

PILLAR CONSULTANTS, INC.
Consulting Engineers, Planners & Surveyors

5230 South University Drive – Suite 104
Davie, Florida 33328
Phone (954) 680-6533 Fax (954) 680-0323

October 16, 2023

Sunil Menon. Owner

Re: Sierra Ranches Lake/Wetland Preserve Analysis
Job Number: 23078
Cross-sections and Earthwork Analysis

Mr. Menon,

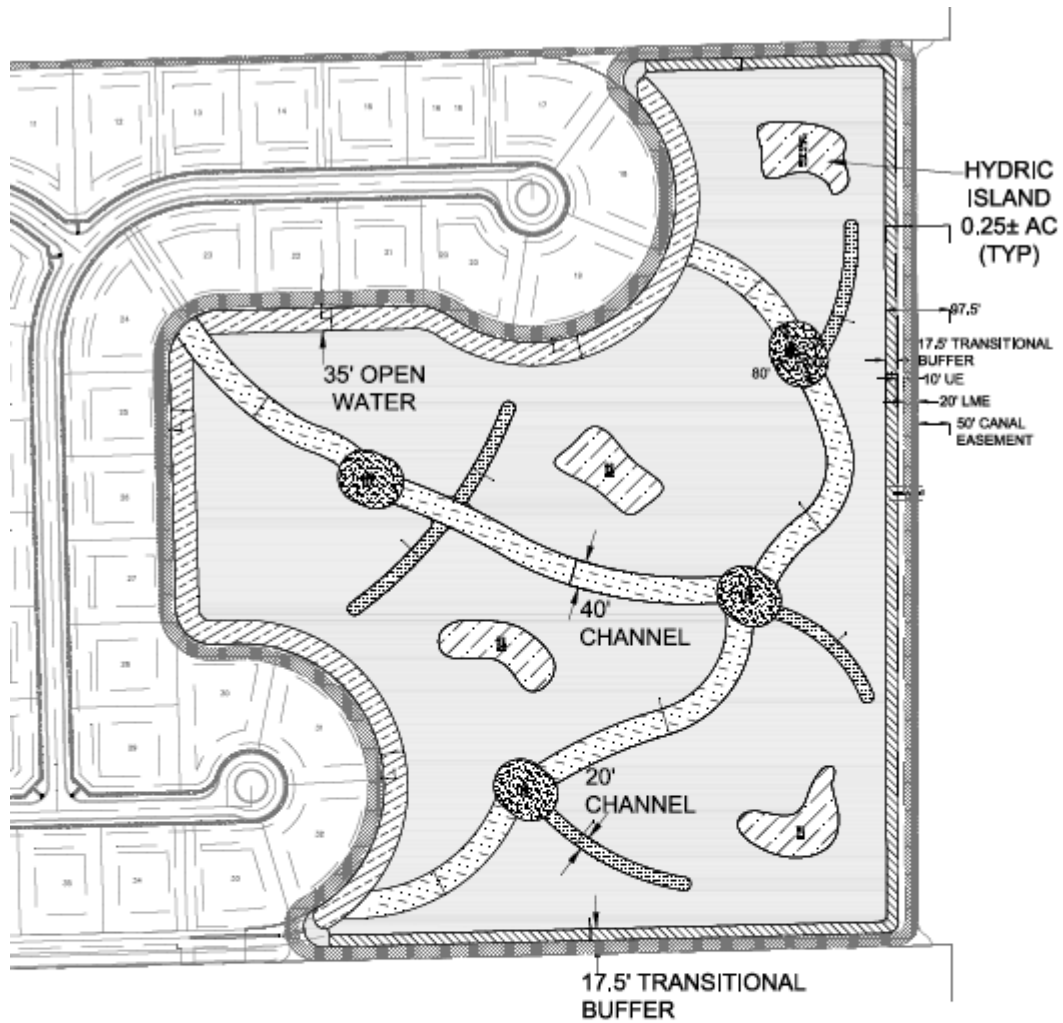
Please see below for the analysis of our review of the Sierra Ranch Estates Preserve shoreline and open water channel design and asbuilts, including updated cross-sections and earthwork analysis along the rear of the single family lots that abut the wetland preserve of the subject subdivision.

Project Location:








The subject property is located in Davie, FL, on the east side of Hiatus Road, approximately between the 1900-2000 blocks. It currently consists of a recently constructed 79 unit, Single Family Home Subdivision on approximately 89 Acre parcel of land. The site layout consists of Homes, streets, sidewalks, landscape buffers, an onsite lake (~6 Acre) and an onsite (~24 Acre) wetland preserve area including open water channels, hydric islands, transitional buffers and marsh areas.



Location Map



LEGEND

-  HYDRIC ISLAND (0.98± AC)
-  80' x 100' OPEN WATER (0.61± AC)
-  20' SECONDARY CHANNELS (0.46± AC)
-  40' PRIMARY CHANNELS (1.86± AC)
-  17.5' TRANSITIONAL BUFFER (1.01± AC)
-  MARSH AREA (17.20± AC)
-  35' OPEN WATER (1.74± AC)
- TOTAL (23.86± AC)**

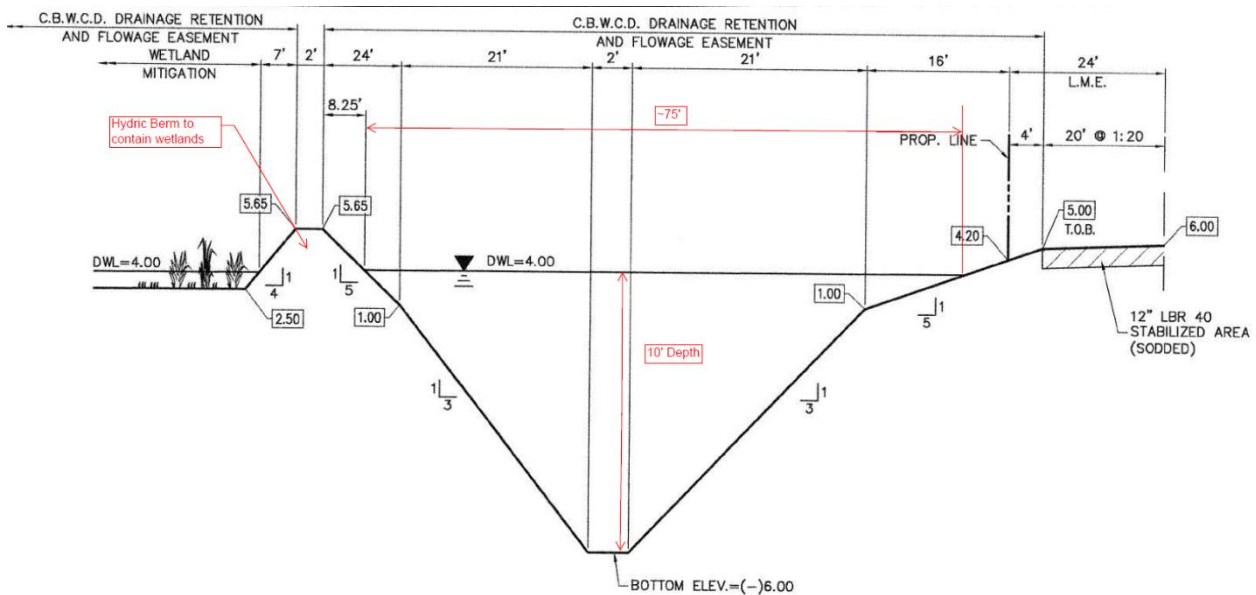


SIERRA RANCH PRESERVE AREA LAYOUT

Current Wetland Preserve Plan View

Project History (based on permitting):

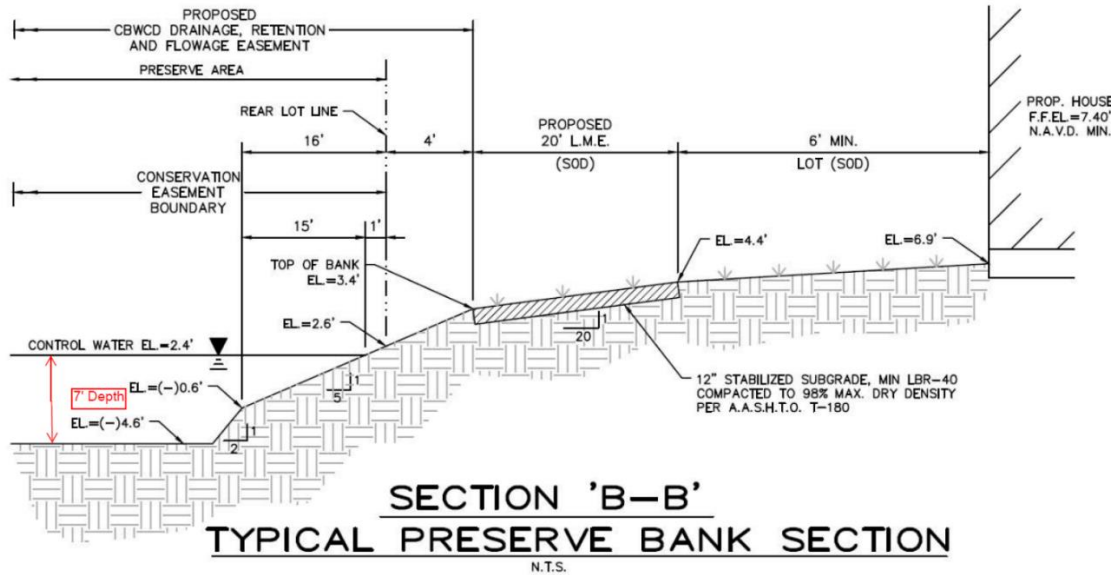
The design of the project went through different iterations under different owners and wetland consultants. There are many different governmental and regulatory agencies that govern projects of this size and when existing wetlands are present. The South Florida Water Management District (SFWMD) is one such entity that governs over wetland mitigative efforts and surface water management concerns (ie flood control) and issues permits associated with proposed development. Between 2003 and 2006, SFWMD had received applications for development of a 62 unit, single family home development on this same property that included onsite wetland mitigation of 13.81 Acres (within a preserve): Application #031215-9. The wetland preserve design provided similar features to the current design, including open water channels (called an open-water buffer), hydric Islands, marsh area and transitional buffers; and an additional feature known as a hydric berm, not included in the current design. It was noted that the depth of the open-water buffer was prescribed at 10 feet deep and included a hydric berm to confine the wetland well beyond the limits of the shoreline (approximately 75' of open water channel-buffer). Please see below for the proposed cross-section from the previous set of plans:



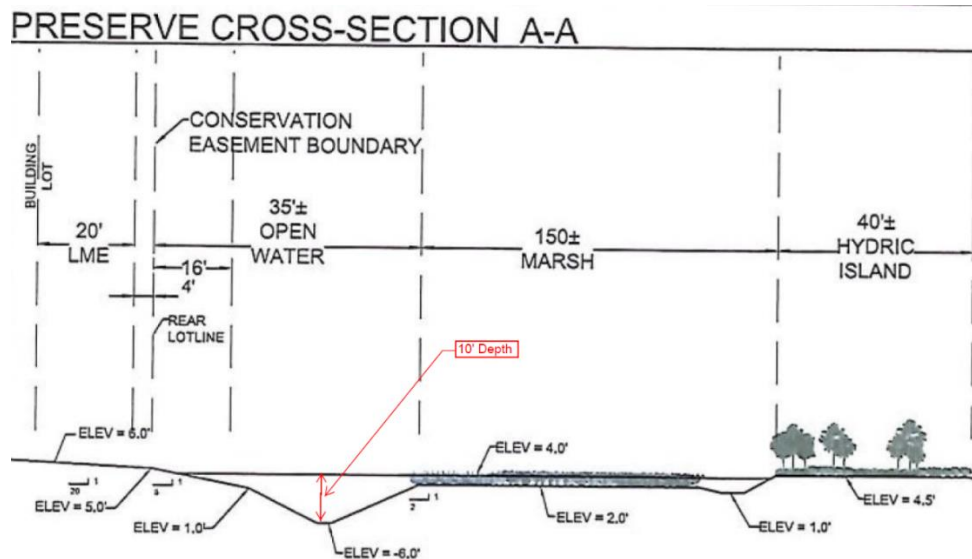
Shoreline Cross-Section (showing Open Water Channel/Buffer, Hydric Berm and 10' depth)
(Elevations shown are in NGVD = NAVD+1.6')

It is unknown why this development did not come to fruition, however, eventually, a new developer applied to the SFWMD for a new permit (2017 application 141223-14) with a modified design of the site and wetland preserve. The new design incorporated an increase in the number of residential units (79). Due to a large onsite existing wetland, mitigation efforts were determined necessary to take place for the development of the subject property. The mitigation was done with a planned combination of providing offsite credits (paying monies towards the creation and maintenance of a wetland that is not onsite) and providing for an onsite wetland.

The new design incorporated a larger wetland preserve, consolidated on the eastern side of the property (see above: Current Wetland Preserve Plan View). This new design, although an overall larger area, reduced the width of the open water channel/buffer (from 75' to 35'), provided conflicting details of the depth of the open water channel (10' and a reduced 7' depth) and removed the hydric berm altogether. See below for the conflicting cross-sections utilized in the current design permitted plans:



Current Cross-Section from Paving Grading and Drainage Plans (showing 7' Channel)
(Elevations shown are in NAVD = NGVD-1.6')



Current Cross-Section from Wetland design plans (showing 10' Channel)
(Elevations shown are in NGVD = NAVD+1.6')

Both the cross-sections above are supposed to represent the shoreline adjacent to the homes adjacent to the preserve. They are also from the same permitted set of plans with SFWMD and were utilized in the construction of the development, however, they differ in the proposed depth (10' vs 7') required in the Open-Water Channel/Buffer.

Current Concerns from residents of the community:

Some residents have noticed that wetland plants (Native and non-native nuisance species) were propagating near the shoreline and throughout the area where the open water channel/buffer is proposed to be, between their homes and the wetland marsh areas. The residents had an understanding that due to the depth of the Open water channel adjacent to their homes, that little to no wetlands would be directly adjacent or within the open water channel buffer. Since there was wetland plants thriving within this area, we were asked to prepare a survey of the current conditions of the open water channel and report back to the residents.

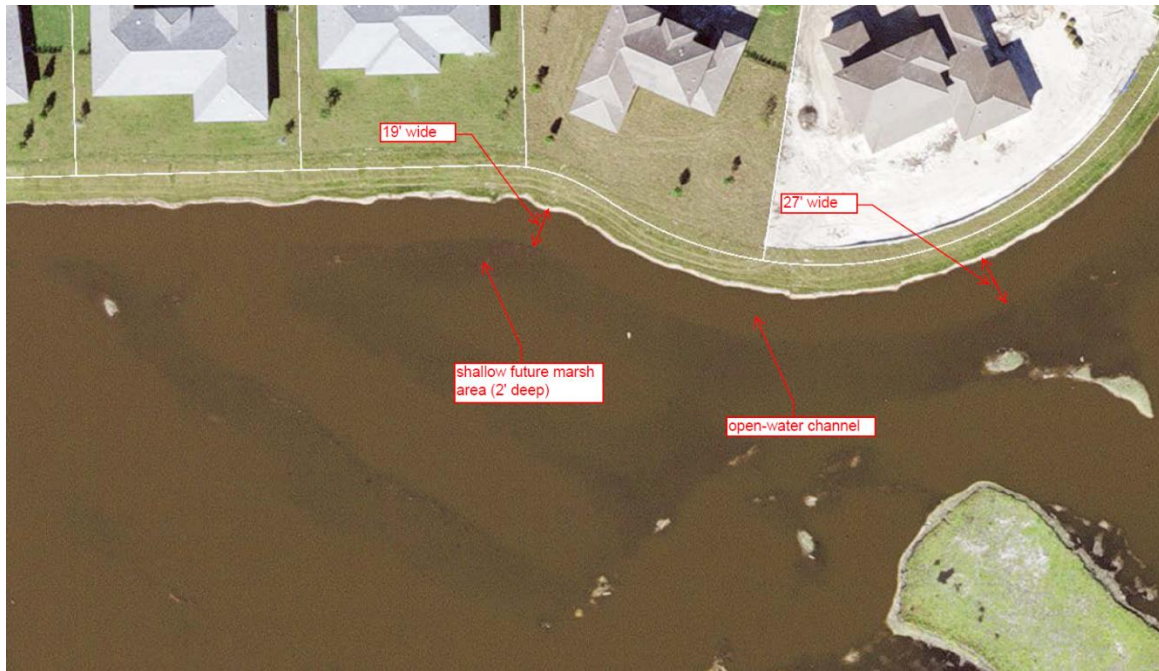
On September 22nd and 25th, 2023, Pillar Consultants, Incorporated (PCI) performed a specific purpose survey for establishing wetland/preserve bank cross sections (Specifically the open water channel) within the recently developed Sierra Ranches Subdivision. PCI utilized the Broward County Highway Construction and Engineering Division Benchmark Number 1581, located at the southeast corner of the door step for the property located at 1901 SW 112th Avenue (Hiatus Road) in Davie, having an elevation of 8.100 according to the National Geodetic Vertical Datum of 1929, and an elevation of 6.550 when converted to the North American Vertical Datum of 1988. PCI performed a three-wire leveling to traverse from the aforementioned location of the benchmark to the rear of Mr. Menon's lot. Once three-wire leveling was established, PCI proceeded to locate 16, approximately 50-foot wide, cross-sections along the perimeter of the preserve area/open water channel, to generate a survey for the residents of Sierra Ranches in an effort to provide a comparison between the designed open water elevations and the current as-built elevations (which was based on a 7' depth; although the proposed plans show both a 7' and 10' depth). The approved design sections and locations were obtained from South Florida Water Management District Permit Number 06-07569-P (showing both 7' and 10'; however for this analysis, the 7' depth cross-section was utilized). Attached are the plan view and profile view of the cross-sections overlaid onto the proposed plan sections (7' depth). Based on the results, the open water channel as proposed on the approved plans (with a the depth of 7') differed significantly from what actually currently exists. Little to no channel currently exists compared to the original approved plans and the asbuilts provided by the developer. Nor does it match the 10' depth as also prescribed in the same set of plans. Although the shoreline lake banks seem to be graded within tolerances acceptable to the Town and Drainage Districts, the bottom of the proposed channel was found to be filled in. It is for these reasons that we believe that wetland plants are propagating within the Open-Water Channel/Buffer when little to no wetland plants should exist due to the prescribed depths of this area (7' or 10').



Image of Survey Performed on Sept. 22, 2023, showing shallow depth of area where the Open-Water Channel is proposed to exist, along with wetland plants along shoreline.

In addition to the cross-sections that were obtained, we were also requested to review past aerials of the construction of the wetland preserve. While it did show that channels were excavated along the shoreline (in addition to others through the wetland preserve area towards the outfall), it was not possible to determine if the channels were constructed sufficiently to the prescribed depths from those aerials. However, per review of aerial photo's taken last year (from BCPA

website), there is a distinction between the proposed future wetland marsh areas (not yet planted at the time the aerial was taken in 2022) and the area near the shore line where the open-water channels were proposed. The prescribed width of the open-water channels per the plans was 35' however, as measured, the open water channel in certain locations is less than 20' wide.



Aerial View of Wetland Preserve (taken 2022)

In addition to the cross-sections, an earthwork analysis was performed (attached) to estimate the amount of material that would need to be removed in order to bring the 'open channel' back to conformity of the plans (utilizing the 7' depth; not to the 10' depth). The total amount of excavation required was estimated to be ~41,000 Cubic Feet of material. To achieve a depth of 10' deep, the open-water channel would need to be widened sufficiently enough to accommodate the natural repose of the existing soils/material in the open water channel. If the 10' depth was utilized as per the permitted environmental consultant's cross-sections and also per the original plans, the excavation required would be approximately 3 times that amount.

Recommendations:

Based on the findings of the recently acquired cross-sections and the assumed sloughing of the open water channel due to not being deep enough, nor the inclusion of a hydric berm to hold back the wetland marsh soils in place, we believe that the channel should be reshaped to the deeper depth as prescribed in the approved plans (10'), widened to accommodate the new depth with required sloping, mixing of rock into the slopes to achieve a LBR40 (lime rock bearing

ratio) and inclusion of a hydric berm to assist in holding back assumed soughing that has taken place.

Should you have any questions regarding the above or the attached survey and analysis, please let me know.

Thank you,

PILLAR CONSULTANTS, INC

A handwritten signature in black ink, appearing to read "Jason R. Wilson". The signature is written in a cursive, somewhat stylized font.

Jason Wilson, President

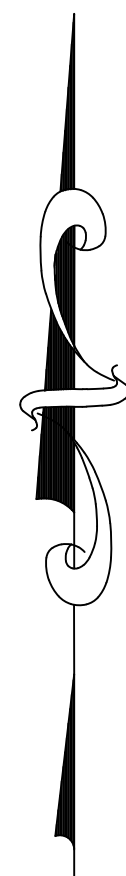
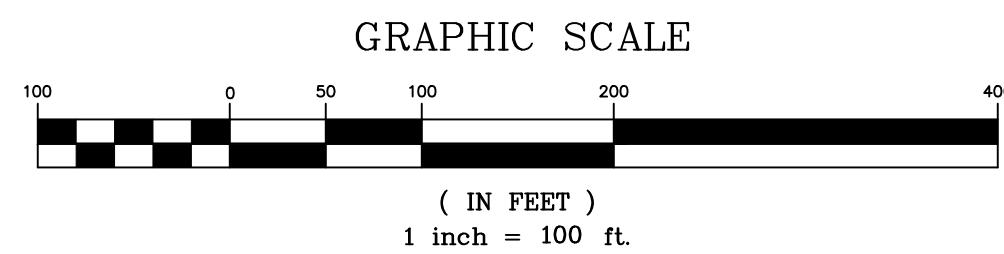
(PLAT BOOK 131, PAGE 26, B.C.R.)



" NORTHSTAR PLAT "
(PLAT BOOK 157, PAGE 31, B.C.R.)

LEGEND:

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- CONC. - CONCRETE
- PROPOSED LINE
- - - ASBUILT LINE
- X.XXAB - ASBUILT ELEVATION



SURVEY NOTES:

1. THIS SURVEY WAS PREPARED FOR THE RESIDENTS OF SIERRA RANCHES IN EFFORT TO PROVIDE A COMPARISON BETWEEN THE DESIGNED OPEN WATER ELEVATIONS AND THE CURRENT ASBUILT ELEVATIONS.
2. NO UNDERGROUND IMPROVEMENTS, UTILITIES OR FOUNDATIONS WERE LOCATED. ONLY VISIBLE AND OBSERVABLE ITEMS ABOVE GROUND, UTILITIES MARKED BY VALVES, CATCH BASINS AND MANHOLES WERE SURVEYED.
3. THERE MAY BE ADDITIONAL INFORMATION CONTAINED WITHIN THE PUBLIC RECORDS THAT MAY AFFECT THIS PROPERTY.
4. THE ELEVATIONS, AS SHOWN HEREON, ARE BASED ON THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88). THE CONVERSION FACTOR FROM NATIONAL GEODITIC VERTICAL DATUM (NGVD) TO NAVD88 FOR THIS PROPERTY IS: NAVD88 = NGVD29 - 1.60.
5. BENCHMARK REFERENCE: THE ELEVATIONS, AS SHOWN HEREON, ARE REFERENCED TO BROWARD COUNTY ENGINEERING DIVISION BENCHMARK #1581 - 1901 SOUTHWEST 112 AVENUE, T.M. FARMAN, SOUTHEAST CORNER OF DOORSTEP, FRONT ENTRANCE ELEVATION = 8.10(NGVD); 6.50(NAVD).
6. THE DESIGNED SECTIONS AND LOCATIONS WERE OBTAINED FROM SFWMD PERMIT 06-07569-P.
7. THE ASBUILT ELEVATIONS AND CROSS SECTION WERE OBTAINED ON 09/22/23 AND 09/25/23.

NOT VALID WITHOUT THE SIGNATURE AND THE ORIGINAL RAISED SEAL OF A FLORIDA LICENSED SURVEYOR AND MAPPER.

SURVEYOR'S CERTIFICATION:

I HEREBY CERTIFY THAT THIS SURVEY IS TRUE AND CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF. I FURTHER CERTIFY THAT THIS SURVEY MEETS THE MINIMUM TECHNICAL STANDARDS AS SET FORTH BY THE FLORIDA BOARD OF PROFESSIONAL SURVEYORS AND MAPPERS IN CHAPTER 5J-17, FLORIDA ADMINISTRATIVE CODE, PURSUANT TO SECTION 472.027, FLORIDA STATUTES.

JOSE A. CORREA DATE
PROFESSIONAL SURVEYOR AND MAPPER LS#7023
STATE OF FLORIDA

PILLAR CONSULTANTS, INC. LB#7024
5230 S UNIVERSITY DRIVE, SUITE 104
DAVIE, FLORIDA 33328

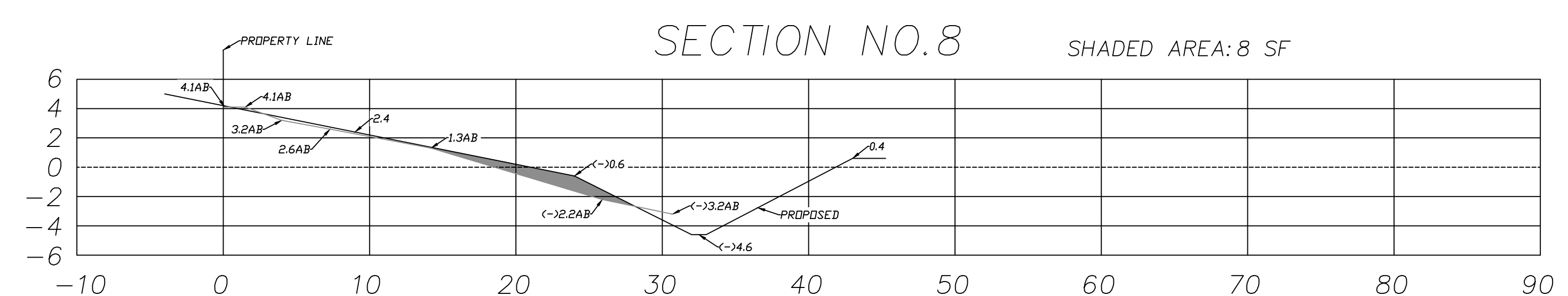
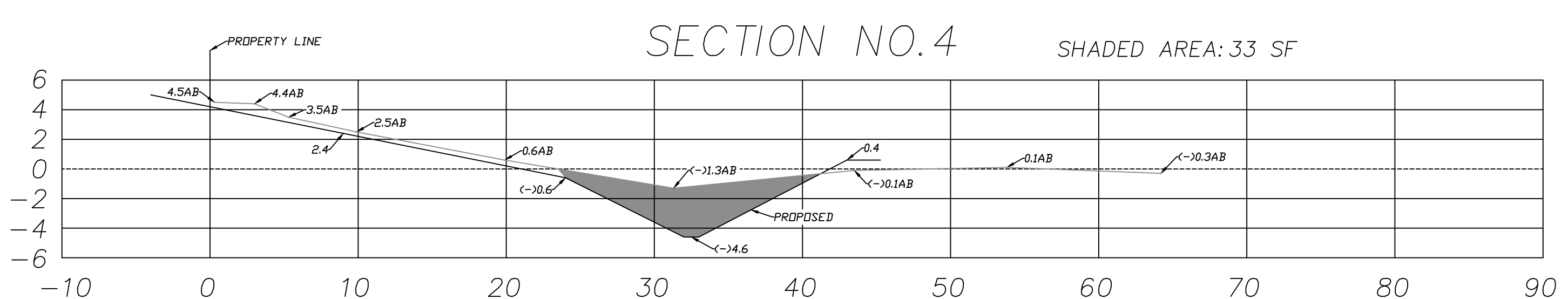
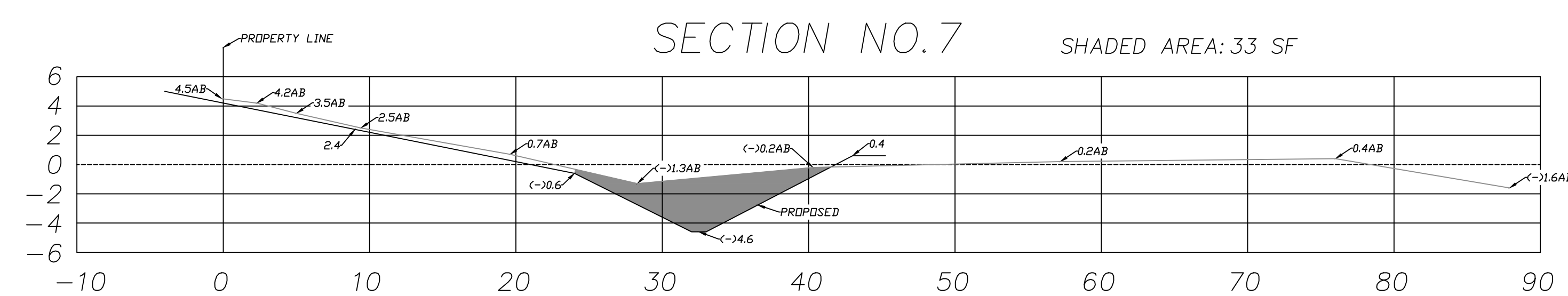
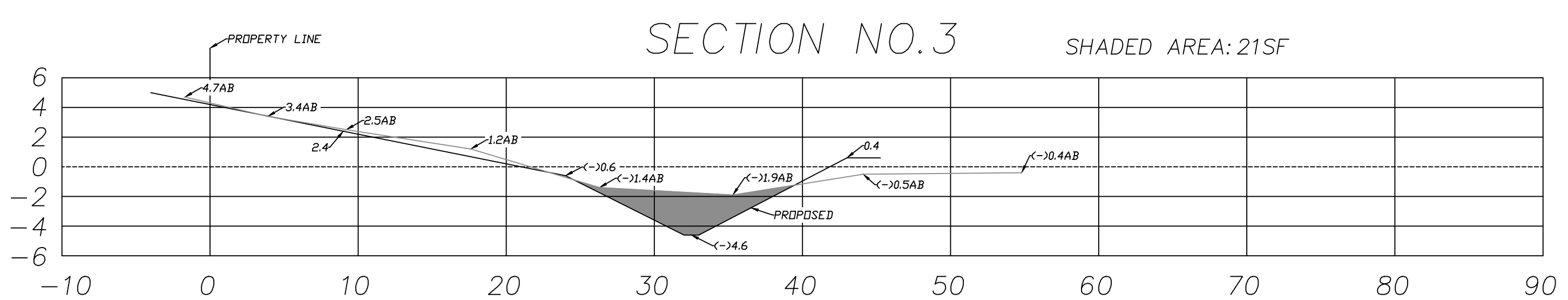
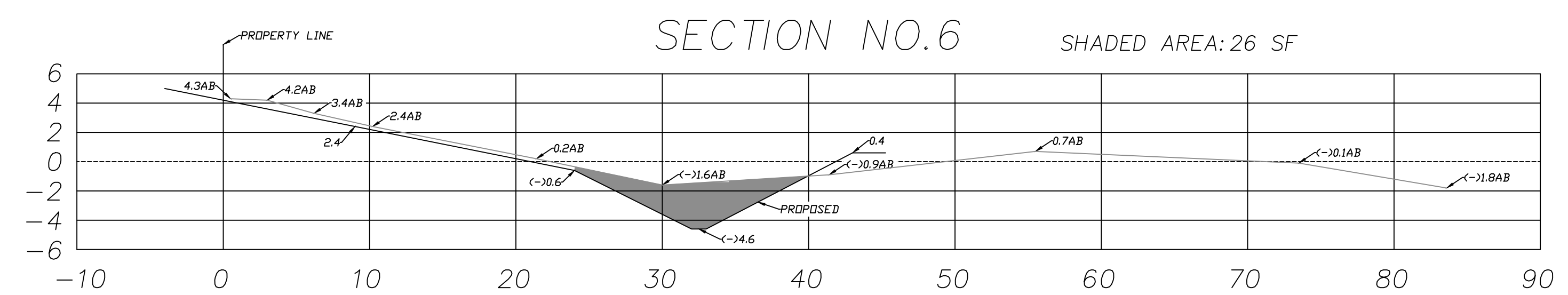
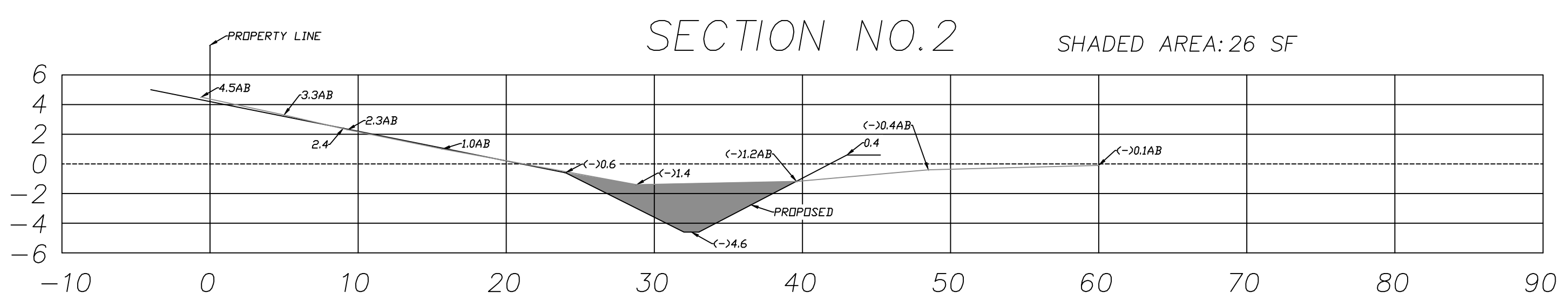
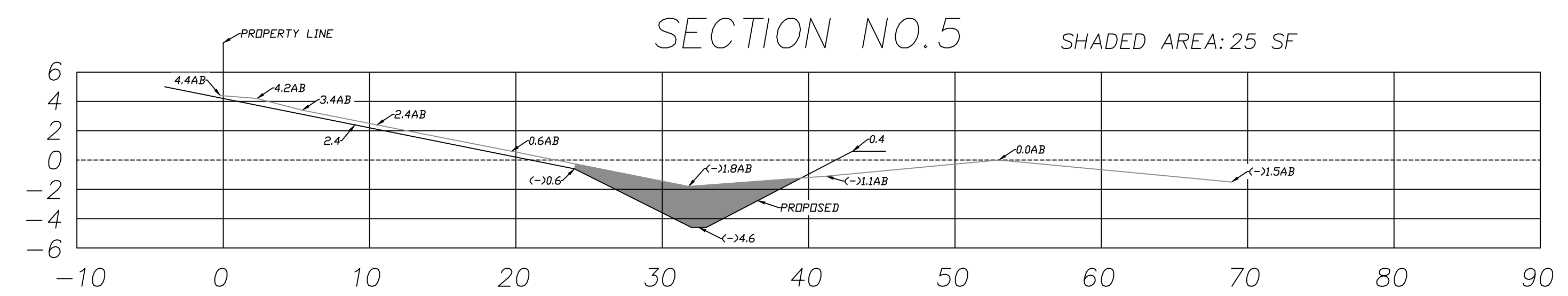
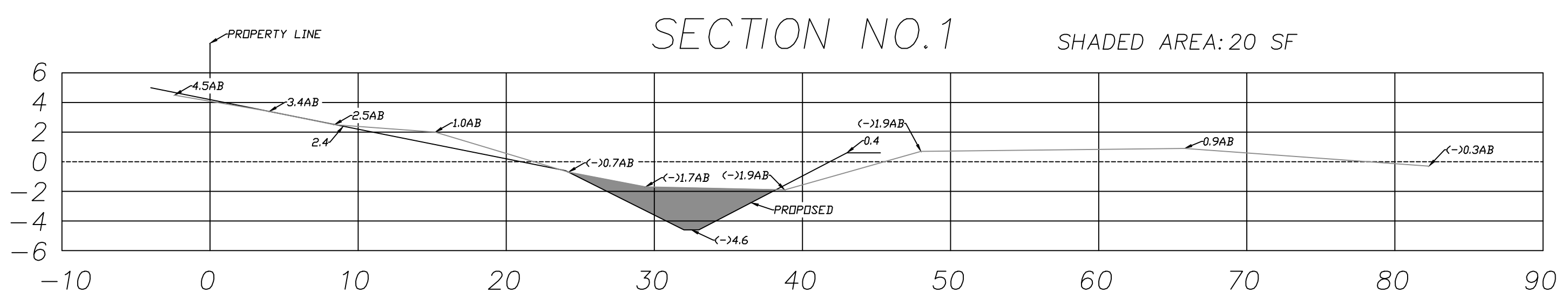
SHEET TITLE
ASBUILT SURVEY

REVISIONS

PILLAR CONSULTANTS, INC.
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5230 S. University Drive - Suite 104
Davie, Florida 33328
Phone: (954) 680-6533

SIERRA RANCHES PRESERVE
OPEN WATER ASBUILT
TOWN OF DAVIE
BROWARD COUNTY, FLORIDA

SCALE: 1"=100'
DATE: 09/26/23
DRAWN BY: JMP
SHEET No.
SU-1
23078



SURVEY NOTES:

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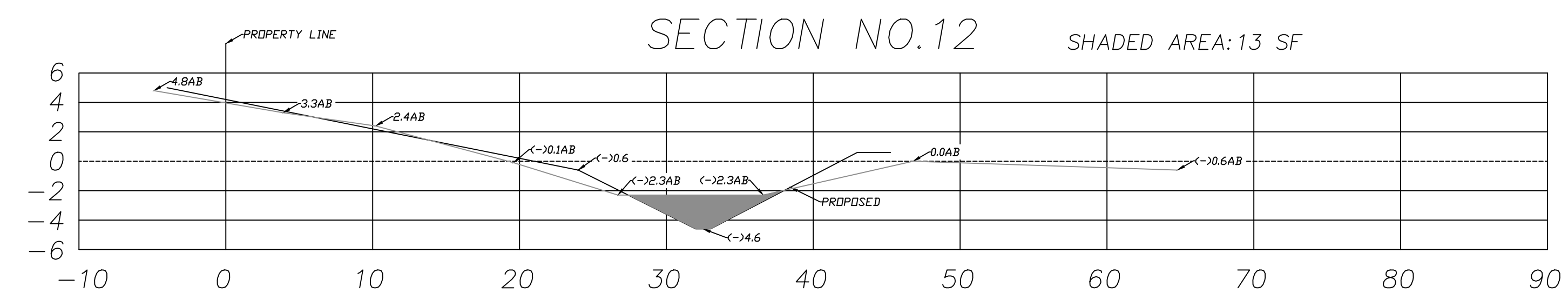
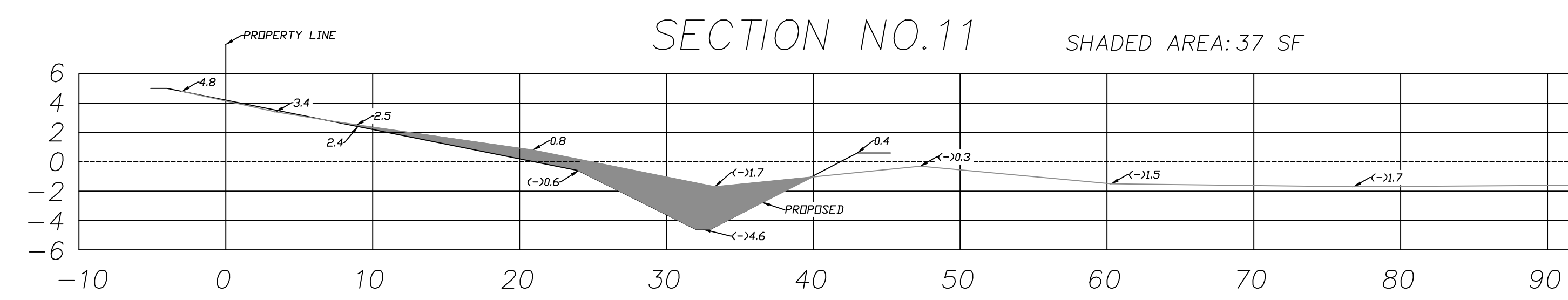
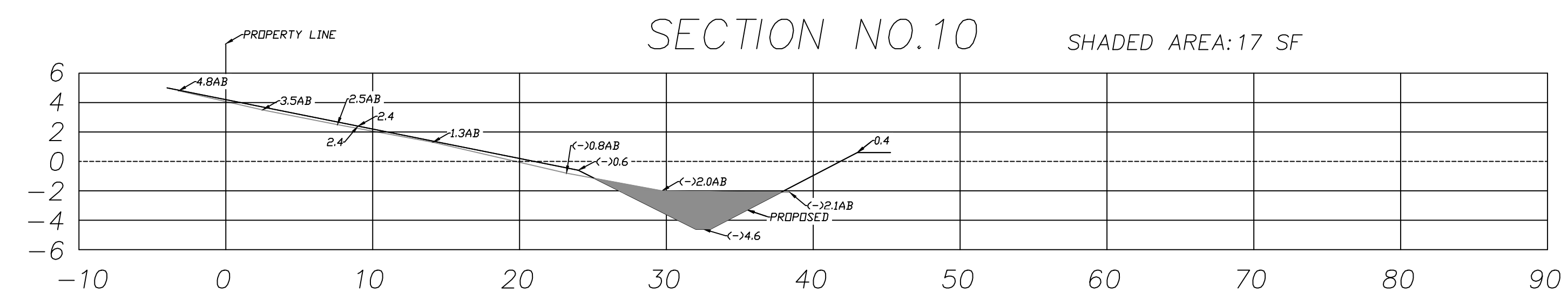
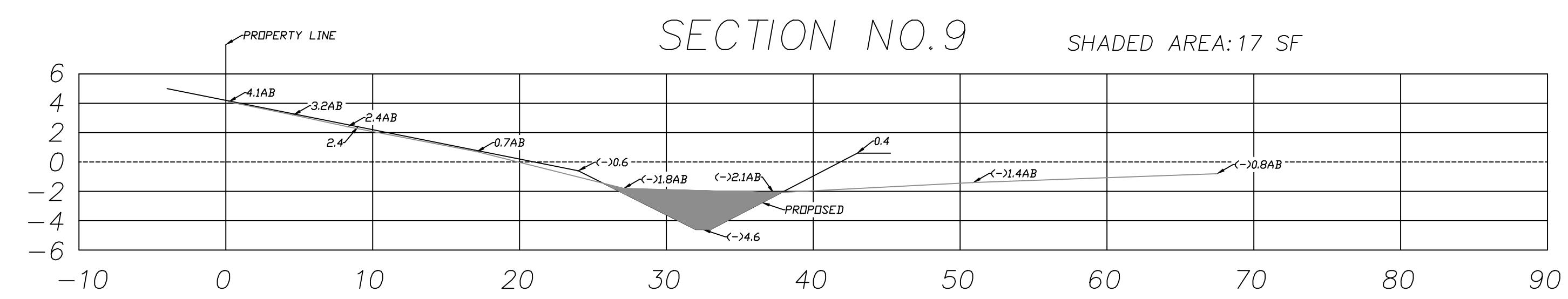
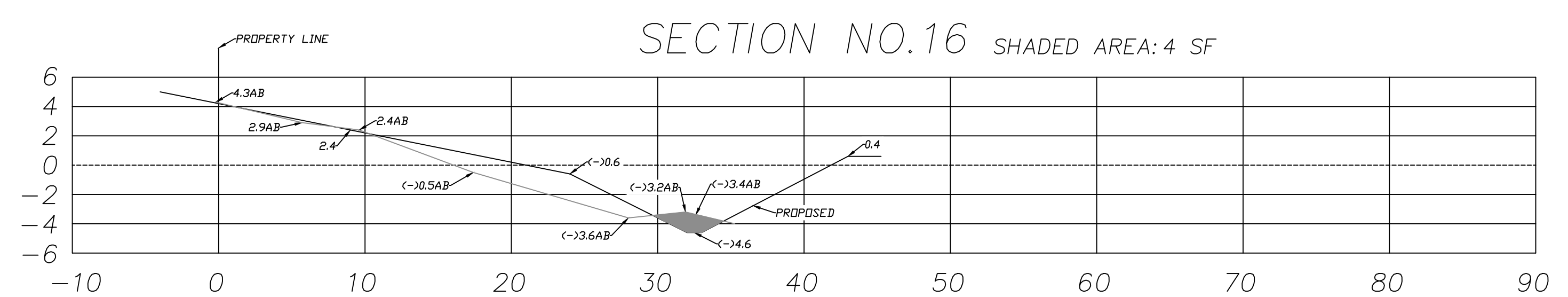
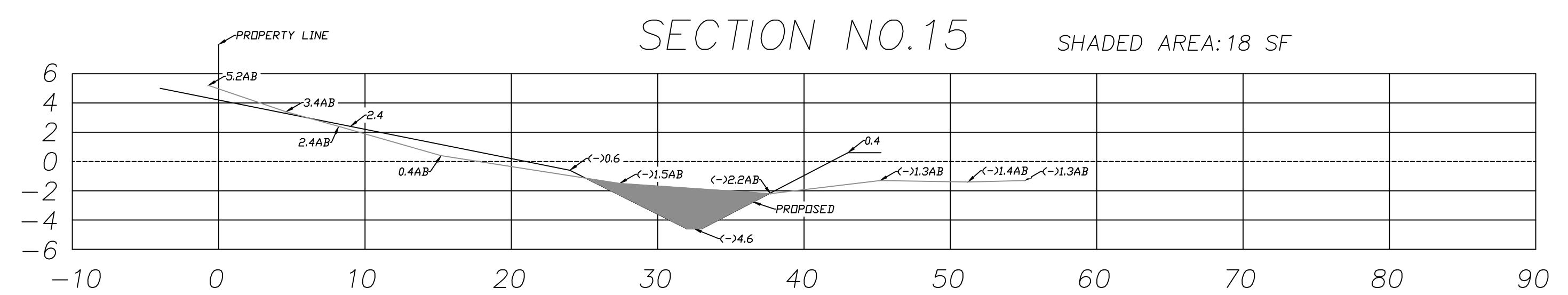
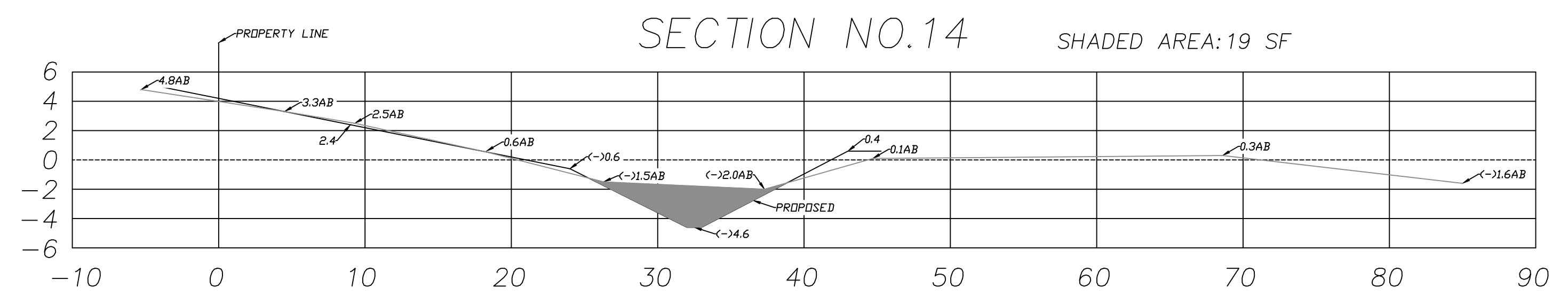
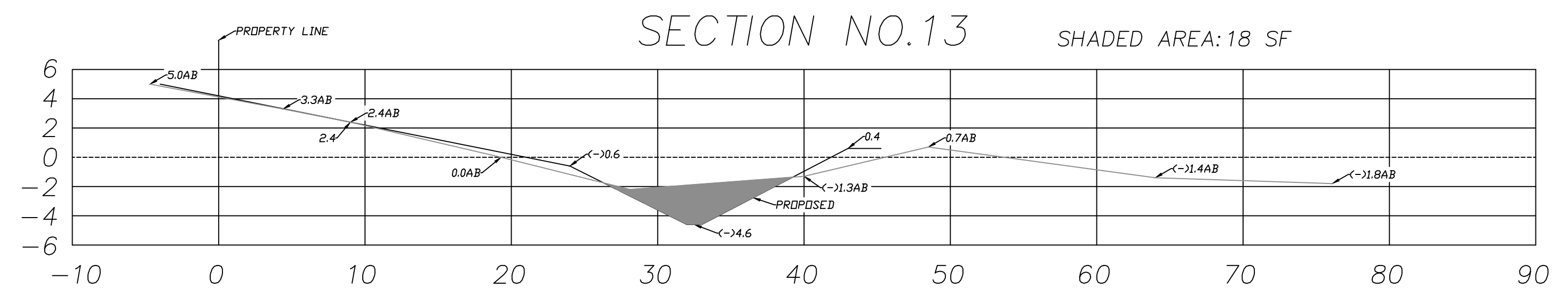
**SIERRA RANCHES RESERVE
OPEN WATER ASBUILT**
TOWN OF DAVIE
BROWARD COUNTY, FLORIDA

SCALE: 1"=7'
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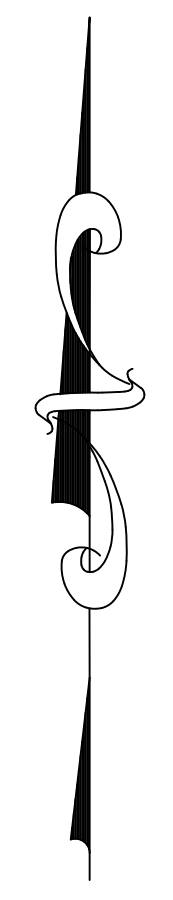
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SCALE: 1"=7'
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23078

EXCAVATION ANALYSIS

Project: 23078 Sierra Ranches - Preserve Earthwork Analysis
 Subject: Earthwork Analysis - Comparing Exist. Open Water section vs Designed
 Date: 9/28/2023

Section	X-sec Area (SF)	Avg. End Area (SF)	Dist. Btwn X-Sect (FT)	Volume (CF)
1	20			
		23	156	3588
2	26			
		23.5	79	1856.5
3	21			
		27	46	1242
4	33			
		29	59	1711
5	25			
		25.5	76	1938
6	26			
		29.5	113	3333.5
7	33			
		20.5	386	7913
8	8			
		12.5	124	1550
9	17			
		17	25	425
10	17			
		27	87	2349
11	37			
		25	207	5175
12	13			
		15.5	176	2728
13	18			
		18.5	132	2442
14	19			
		18.5	129	2386.5
15	18			
		16	134	2144
16	14			

Total Cut (CF) 40781.5
Total Cut (CY) 1510