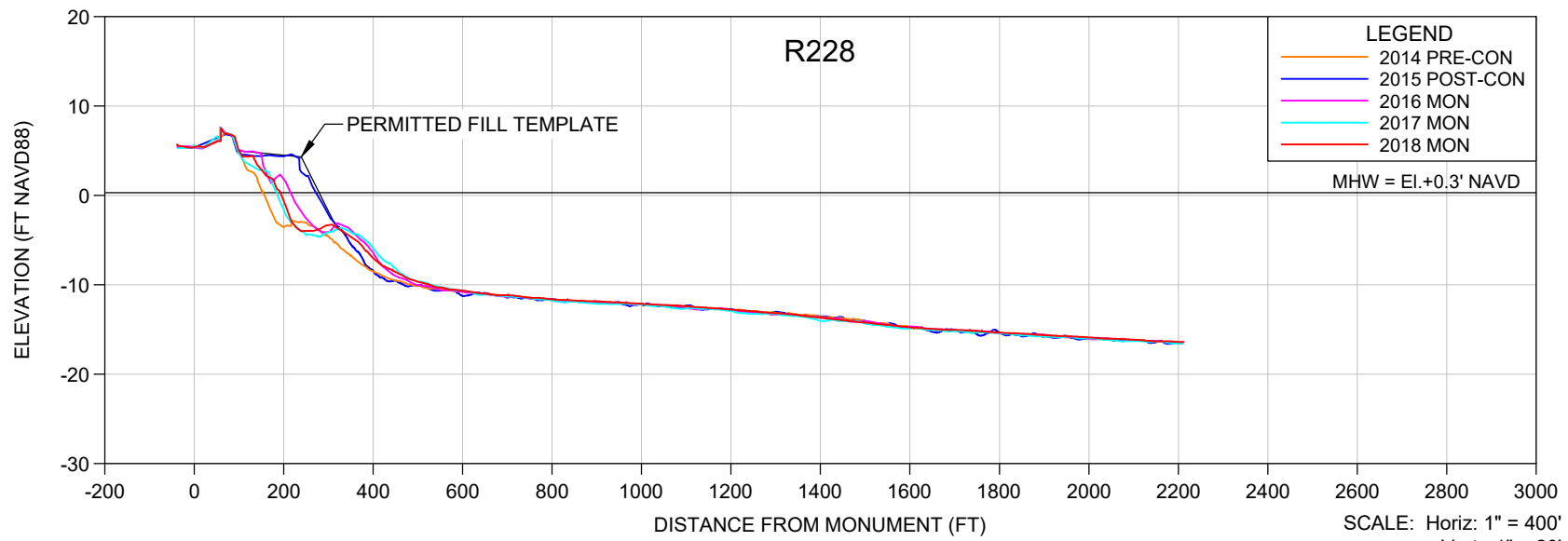
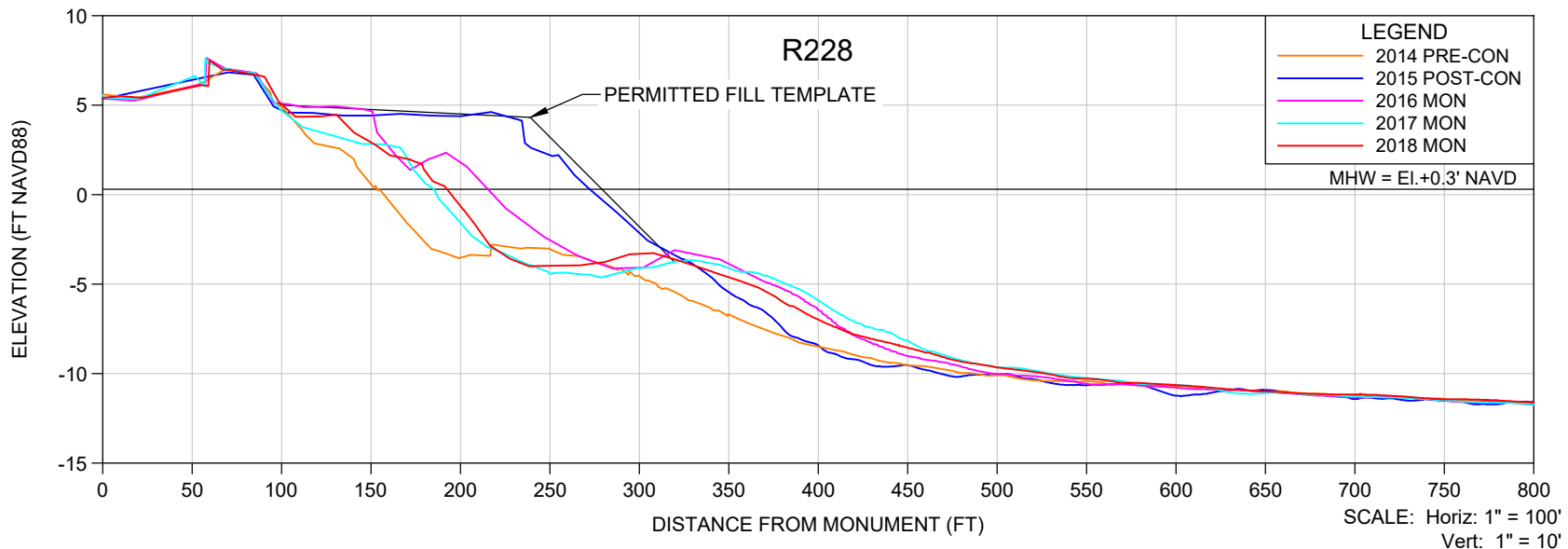
PHONE: (239)643-2324
FAX: (239)643-1143
www.coastalengineering.com
E-Mail: engcollier@cecifl.com

CLIENT: **LEE COUNTY**

TITLE: **BONITA BEACH AND LOVERS KEY R-227.5 MONITORING SURVEY**

DATE:	7/26/2018	SCALE:	AS SHOWN
DRAWN:	SDB	F.B.	
CHECKED:	MTP	PG.	
SEC.	TWP.	RNG.	
ACAD NO.	18079-Lovers Bonita Mon Profiles.dwg		
REF. NO.	18.079	NO.	DATE

NO.	DATE	BY	REVISION DESCRIPTION



NOTES:

- ELEVATIONS ARE REFERENCED TO NAVD 1988.
- PROFILE DATA ARE FROM SURVEYS BY CEC.

SHEET 33
FILE NO.: 18079-R-228

COASTAL ENGINEERING CONSULTANTS INC.
A CECI GROUP COMPANY
Serving Florida Since 1977

3106 SOUTH HORSESHOE DRIVE
NAPLES, FLORIDA 34104

CIVIL ENGINEERING
SURVEY & MAPPING
COASTAL ENGINEERING
ENVIRONMENTAL
PLANNING SERVICES

PHONE: (239)643-2324
FAX: (239)643-1143
www.coastalengineering.com
E-Mail: engcollier@cecifl.com

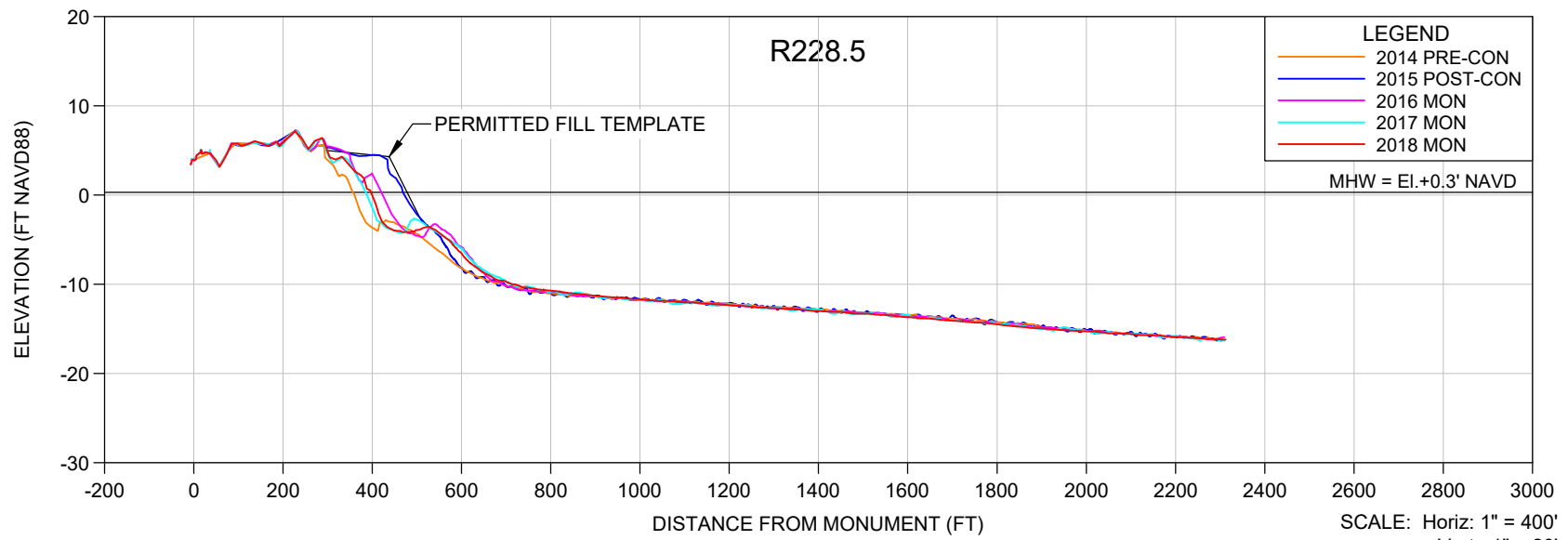
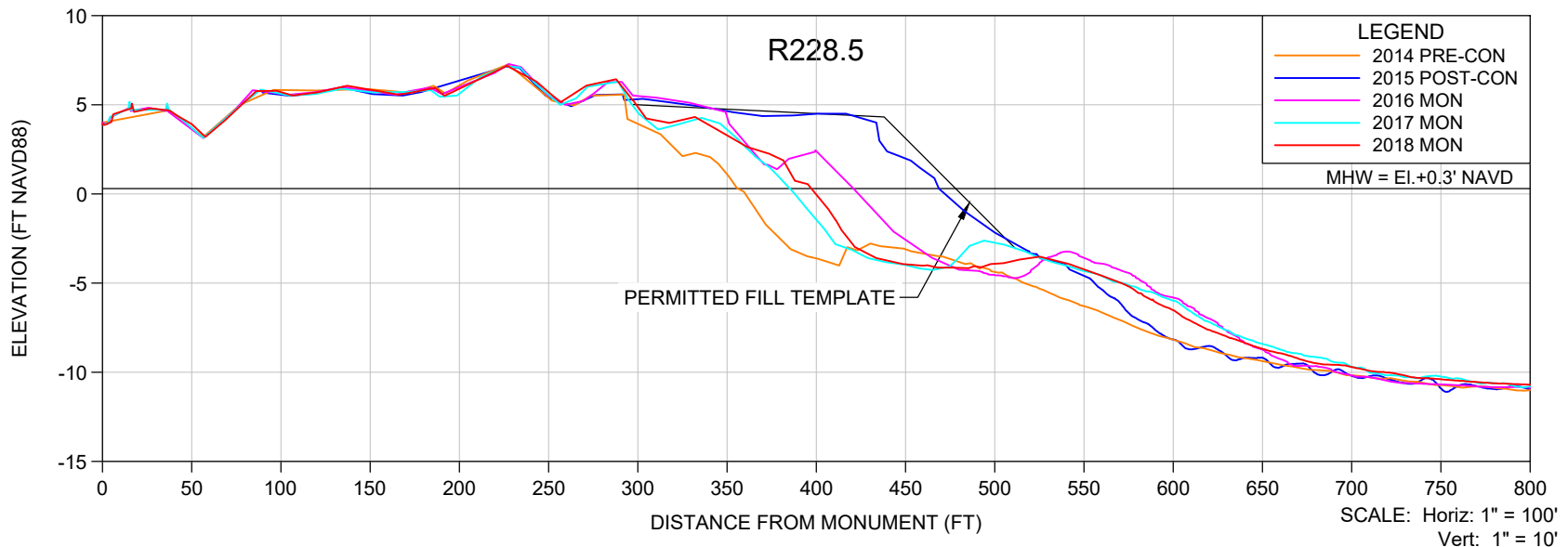
CLIENT: **LEE COUNTY**

TITLE: **BONITA BEACH AND LOVERS KEY R-228 MONITORING SURVEY**

DATE: 7/26/2018
DRAWN: SDB
CHECKED: MTP
SEC. TWP. RNG.
ACAD NO: 18079-Lovers Bonita Mon Profiles.dwg
REF. NO. 18.079

SCALE: AS SHOWN
F.B.
PG.
RNG.

NO.	DATE	BY	REVISION DESCRIPTION



NOTES:

1. ELEVATIONS ARE REFERENCED TO NAVD 1988.
2. PROFILE DATA ARE FROM SURVEYS BY CEC.

SHEET 34
FILE NO.: 18079-R-228.5

COASTAL ENGINEERING CONSULTANTS INC.
A CECI GROUP COMPANY
Serving Florida Since 1977
3106 SOUTH HORSESHOE DRIVE
NAPLES, FLORIDA 34104

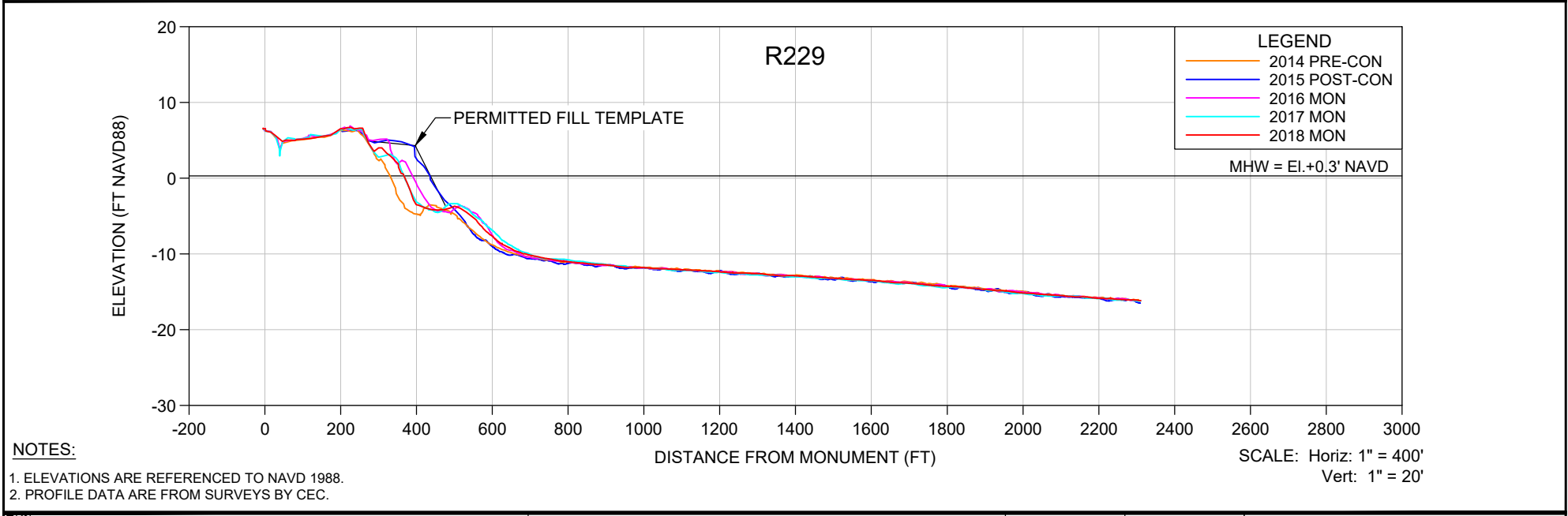
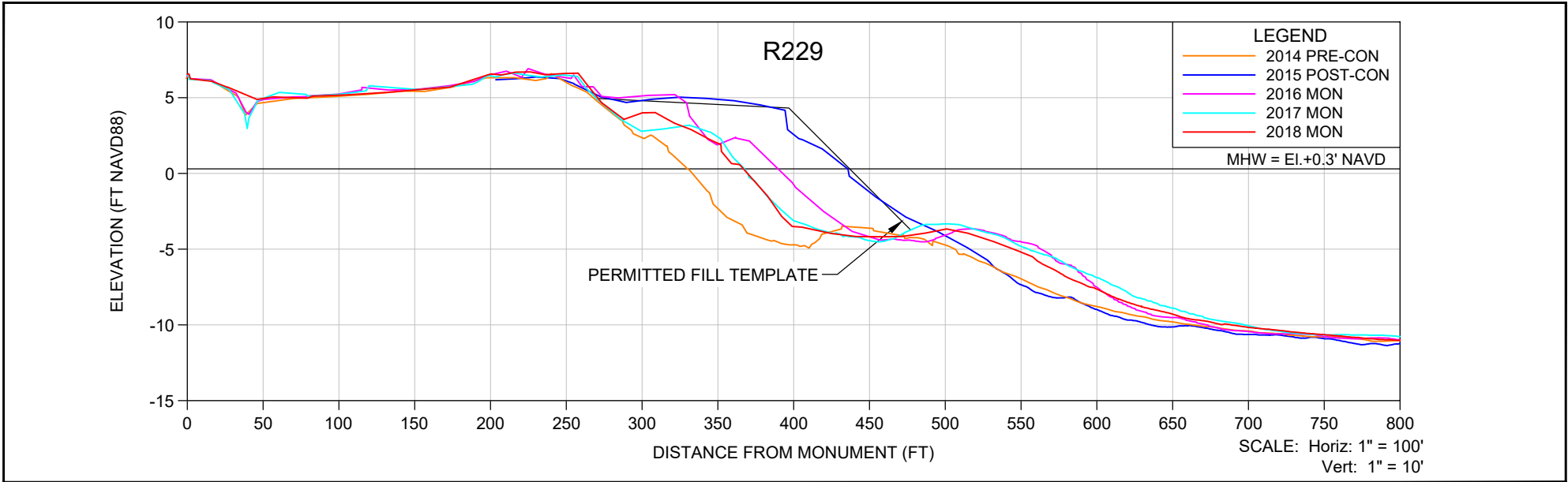
CIVIL ENGINEERING
SURVEY & MAPPING
COASTAL ENGINEERING
ENVIRONMENTAL
PLANNING SERVICES
PHONE: (239)643-2324
FAX: (239)643-1143
www.coastalengineering.com
E-Mail: engcollier@cecifl.com

CLIENT: **LEE COUNTY**


TITLE: **BONITA BEACH AND LOVERS KEY R-228.5 MONITORING SURVEY**

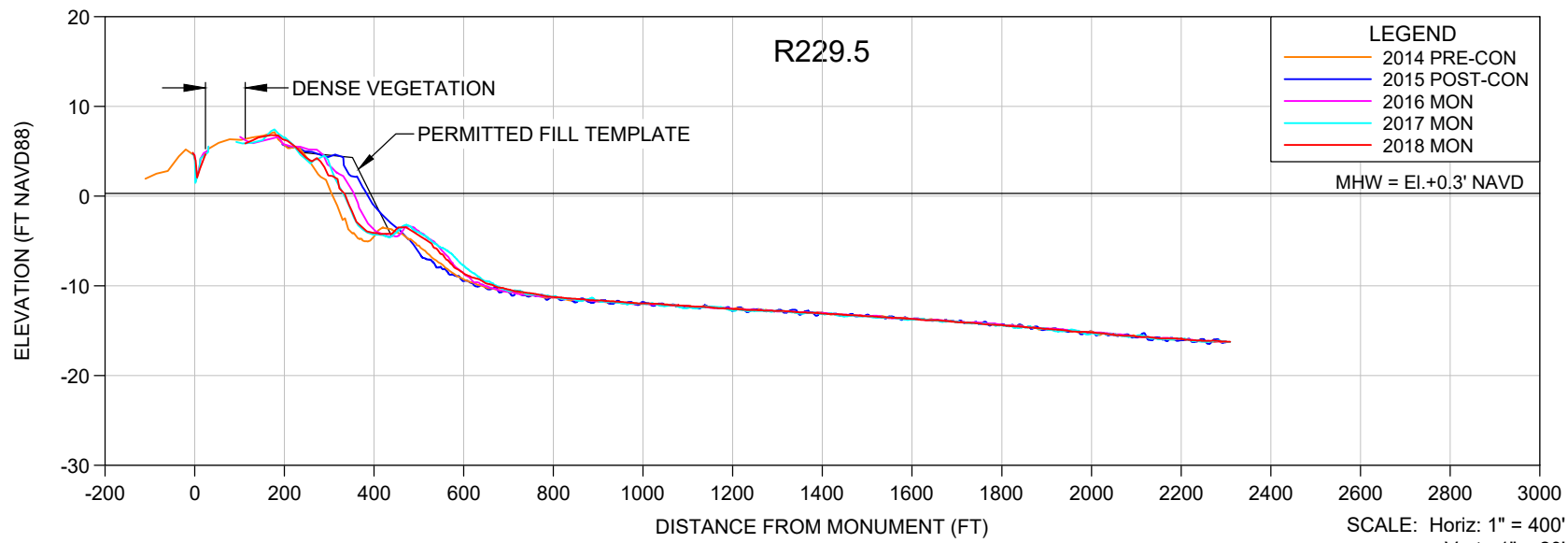
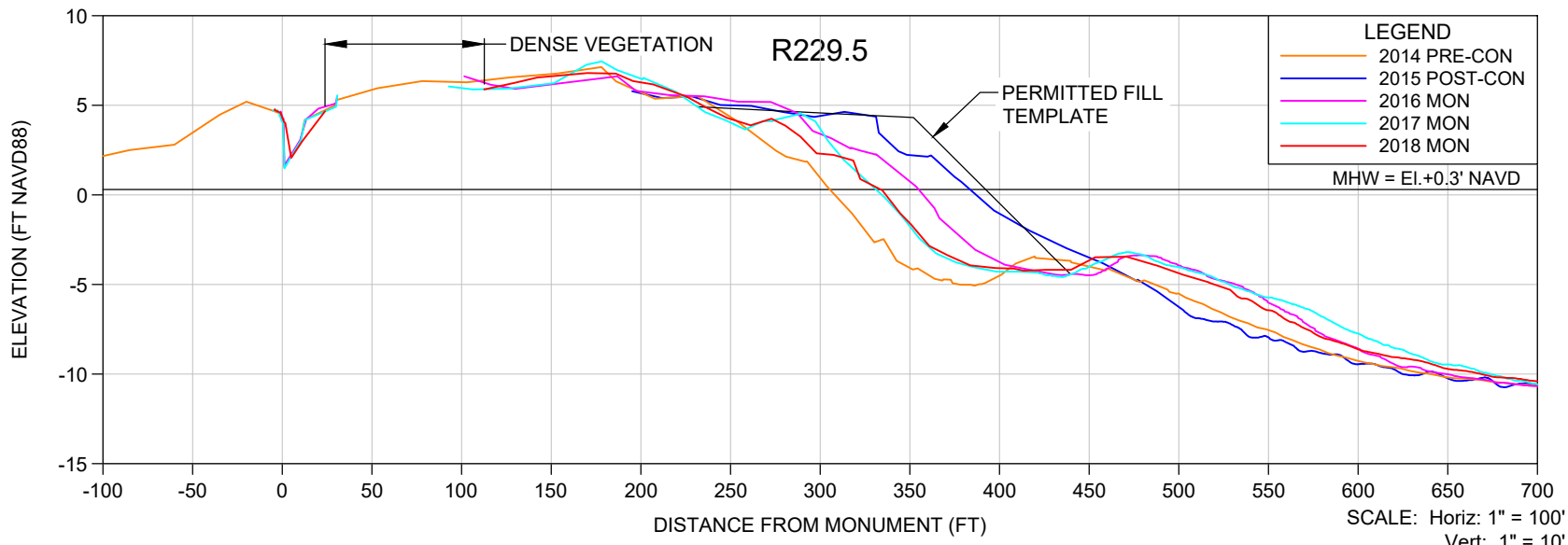
DATE:	7/26/2018	SCALE:	AS SHOWN
DRAWN:	SDB	F.B.	
CHECKED:	MTP	PG.	
SEC.	TWP.	RNG.	
ACAD NO	18079-Lovers Bonita Mon Profiles.dwg		
REF. NO.	18.079	NO.	DATE

NO.	DATE	BY	REVISION DESCRIPTION




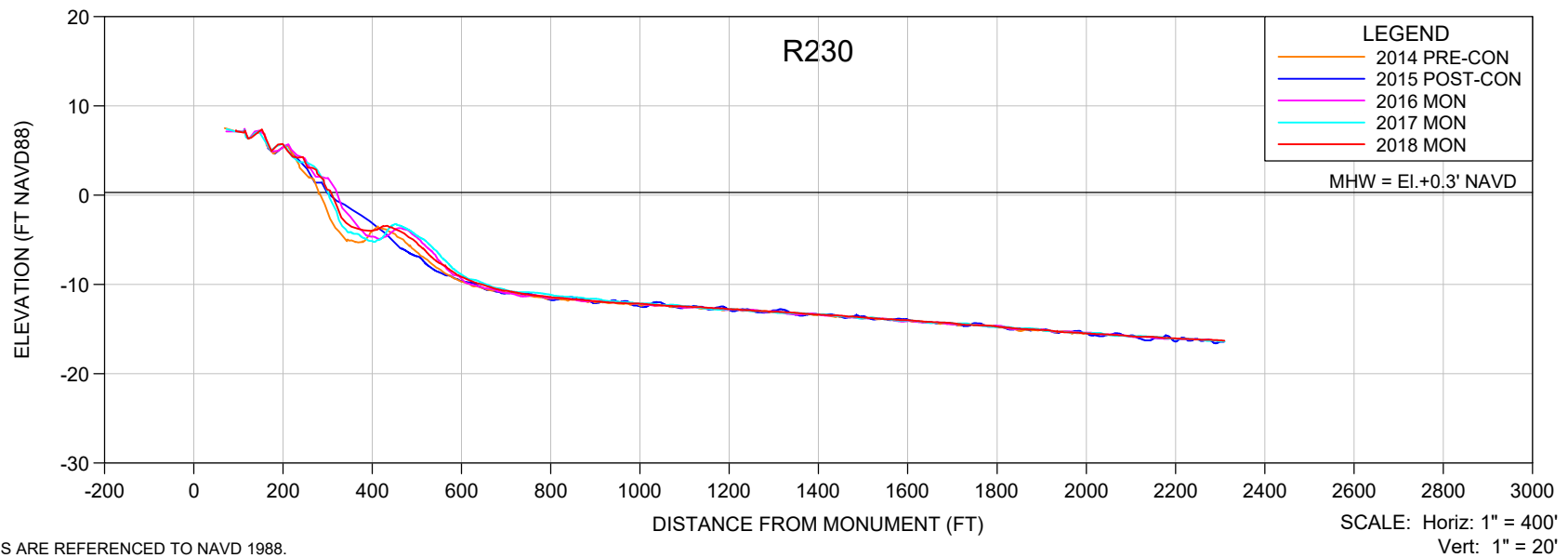
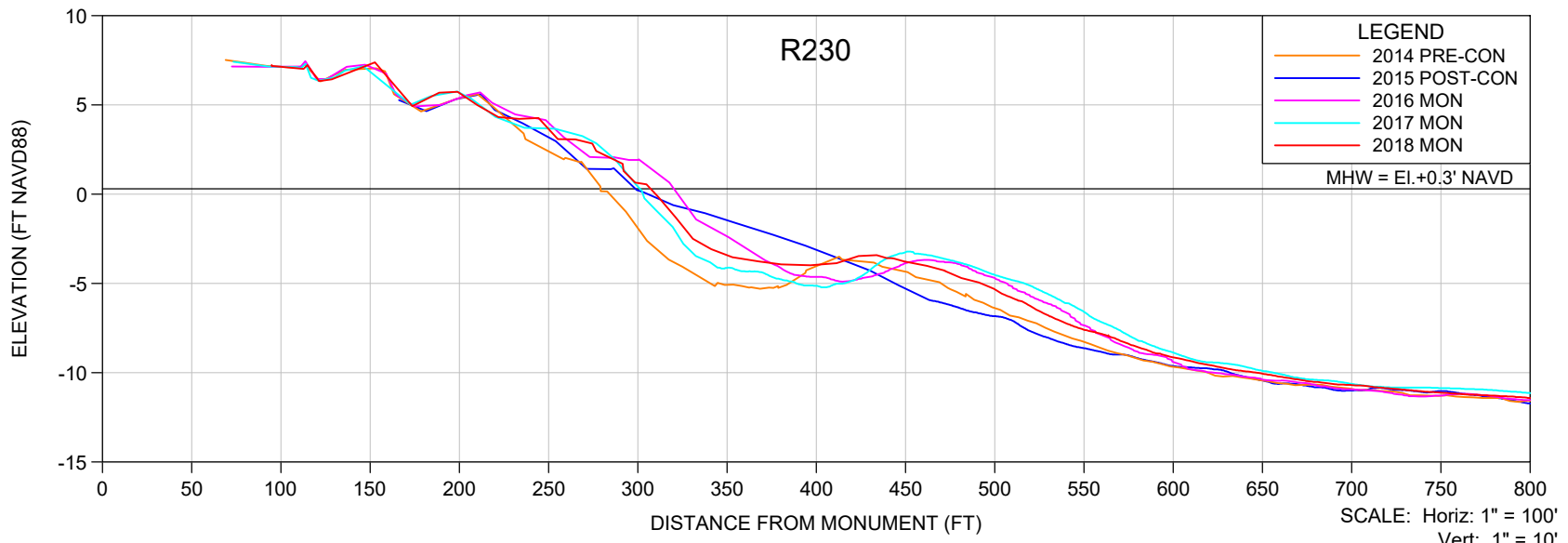
- NOTES:**
- ELEVATIONS ARE REFERENCED TO NAVD 1988.
 - PROFILE DATA ARE FROM SURVEYS BY CEC.

SHEET 35 FILE NO.: 18079-R-229	 COASTAL ENGINEERING CONSULTANTS INC. A CECI GROUP COMPANY Serving Florida Since 1977 3106 SOUTH HORSESHOE DRIVE NAPLES, FLORIDA 34104	CIVIL ENGINEERING SURVEY & MAPPING COASTAL ENGINEERING ENVIRONMENTAL PLANNING SERVICES PHONE: (239)643-2324 FAX: (239)643-1143 www.coastalengineering.com E-Mail: engcollier@cecifl.com	CLIENT:	LEE COUNTY			DATE:	7/26/2018	SCALE:	AS SHOWN					
			TITLE:	BONITA BEACH AND LOVERS KEY R-229 MONITORING SURVEY			DRAWN:	SDB	F.B.						
						CHECKED:	MTP	PG.							
						SEC.	TWP.	RNG.							
						ACAD NO:	18079-Lovers Bonita Mon Profiles.dwg								
			REF. NO.	18.079			NO.	DATE	BY	REVISION DESCRIPTION					



- NOTES:**
- ELEVATIONS ARE REFERENCED TO NAVD 1988.
 - PROFILE DATA ARE FROM SURVEYS BY CEC.

SHEET 36 FILE NO.: 18079-R-229.5	 COASTAL ENGINEERING CONSULTANTS INC. <small>A CECI GROUP COMPANY Serving Florida Since 1977</small> 3106 SOUTH HORSESHOE DRIVE NAPLES, FLORIDA 34104	CIVIL ENGINEERING SURVEY & MAPPING COASTAL ENGINEERING ENVIRONMENTAL PLANNING SERVICES PHONE: (239)643-2324 FAX: (239)643-1143 www.coastalengineering.com E-Mail: engcollier@cecifl.com	CLIENT:	LEE COUNTY			DATE:	7/26/2018	SCALE:	AS SHOWN					
			TITLE:	BONITA BEACH AND LOVERS KEY R-229.5 MONITORING SURVEY			DRAWN:	SDB	F.B.						
						CHECKED:	MTP	PG.							
						SEC.	TWP.	RNG.							
						ACAD NO	18079-Lovers Bonita Mon Profiles.dwg								
			REF. NO.	18.079	NO.	DATE	BY	REVISION DESCRIPTION							



- NOTES:**
- ELEVATIONS ARE REFERENCED TO NAVD 1988.
 - PROFILE DATA ARE FROM SURVEYS BY CEC.

SHEET 37
FILE NO.: 18079-R-230

COASTAL ENGINEERING CONSULTANTS INC.
A CECI GROUP COMPANY
Serving Florida Since 1977
3106 SOUTH HORSESHOE DRIVE
NAPLES, FLORIDA 34104

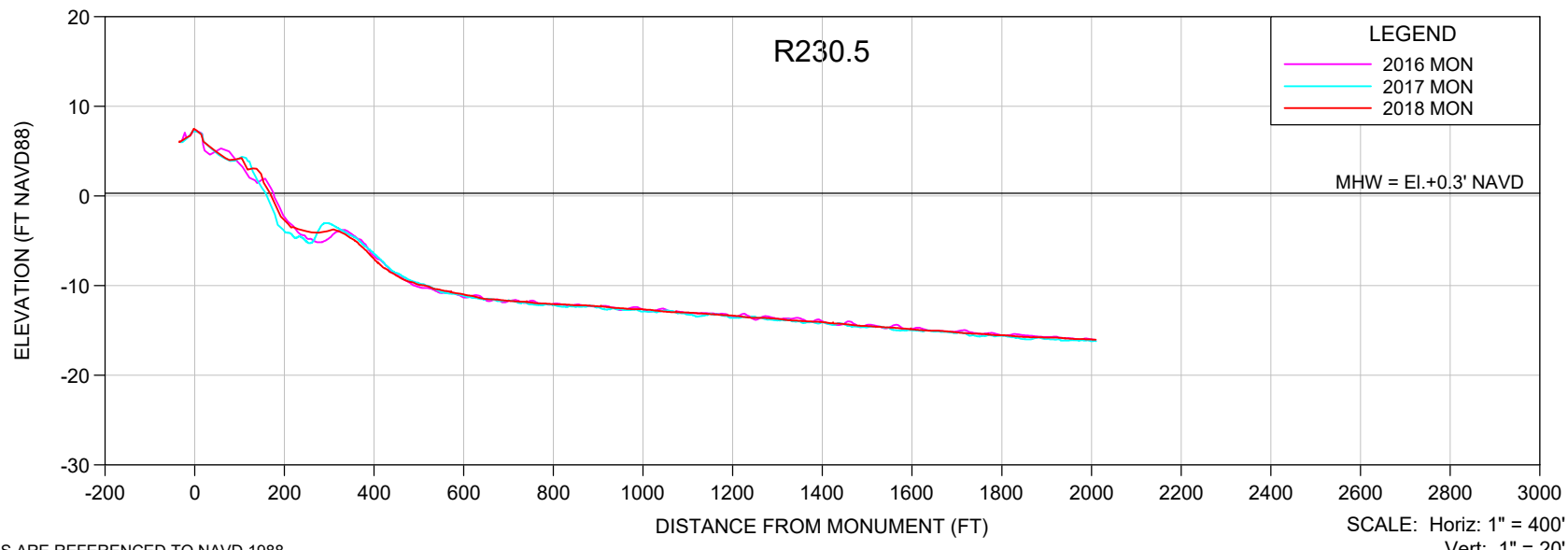
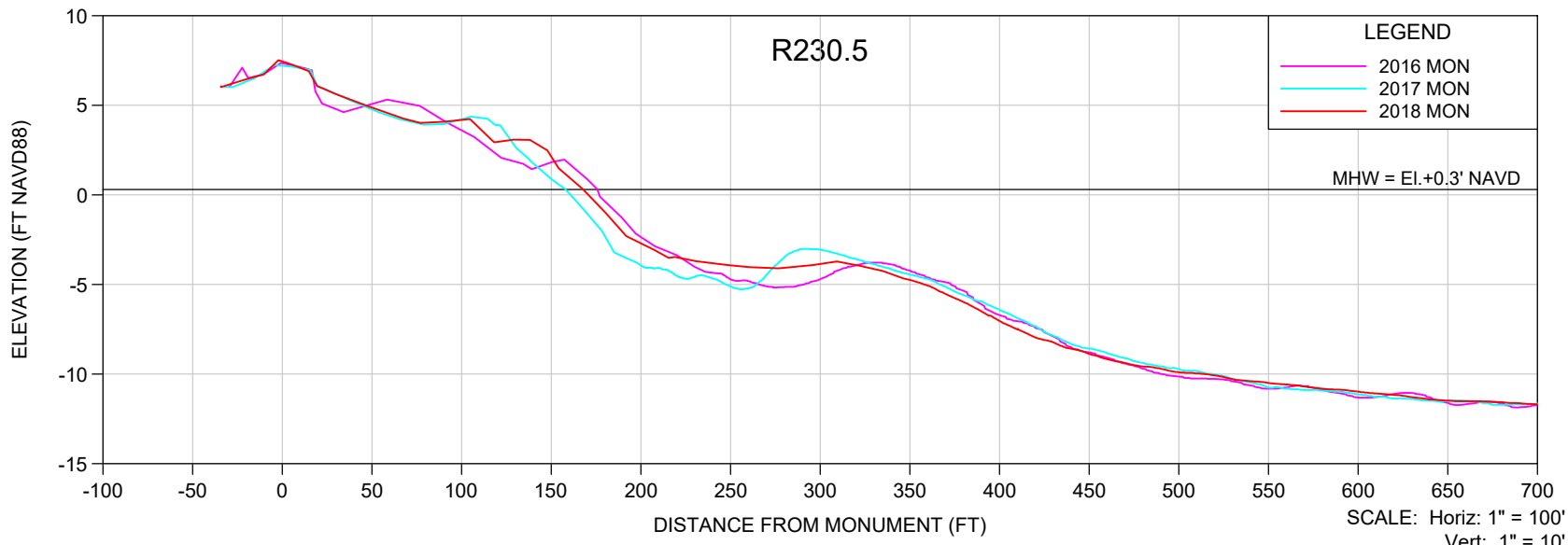
CIVIL ENGINEERING
SURVEY & MAPPING
COASTAL ENGINEERING
ENVIRONMENTAL
PLANNING SERVICES
PHONE: (239)643-2324
FAX: (239)643-1143
www.coastalengineering.com
E-Mail: engcollier@cecifl.com

CLIENT: **LEE COUNTY**


TITLE: **BONITA BEACH AND LOVERS KEY R-230 MONITORING SURVEY**

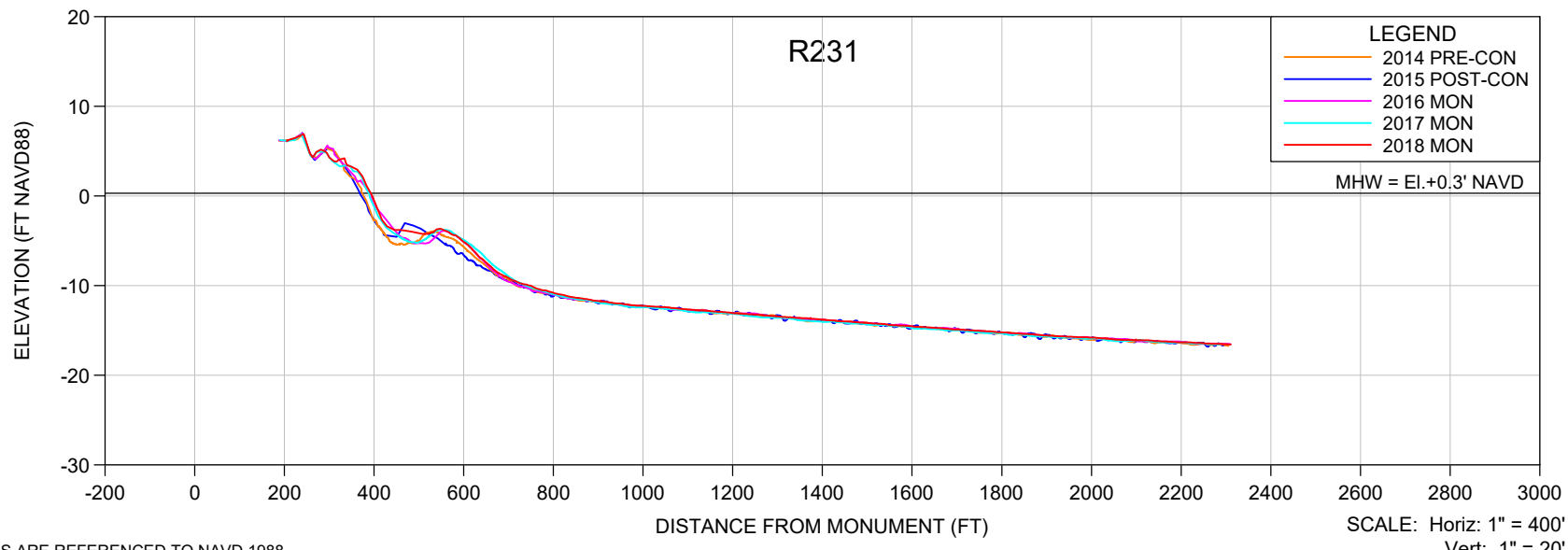
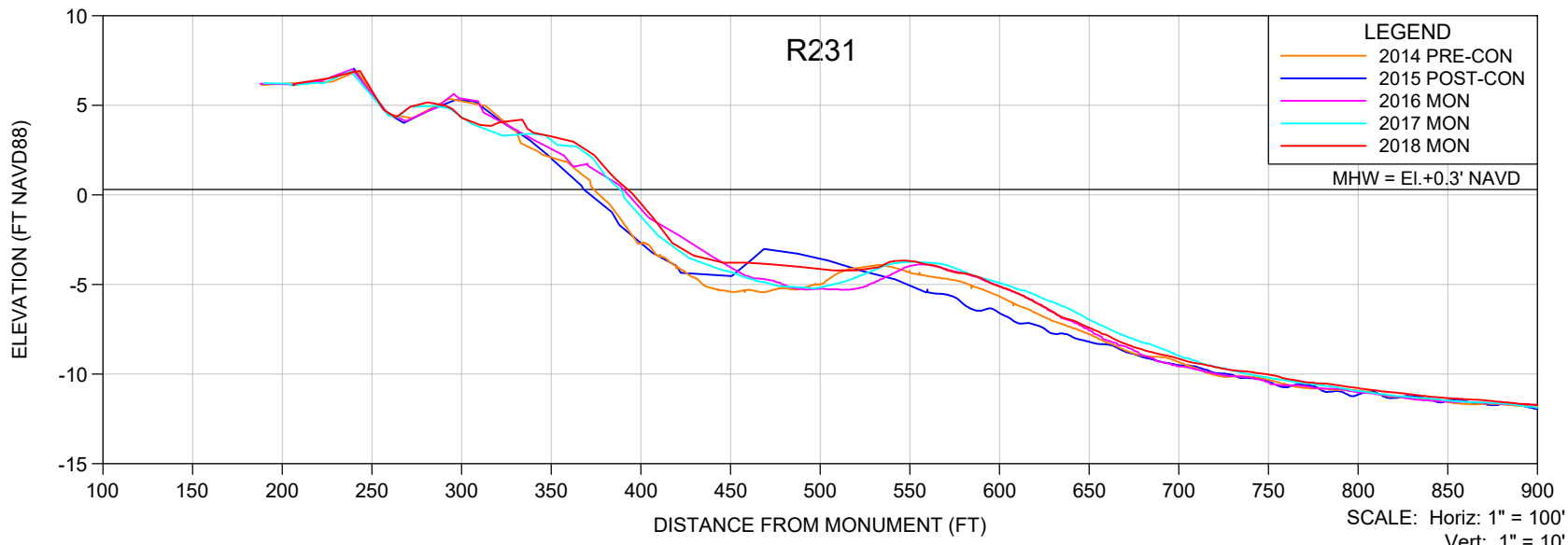
DATE:	7/26/2018	SCALE:	AS SHOWN
DRAWN:	SDB	F.B.	
CHECKED:	MTP	PG.	
SEC.	TWP.	RNG.	
ACAD NO.	18079-Lovers Bonita Mon Profiles.dwg		
REF. NO.	18.079	NO.	DATE

NO.	DATE	BY	REVISION DESCRIPTION



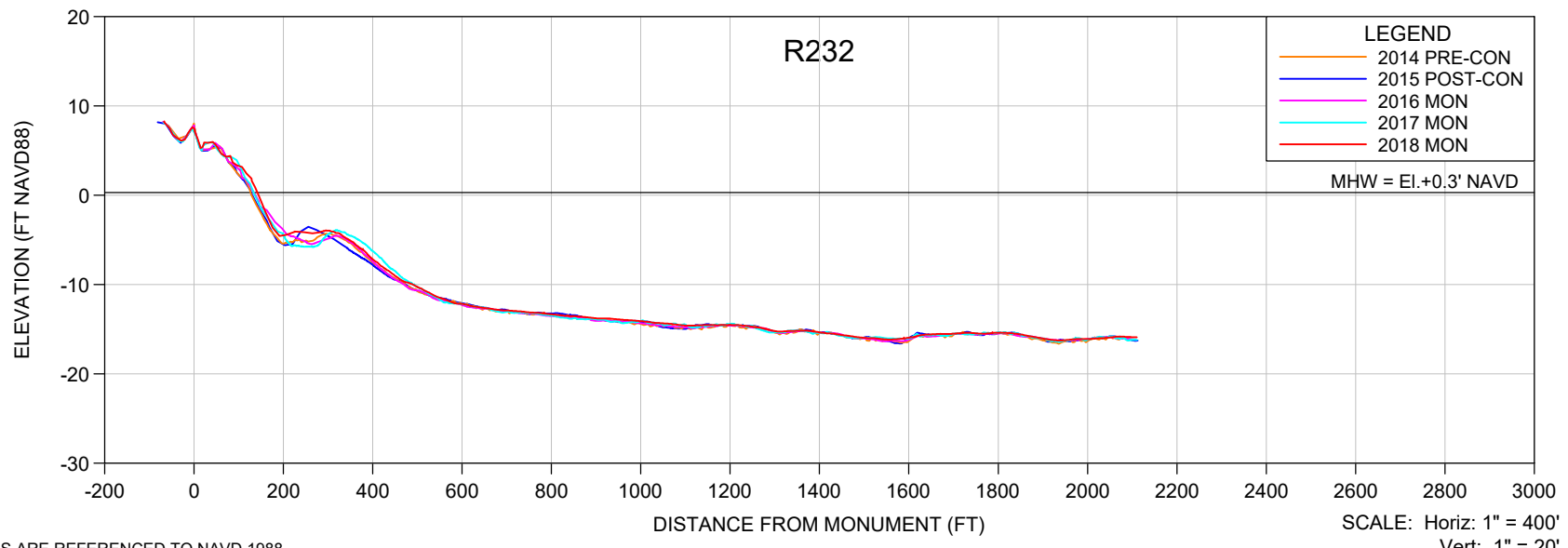
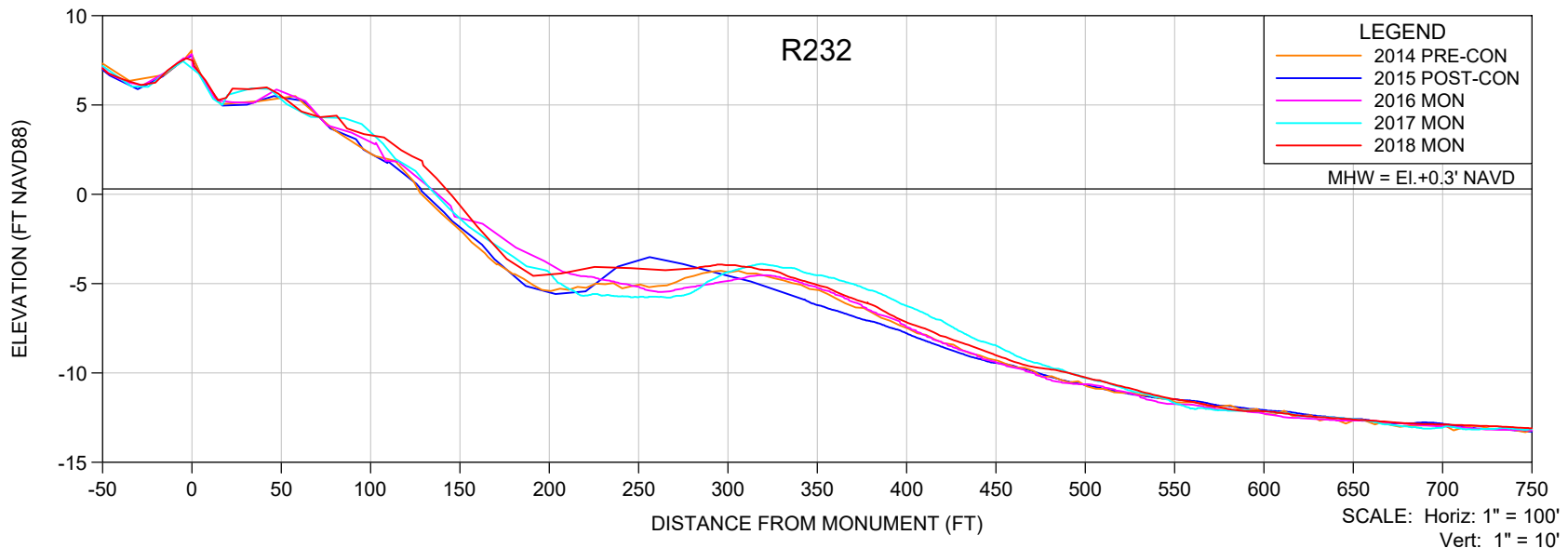
- NOTES:**
1. ELEVATIONS ARE REFERENCED TO NAVD 1988.
 2. PROFILE DATA ARE FROM SURVEYS BY CEC.

SHEET 38 FILE NO.: 18079-R-230.5	 COASTAL ENGINEERING CONSULTANTS INC. A CECI GROUP COMPANY Serving Florida Since 1977 3106 SOUTH HORSESHOE DRIVE NAPLES, FLORIDA 34104	CIVIL ENGINEERING SURVEY & MAPPING COASTAL ENGINEERING ENVIRONMENTAL PLANNING SERVICES PHONE: (239)643-2324 FAX: (239)643-1143 www.coastalengineering.com E-Mail: engcollier@cecifl.com	CLIENT:	LEE COUNTY			DATE: 7/26/2018	SCALE: AS SHOWN					
			TITLE:	BONITA BEACH AND LOVERS KEY R-230.5 MONITORING SURVEY			DRAWN: SDB	F.B.					
							CHECKED: MTP	PG.					
							SEC.	TWP.	RNG.				
							ACAD NO: 18079-Lovers Bonita Mon Profiles.dwg						
				REF. NO.	18.079	NO.	DATE	BY	REVISION DESCRIPTION				



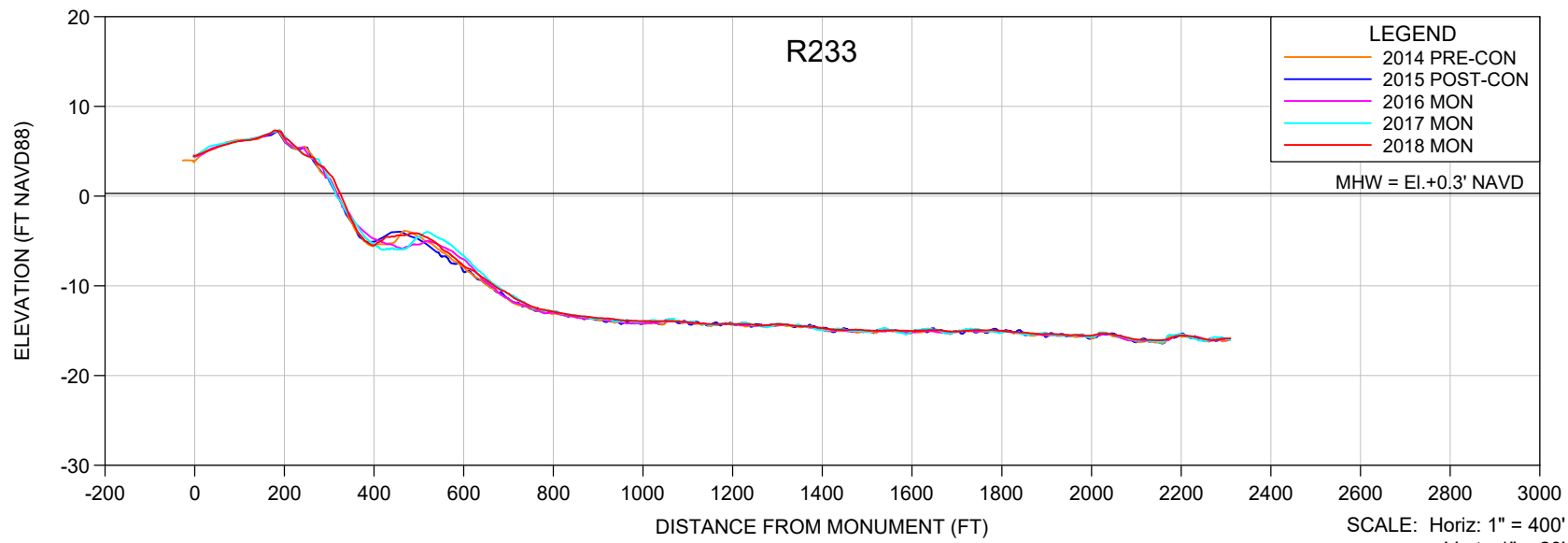
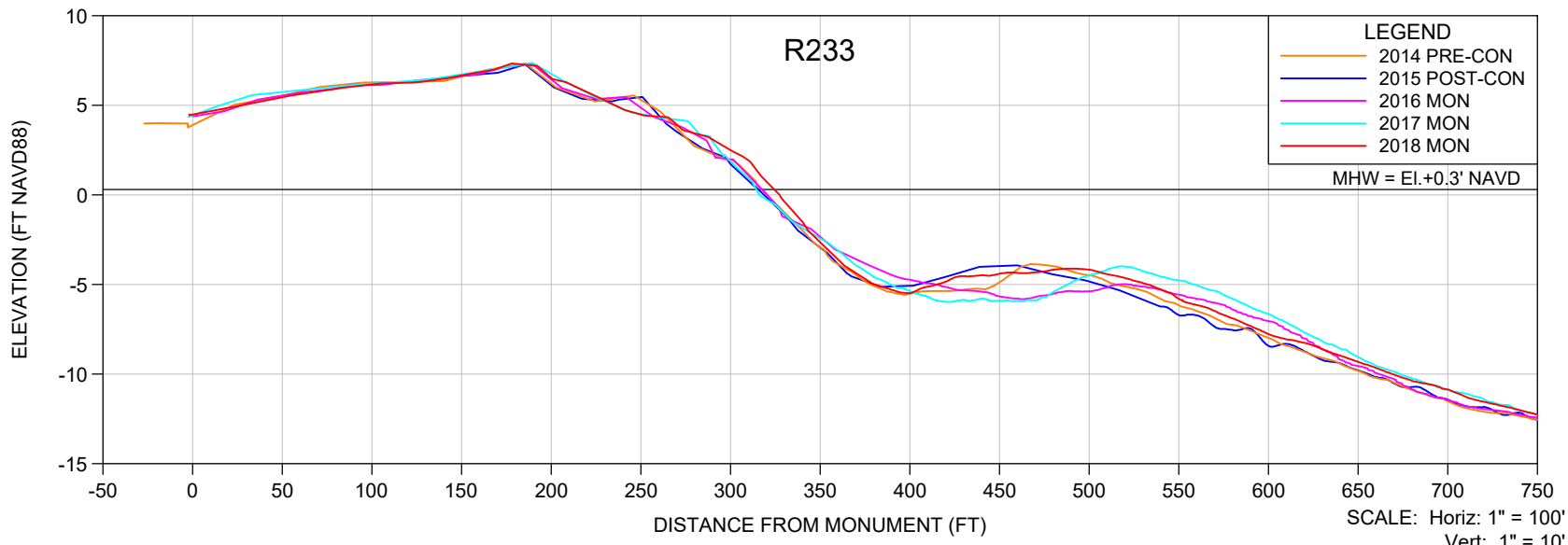
- NOTES:**
- ELEVATIONS ARE REFERENCED TO NAVD 1988.
 - PROFILE DATA ARE FROM SURVEYS BY CEC.

SHEET 39 FILE NO.: 18079-R-231	<p>COASTAL ENGINEERING CONSULTANTS INC. A CECI GROUP COMPANY Serving Florida Since 1977 3106 SOUTH HORSESHOE DRIVE NAPLES, FLORIDA 34104</p>	<p>CIVIL ENGINEERING SURVEY & MAPPING COASTAL ENGINEERING ENVIRONMENTAL PLANNING SERVICES</p> <p>PHONE: (239)643-2324 FAX: (239)643-1143 www.coastalengineering.com E-Mail: engcollier@cecifl.com</p>	CLIENT:	LEE COUNTY			DATE:	7/26/2018	SCALE:	AS SHOWN					
			TITLE:	BONITA BEACH AND LOVERS KEY R-231 MONITORING SURVEY			DRAWN:	SDB	F.B.						
						CHECKED:	MTP	PG.							
						SEC.	TWP.	RNG.							
						ACAD NO	18079-Lovers Bonita Mon Profiles.dwg								
						REF. NO.	18.079	NO.	DATE	BY	REVISION DESCRIPTION				



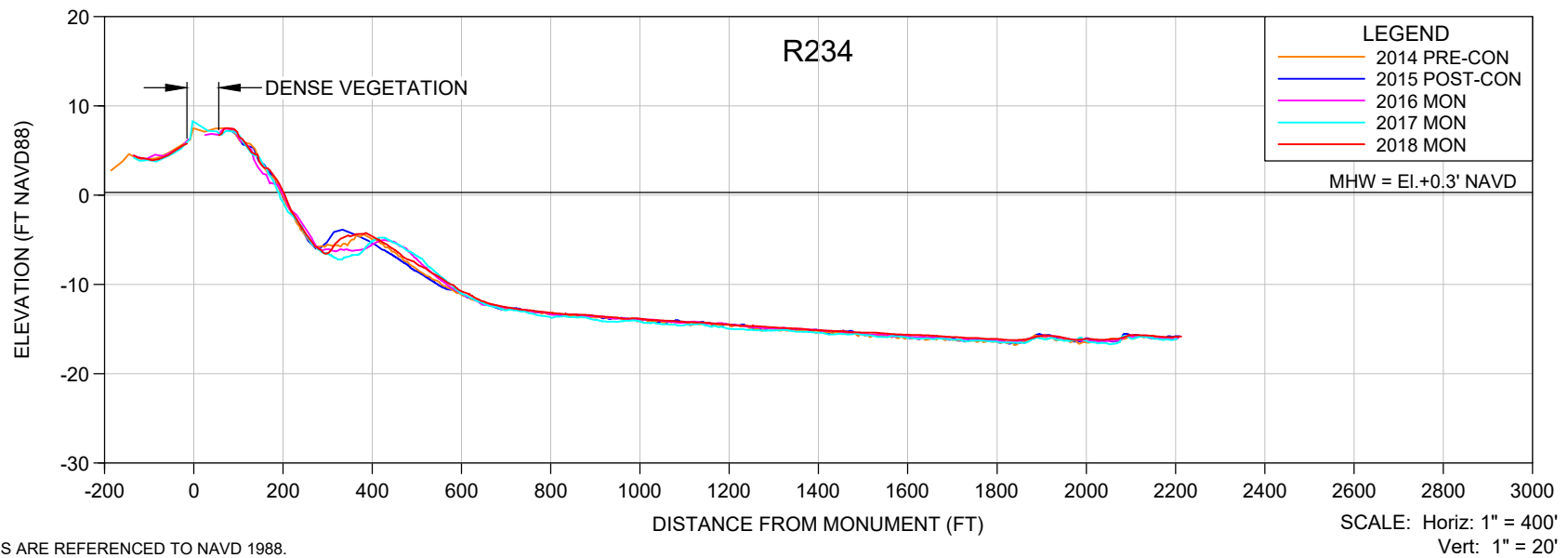
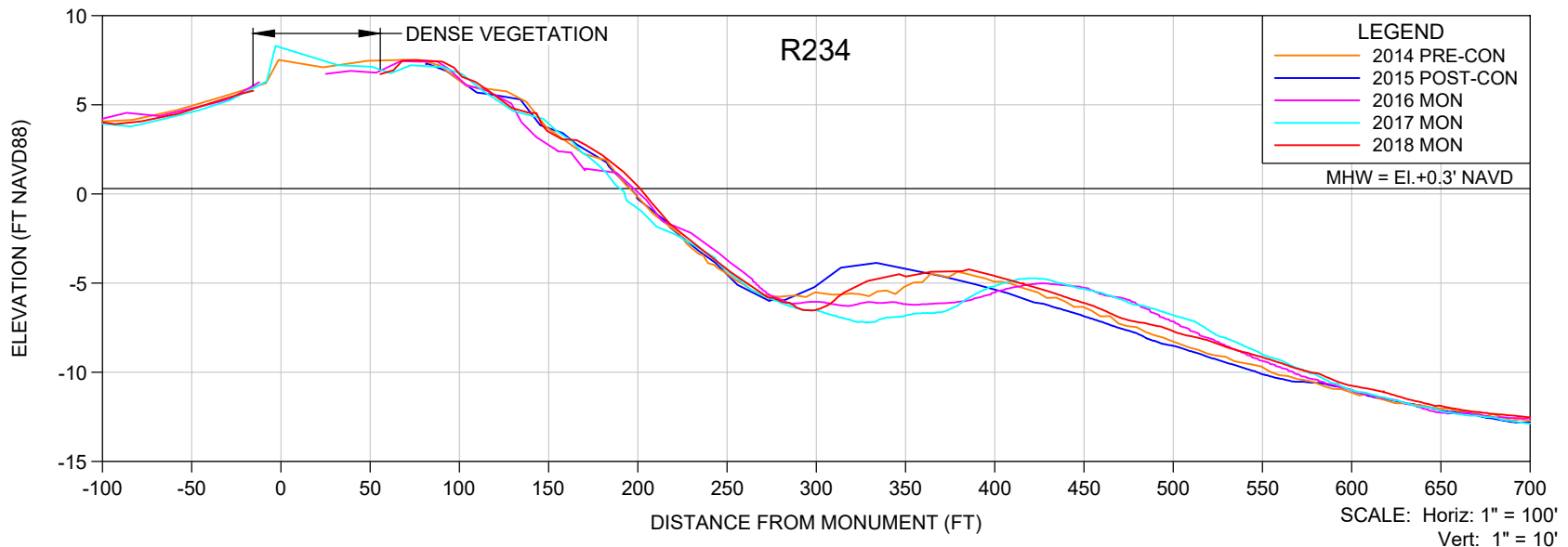
- NOTES:**
- ELEVATIONS ARE REFERENCED TO NAVD 1988.
 - PROFILE DATA ARE FROM SURVEYS BY CEC.

SHEET 40 FILE NO.: 18079-R-232	<p>COASTAL ENGINEERING CONSULTANTS INC. A CECI GROUP COMPANY Serving Florida Since 1977 3106 SOUTH HORSESHOE DRIVE NAPLES, FLORIDA 34104</p>	<p>CIVIL ENGINEERING SURVEY & MAPPING COASTAL ENGINEERING ENVIRONMENTAL PLANNING SERVICES</p> <p>PHONE: (239)643-2324 FAX: (239)643-1143 www.coastalengineering.com E-Mail: engcollier@cecifl.com</p>	CLIENT:	LEE COUNTY			DATE:	7/26/2018	SCALE:	AS SHOWN					
			TITLE:	BONITA BEACH AND LOVERS KEY R-232 MONITORING SURVEY			DRAWN:	SDB	F.B.						
						CHECKED:	MTP	PG.							
						SEC.	TWP.	RNG.							
						ACAD NO.	18079-Lovers Bonita Mon Profiles.dwg								
			REF. NO.	18.079			NO.	DATE	BY	REVISION DESCRIPTION					



- NOTES:**
- ELEVATIONS ARE REFERENCED TO NAVD 1988.
 - PROFILE DATA ARE FROM SURVEYS BY CEC.

SHEET 41 FILE NO.: 18079-R-233	<p>COASTAL ENGINEERING CONSULTANTS INC. A CECI GROUP COMPANY Serving Florida Since 1977 3106 SOUTH HORSESHOE DRIVE NAPLES, FLORIDA 34104</p>	<p>CIVIL ENGINEERING SURVEY & MAPPING COASTAL ENGINEERING ENVIRONMENTAL PLANNING SERVICES</p> <p>PHONE: (239)643-2324 FAX: (239)643-1143 www.coastalengineering.com E-Mail: engcollier@cecifl.com</p>	CLIENT:	LEE COUNTY			DATE:	7/26/2018	SCALE:	AS SHOWN					
			TITLE:	BONITA BEACH AND LOVERS KEY R-233 MONITORING SURVEY			DRAWN:	SDB	F.B.						
						CHECKED:	MTP	PG.							
						SEC.	TWP.	RNG.							
						ACAD NO.	18079-Lovers Bonita Mon Profiles.dwg								
			REF. NO.	18.079			NO.	DATE	BY	REVISION DESCRIPTION					



NOTES:

1. ELEVATIONS ARE REFERENCED TO NAVD 1988.
2. PROFILE DATA ARE FROM SURVEYS BY CEC.

SHEET 42
FILE NO.: 18079-R-234

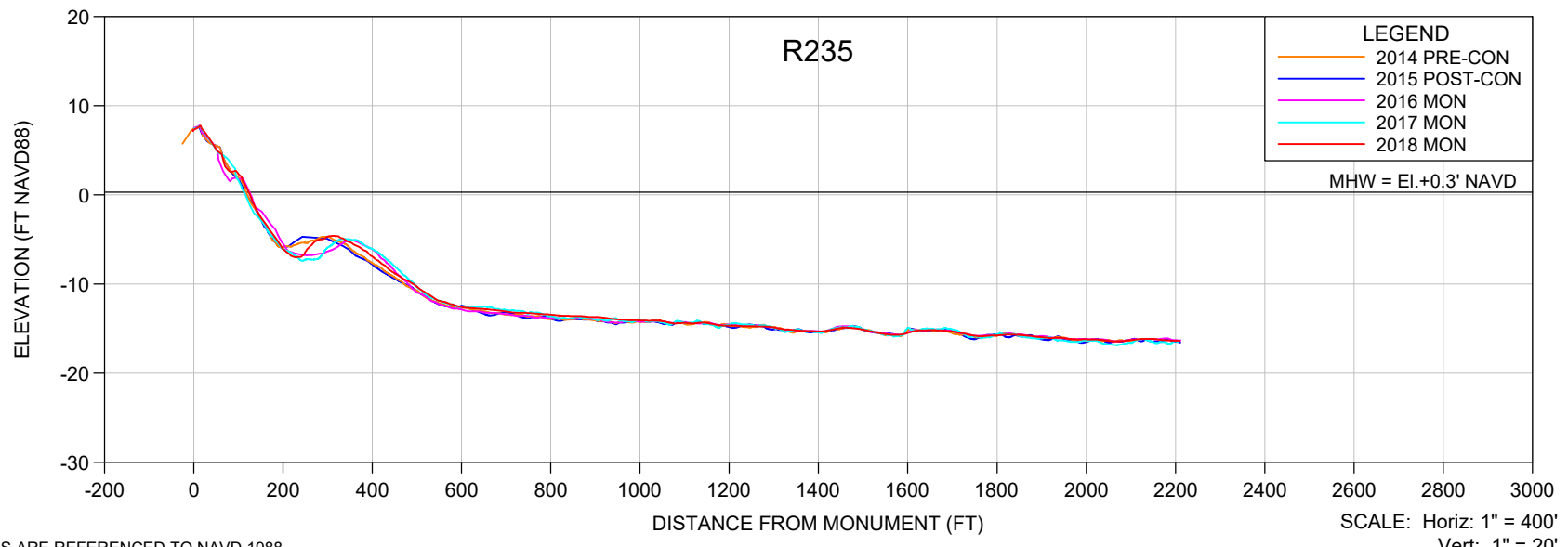
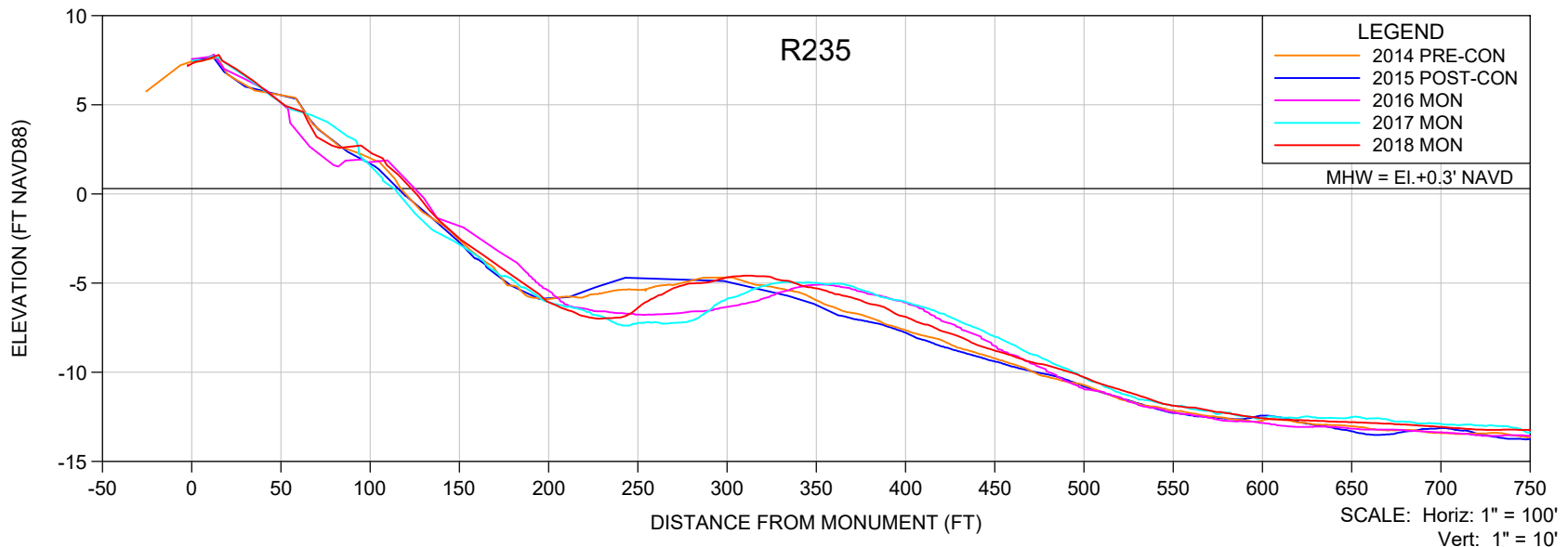
COASTAL ENGINEERING CONSULTANTS INC.
A CECI GROUP COMPANY
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3106 SOUTH HORSESHOE DRIVE
NAPLES, FLORIDA 34104

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ENVIRONMENTAL
PLANNING SERVICES
PHONE: (239)643-2324
FAX: (239)643-1143
www.coastalengineering.com
E-Mail: engcollier@cecifl.com

CLIENT: **LEE COUNTY**
TITLE: **BONITA BEACH AND LOVERS KEY R-234 MONITORING SURVEY**

DATE:	7/26/2018	SCALE:	AS SHOWN
DRAWN:	SDB	F.B.	
CHECKED:	MTP	PG.	
SEC.	TWP.	RNG.	
ACAD NO.	18079-Lovers Bonita Mon Profiles.dwg		
REF. NO.	18.079	NO.	DATE

NO.	DATE	BY	REVISION DESCRIPTION



- NOTES:**
- ELEVATIONS ARE REFERENCED TO NAVD 1988.
 - PROFILE DATA ARE FROM SURVEYS BY CEC.

SHEET 43
FILE NO.: 18079-R-235

COASTAL ENGINEERING CONSULTANTS INC.
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PLANNING SERVICES

PHONE: (239)643-2324
FAX: (239)643-1143
www.coastalengineering.com
E-Mail: engcollier@cecifl.com

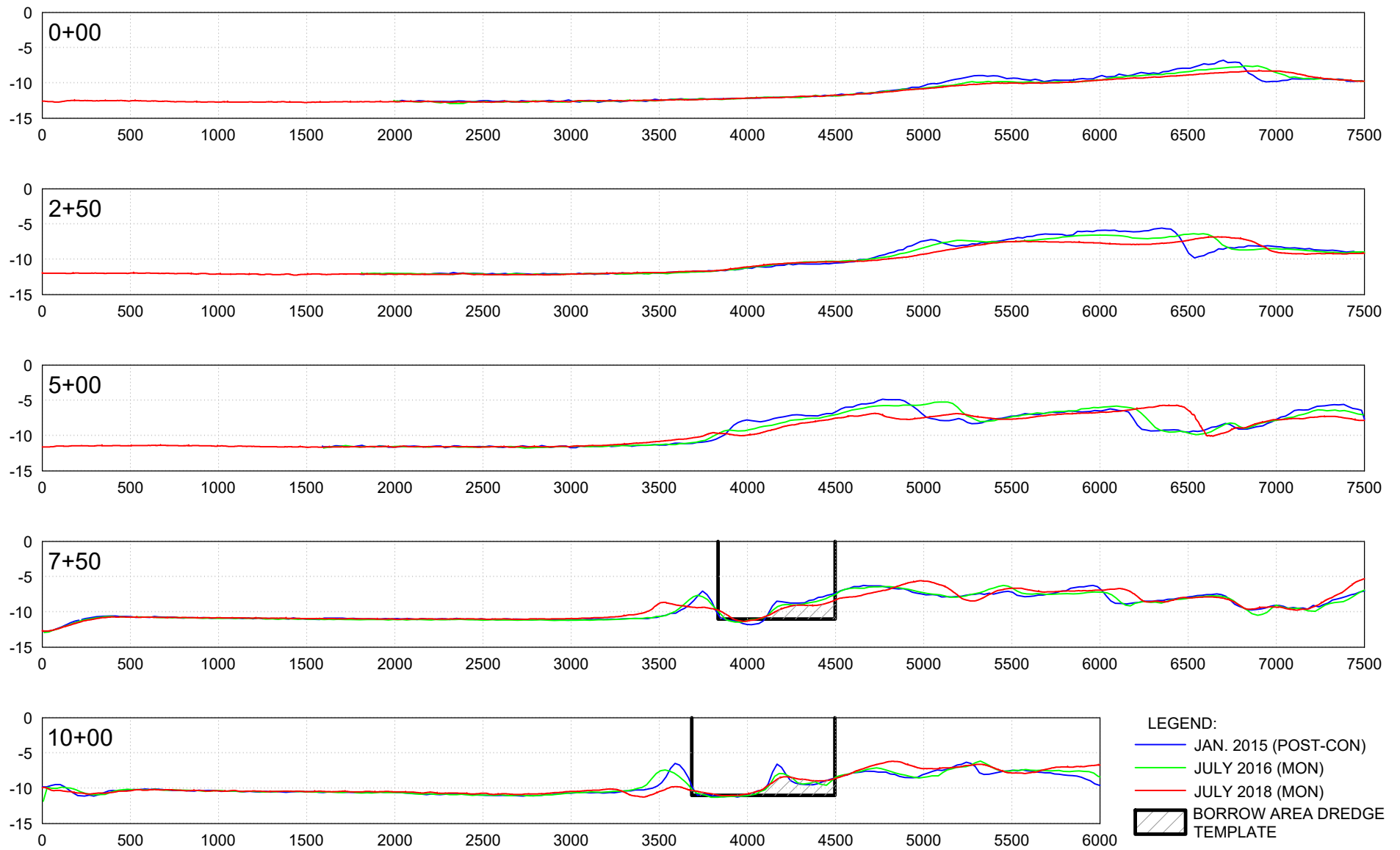
CLIENT: **LEE COUNTY**

TITLE: **BONITA BEACH AND LOVERS KEY R-235 MONITORING SURVEY**

DATE:	7/26/2018	SCALE:	AS SHOWN
DRAWN:	SDB	F.B.	
CHECKED:	MTP	PG.	
SEC.	TWP.	RNG.	
ACAD NO.	18079-Lovers Bonita Mon Profiles.dwg		
REF. NO.	18.079	NO.	DATE
		BY	REVISION DESCRIPTION

APPENDIX 3

BORROW AREA CROSS SECTIONS



LEGEND:
 — JAN. 2015 (POST-CON)
 — JULY 2016 (MON)
 — JULY 2018 (MON)
 ▨ BORROW AREA DREDGE TEMPLATE

SCALE: Horiz: 1" = 800'
 Vert: 1" = 20'

SHEET
FILE NO.: 18079BA-1

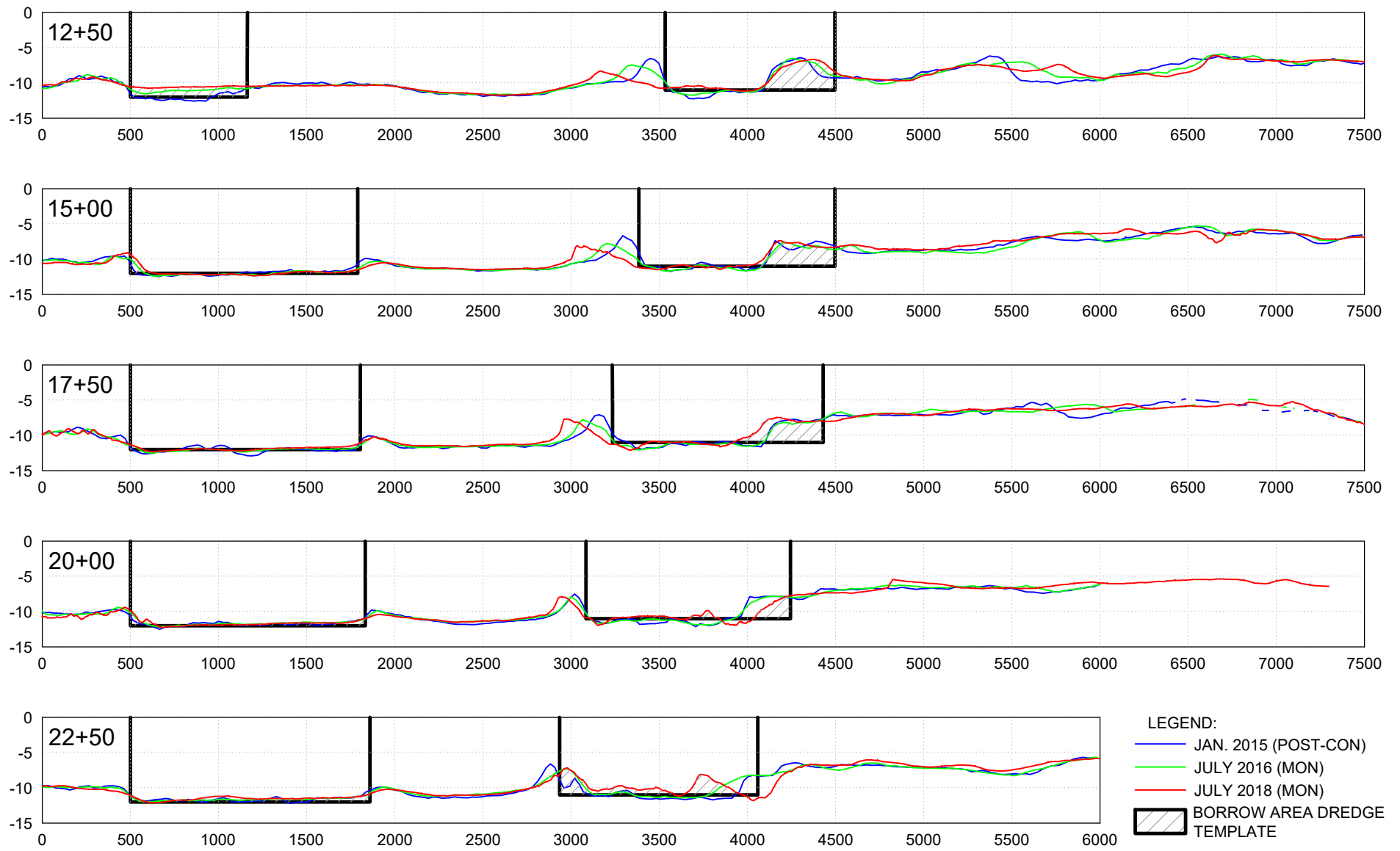
COASTAL ENGINEERING CONSULTANTS INC.
 A CECI GROUP COMPANY
 Serving Florida Since 1977
 3106 SOUTH HORSESHOE DRIVE
 NAPLES, FLORIDA 34104

CIVIL ENGINEERING
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 PLANNING SERVICES
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 FAX: (239)643-1143
 www.coastalengineering.com
 E-Mail: engcollier@cecifl.com

CLIENT: **LEE COUNTY**
 TITLE: **BONITA BEACH AND LOVERS KEY
 BORROW AREA CROSS SECTIONS 0+00-10+00**

DATE:	8/23/2018	SCALE:	AS SHOWN
DRAWN:	SDB	F.B.	
CHECKED:	MTP	PG.	
SEC.	TWP.	RNG.	
ACAD NO.	18079-Lovers Bonita Borrow Area.dwg		
REF. NO.	18.079	NO.	DATE

NO.	DATE	BY	REVISION DESCRIPTION



SCALE: Horiz: 1" = 800'
 Vert: 1" = 20'

SHEET
FILE NO.: 18079BA-2

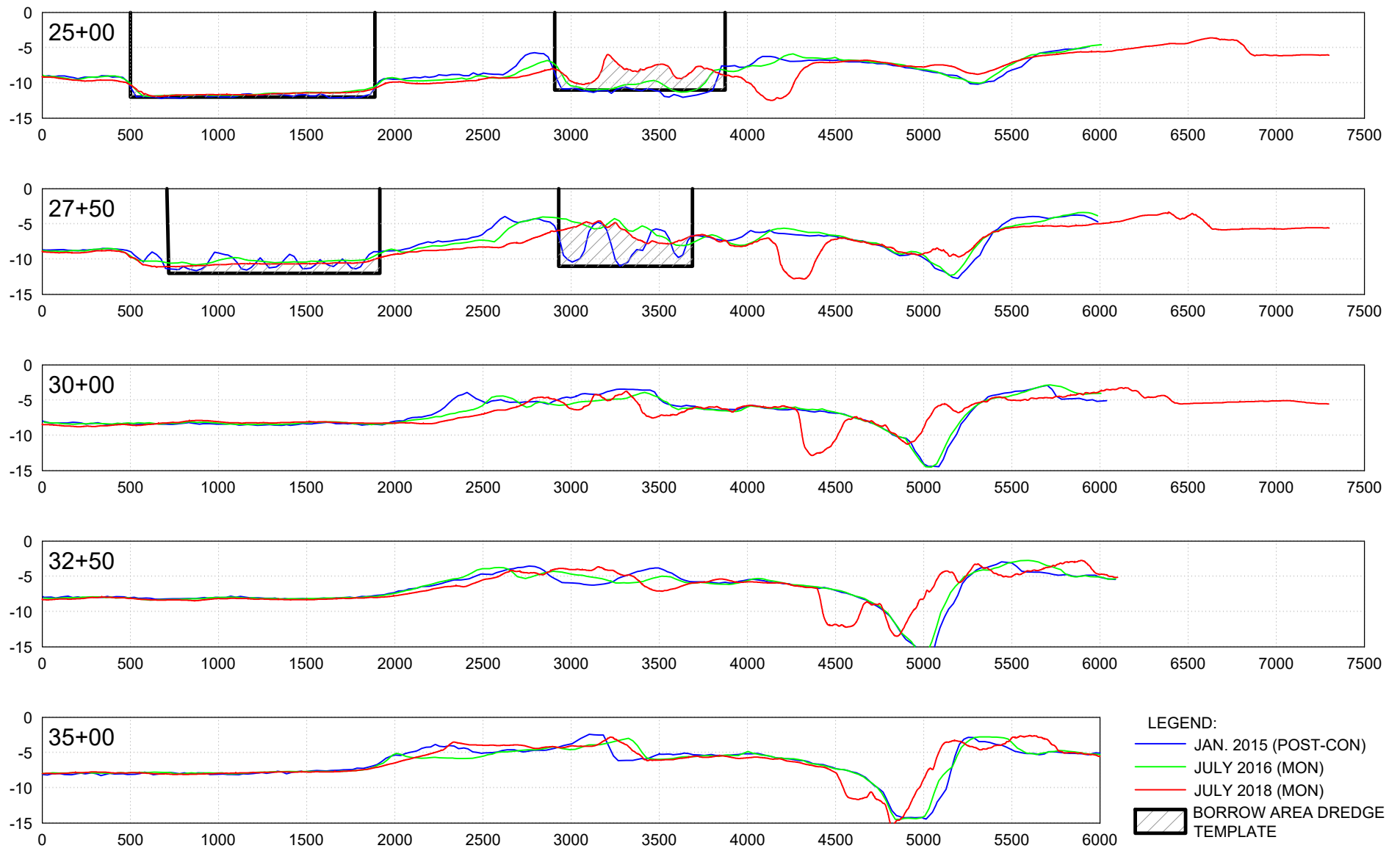
COASTAL ENGINEERING CONSULTANTS INC.
 A CECI GROUP COMPANY
 Serving Florida Since 1977
 3106 SOUTH HORSESHOE DRIVE
 NAPLES, FLORIDA 34104

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 FAX: (239)643-1143
 www.coastalengineering.com
 E-Mail: engcollier@cecifl.com

CLIENT: **LEE COUNTY**
 TITLE: **BONITA BEACH AND LOVERS KEY
 BORROW AREA CROSS SECTIONS 12+50-22+50**

DATE:	8/23/2018	SCALE:	AS SHOWN
DRAWN:	SDB	F.B.	
CHECKED:	MTP	PG.	
SEC.	TWP.	RNG.	
ACAD NO.	18079-Lovers Bonita Borrow Area.dwg		
REF. NO.	18.079	NO.	DATE

NO.	DATE	BY	REVISION DESCRIPTION



SCALE: Horiz: 1" = 800'
 Vert: 1" = 20'

SHEET
FILE NO.: 18079BA-3

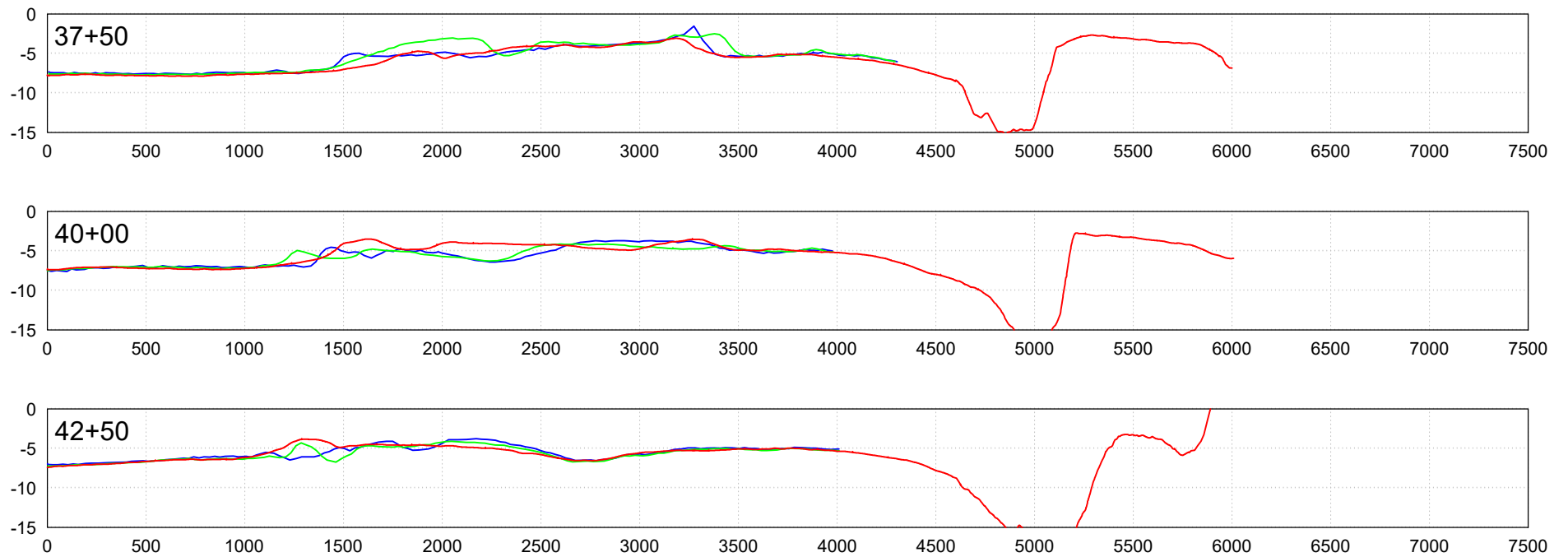
COASTAL ENGINEERING CONSULTANTS INC.
 A CECI GROUP COMPANY
 Serving Florida Since 1977
 3106 SOUTH HORSESHOE DRIVE
 NAPLES, FLORIDA 34104

CIVIL ENGINEERING
 SURVEY & MAPPING
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 ENVIRONMENTAL
 PLANNING SERVICES
 PHONE: (239)643-2324
 FAX: (239)643-1143
 www.coastalengineering.com
 E-Mail: engcollier@cecifl.com

CLIENT: **LEE COUNTY**
 TITLE: **BONITA BEACH AND LOVERS KEY
 BORROW AREA CROSS SECTIONS 25+00-35+00**

DATE:	8/23/2018	SCALE:	AS SHOWN
DRAWN:	SDB	F.B.	
CHECKED:	MTP	PG.	
SEC.	TWP.	RNG.	
ACAD NO.	18079-Lovers Bonita Borrow Area.dwg		
REF. NO.	18.079	NO.	DATE

NO.	DATE	BY	REVISION DESCRIPTION



LEGEND:
 — JAN. 2015 (POST-CON)
 — JULY 2016 (MON)
 — JULY 2018 (MON)

SCALE: Horiz: 1" = 800'
 Vert: 1" = 20'

SHEET
FILE NO.: 18079BA-4

COASTAL ENGINEERING CONSULTANTS INC.
 A CECI GROUP COMPANY
 Serving Florida Since 1977
 3106 SOUTH HORSESHOE DRIVE
 NAPLES, FLORIDA 34104

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 PHONE: (239)643-2324
 FAX: (239)643-1143
 www.coastalengineering.com
 E-Mail: engcollier@cecifl.com

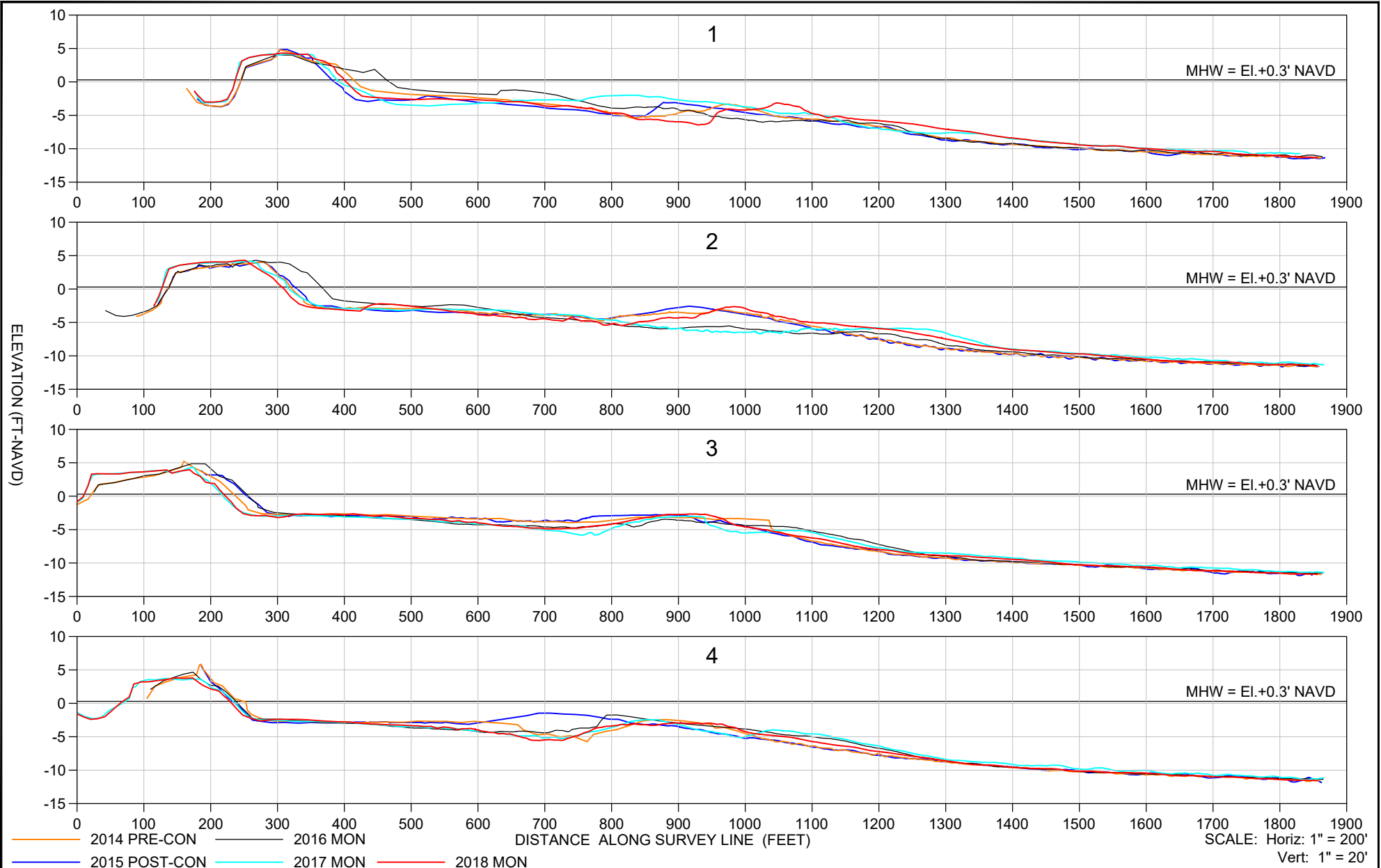
CLIENT: **LEE COUNTY**
 TITLE: **BONITA BEACH AND LOVERS KEY
 BORROW AREA CROSS SECTIONS 37+50-42+50**

DATE:	8/23/2018	SCALE:	AS SHOWN
DRAWN:	SDB	F.B.	
CHECKED:	MTP	PG.	
SEC.	TWP.	RNG.	
ACAD NO.	18079-Lovers Bonita Borrow Area.dwg		
REF. NO.	18.079	NO.	DATE

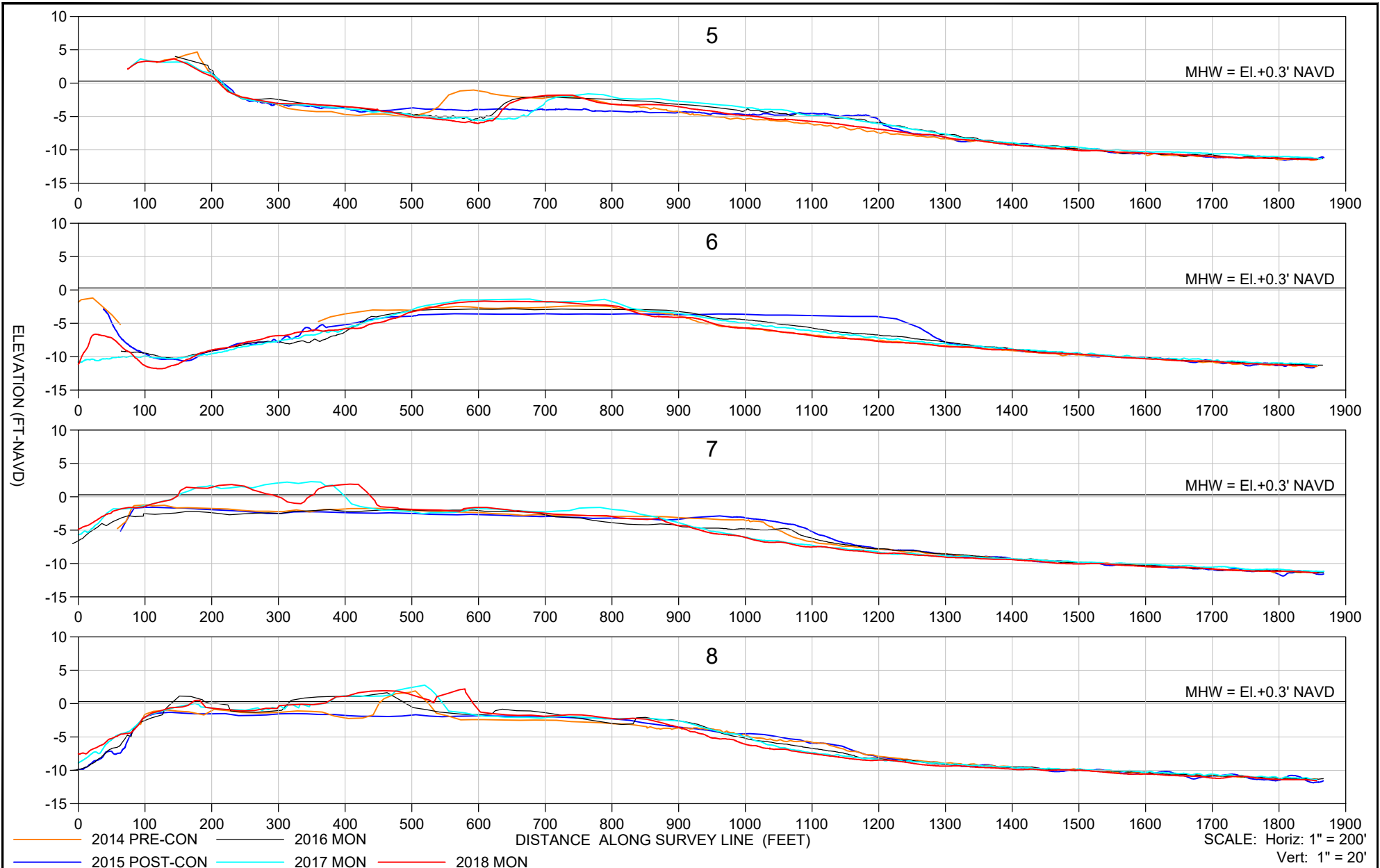
NO.	DATE	BY	REVISION DESCRIPTION

APPENDIX 4

BIG HICKORY PASS EBB TIDAL SHOAL CROSS SECTIONS



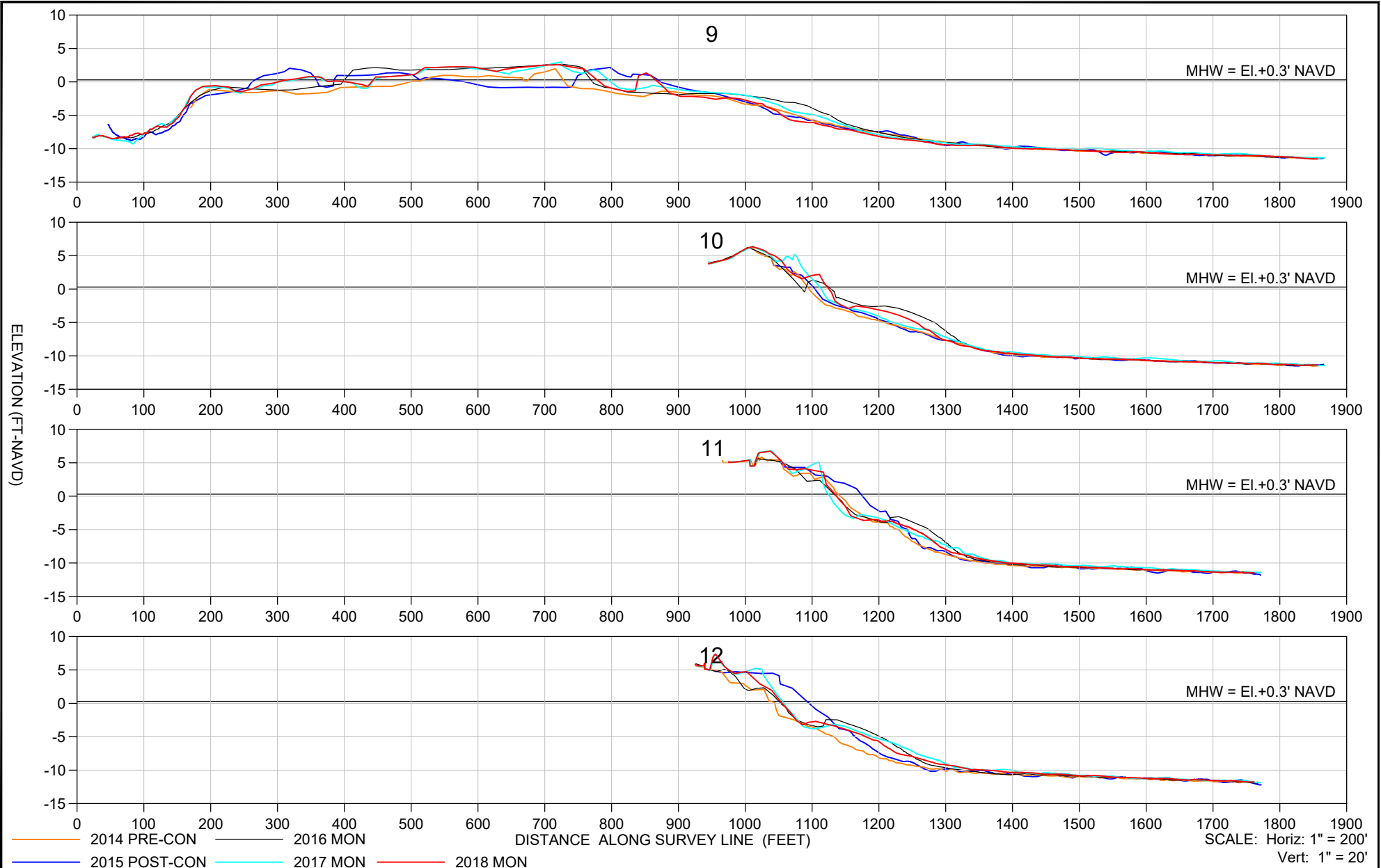
SHEET 54 FILE NO.: 18079-BH-1	<p>COASTAL ENGINEERING CONSULTANTS INC. A CECI GROUP COMPANY Serving Florida Since 1977 3106 SOUTH HORSESHOE DRIVE NAPLES, FLORIDA 34104</p>	<p>CIVIL ENGINEERING SURVEY & MAPPING COASTAL ENGINEERING ENVIRONMENTAL PLANNING SERVICES</p> <p>PHONE: (239)643-2324 FAX: (239)643-1143 www.coastalengineering.com E-Mail: engcollier@cecifl.com</p>	CLIENT:	LEE COUNTY			DATE:	7/26/2018	SCALE:	AS SHOWN						
			TITLE:	BONITA BEACH AND LOVERS KEY BIG HICKORY PASS CROSS SECTIONS 1 - 4			DRAWN:	SDB	F.B.							
						CHECKED:	MTP	PG.								
						SEC.	TWP.	RNG.								
						ACAD NO.	18079-Lovers Bonita Mon Profiles.dwg									
			REF. NO.	18.079							NO.	DATE	BY	REVISION DESCRIPTION		



— 2014 PRE-CON — 2016 MON — 2015 POST-CON — 2017 MON — 2018 MON

SCALE: Horiz: 1" = 200'
Vert: 1" = 20'

SHEET 55 FILE NO.: 18079-BH-2	COASTAL ENGINEERING CONSULTANTS INC. A CECI GROUP COMPANY Serving Florida Since 1977 3106 SOUTH HORSESHOE DRIVE NAPLES, FLORIDA 34104	CIVIL ENGINEERING SURVEY & MAPPING COASTAL ENGINEERING ENVIRONMENTAL PLANNING SERVICES PHONE: (239)643-2324 FAX: (239)643-1143 www.coastalengineering.com E-Mail: engcollier@cecifl.com	CLIENT: LEE COUNTY TITLE: BONITA BEACH AND LOVERS KEY BIG HICKORY PASS CROSS SECTIONS 5 - 8	DATE: 7/26/2018 DRAWN: SDB CHECKED: MTP SEC. TWP. RNG. ACAD NO: 18079-Lovers Bonita Mon Profiles.dwg REF. NO. 18.079	SCALE: AS SHOWN F.B. PG. NO. DATE BY REVISION DESCRIPTION



SHEET 56 FILE NO.: 18079-BH-3	COASTAL ENGINEERING CONSULTANTS INC. A CECI GROUP COMPANY Serving Florida Since 1977 3106 SOUTH HORSESHOE DRIVE NAPLES, FLORIDA 34104	CIVIL ENGINEERING SURVEY & MAPPING COASTAL ENGINEERING ENVIRONMENTAL PLANNING SERVICES PHONE: (239)643-2324 FAX: (239)643-1143 www.coastalengineering.com E-Mail: engcollier@cecifl.com	CLIENT:	LEE COUNTY			DATE:	7/26/2018	SCALE:	AS SHOWN					
			TITLE:	BONITA BEACH AND LOVERS KEY BIG HICKORY PASS CROSS SECTIONS 9 - 12			DRAWN:	SDB	F.B.						
						CHECKED:	MTP	PG.							
						SEC.	TWP.	RNG.							
						ACAD NO.	18079-Lovers Bonita Mon Profiles.dwg								
			REF. NO.	18.079			NO.	DATE	BY	REVISION DESCRIPTION					