Cross Lake Channel Rock Assessment
Lake Okeechobee Waterway
Route 1

Martin and Palm Beach Counties
Florida

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Cross Lake Channel Rock Assessment
Lake Okeechobee Waterway Route 1
Martin and Palm Beach Counties, FL

Final Report

Prepared for

Florida Inland Navigation District

Work Order No. 20-11

by

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1.0 BACKGROUND

On November 16, 2019, the Florida Inland Navigation District (FIND) approved Taylor Engineering Work Order Number 19-08 for the Lake Okeechobee Channel Maintenance Dredging Analysis in Martin and Palm Beach Counties, Florida. During the initial stages of the maintenance dredging analysis, Taylor Engineering completed physical and chemical sediment data collection for representative areas along the Okeechobee Waterway (OWW) Cross Lake (Route 1) channel. Taylor Engineering provided FIND a summary report on the Lake Okeechobee Cross Lake Channel Geotechnical Investigation in July 2020. The initial geotechnical exploration recovered silts and fine sands from areas closest to Port Mayaca Lock on the east and from Clewiston Cut on the southwest side of the lake (**Figure 1.1**). The investigation recovered mostly limestone gravel with varying amounts of shell, sand, and silt from samples collected in the open waters of the lake. The presence of limestone in conjunction with anecdotal evidence suggested the potential for a significant amount of rock outcroppings or shallow rock in the vicinity of the channel.

This report summarizes additional channel-bottom sediment evaluations completed in January and February 2021 to classify and map substrate types across the Route 1 Channel. This investigation collected side scan sonar images of the entire Route 1 Channel and additional borings to provide further input about location, density, and thickness of surficial geology of the channel-bottom. Additionally, under this scope of services, Taylor Engineering completed a comprehensive survey of all existing Aids to Navigation (ATON) present in Route 1 and initiated coordination with the U.S. Coast Guard (USCG) on required maintenance of existing ATONs and needs for new ATONs to properly mark the Route 1 Channel.

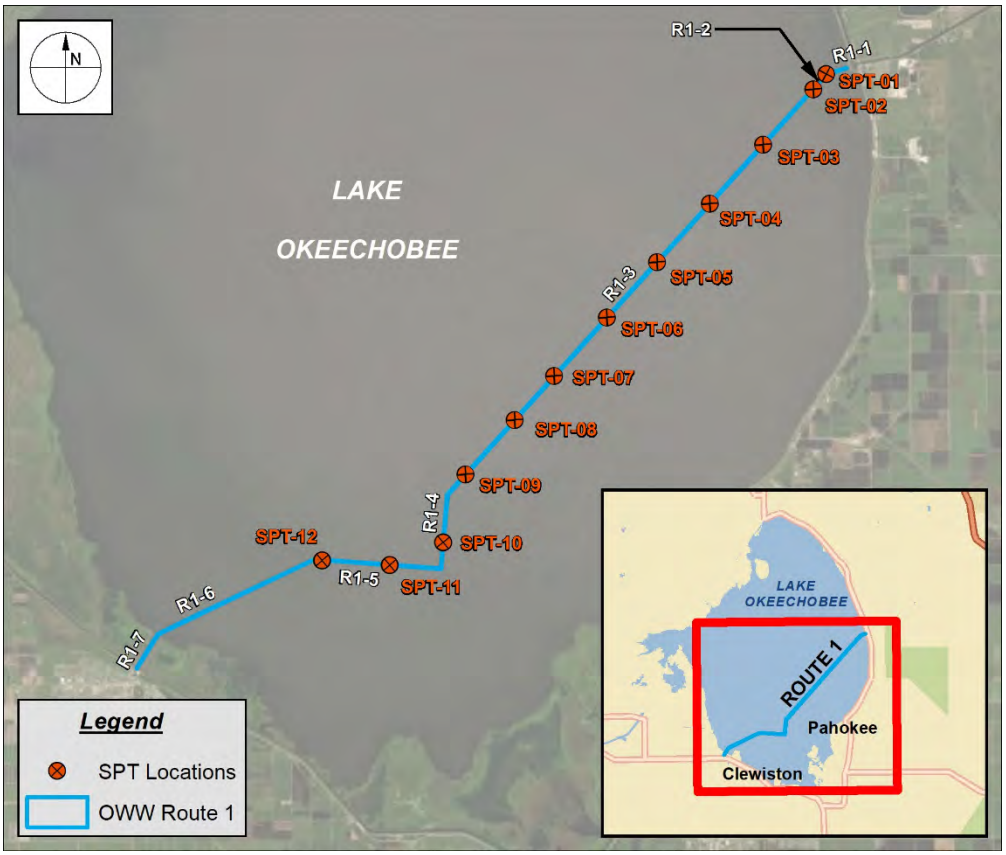


Figure 1.1 Lake Okeechobee Route 1 Alignment, Cuts, and SPT Boring Locations

2.0 SIDE SCAN SONAR AND SURVEY DATA COLLECTION

Taylor Engineering subcontracted with Terraquatic Survey and Mapping (Terraquatic) to complete a side scan sonar and ATON survey of the OWW Route 1. Terraquatic completed all survey activities in January 2021. The surveyor collected side scan data along two transect lines—one transect along the channel center line from each direction (east and west) across the channel—to provide a complete side scan image of the Route 1 Channel. The surveyor utilized an EdgeTech Model 4125 with dual frequency (600 & 1600kHz) capability to record the side scan images. The surveyor recorded both frequencies for postprocessing. The intent of the survey was to classify the bottom type throughout the channel, primarily to identify sediment versus hard bottom, as well as other obstructions or navigational hazards. Additionally, the surveyor located all existing navigation markers and signs along Route 1 using a Real-Time Kinematic Laser Scanning System (RTK LSS) positioning. The surveyor obtained digital photos of each marker and noted marker type, material, and condition during their survey. **Appendix A** provides all side scan mosaics where brighter colors (stronger signals) indicate harder, rocky surfaces while darker colors (weaker signals) indicate softer, loose sediment surfaces.

3.0 GEOTECHNICAL INVESTIGATION

Taylor Engineering subcontracted with Amdrill, Inc. to collect additional geotechnical data at predetermined locations across the OWW Route 1 Channel. Taylor Engineering selected Standard Penetration Test (SPT) drilling locations based on review of the side scan sonar data and classification of channel bottom types. The intent of the additional drilling was to characterize rock and sediment thickness and density for future channel maintenance consideration.

3.1 Sampling

Amdrill completed the SPT borings from a barge-mounted drill rig. **Table 3.1** provides a summary of the boring locations, elevations, and penetration. SPT soil sampling is a test procedure that drops a 140-pound hammer 30 inches to drive a 2-inch split-spoon sampler 18 inches. The blow count for each 6-inch interval is recorded separately. The number of blows (N) is determined from the final 12 inches of penetration. Sediment conditions are correlated to the recorded N value. Higher N values indicate denser sediment or poorly consolidated rock, and lower values represent loose/soft sediments.

At each six-inch interval, the drilling team recovered the split spoon sampler and preserved recovered materials. The team then returned the sampler and advanced it six more inches, recovering the sample for that interval. The team repeated this process until the boring penetrated a minimum of four feet below the mudline. Taylor Engineering composited the six-inch samples in two-foot intervals for lab analysis.

Table 3.1 SPT Boring Locations, Elevations, and Penetrations

Boring	Latitude	Longitude	Top of Boring Elevation (feet Lake Okeechobee Datum)	Penetration (feet below mudline)
SPT-01	26.9815	-80.6311	-8.4	4.0
SPT-02	26.9762	-80.6363	-10.0	6.0
SPT-03	26.9555	-80.6572	-11.1	6.0
SPT-04	26.9337	-80.6793	-11.6	6.0
SPT-05	26.9120	-80.7015	-12.0	6.0
SPT-06	26.8913	-80.7223	-12.1	6.0
SPT-07	26.8696	-80.7443	-11.2	4.0
SPT-08	26.8532	-80.7609	-11.8	6.0
SPT-09	26.8329	-80.7814	-9.9	6.0
SPT-10	26.8076	-80.7905	-9.8	6.0
SPT-11	26.7994	-80.8127	-9.5	4.0
SPT-12	26.8011	-80.8411	-8.0	4.0

3.2 Drilling Observations

Taylor Engineering provided a Florida registered Professional Geologist onboard the drilling barge during drilling operations. The geologist oversaw and coordinated drilling operations, ensured correct drilling locations, and ensured that drilling methods met the objective of assessing densities and thicknesses of various observed channel bottom types. The geologist maintained detailed field notes about location, blow counts, and samples recovered. **Appendix B** provides the drilling field logs where B-1 indicates SPT-01.

3.3 Visual Classification and Photographs of Recovered Samples

Following the SPT split spoon sample collection, Taylor Engineering returned the jarred sediment/substrate samples to its Coastal and Marine Geosciences Laboratory in Jacksonville, Florida, for photographic documentation and visual classification according to the Unified Soil Classification System (USCS). Taylor Engineering took photographs of the sediment samples with a high-resolution digital camera, with full lighting on a middle grey background for ideal visualization. **Appendix C** provides a photographic appendix documenting each sampled interval recovered and provided to the lab for classification where B-01 indicates SPT-01. Visual classification of samples ranged from silt (ML) to limestone rock (LS). Boring logs indicate the channel-bottom geology consists of exposed limestone rock, limestone rock overlain by a variably thin layer of silt/sand, and areas of silt/sand without limestone. **Table 3.2** provides a summary and description of the samples collected.

Table 3.2 Summary of Sediment Sample Characteristics

Analyte	Depth Below Top of Boring (feet)	N-Value	USCS Visual Classification	Lab Description
SPT-01	0 - 2	29	LS	Limestone Rock
	2 - 4	37	LS	Limestone Rock
SPT-02	0 - 2	2	ML	Silt, trace fine sand, trace shell, dark brown
	2 - 4	17	SM	Silty sand, fine to medium grained, little silt, little fine-gravel, trace shell, gray
	4 - 6	50/5	LS	Limestone Rock
SPT-03	0 - 2	0	ML	Silt, dark brown
	2 - 3	10	ML	Silt, dark brown
	3 - 4	10	SM	Silty sand, fine to coarse sand, some silt, trace shell, dark brown to gray
	4 - 4.5	50/5	LS	Limestone Rock
SPT-04	0 - 1	4	ML	Silt, few fine to medium sand, trace shell, gray/brown
	1 - 2	6	SM	Silty sand, fine to coarse sand, some silt, gray
	2 - 4	6	SM	Silty sand, fine to coarse sand, some silt, gray
	4 - 6	33	ML	Silt, little fine to coarse sand, trace gravel, trace shell, gray
SPT-05	0 - 2	0	ML	Silt, dark brown
	2 - 4	5	ML	Silt, few fine sand, trace gravel, trace shell, gray
	4 - 6	3	ML	Silt, little fine sand, trace shell, gray
SPT-06	0 - 1.5	2	ML	Silt, trace fine to coarse sand, dark brown/gray
	1.5 - 2	2	ML	Silt, little fine to coarse sand, trace shell, gray
	2 - 4	4	ML	Silt, little fine to coarse sand, trace shell, gray
	4 - 6	4	ML	Silt, little fine to coarse sand, few shell, gray
SPT-07	1 - 2	9	SM	Silty sand, fine to medium grained, little silt, tan/gray
	2 - 4	20	ML	Silt, some fine sand, gray
SPT-08	0 - 2	0	ML	Silt, few fine to coarse sand, gray
	2 - 4	3	ML	Silt, little fine to coarse sand, gray
	4 - 5.5	50/5	LS	Limestone Rock
SPT-09	0 - 2	3	ML	Silt, little fine to coarse sand, trace shell, gray
	2 - 4	7	ML	Silt, little fine to coarse sand, trace gravel, trace shell, gray
	4 - 6	31	SM	Silty sand, fine to coarse grained, some silt, gray
SPT-10	0 - 2	5	SM	Silty sand, fine to medium grained, some silt, tan
	2 - 4	7	ML	Silt, little fine to coarse sand, gray
	4 - 6	8	SM	Silty sand, fine to medium grained, little silt, tan
SPT-11	0 - 2	36	ML	Silt, little fine to coarse sand, trace gravel, tan
	2 - 3.3	50/4	LS	Limestone Rock
SPT-12	0 - 2	1	ML	Silt, little fine to coarse sand, few gravel, gray
	2 - 3.5	50/5	LS	Limestone Rock

4.0 GEOTECHNICAL AND GEOPHYSICAL INVESTIGATION SUMMARY

To obtain a representation of shoal composition throughout the OWW Route 1 Channel, Taylor Engineering reviewed the side scan images, SPT boring data, and survey data. Taylor Engineering interpreted side scan imagery based on the strength of the return signal to evaluate the channel bottom surface geology. Brighter colors (stronger signals) indicate harder, rocky surfaces, while darker colors (weaker signals) indicate softer, loose sediment surfaces. The side scan analysis revealed two main bottom types: exposed rock and unconsolidated sediment. Taylor Engineering then compared the side scan imagery to the boring logs and sediment grab samples to ground truth the side scan channel-bottom interpretation. Boring data indicated the exposed rocky surfaces are composed of limestone, while unconsolidated sediments vary between altering amounts of silt, sand, and shell. **Appendix D** provides a geologic map of the shoals within the Route 1 Channel (above -10-ft Lake Okeechobee Datum) created using the side scan imagery and boring log interpretation where red indicates limestone rock and yellow indicates unconsolidated sediment.

Survey date estimates a total of 9,099 cubic yards (cy) of shoaling above the channel design depth of -8-ft LOD, 68,491 cy of shoaling with 1-foot of overdredge (-9-ft LOD), and 229,888 cy of shoaling with 2-feet of overdredge (-10-ft LOD). Side scan and sediment sample data estimates the OWW Route 1 channel shoals above -8-ft LOD are comprised of 4,222 cy of unconsolidated sediment and 4,876 cy of limestone rock, shoals above -9-ft LOD are comprised of 20,892 cy of unconsolidated sediment and 47,599 cy of limestone rock, and shoals above -10-ft LOD are comprised of 65,097 cy of unconsolidated sediment and 164,791 cy of limestone rock. The distribution of material above the dredge design depth of -8-ft LOD is split evenly between rock and unconsolidated sediment. When including the overdredge depths of -9-ft LOD and -10-ft LOD, the distribution of material is approximately 70% rock and 30% unconsolidated sediment. The increase in the distribution of rock, including the overdredge depths, is likely attributed to areas of the channel that were not previously deepened beyond the 8-ft design depth. **Table 4.1** provides a summary of channel bottom surface conditions for each Cut of Route 1.

Table 4.1 Geologic Composition & Volume Estimates of Route 1 Shoal Material by Dredge Elevation

Cut	Material Above -8-ft LOD (cy)			Material Above -9-ft LOD (cy)			Material Above -10-ft LOD (cy)		
	Unconsolidated Sediment	Limestone Rock	Total	Unconsolidated Sediment	Limestone Rock	Total	Unconsolidated Sediment	Limestone Rock	Total
R1-1	494	-	494	4,257	-	4,257	8,276	-	8,276
R1-2	-	-	0	2,091	422	2,513	7,676	1,285	8,961
R1-3	-	-	0	-	1,222	1,222	582	10,023	10,605
R1-4	-	-	0	-	2,128	2,128	-	14,768	14,768
R1-5	-	445	445	222	17,745	17,967	820	73,068	73,888
R1-6	532	4,392	4,925	6,944	25,946	32,889	30,406	65,388	95,794
R1-7	3,187	38	3,225	7,379	136	7,514	17,338	258	17,596
Total	**4,222**	**4,876**	**9,099**	**20,892**	**47,599**	**68,491**	**65,097**	**164,791**	**229,888**

5.0 AIDS TO NAVIGATION COORDINATION

Taylor Engineering reviewed the ATON photographs and cataloged the type and observed condition of each ATON. This review excludes structural assessment or review of navigation lights. An overlay of ATON locations over NOAA Nautical charts, available bathymetric data, and side scan data provided tools for assessing the navigable channel conditions. Taylor Engineering then summarized the ATON assessment and provided it to FIND via an electronic memo on July 27, 2021. **Appendix E** provides the memo in full, including a summary of the aids to navigation coordinates, photos, and observations recorded by the surveyor. Notably, these observations are limited and do not include structural inspection.

Taylor Engineering initiated coordination in July 2021 with the USCG and the US Army Corps of Engineers at Port Mayaca to gather known navigation issues along Route 1. The USCG reported that there are no documented navigation issues or marine incidents along Route 1. However, based on onsite observations and a brief discussion with Port Mayaca staff, Taylor Engineering identified some potential for navigation issues along Rocky Reef, identified in the nautical chart. Distance between beacons and channel orientation changes, particularly where OWW Cut-6 ends and OWW Cut-7 begins near the reef, create a potential for navigation error. Vessels traveling northeast toward the OWW Cut-6 and Cut-7 connection have potential for grounding if realignment of the channel is bypassed and a northeasterly course is maintained. Similarly, there is a lesser potential for navigation issues approaching the rocky reef traveling southwesterly at the Route 1 Cross Lake channel realignment near Green Marker Beacon #7, where OWW Cut-2 ends and Cut-3 begins. To support future discussions with the USCG and FIND, **Appendix E** provides maps of potential additional ATON locations to reduce the possibility of navigation error around Rocky Reef. **Table 5.1** provides a summary of the proposed four additional ATON locations.

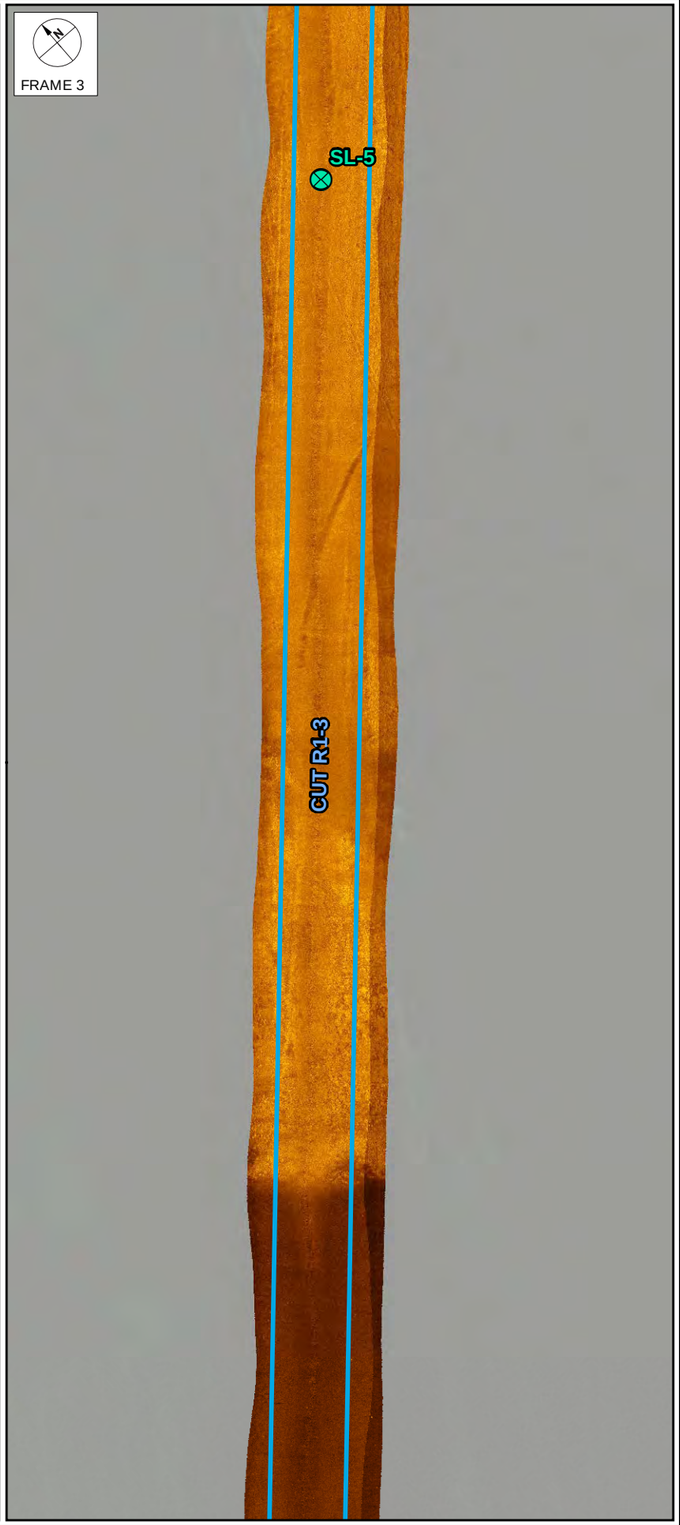
Taylor Engineering has provided photos and survey data for all located ATON to the appropriately responsible USCG Office. Based on initial observations provided to USCG, Taylor Engineering is prepared to arrange coordination meetings between FIND and USCG, as necessary. Following initial coordination, Taylor Engineering will maintain regular contact, via telephone and electronic mail, with USCG for coordination related to any ATON additions or maintenance requests. This scope of services includes regular USCG coordination for up to four months following the initial meeting.

Table 5.1 Proposed Additional ATON Locations

Proposed ATON	Latitude	Longitude
Red Beacon #8	26.82239	-80.7916
Green Beacon #15	26.79829	-80.8039
Green Beacon #17	26.79899	-80.8307
Red Beacon #18	26.80202	-80.8307

APPENDIX A

Side Scan Survey Mosaics



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- Grab Sample Locations

Aids to Navigation

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- Odd
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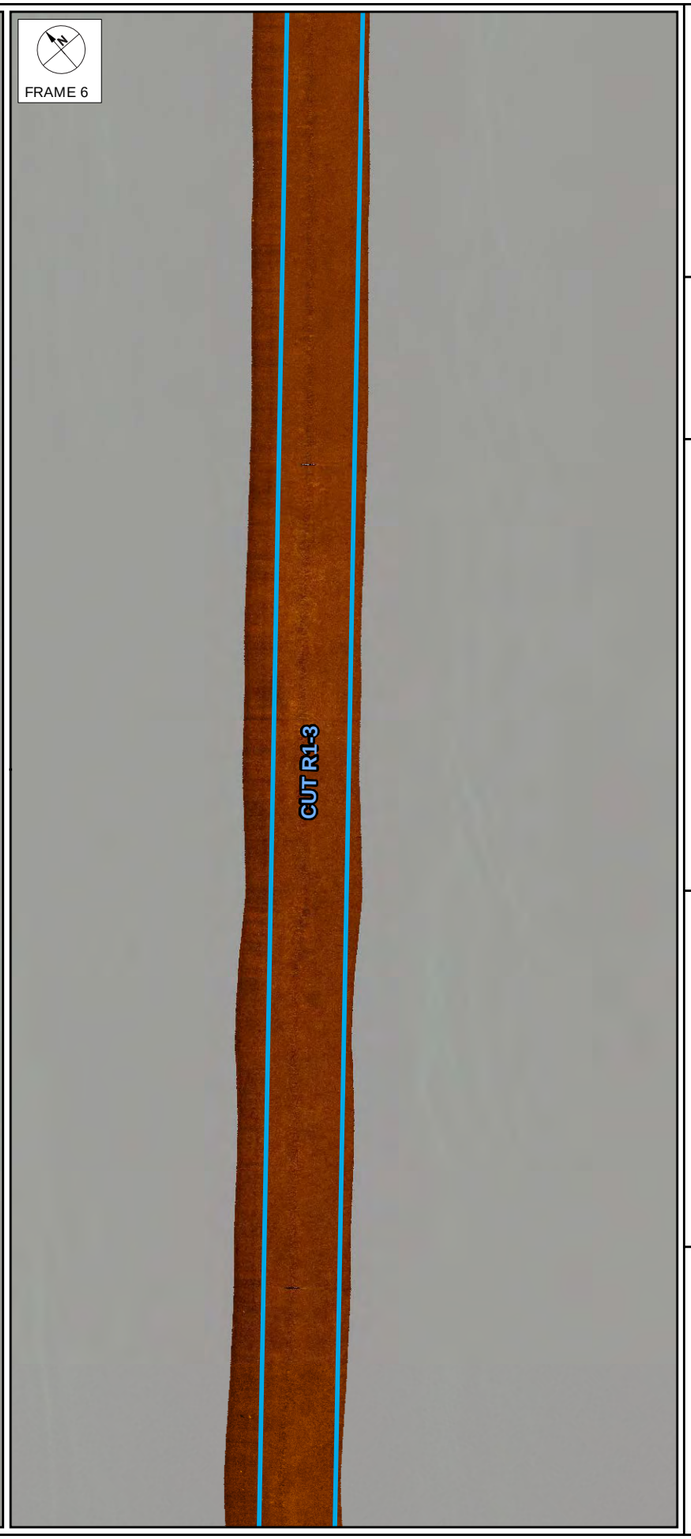

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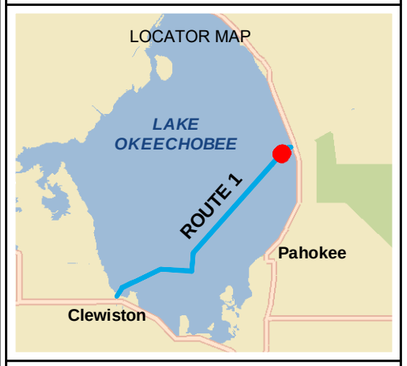

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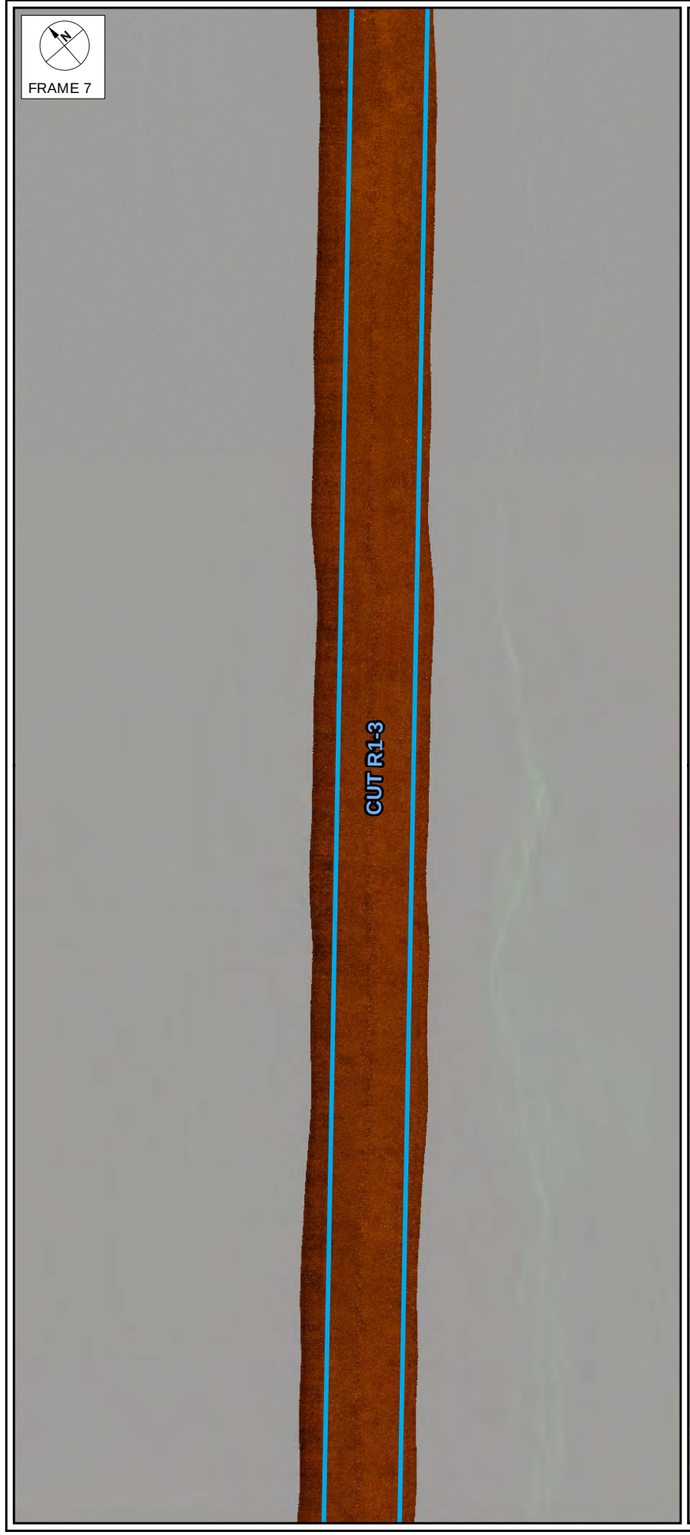

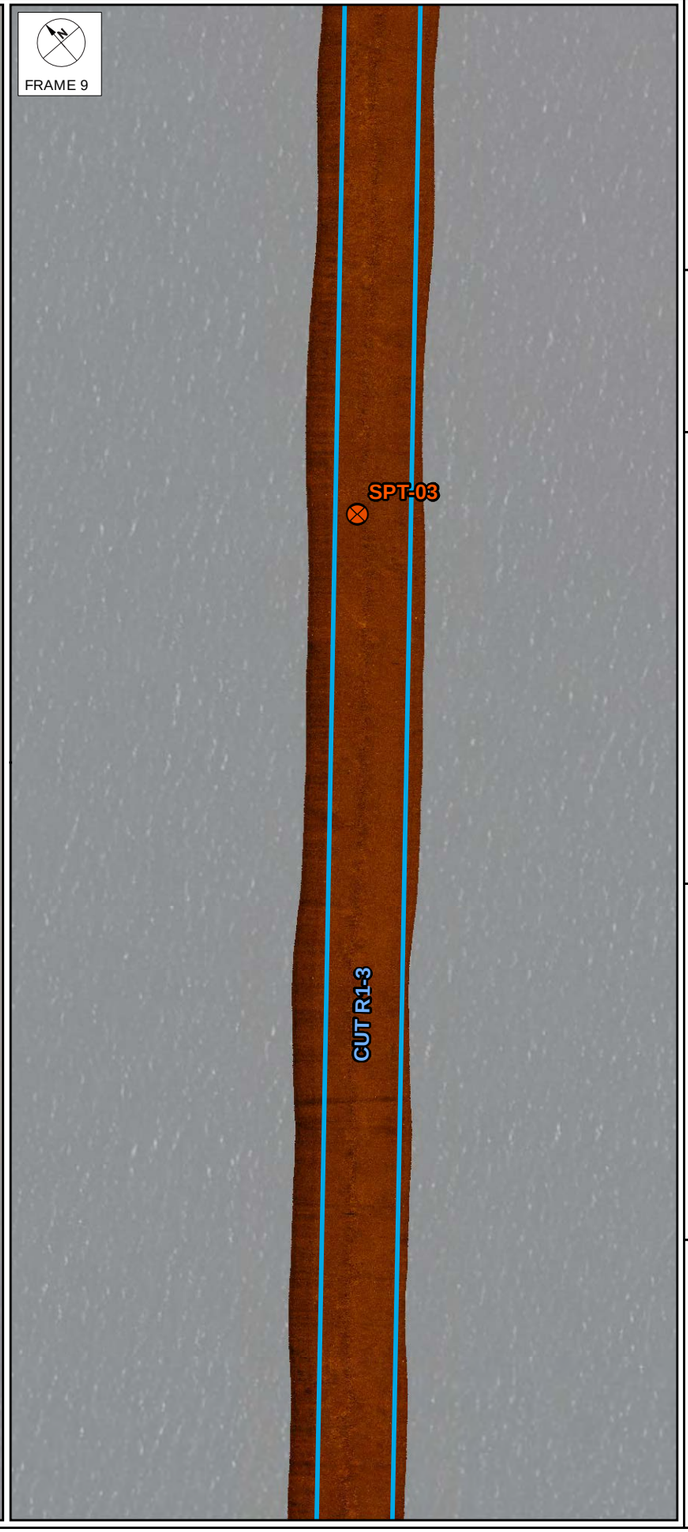

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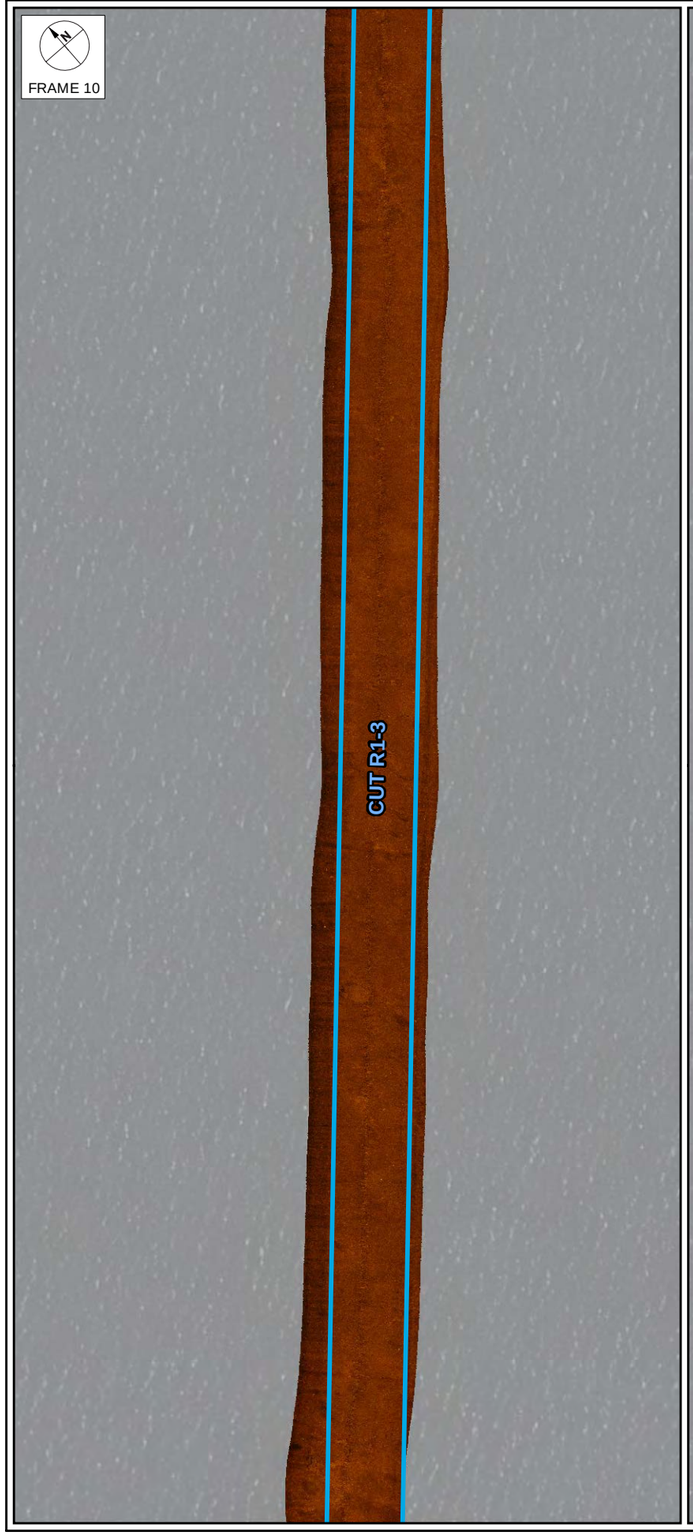

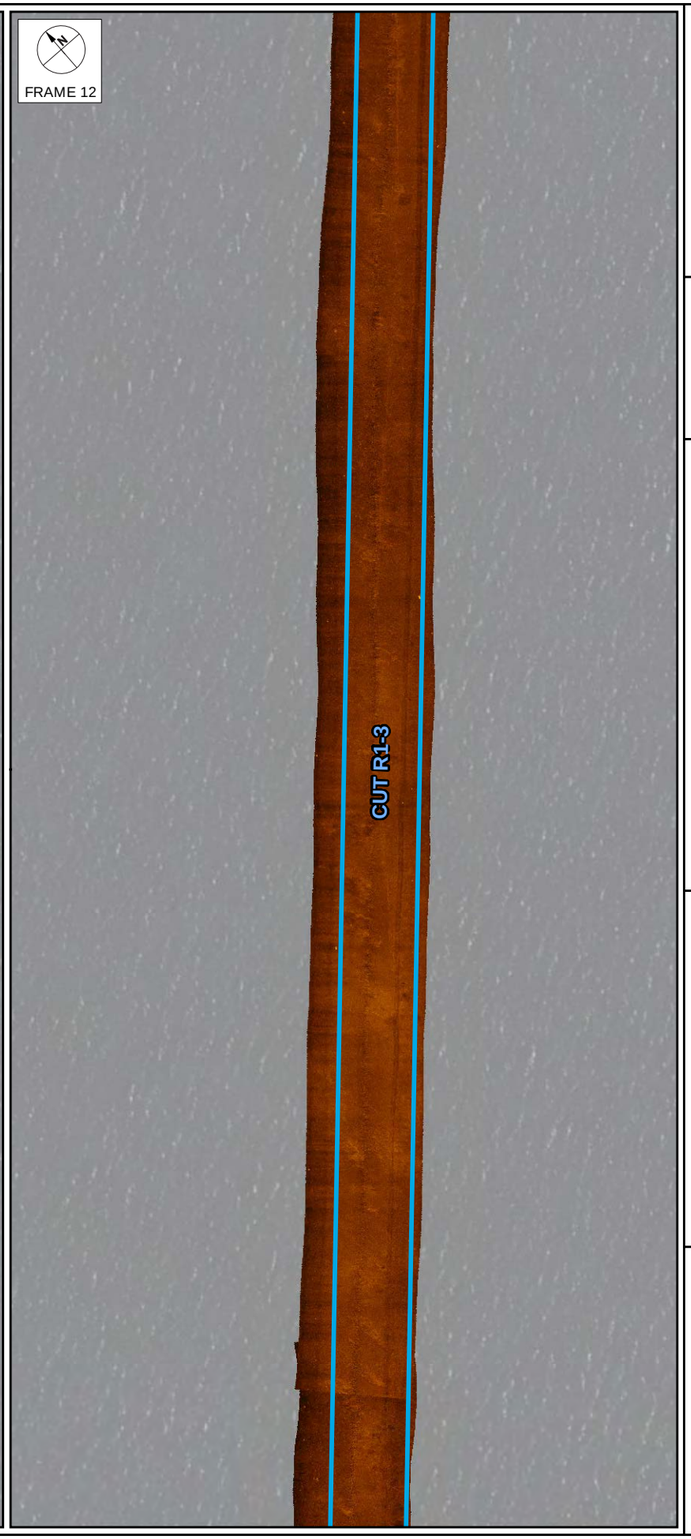

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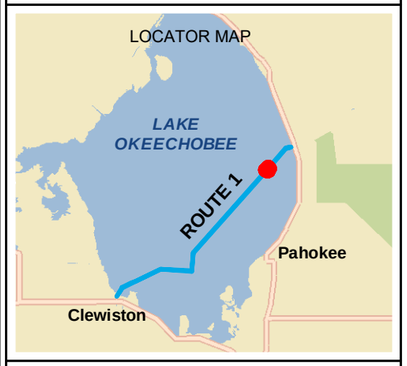

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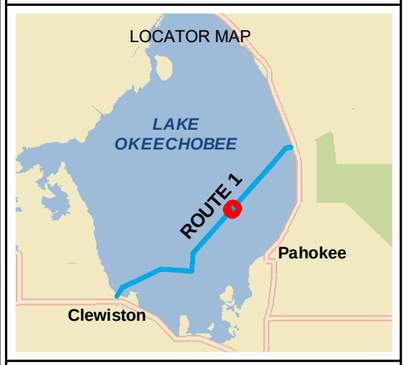

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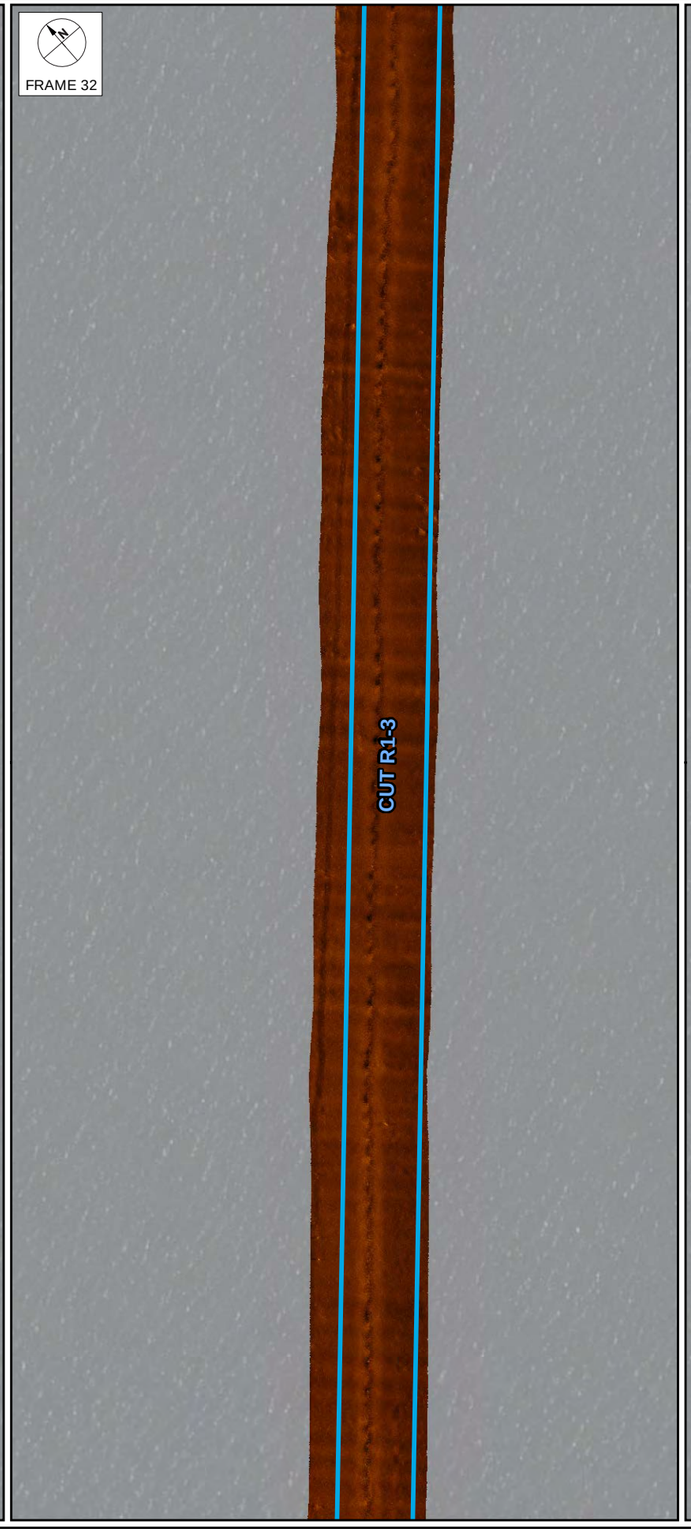

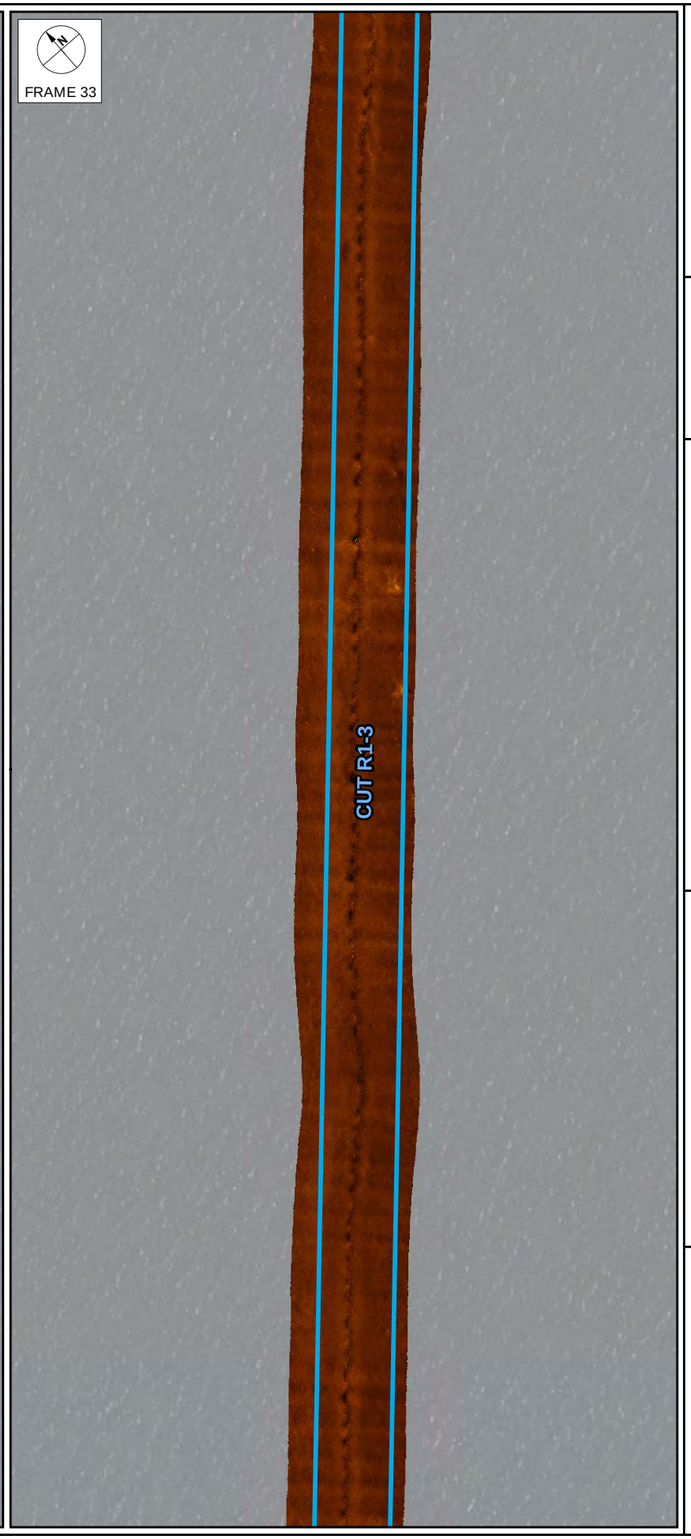

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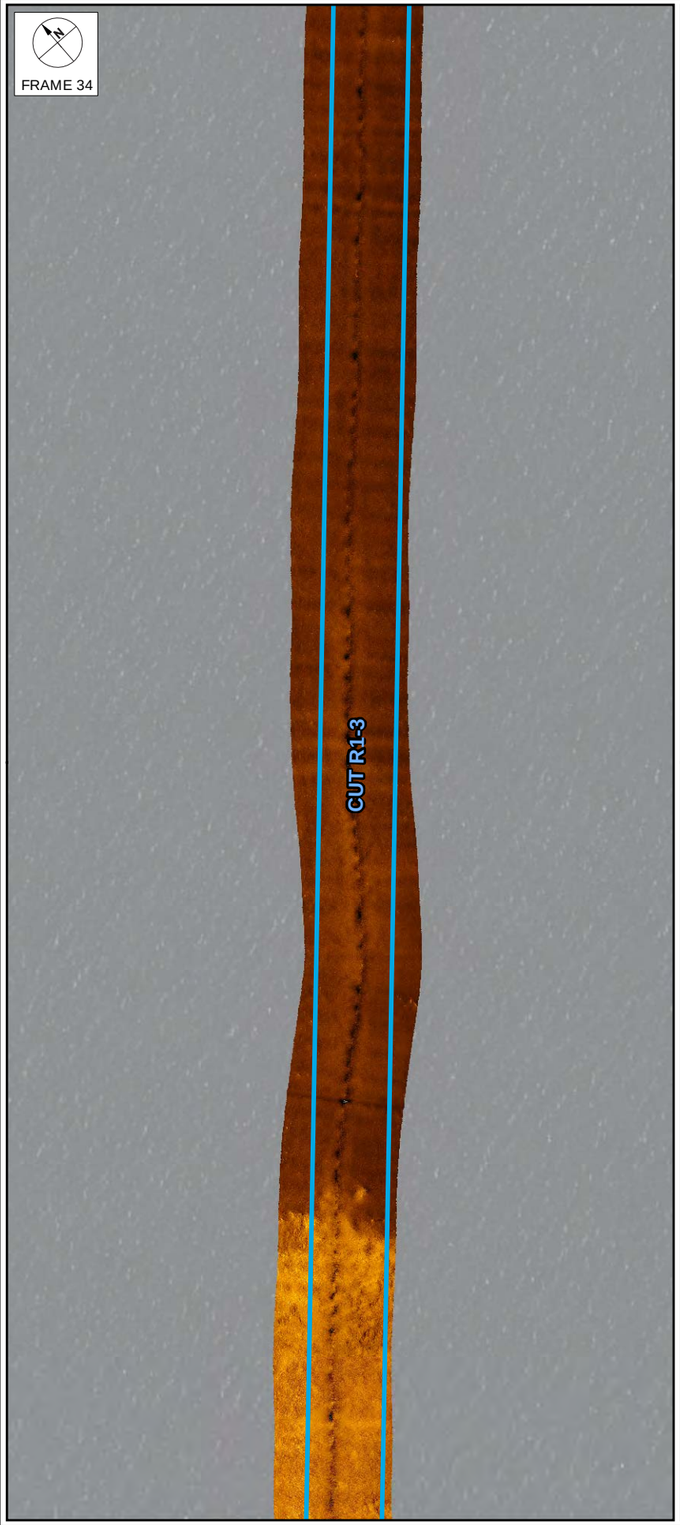

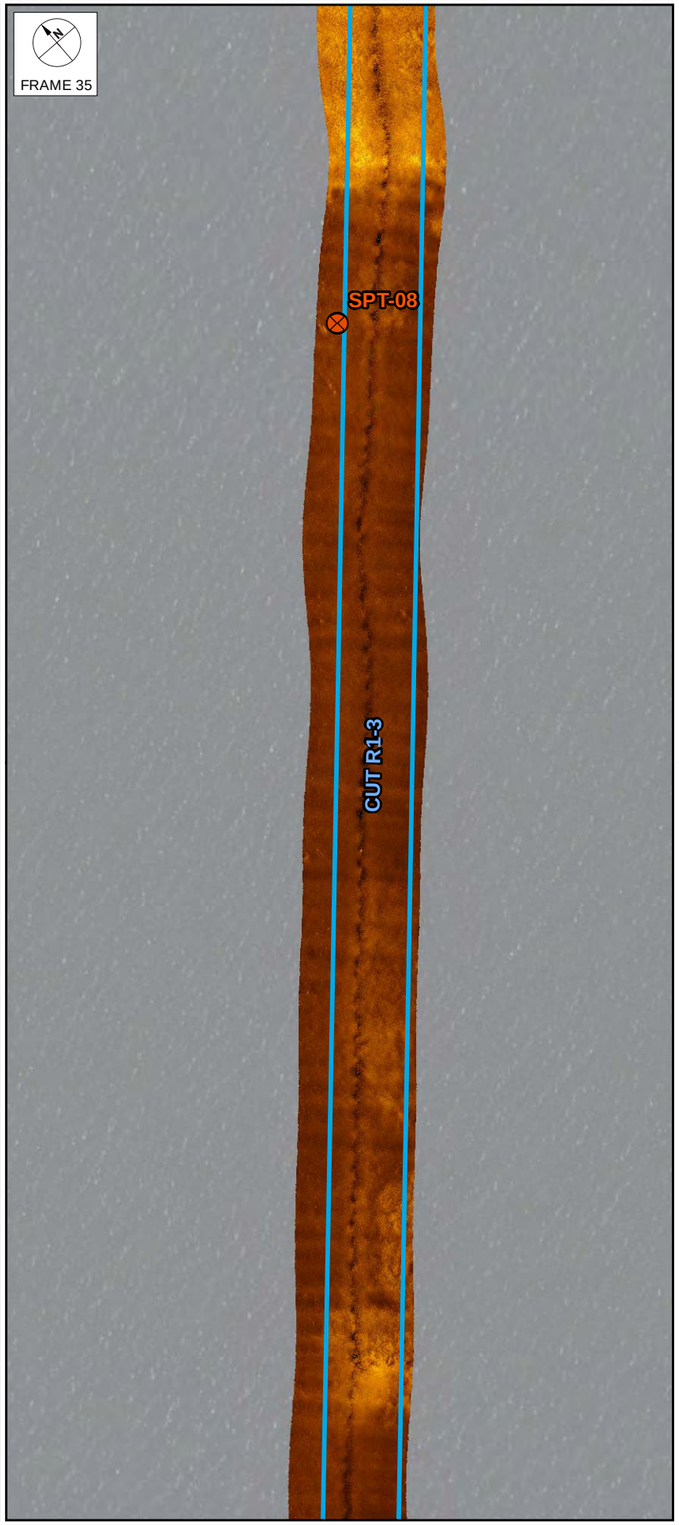

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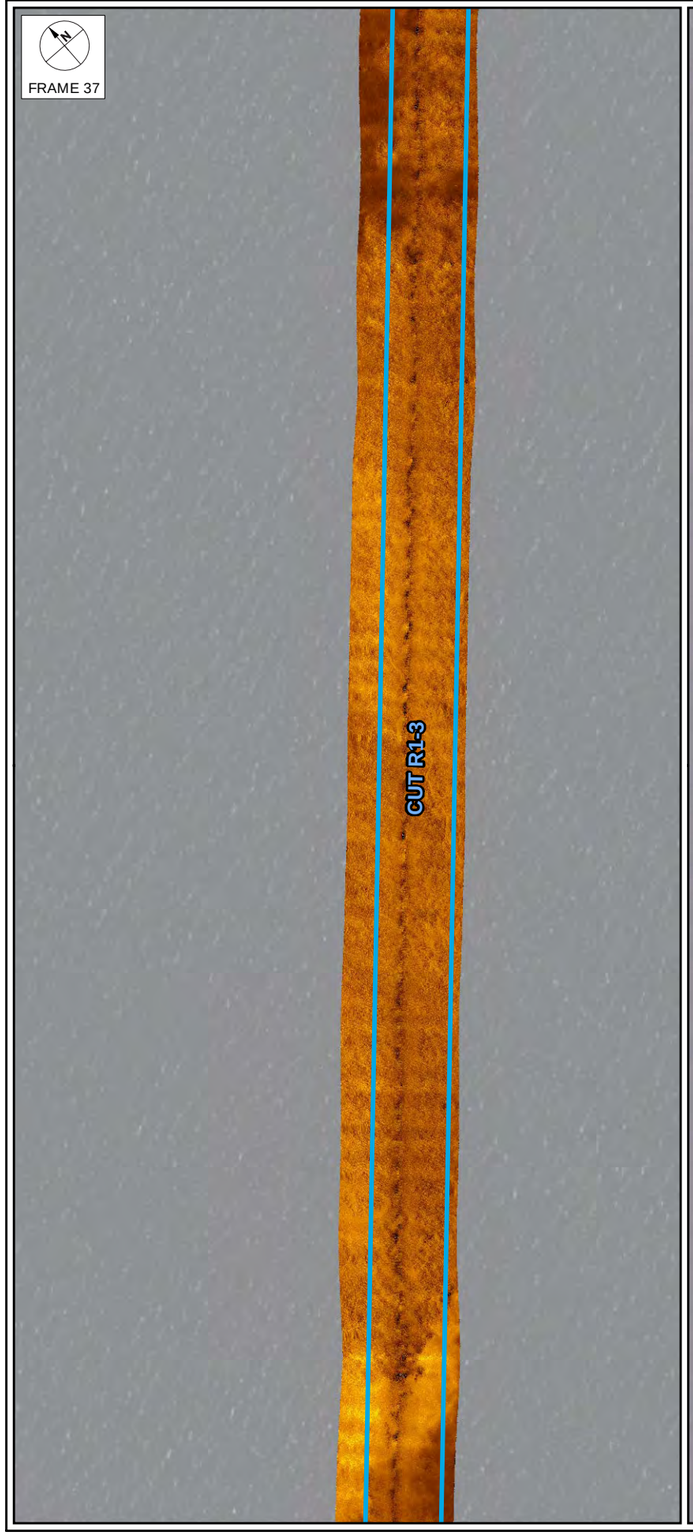

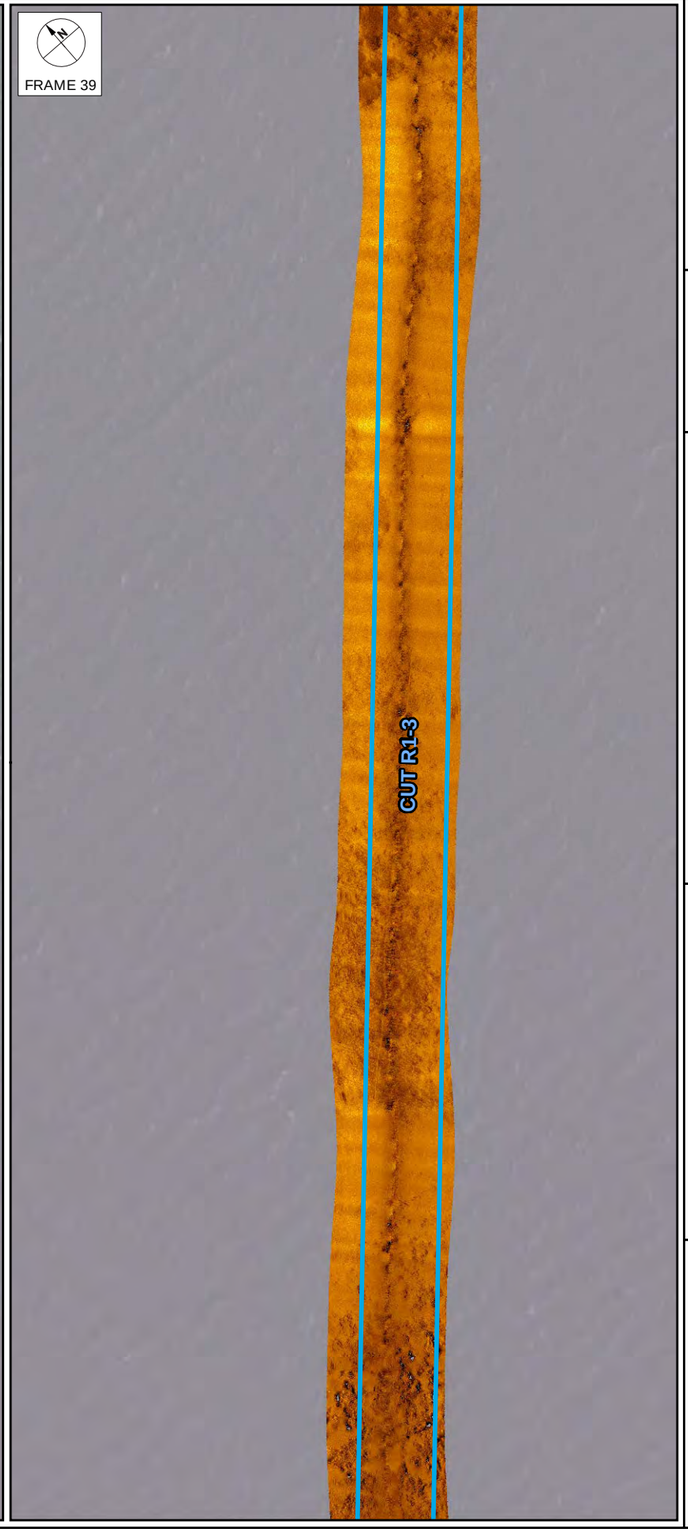

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FLORIDA INLAND NAVIGATION DISTRICT
LAKE OKEECHOBEE
ROUTE 1 CHANNEL
ROCK ASSESSMENT
SIDE SCAN SURVEY IMAGES

Legend

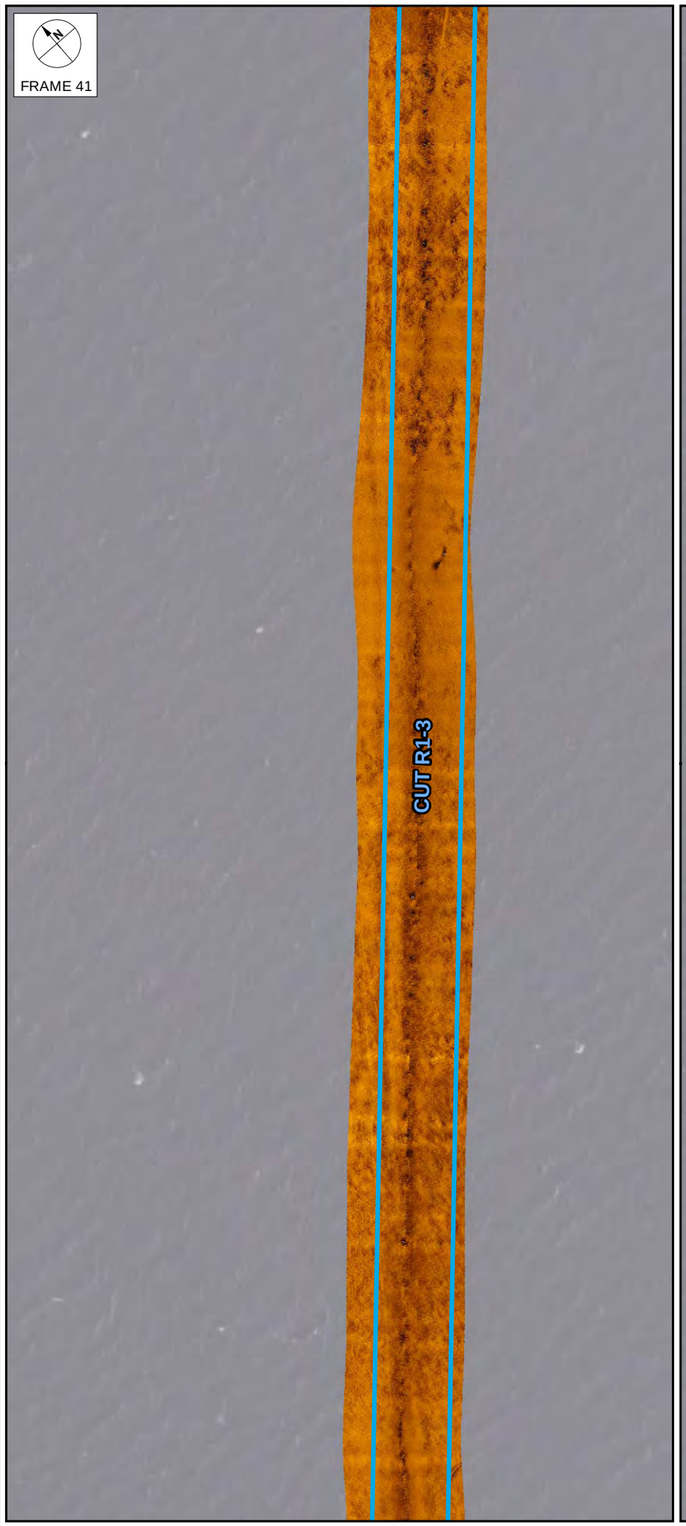
- SPT Locations
- Grab Sample Locations

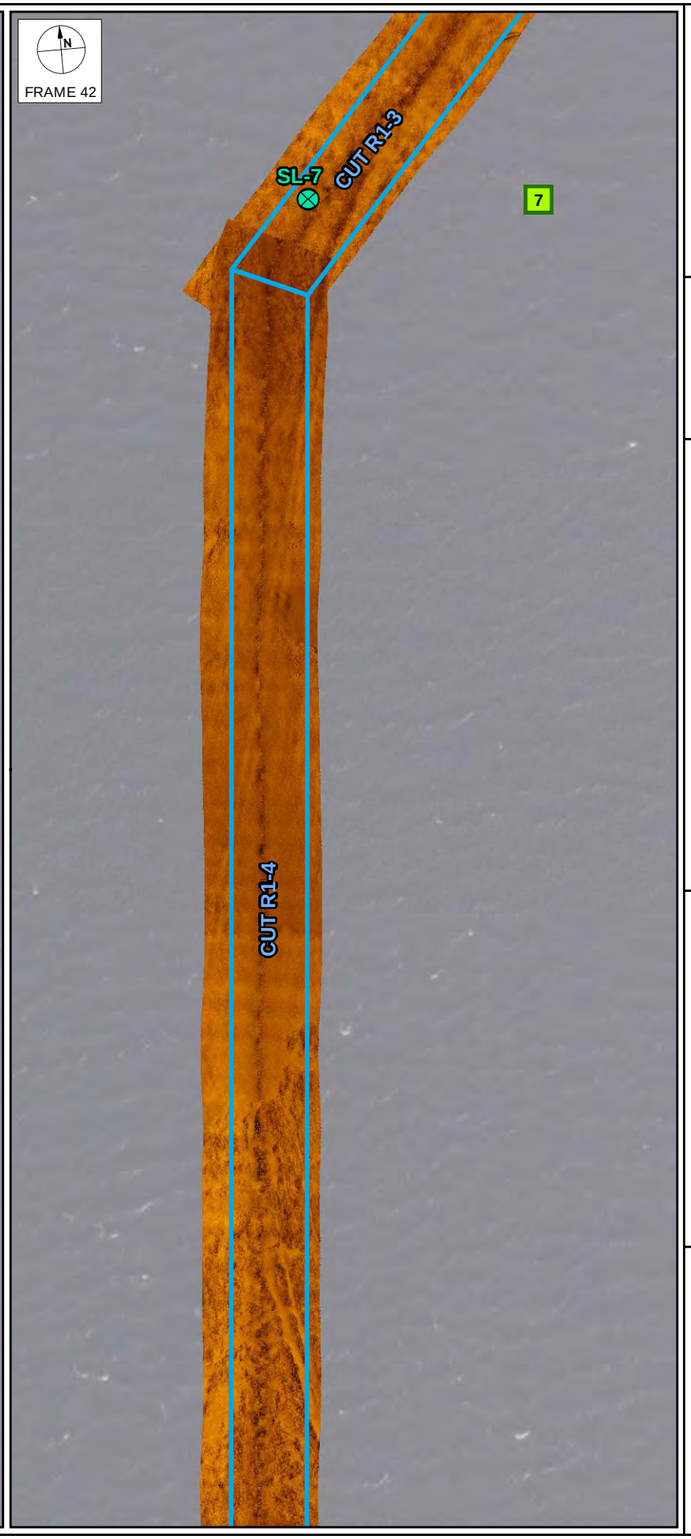
Aids to Navigation

- Even
- Odd
- Other
- OWW Channel/Cuts

0 200 400
FEET

ATLANTIC FLORIDA INLAND NAVIGATION DISTRICT INTRACOASTAL





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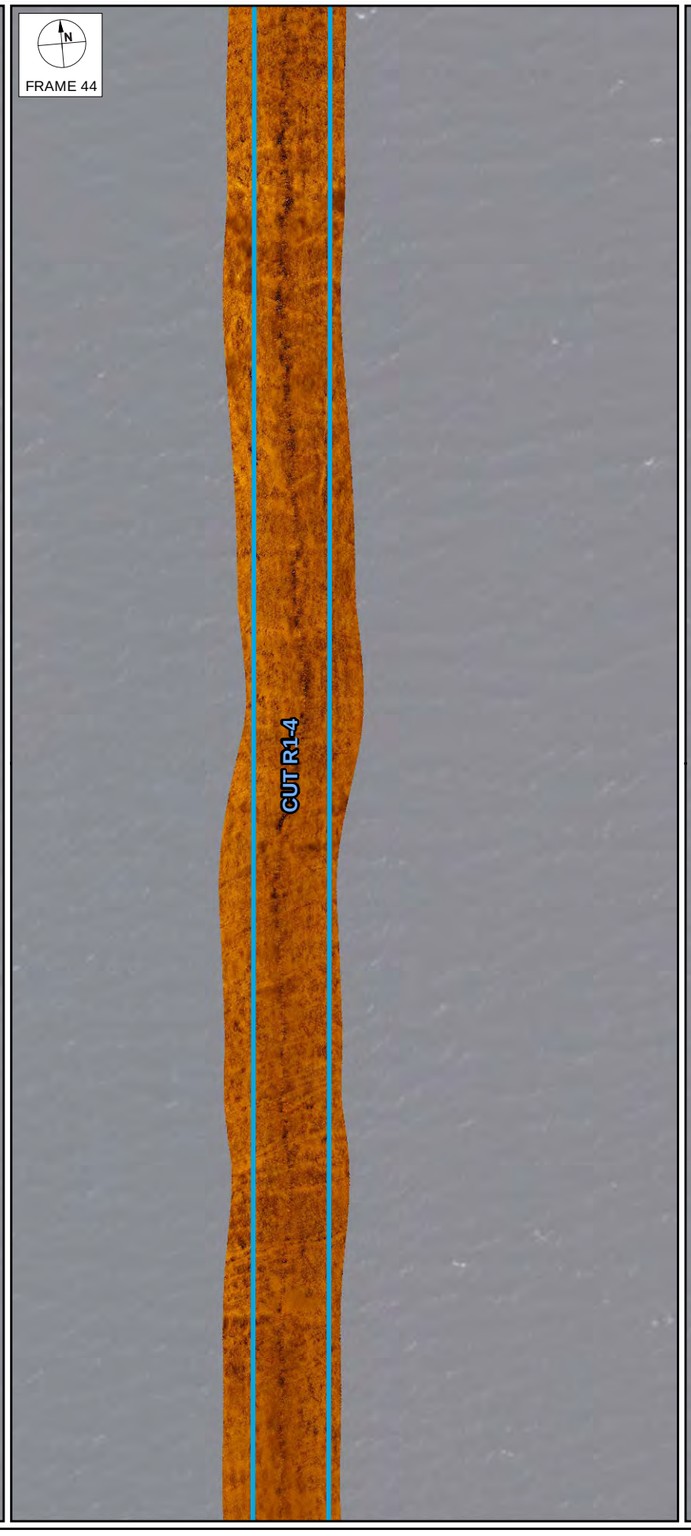

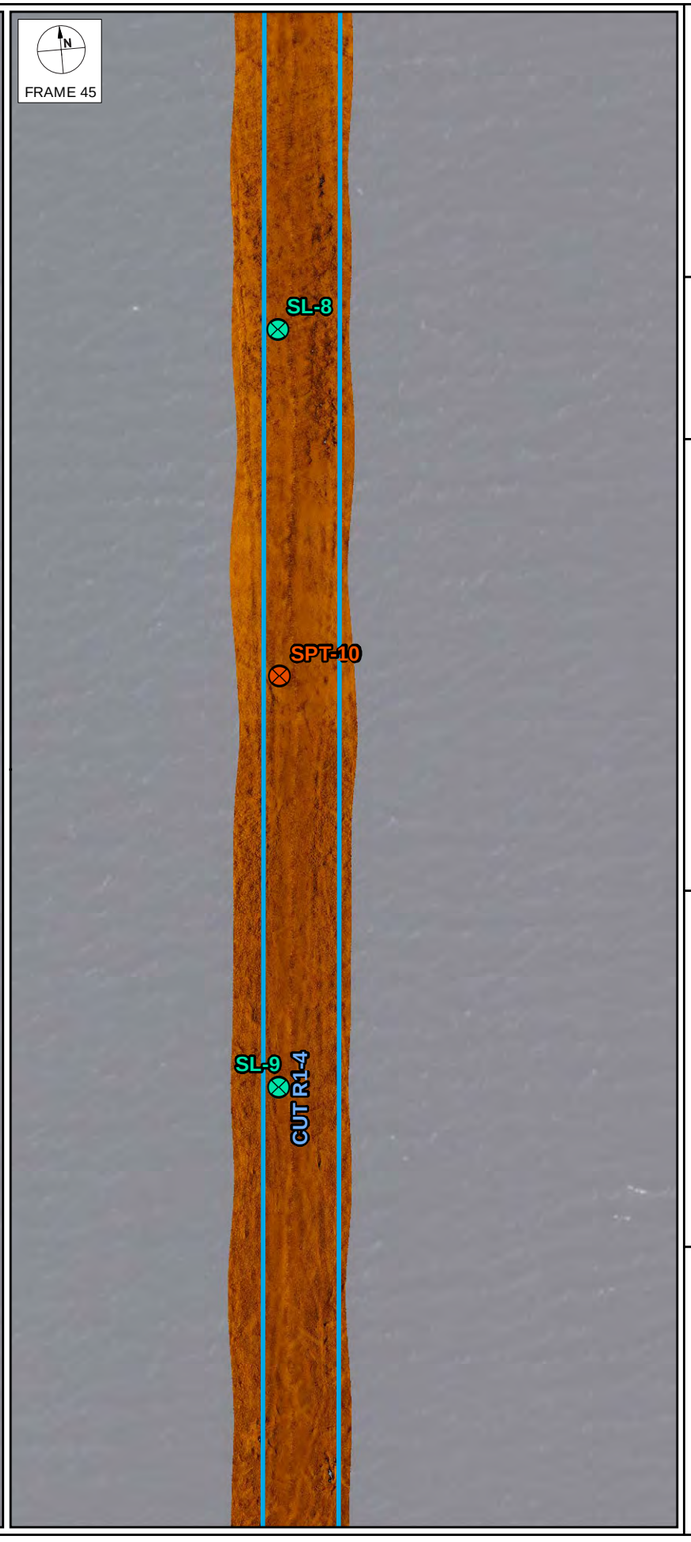

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FLORIDA INLAND NAVIGATION DISTRICT LAKE OKEECHOBEE ROUTE 1 CHANNEL ROCK ASSESSMENT SIDE SCAN SURVEY IMAGES

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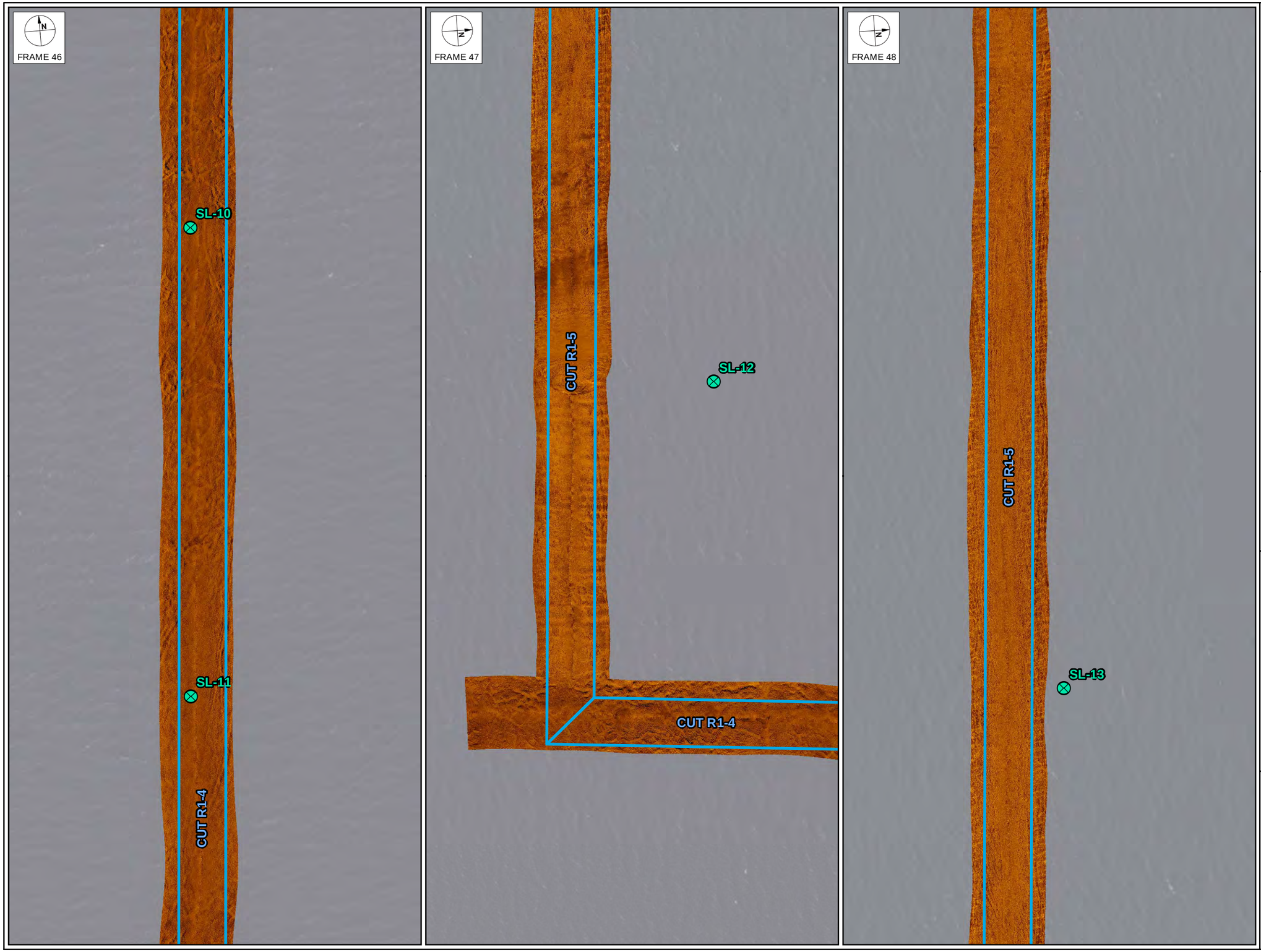
FEET



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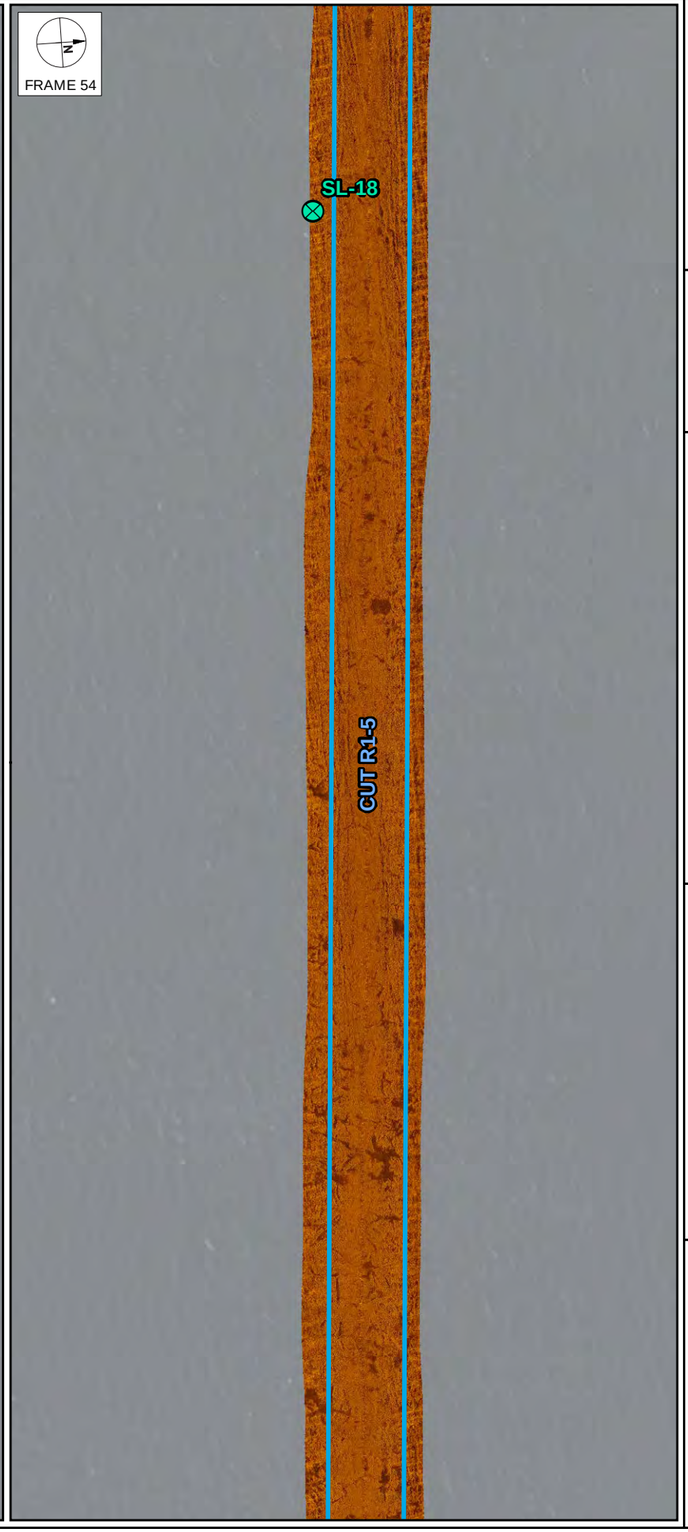

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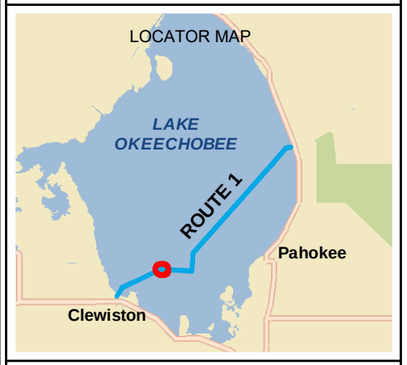

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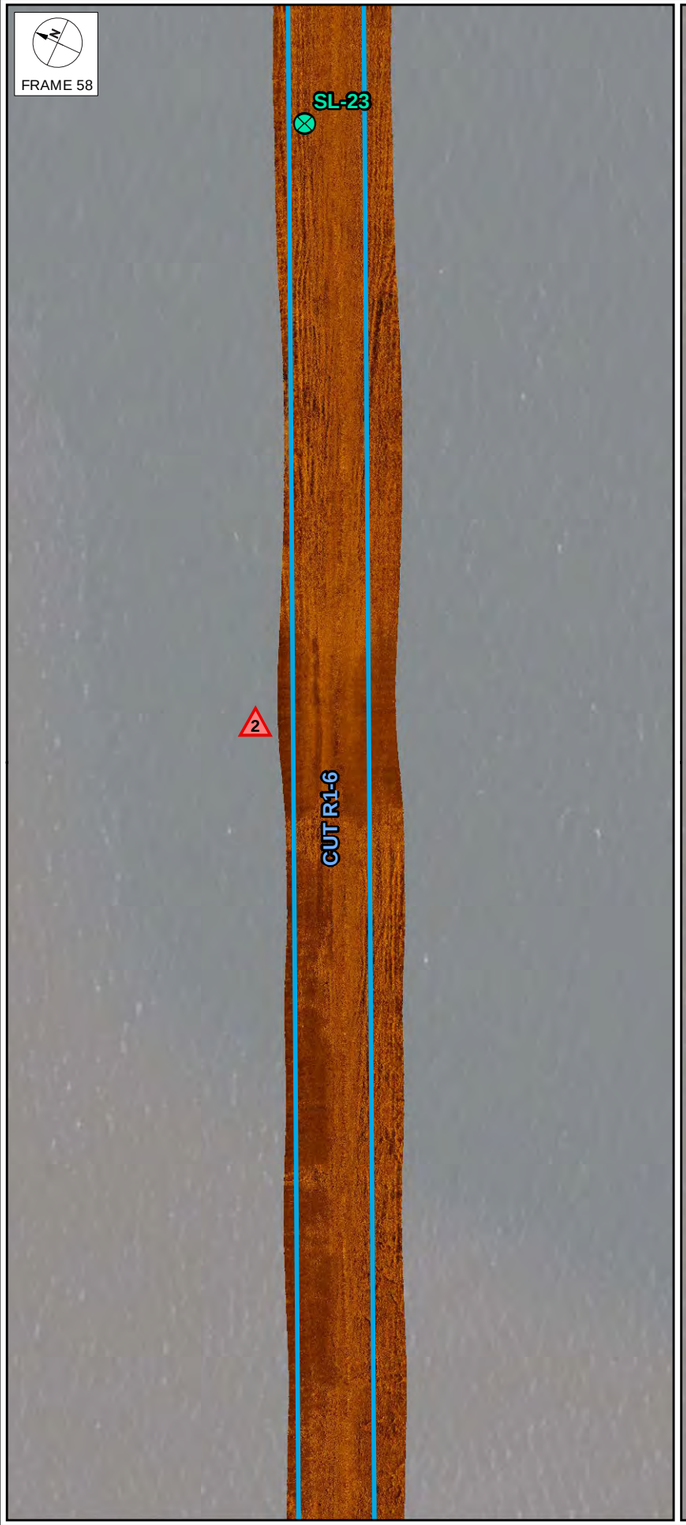
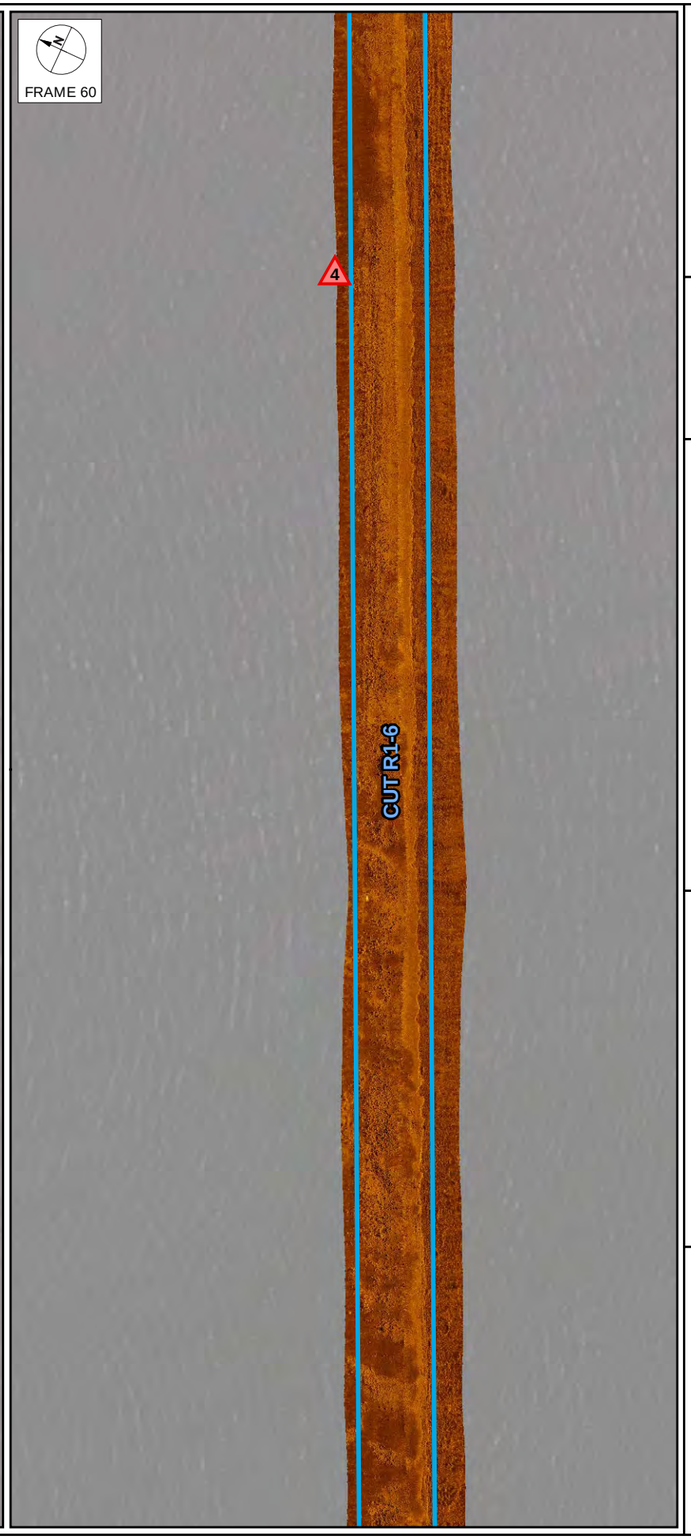
FLORIDA INLAND NAVIGATION DISTRICT





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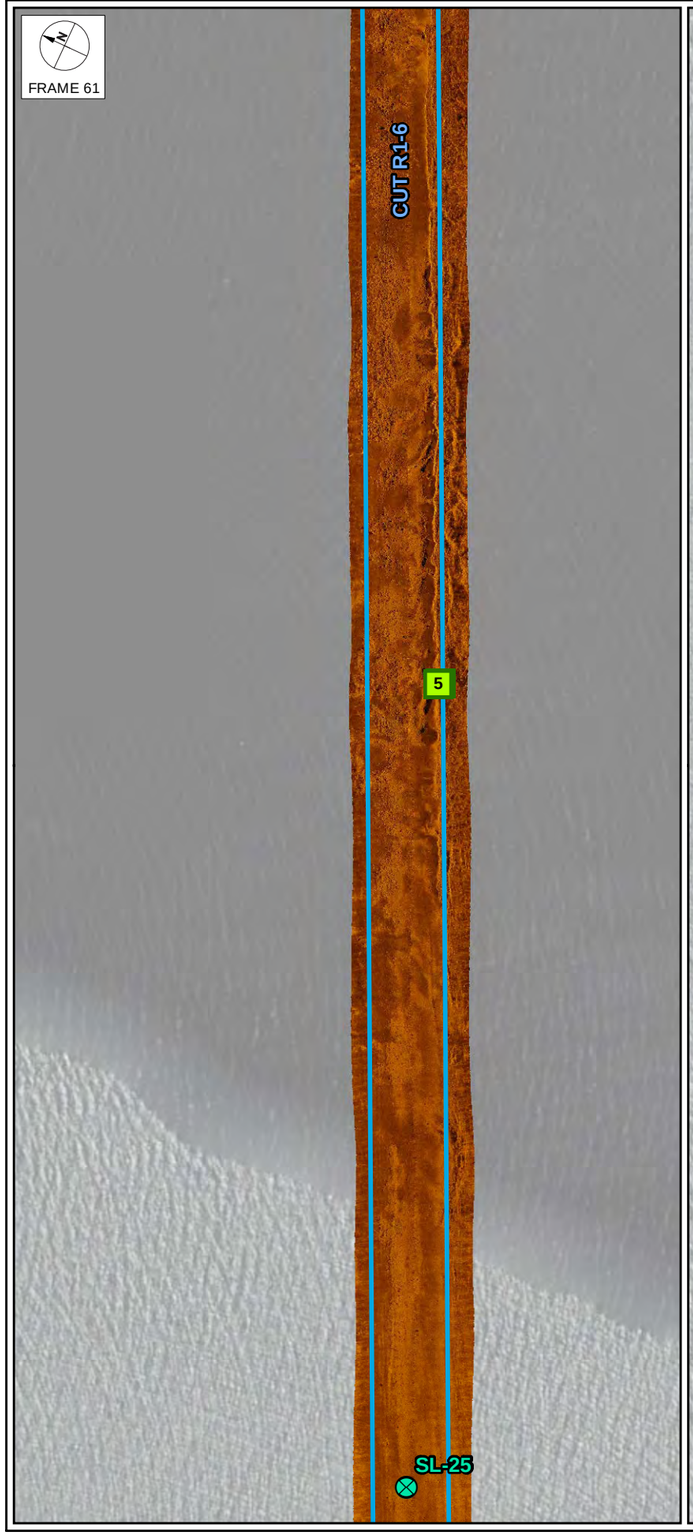
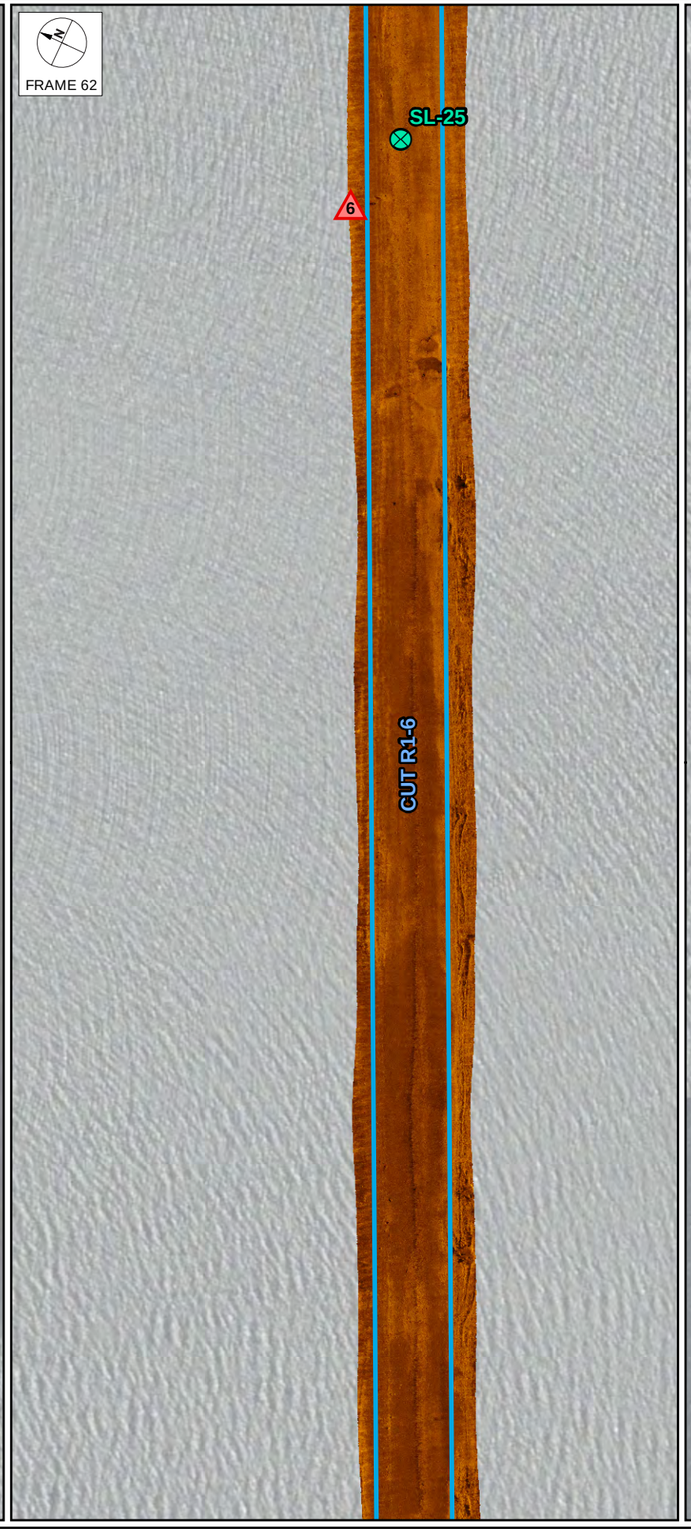
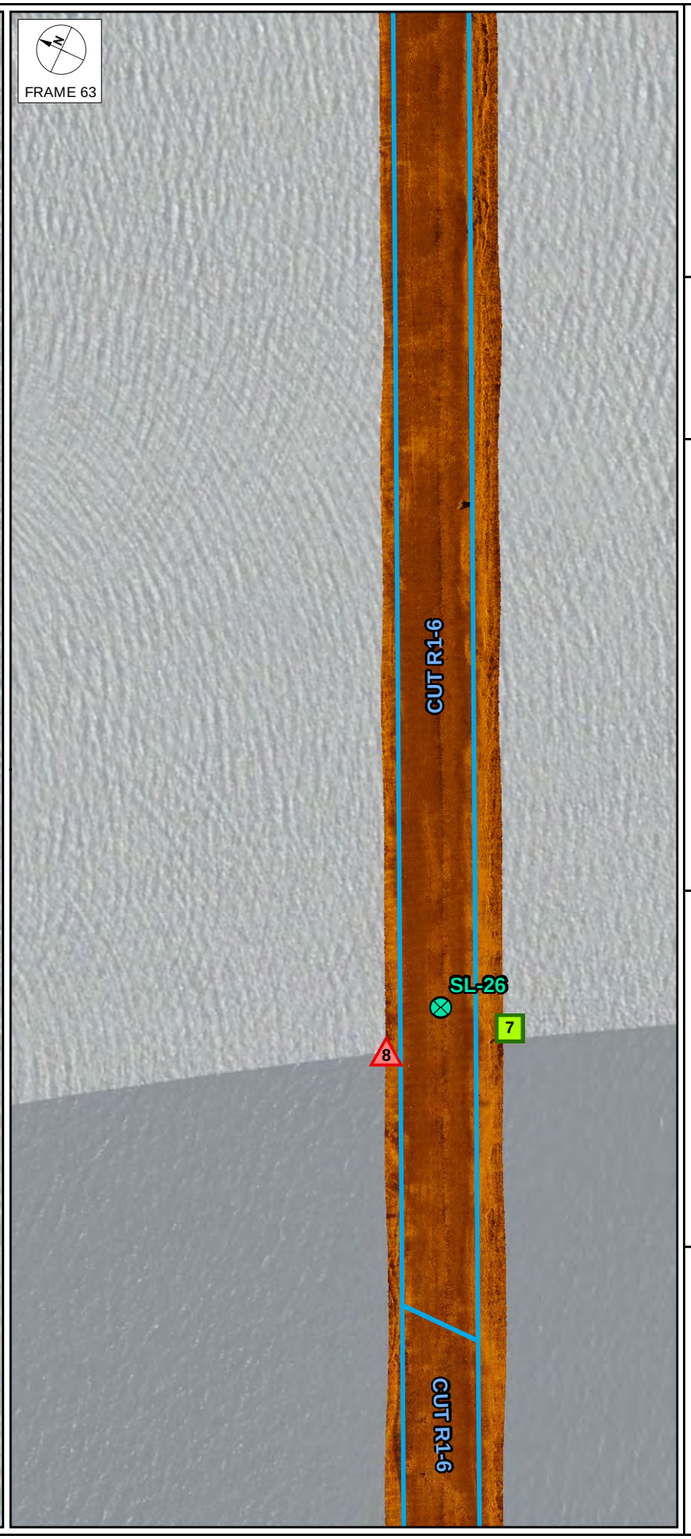
FLORIDA INLAND NAVIGATION DISTRICT







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ROUTE 1 CHANNEL
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FLORIDA INLAND NAVIGATION DISTRICT LAKE OKEECHOBEE ROUTE 1 CHANNEL ROCK ASSESSMENT SIDE SCAN SURVEY IMAGES

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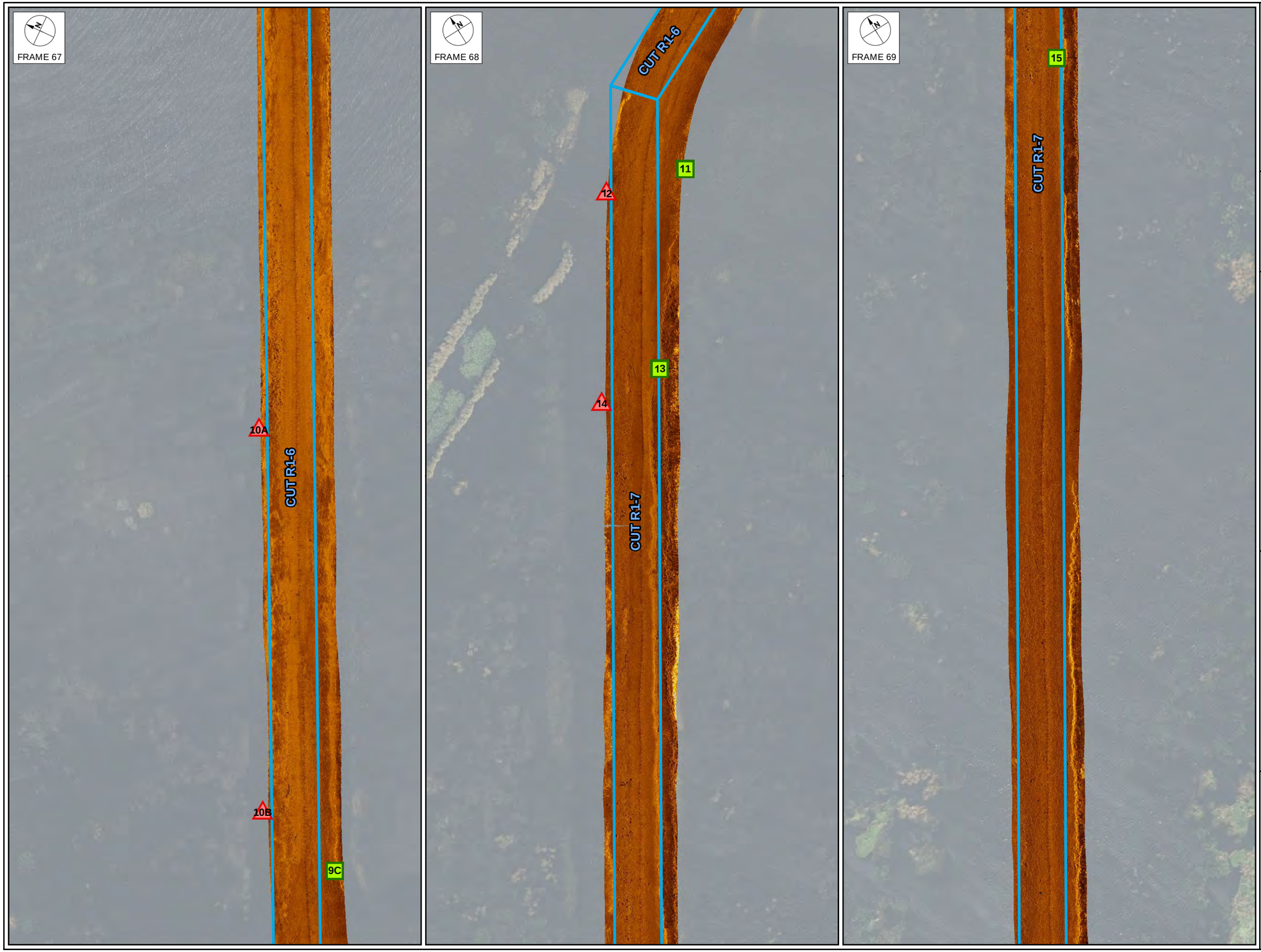

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ATLANTIC INTRACOASTAL
FLORIDA INLAND NAVIGATION DISTRICT

APPENDIX B

Drilling Field Logs

Project #: _____ Client: TAYLOR

Project I.D.: _____

Project Location: Okeechobee Channel 2-22-21

Driller: Dean Boring Started On: 1:58 PM

Drill Rig Type: CME55 Completed: 2:15 PM

Boring #: B-1 Sheet #: _____

Boring Location: N26.98154 W80.63115 7FT

Spoon Data: Inside Dia.: _____ Outside Dia.: _____

Hammer Data: Drop: Auto Weight: _____

Casing Data: Size/Type: _____ Length: _____

Depth Interval (ft)	Sample Number	Hammer Blows 1st	2nd	3rd	4th	SPT N' Value	Soil Description	Comments
0'-2'	1	1/44	5	9	20	29	Stone, Gray Sand Shell, limerock	
2'-4'	2		19	15	22	37	Lime Rock Gray	
4'-6'	3							
6'-8'	4							
8'-10'	5							
13.5'-15'	6							
18.5'-20'	7							
23.5'-25'	8							
28.5'-30'	9							
33.5'-35'	10							
38.5'-40'	11							
43.5'-45'	12							
48.5'-50'	13							
53.5'-55'	14							
58.5'-60'	15							
63.5'-65'	16							
68.5'-70'	17							
73.5'-75'	18							
78.5'-80'	19							
83.5'-85'	20							
88.5'-90'	21							
93.5'-95'	22							
98.5'-100'	23							
103.5'-105'	24							
108.5'-110'	25							

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address: P.O. Box 10278, Brooksville, FL 34603
email: amdrillinc@amdrillinc.com
website: https://amdrillinc.com/

Encountered Groundwater: _____

24 Hour Groundwater: _____

Loss of Circulation: _____

Surface Elevation: Water Depth 11FT

Project #: _____ Client: Taylor

Project I.D.: _____

Project Location: Okeechobe Channel 2-22-21

Driller: Dean Boring Started On: 255 PM

Drill Rig Type: CME 55 Completed: 313 PM

Boring #: B-2 Sheet #: _____

Boring Location: 26.9922 -80.63663 10 FT off

Spoon Data: Inside Dia.: _____ Outside Dia.: _____

Hammer Data: Drop: Auto Weight: _____

Casing Data: Size/Type: _____ Length: _____

Depth Interval (ft)	Sample Number	Hammer Blows 1st	2nd	3rd	4th	SPT N' Value	Soil Description	Comments
0'-2'	1	W/H	W/H	1	1	2	Dck Gray Silty Sand	
2'-4'	2	1	5	8	9	17	Weathered Lime Rock	
4'-6'	3	50/5					Lime Rock	
6'-8'	4							
8'-10'	5							
13.5'-15'	6							
18.5'-20'	7							
23.5'-25'	8							
28.5'-30'	9							
33.5'-35'	10							
38.5'-40'	11							
43.5'-45'	12							
48.5'-50'	13							
53.5'-55'	14							
58.5'-60'	15							
63.5'-65'	16							
68.5'-70'	17							
73.5'-75'	18							
78.5'-80'	19							
83.5'-85'	20							
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93.5'-95'	22							
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website: https://amdrillinc.com/

Encountered Groundwater: _____

24 Hour Groundwater: _____

Loss of Circulation: _____

Surface Elevation: Water Depth 12 FT

Project #: _____ Client: Taylor

Project I.D.: _____

Project Location: Okeechobee Channel

Driller: Dean Boring Started On: 2-23-21 1:05 PM

Drill Rig Type: CME 55 Completed: 1:29 P/M

Boring #: B-3 Sheet #: _____

Boring Location: 26 95552 80 65723

Spoon Data: Inside Dia.: _____ Outside Dia.: _____

Hammer Data: Drop: Auto Weight: _____

Casing Data: Size/Type: _____ Length: _____

Depth Interval (ft)	Sample Number	Hammer Blows 1st	2nd	3rd	4th	SPT N' Value	Soil Description	Comments
0'-2'	1	W/R	W/R	W/R	W/R	0	Drk Brown silty Sand	
2'-4'	2	W/R	W/R	5	5	10	Drk Brown silty Sand / Gray Sand, Shell	
4'-6'	3	50/5				50/5	Limerock	
6'-8'	4							
8'-10'	5							
13.5'-15'	6							
18.5'-20'	7							
23.5'-25'	8							
28.5'-30'	9							
33.5'-35'	10							
38.5'-40'	11							
43.5'-45'	12							
48.5'-50'	13							
53.5'-55'	14							
58.5'-60'	15							
63.5'-65'	16							
68.5'-70'	17							
73.5'-75'	18							
78.5'-80'	19							
83.5'-85'	20							
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93.5'-95'	22							
98.5'-100'	23							
103.5'-105'	24							
108.5'-110'	25							

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website: https://amdrillinc.com/

Encountered Groundwater: _____

24 Hour Groundwater: _____

Loss of Circulation: _____

Surface Elevation: Water Depth 14FT

Project #: _____ Client: TAYLOR

Project I.D.: _____

Project Location: Okeechobee Channel

Driller: Dean Boring Started On: 2:28 PM

Drill Rig Type: CME 55 Completed: 2:40 PM

Boring #: B-4 Sheet #: _____

Boring Location: 26.93374 80.67929

Spoon Data: Inside Dia.: _____ Outside Dia.: _____

Hammer Data: Drop: Auto Weight: _____

Casing Data: Size/Type: _____ Length: _____

Depth Interval (ft)	Sample Number	Hammer Blows 1st	2nd	3rd	4th	SPT N' Value	Soil Description	Comments
0'-2'	1	W/R	W/H	1	3	4	Silty sand, sand shell, weathered Limerock	
2'-4'	2	3	3	3	3	6	weathered Limerock	
4'-6'	3	10	17	12	21	33	weathered Limerock	
6'-8'	4							
8'-10'	5							
13.5'-15'	6							
18.5'-20'	7							
23.5'-25'	8							
28.5'-30'	9							
33.5'-35'	10							
38.5'-40'	11							
43.5'-45'	12							
48.5'-50'	13							
53.5'-55'	14							
58.5'-60'	15							
63.5'-65'	16							
68.5'-70'	17							
73.5'-75'	18							
78.5'-80'	19							
83.5'-85'	20							
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93.5'-95'	22							
98.5'-100'	23							
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Encountered Groundwater: _____

24 Hour Groundwater: _____

Loss of Circulation: _____

Surface Elevation: Water depth 14 FT

Project #: _____ Client: TAylor

Project I.D.: _____

Project Location: Okeechobee Channel

Driller: Dean Boring Started On: 355 Pm

Drill Rig Type: CME 55 Completed: 408 Pm

Boring #: B-5 Sheet #: _____

Boring Location: 26 91196 80 70149

Spoon Data: Inside Dia.: _____ Outside Dia.: _____

Hammer Data: Drop: Auto Weight: _____

Casing Data: Size/Type: _____ Length: _____

Depth Interval (ft)	Sample Number	Hammer Blows 1st	2nd	3rd	4th	SPT N' Value	Soil Description	Comments
0'-2'	1	W/R	W/R	W/R	W/H	0	Drk Brown Silty Sand	
2'-4'	2	2	3	3	2	5	weathered Limerock	
4'-6'	3	2	2	2	1	3	weathered Limerock	
6'-8'	4							
8'-10'	5							
13.5'-15'	6							
18.5'-20'	7							
23.5'-25'	8							
28.5'-30'	9							
33.5'-35'	10							
38.5'-40'	11							
43.5'-45'	12							
48.5'-50'	13							
53.5'-55'	14							
58.5'-60'	15							
63.5'-65'	16							
68.5'-70'	17							
73.5'-75'	18							
78.5'-80'	19							
83.5'-85'	20							
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93.5'-95'	22							
98.5'-100'	23							
103.5'-105'	24							
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Encountered Groundwater: _____

24 Hour Groundwater: _____

Loss of Circulation: _____

Surface Elevation: Water Depth 14 FT

Project #: _____ Client: Taylor

Project I.D.: _____

Project Location: Okeechobee Channel

Driller: Dean Boring Started On: 455 PM

Drill Rig Type: CMESS Completed: 510 PM

Boring #: B-6 Sheet #: _____

Boring Location: 26 89128 80 72234

Spoon Data: Inside Dia.: _____ Outside Dia.: _____

Hammer Data: Drop: Auto Weight: _____

Casing Data: Size/Type: _____ Length: _____

Depth Interval (ft)	Sample Number	Hammer Blows 1st	2nd	3rd	4th	SPT N' Value	Soil Description	Comments
0'-2'	1	W/R	W/R	W/R	2		silty Sand weathered limerock	
2'-4'	2	4	3	2	2		weathered limerock	
4'-6'	3	2	2	2	2		weathered limerock	
6'-8'	4							
8'-10'	5							
13.5'-15'	6							
18.5'-20'	7							
23.5'-25'	8							
28.5'-30'	9							
33.5'-35'	10							
38.5'-40'	11							
43.5'-45'	12							
48.5'-50'	13							
53.5'-55'	14							
58.5'-60'	15							
63.5'-65'	16							
68.5'-70'	17							
73.5'-75'	18							
78.5'-80'	19							
83.5'-85'	20							
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98.5'-100'	23							
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website: https://amdrillinc.com/

Encountered Groundwater: _____

24 Hour Groundwater: _____

Loss of Circulation: _____

Surface Elevation: Water Depth 14FT

Project #: _____ Client: Taylor

Project I.D.: _____

Project Location: Okeechobee Channel

2-24-21

Driller: Dean

Drill Rig Type: CME 55

Boring Started On: 10:05 AM

Completed: 10:20 AM

Boring #: B-7 Sheet #: _____

Boring Location: 2696966 807 4428

Spoon Data: Inside Dia.: _____ Outside Dia.: _____

Hammer Data: Drop: Auto Weight: _____

Casing Data: Size/Type: _____ Length: _____

Depth Interval (ft)	Sample Number	Hammer Blows 1st	2nd	3rd	4th	SPT N' Value	Soil Description	Comments
0'-2'	1	W/R	W/R	3	6	9	Weathered Limerock	
2'-4'	2	5	3	6	14	20	Weathered Limerock	
4'-6'	3							
6'-8'	4							
8'-10'	5							
13.5'-15'	6							
18.5'-20'	7							
23.5'-25'	8							
28.5'-30'	9							
33.5'-35'	10							
38.5'-40'	11							
43.5'-45'	12							
48.5'-50'	13							
53.5'-55'	14							
58.5'-60'	15							
63.5'-65'	16							
68.5'-70'	17							
73.5'-75'	18							
78.5'-80'	19							
83.5'-85'	20							
88.5'-90'	21							
93.5'-95'	22							
98.5'-100'	23							
103.5'-105'	24							
108.5'-110'	25							

AMDRILL inc.
GEOTECHNICAL ENVIRONMENTAL DRILLING & SINKHOLE REPAIR SERVICES

phone: (352) 540-9666 | fax: (352) 796-1666
address: P.O. Box 10278, Brooksville, FL 34603
email: amdrillinc@amdrillinc.com
website: https://amdrillinc.com/

Encountered Groundwater: _____

24 Hour Groundwater: _____

Loss of Circulation: _____

Surface Elevation: Water Depth 13ft 4in

Project #: _____ Client: Taylor

Project I.D.: _____

Project Location: Okeechobee Channel

2-24-21

Driller: Dean 2-24-21 Boring Started On: 1105 AM

Drill Rig Type: CME 55 Completed: 1120 AM

Boring #: B8 Sheet #: _____

Boring Location: 26 85320 80 7685

Spoon Data: Inside Dia.: _____ Outside Dia.: _____

Hammer Data: Drop: Auto Weight: _____

Casing Data: Size/Type: _____ Length: _____

Depth Interval (ft)	Sample Number	Hammer Blows 1st	2nd	3rd	4th	SPT N' Value	Soil Description	Comments
0'-2'	1	W/R	W/R	W/R	W/H	0	weathered limerock	
2'-4'	2	W/H	4	2	1	3	weathered Limerock, Shell	
4'-6'	3	5	20	50/5			weathered Limerock, Shell	
6'-8'	4							
8'-10'	5							
13.5'-15'	6							
18.5'-20'	7							
23.5'-25'	8							
28.5'-30'	9							
33.5'-35'	10							
38.5'-40'	11							
43.5'-45'	12							
48.5'-50'	13							
53.5'-55'	14							
58.5'-60'	15							
63.5'-65'	16							
68.5'-70'	17							
73.5'-75'	18							
78.5'-80'	19							
83.5'-85'	20							
88.5'-90'	21							
93.5'-95'	22							
98.5'-100'	23							
103.5'-105'	24							
108.5'-110'	25							

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website: https://amdrillinc.com/

Encountered Groundwater: _____

24 Hour Groundwater: _____

Loss of Circulation: _____

Surface Elevation: water depth 1 FT

Project #: _____ Client: Taylor

Project I.D.: _____

Project Location: Okeechobee Channel

2-24-21

Driller: Dean 2-24-21 Boring Started On: 12:11 PM.

Drill Rig Type: CME55 Completed: 12:25 PM

Boring #: B-9 Sheet #: _____

Boring Location: 2683294 8078137

Spoon Data: Inside Dia.: _____ Outside Dia.: _____

Hammer Data: Drop: Auto Weight: _____

Casing Data: Size/Type: _____ Length: _____

Depth Interval (ft)	Sample Number	Hammer Blows 1st	2nd	3rd	4th	SPT N' Value	Soil Description	Comments
0'-2'	1	W/H	W/H.	1	2	3	weathered limerock	
2'-4'	2	2	3	4	3	7	Shell, weathered limerock	
4'-6'	3	4	12	15	16	31	Sand Shell, weathered limerock	
6'-8'	4							
8'-10'	5							
13.5'-15'	6							
18.5'-20'	7							
23.5'-25'	8							
28.5'-30'	9							
33.5'-35'	10							
38.5'-40'	11							
43.5'-45'	12							
48.5'-50'	13							
53.5'-55'	14							
58.5'-60'	15							
63.5'-65'	16							
68.5'-70'	17							
73.5'-75'	18							
78.5'-80'	19							
83.5'-85'	20							
88.5'-90'	21							
93.5'-95'	22							
98.5'-100'	23							
103.5'-105'	24							
108.5'-110'	25							

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website: https://amdrillinc.com/

Encountered Groundwater: _____

24 Hour Groundwater: _____

Loss of Circulation: _____

Surface Elevation: Water Depth 13.5

Project #: _____ Client: Taylor

Project I.D.: _____

Project Location: Okeechobee Channel

2-24-21

Driller: Dean 2-24-21 Boring Started On: 112 PM

Drill Rig Type: CME-55 Completed: 125 PM

Boring #: B-10 Sheet #: _____

Boring Location: 26 80764 80 79053

Spoon Data: Inside Dia.: _____ Outside Dia.: _____

Hammer Data: Drop: Auto Weight: _____

Casing Data: Size/Type: _____ Length: _____

Depth Interval (ft)	Sample Number	Hammer Blows 1st	2nd	3rd	4th	SPT N' Value	Soil Description	Comments
0'-2'	1	W/R	W/R	2	3	5	Sand shell weathered Limerock	
2'-4'	2	3	4	4	3	7	Shell weathered Limerock	
4'-6'	3	8	6	4	4		shell/ weathered Limerock	
6'-8'	4							
8'-10'	5							
13.5'-15'	6							
18.5'-20'	7							
23.5'-25'	8							
28.5'-30'	9							
33.5'-35'	10							
38.5'-40'	11							
43.5'-45'	12							
48.5'-50'	13							
53.5'-55'	14							
58.5'-60'	15							
63.5'-65'	16							
68.5'-70'	17							
73.5'-75'	18							
78.5'-80'	19							
83.5'-85'	20							
88.5'-90'	21							
93.5'-95'	22							
98.5'-100'	23							
103.5'-105'	24							
108.5'-110'	25							

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website: https://amdrillinc.com/

Encountered Groundwater: _____

24 Hour Groundwater: _____

Loss of Circulation: _____

Surface Elevation: water depth 12 FT

Project #: _____ Client: Taylor

Project I.D.: _____

Project Location: Okeechobee Channel

2-24-21

Driller: Dean 2-24-21 Boring Started On: 2:05 PM

Drill Rig Type: CME-55 Completed: 2:15 PM

Boring #: B-11 Sheet #: _____

Boring Location: 36 79937 8081268

Spoon Data: Inside Dia.: _____ Outside Dia.: _____

Hammer Data: Drop: Auto Weight: _____

Casing Data: Size/Type: _____ Length: _____

Depth Interval (ft)	Sample Number	Hammer Blows 1st	2nd	3rd	4th	SPT N' Value	Soil Description	Comments
0'-2'	1	W/R	W/H	12	24	36	Sand Shell, weathered limerock	
2'-4'	2	24	26	50/4			limerock	
4'-6'	3							
6'-8'	4							
8'-10'	5							
13.5'-15'	6							
18.5'-20'	7							
23.5'-25'	8							
28.5'-30'	9							
33.5'-35'	10							
38.5'-40'	11							
43.5'-45'	12							
48.5'-50'	13							
53.5'-55'	14							
58.5'-60'	15							
63.5'-65'	16							
68.5'-70'	17							
73.5'-75'	18							
78.5'-80'	19							
83.5'-85'	20							
88.5'-90'	21							
93.5'-95'	22							
98.5'-100'	23							
103.5'-105'	24							
108.5'-110'	25							

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website: https://amdrillinc.com/

Encountered Groundwater: _____

24 Hour Groundwater: _____

Loss of Circulation: _____

Surface Elevation: Water Depth 11.5

Project #: _____ Client: Taylor

Project I.D.: _____

Project Location: Okeechobee Channel

Driller: Dean Boring Started On: 2-24-21 305 PM

Drill Rig Type: CME-55 Completed: 316 PM

Boring #: B12 Sheet #: _____

Boring Location: 2680106 80 84109

Spoon Data: Inside Dia.: _____ Outside Dia.: _____

Hammer Data: Drop: Auto Weight: _____

Casing Data: Size/Type: _____ Length: _____

Depth Interval (ft)	Sample Number	Hammer Blows 1st	2nd	3rd	4th	SPT N' Value	Soil Description	Comments
0'-2'	1	W/R	W/R	W/H	1		Lime Rock	
2'-4'	2	10	12	50/5			Lime Rock	
4'-6'	3							
6'-8'	4							
8'-10'	5							
13.5'-15'	6							
18.5'-20'	7							
23.5'-25'	8							
28.5'-30'	9							
33.5'-35'	10							
38.5'-40'	11							
43.5'-45'	12							
48.5'-50'	13							
53.5'-55'	14							
58.5'-60'	15							
63.5'-65'	16							
68.5'-70'	17							
73.5'-75'	18							
78.5'-80'	19							
83.5'-85'	20							
88.5'-90'	21							
93.5'-95'	22							
98.5'-100'	23							
103.5'-105'	24							
108.5'-110'	25							

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website: https://amdrillinc.com/

Encountered Groundwater: _____

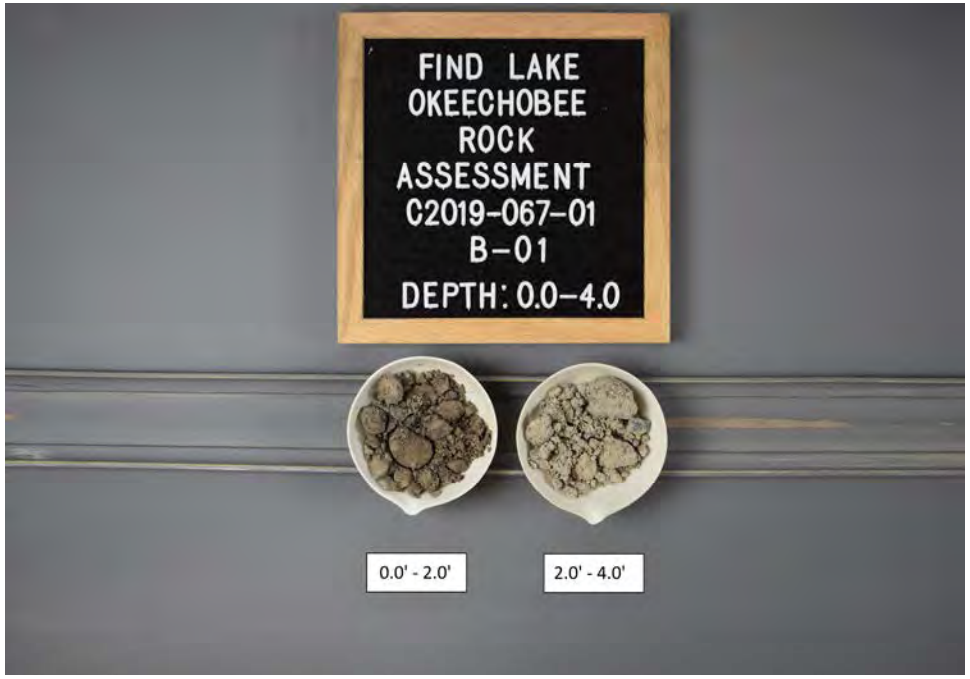
24 Hour Groundwater: _____

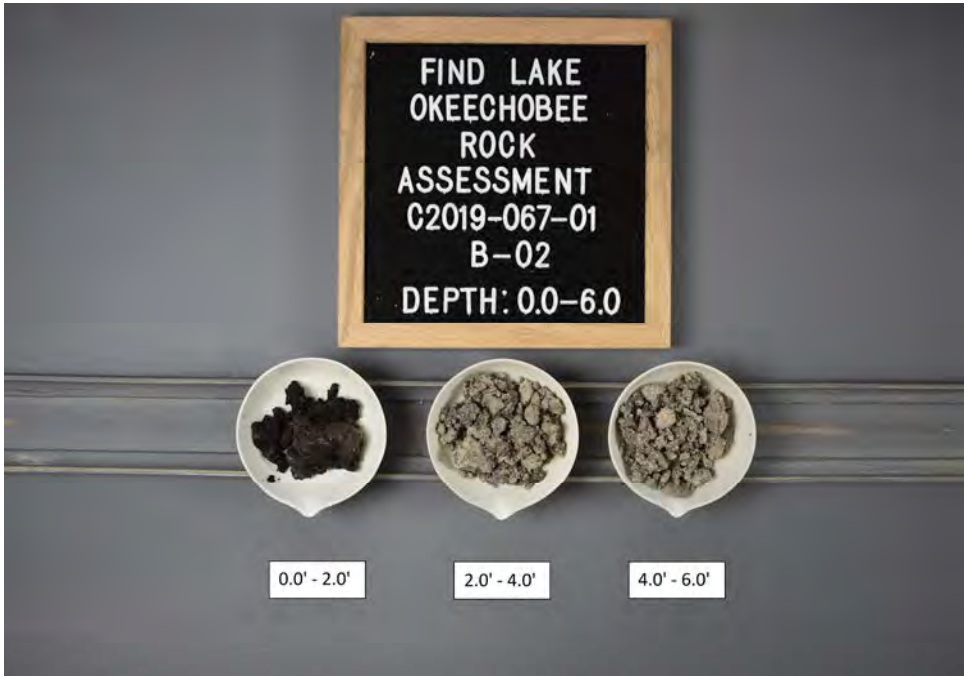
Loss of Circulation: _____

Surface Elevation: water depth 10 ft

APPENDIX C

Sediment Sample Photographs


FIND LAKE
OKEECHOBEE
ROCK
ASSESSMENT
C2019-067-01
B-01
DEPTH: 0.0-4.0
0.0' - 2.0'
2.0' - 4.0'

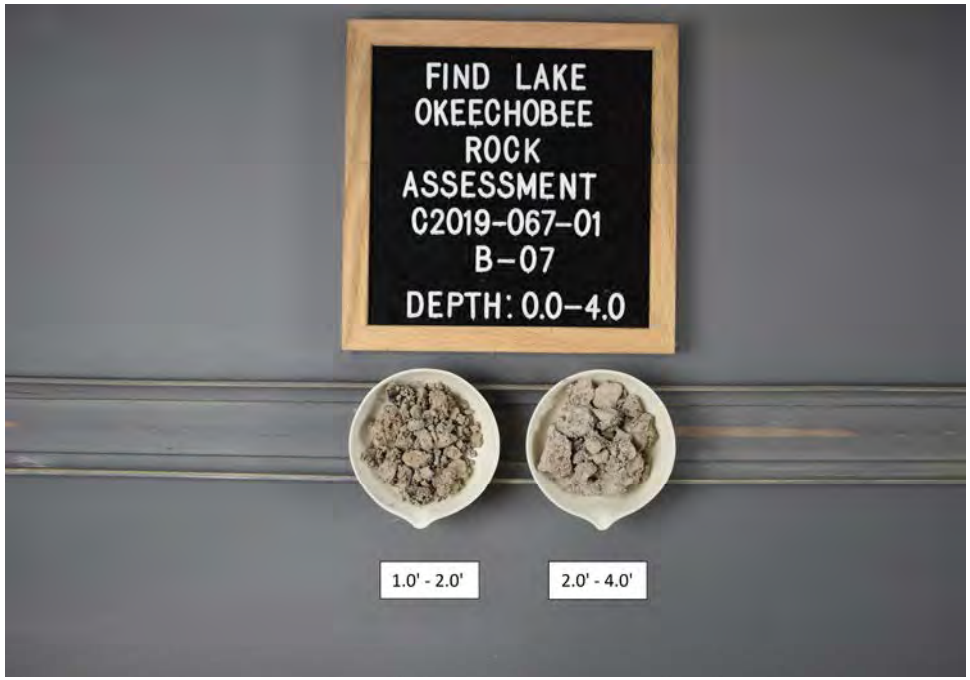

FIND LAKE
OKEECHOBEE
ROCK
ASSESSMENT
C2019-067-01
B-02
DEPTH: 0.0-6.0
0.0' - 2.0'
2.0' - 4.0'
4.0' - 6.0'


FIND LAKE
OKEECHOBEE
ROCK
ASSESSMENT
C2019-067-01
B-03
DEPTH: 0.0-4.5
0.0' -2.0'
2.0' - 3.0'
3.0' - 4.0'
4.0' - 4.5'


FIND LAKE
OKEECHOBEE
ROCK
ASSESSMENT
C2019-067-01
B-04
DEPTH: 0.0-6.0
0.0' - 1.0'
1.0' - 2.0'
2.0' - 4.0'
4.0' - 6.0'


FIND LAKE
OKEECHOBEE
ROCK
ASSESSMENT
C2019-067-01
B-05
DEPTH: 0.0-6.0
0.0' - 2.0'
2.0' - 4.0'
4.0' - 6.0'


FIND LAKE
OKEECHOBEE
ROCK
ASSESSMENT
C2019-067-01
B-06
DEPTH: 0.0-6.0
0.0' -1.5'
1.5' - 2.0'
2.0' - 4.0'
4.0' - 6.0'

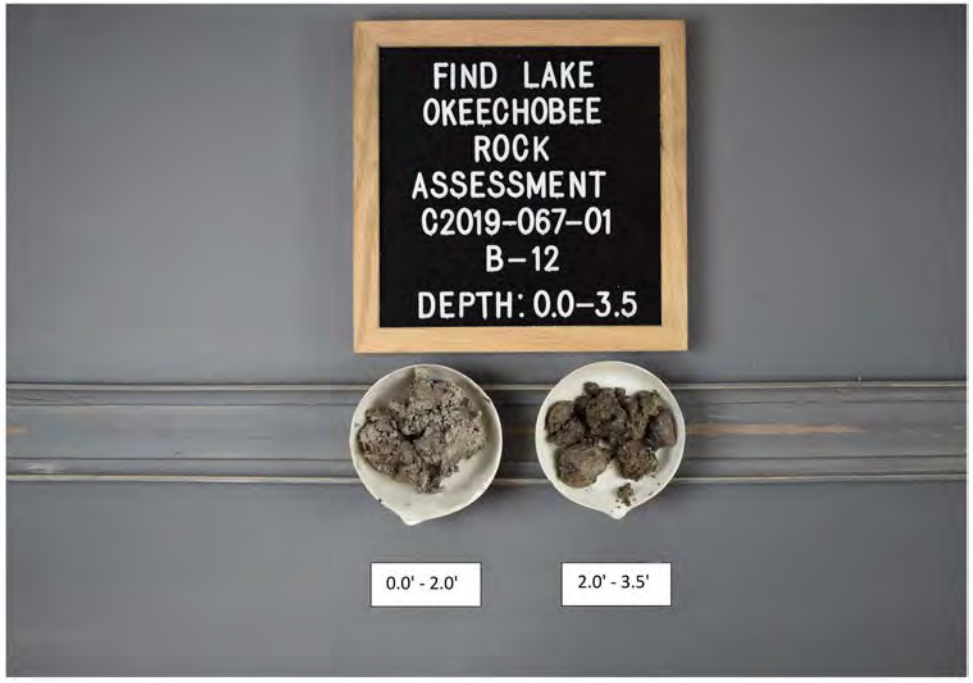

FIND LAKE
OKEECHOBEE
ROCK
ASSESSMENT
C2019-067-01
B-07
DEPTH: 0.0-4.0
1.0' - 2.0'
2.0' - 4.0'


FIND LAKE
OKEECHOBEE
ROCK
ASSESSMENT
C2019-067-01
B-08
DEPTH: 0.0-5.5
0.0' - 2.0'
2.0' - 4.0'
4.0' - 5.5'


FIND LAKE
OKEECHOBEE
ROCK
ASSESSMENT
C2019-067-01
B-09
DEPTH: 0.0-6.0
0.0' - 2.0'
2.0' - 4.0'
4.0' - 6.0'

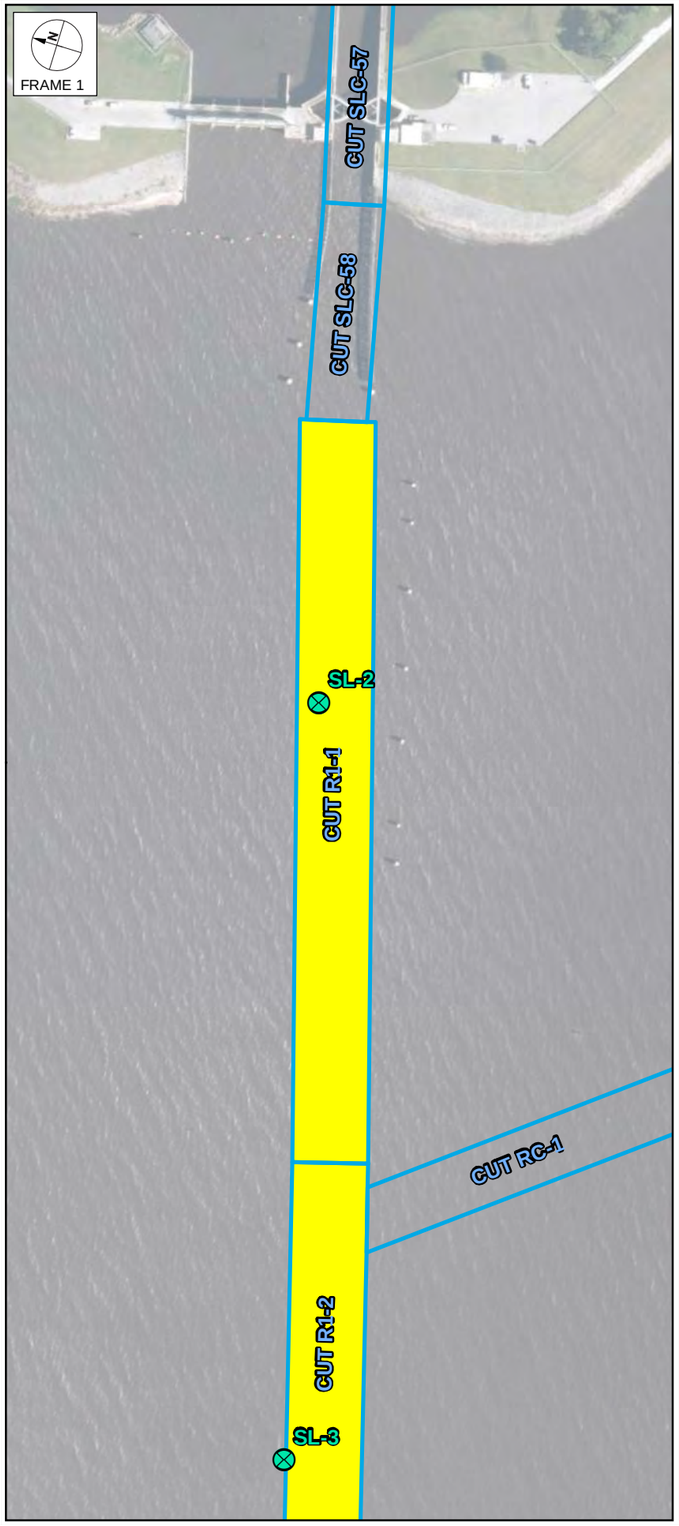

FIND LAKE
OKEECHOBEE
ROCK
ASSESSMENT
C2019-067-01
B-10
DEPTH: 0.0-6.0
0.0' - 2.0'
2.0' - 4.0'
4.0' - 6.0'

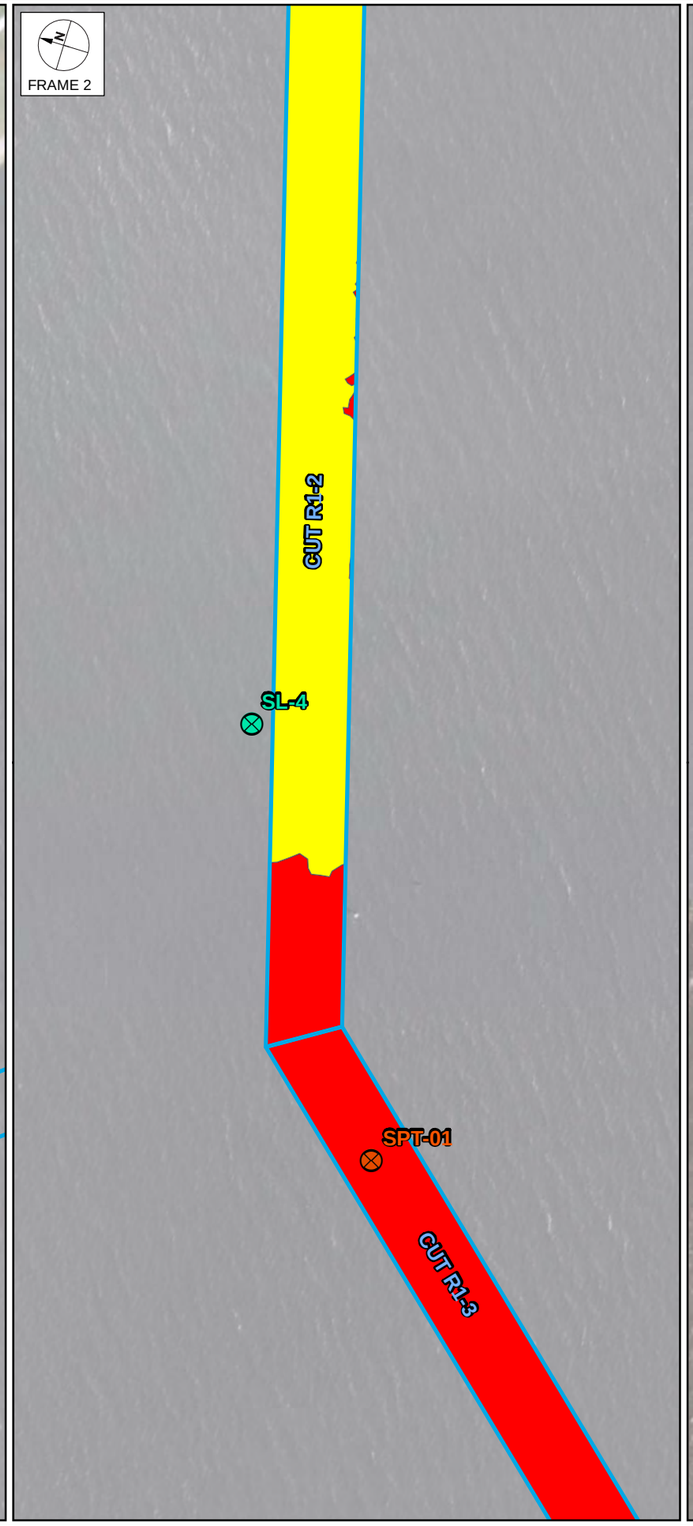

FIND LAKE
OKEECHOBEE
ROCK
ASSESSMENT
C2019-067-01
B-11
DEPTH: 0.0-3.3
0.0' - 2.0'
2.0' -3.3'

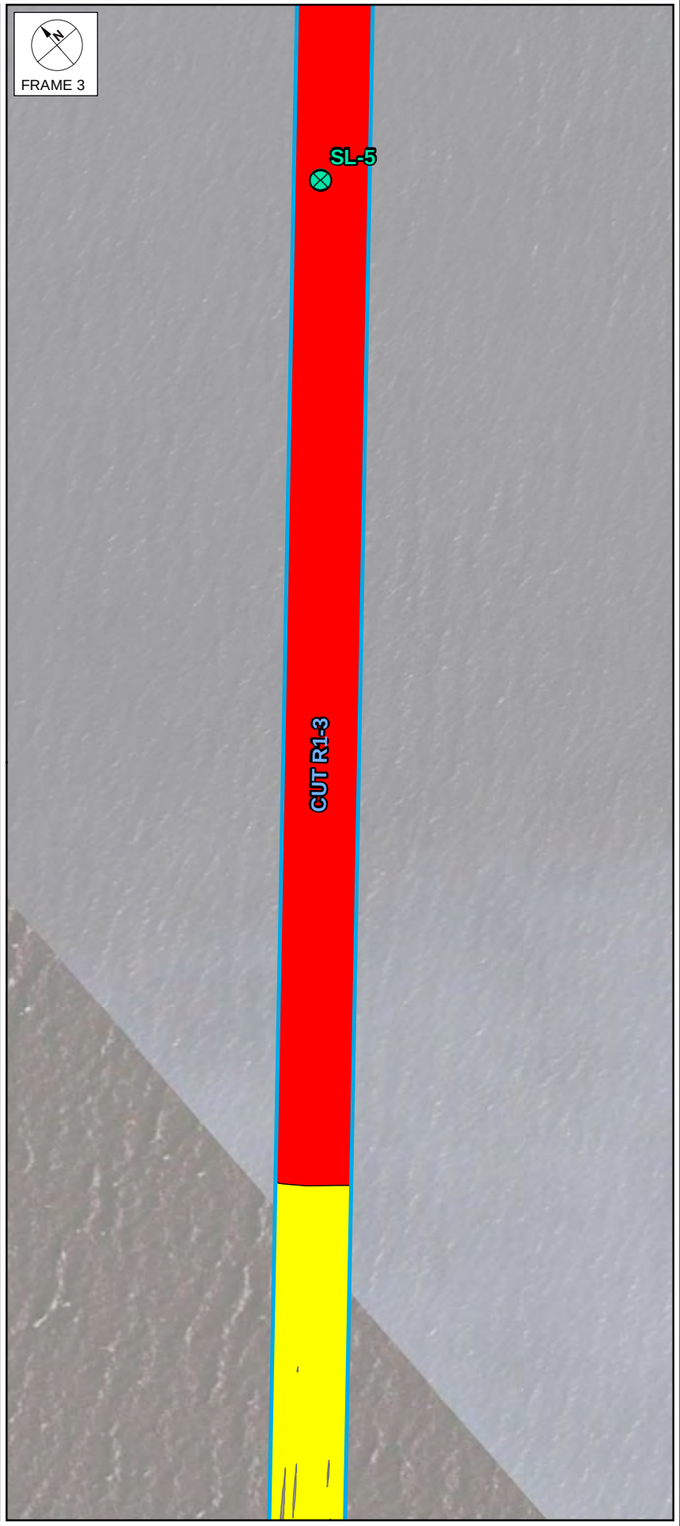

FIND LAKE
OKEECHOBEE
ROCK
ASSESSMENT
C2019-067-01
B-12
DEPTH: 0.0-3.5
0.0' - 2.0'
2.0' - 3.5'

APPENDIX D

Geologic Map of Channel Bottom







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FLORIDA INLAND NAVIGATION DISTRICT LAKE OKEECHOBEE ROUTE 1 CHANNEL SHOAL COMPOSITION

Legend

- SPT Locations
- Grab Sample Locations
- OWW/Route 1 Channel/Cuts

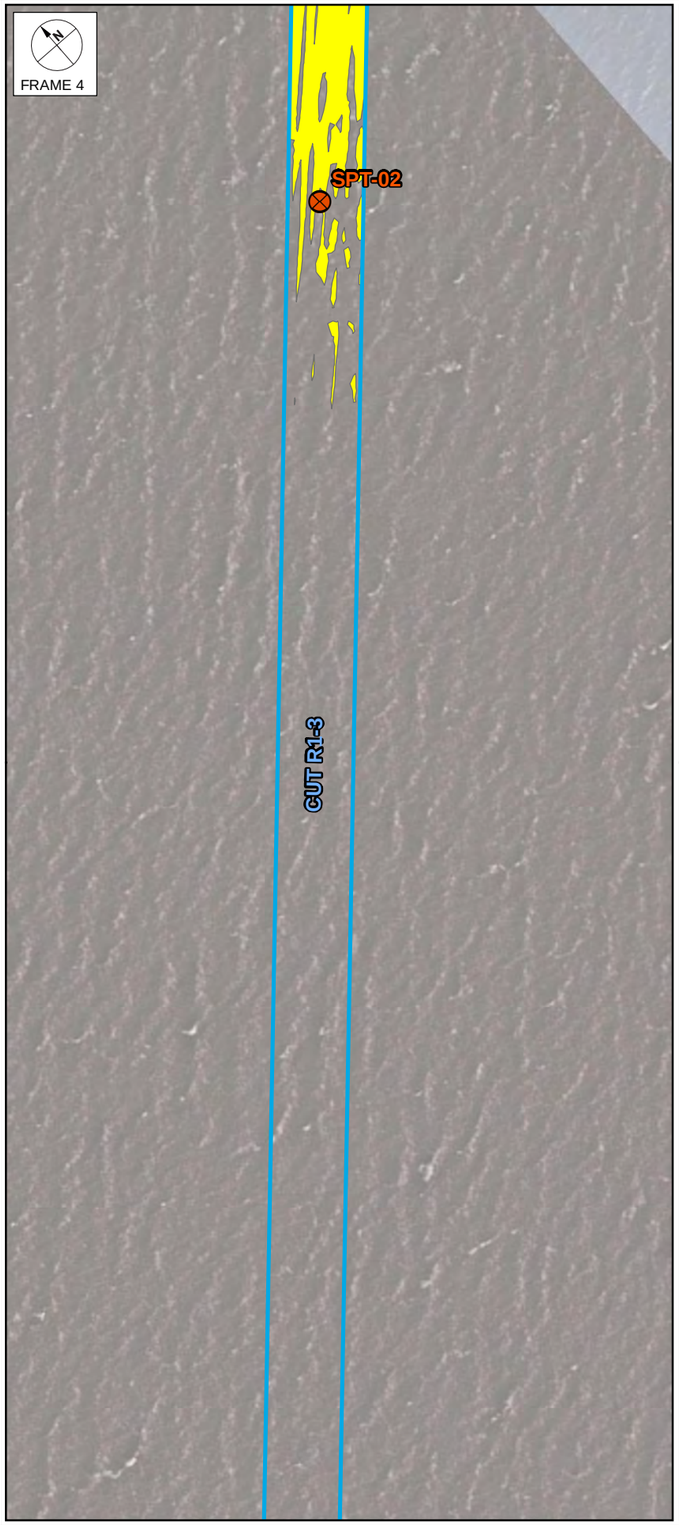
Geologic Classification

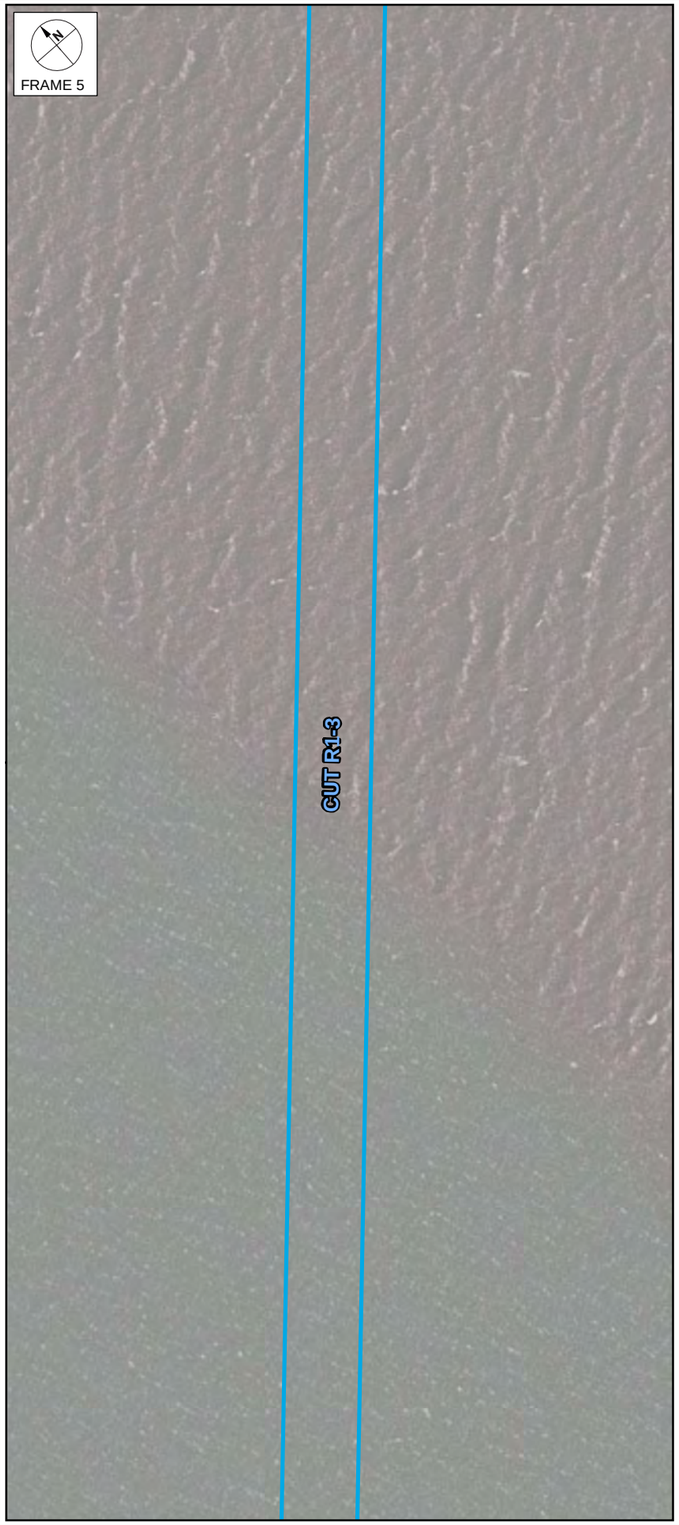
- Limestone Rock
- Unconsolidated Sediment

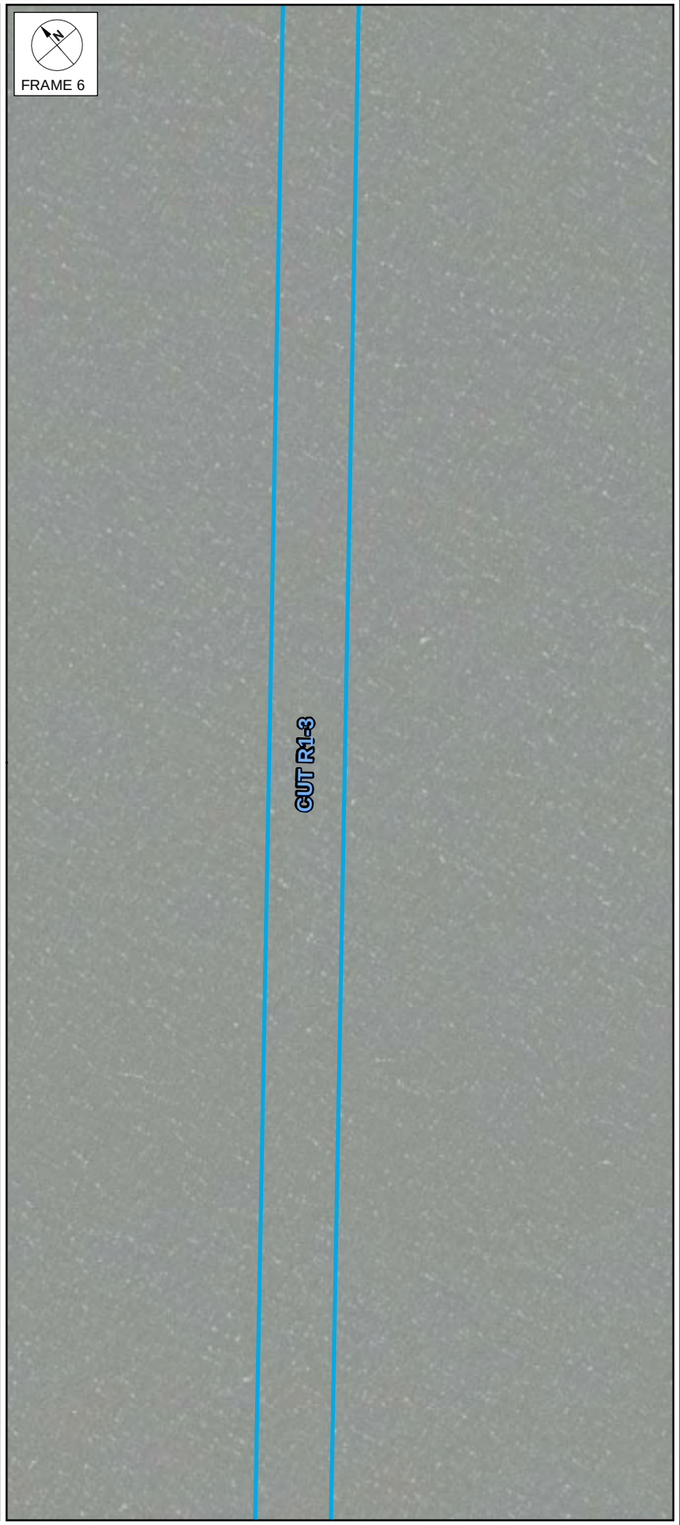
*Shoaling above -10-ft LOD

0 200 400
FEET

ATLANTIC INTRACOASTAL
FLORIDA INLAND NAVIGATION DISTRICT







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FLORIDA INLAND NAVIGATION DISTRICT
LAKE OKEECHOBEE
ROUTE 1 CHANNEL
SHOAL COMPOSITION

Legend

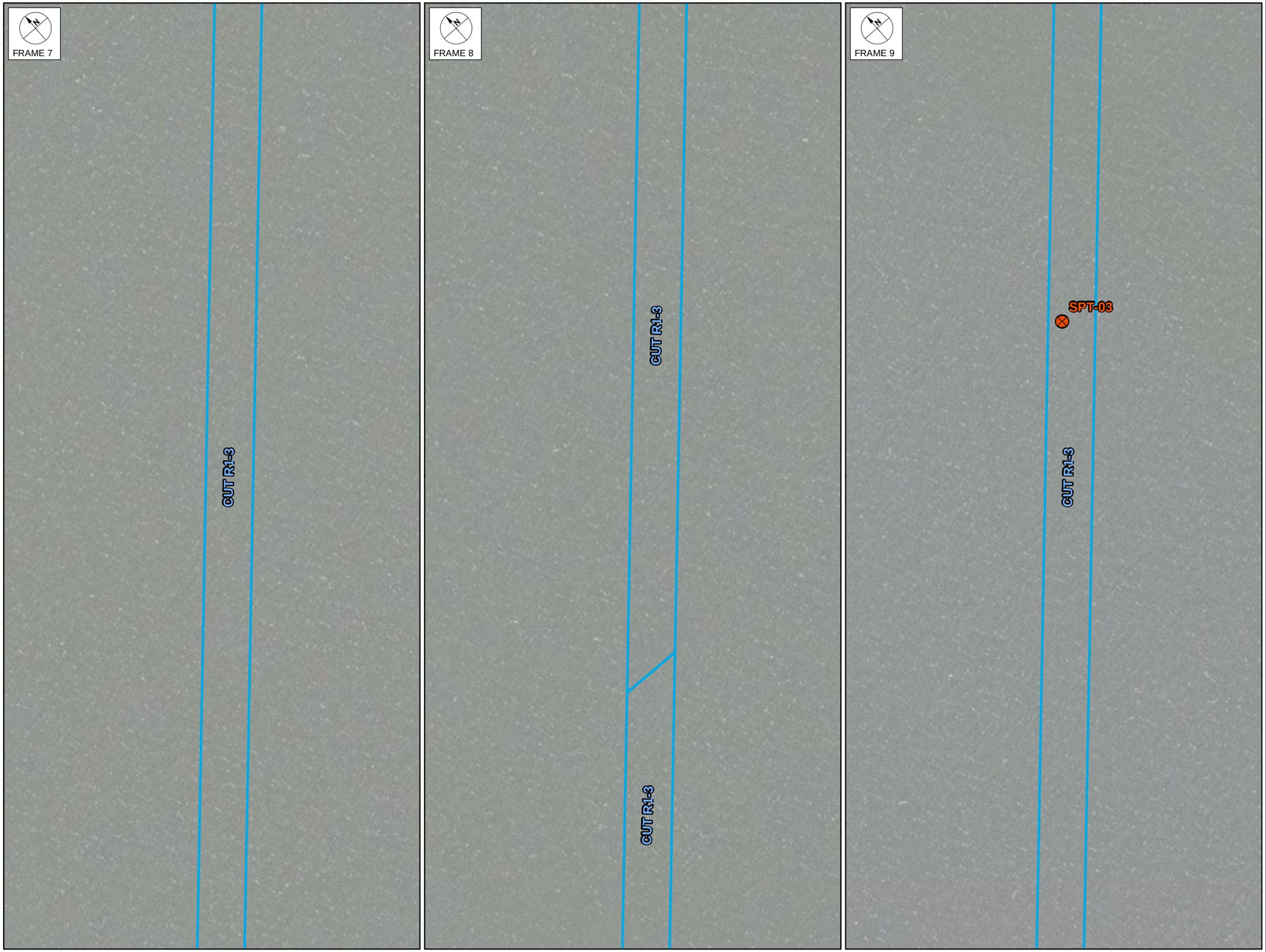
- SPT Locations
- Grab Sample Locations
- OWW/Route 1 Channel/Cuts

Geologic Classification

- Limestone Rock
- Unconsolidated Sediment
- *Shoaling above -10-ft LOD

0 200 400
FEET

ATLANTIC FLORIDA INLAND NAVIGATION DISTRICT INTRACOASTAL



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Legend

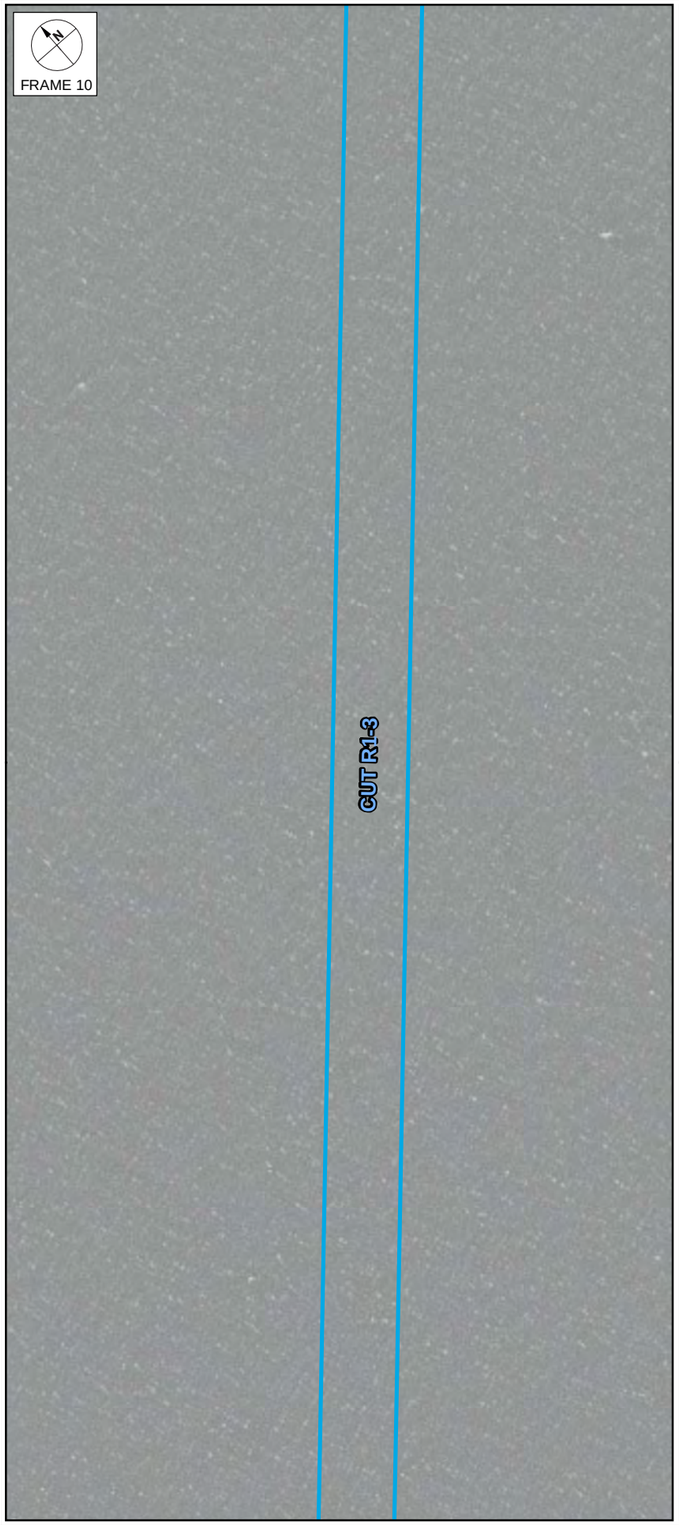
- SPT Locations
- Grab Sample Locations
- OWW/Route 1 Channel/Cuts

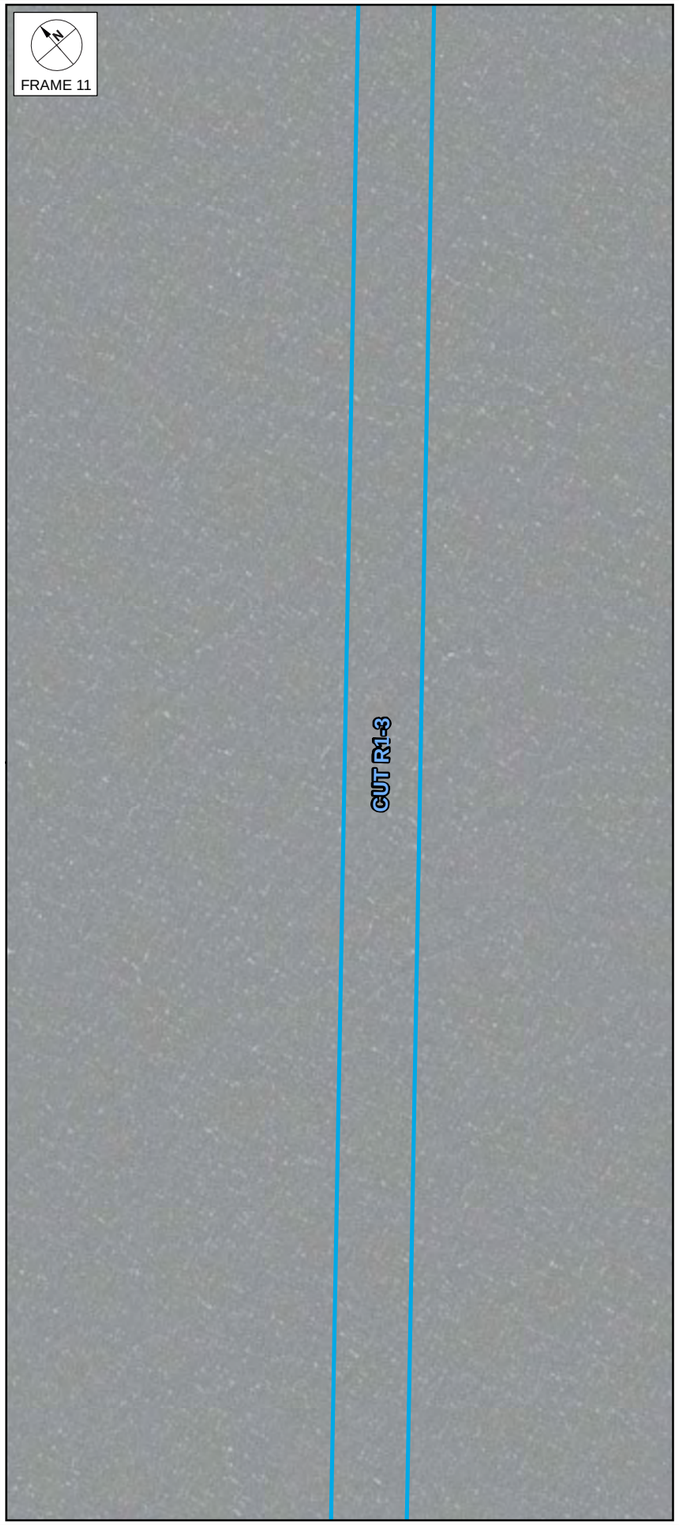
Geologic Classification

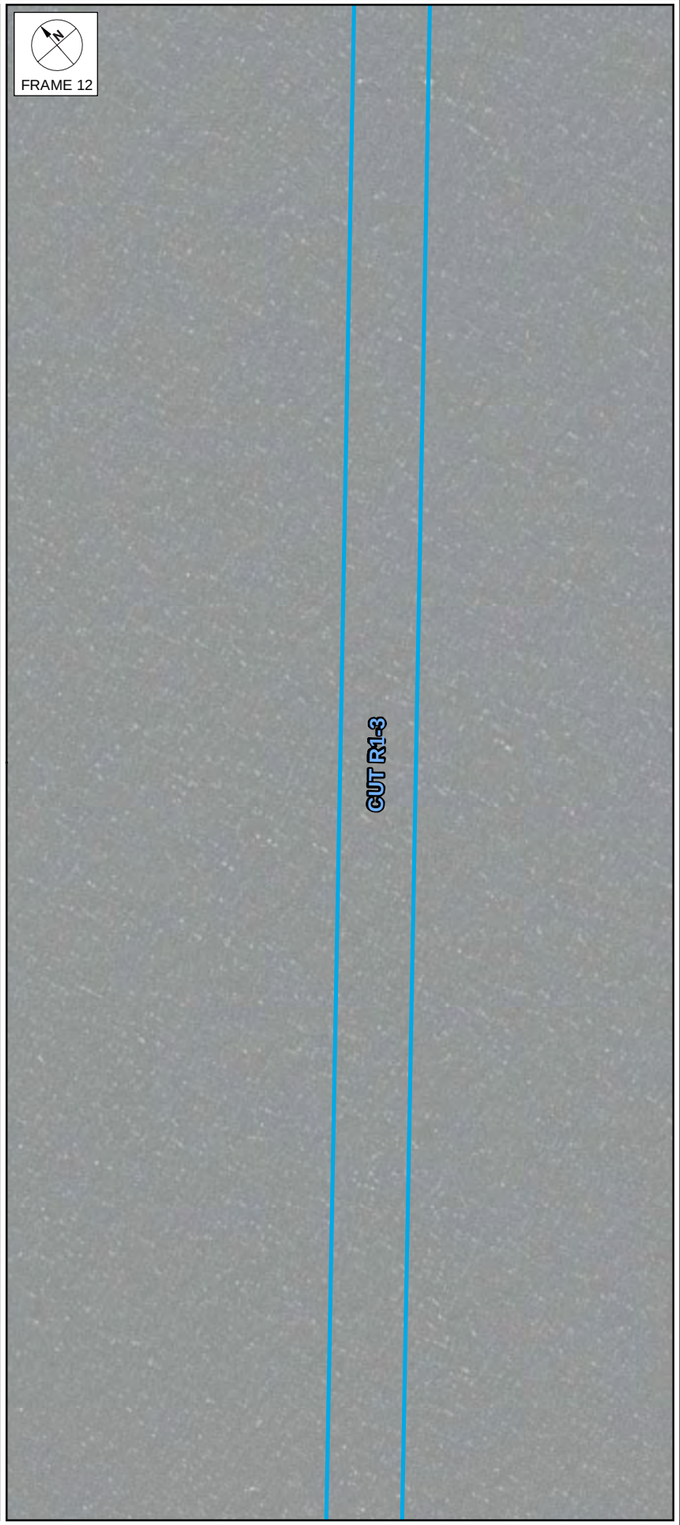
- Limestone Rock
- Unconsolidated Sediment
- *Shoaling above -10-ft LOD

0 200 400
FEET

ATLANTIC FLORIDA INLAND NAVIGATION DISTRICT INTRACOASTAL







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FLORIDA INLAND NAVIGATION DISTRICT
LAKE OKEECHOBEE
ROUTE 1 CHANNEL
SHOAL COMPOSITION

Legend

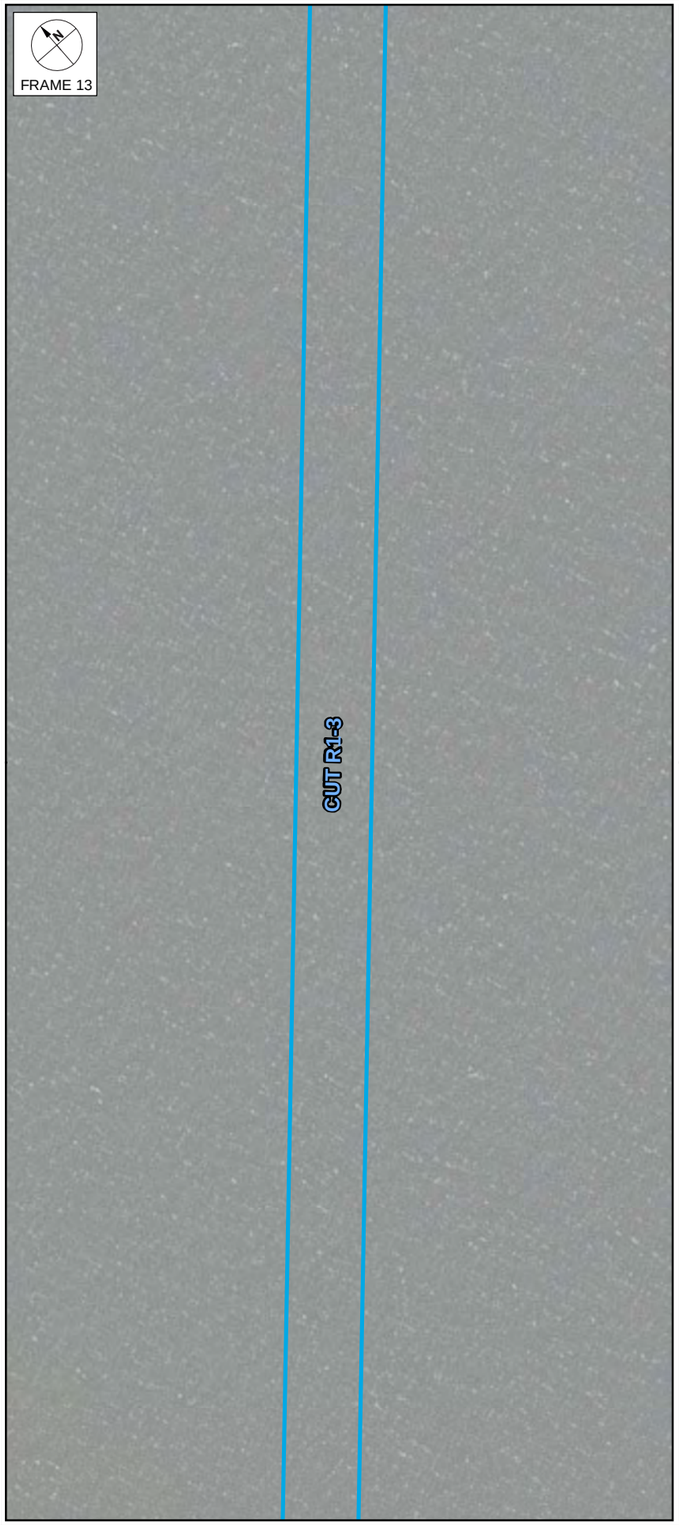
- SPT Locations
- Grab Sample Locations
- OWW/Route 1 Channel/Cuts

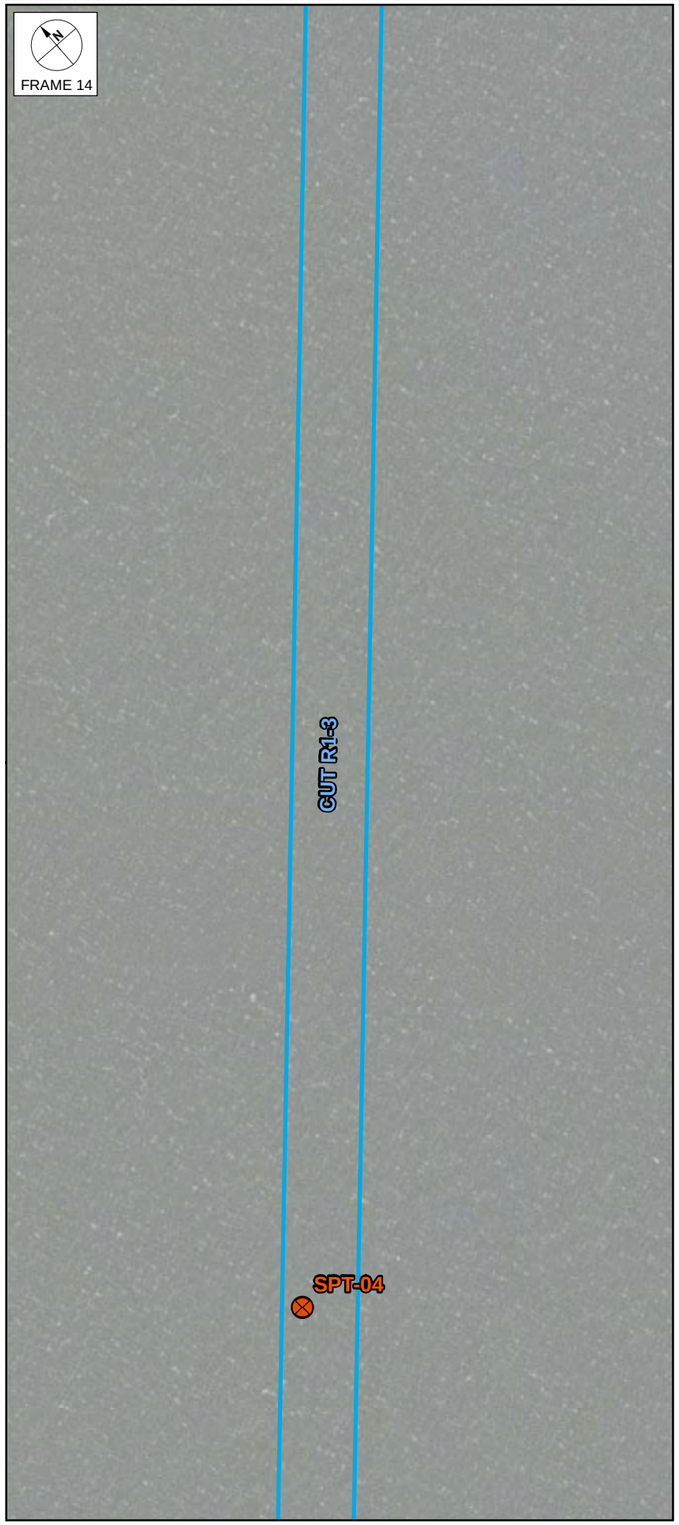
Geologic Classification

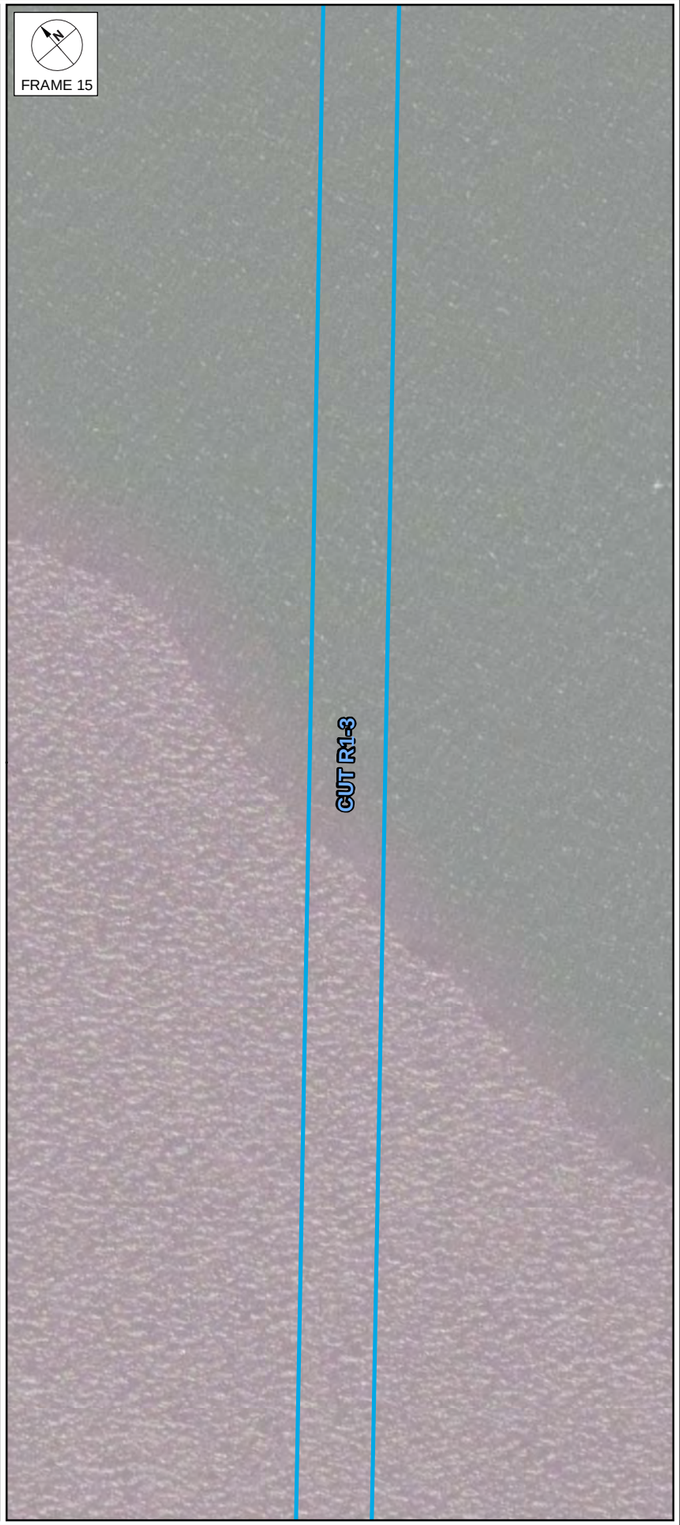
- Limestone Rock
- Unconsolidated Sediment
- *Shoaling above -10-ft LOD

0 200 400
FEET

ATLANTIC FLORIDA INLAND NAVIGATION DISTRICT INTRACOASTAL







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FLORIDA INLAND NAVIGATION DISTRICT
LAKE OKEECHOBEE
ROUTE 1 CHANNEL
SHOAL COMPOSITION

Legend

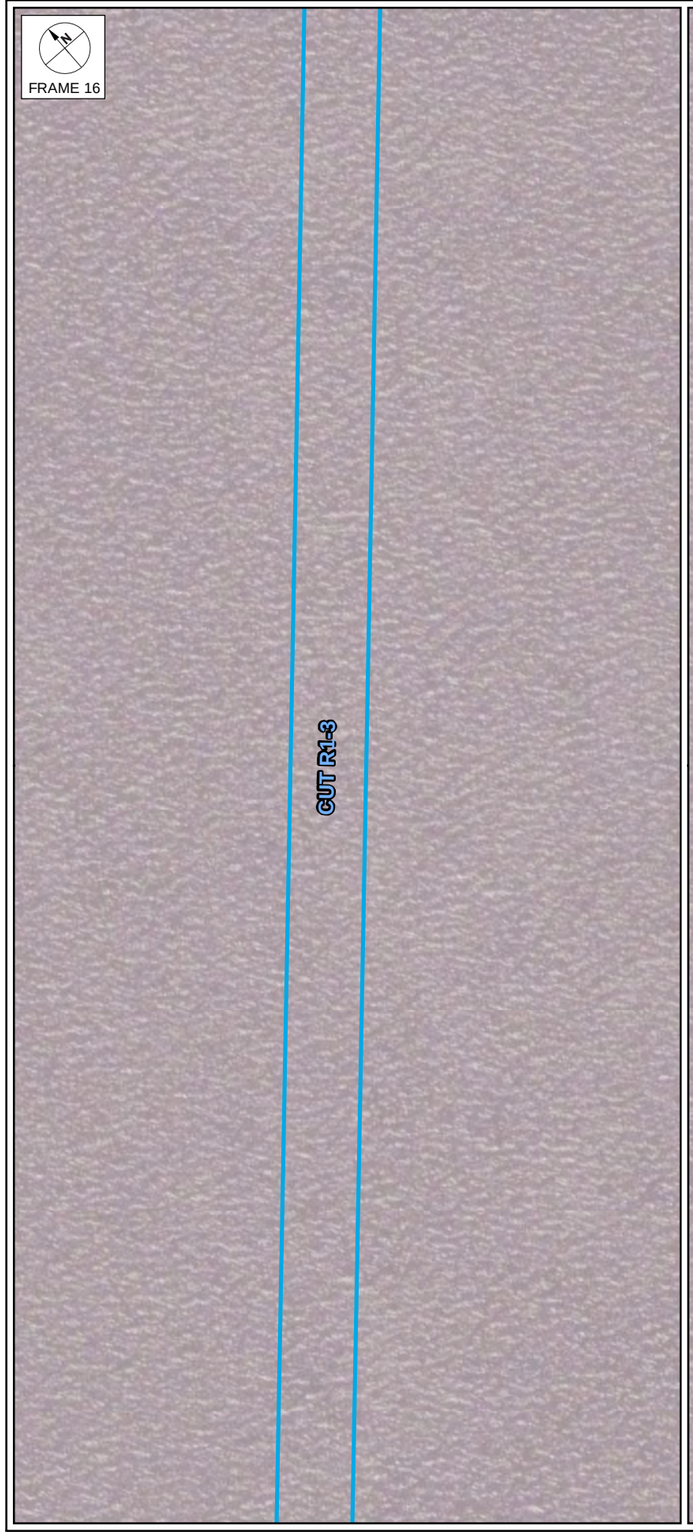
- SPT Locations
- Grab Sample Locations
- OWW/Route 1 Channel/Cuts

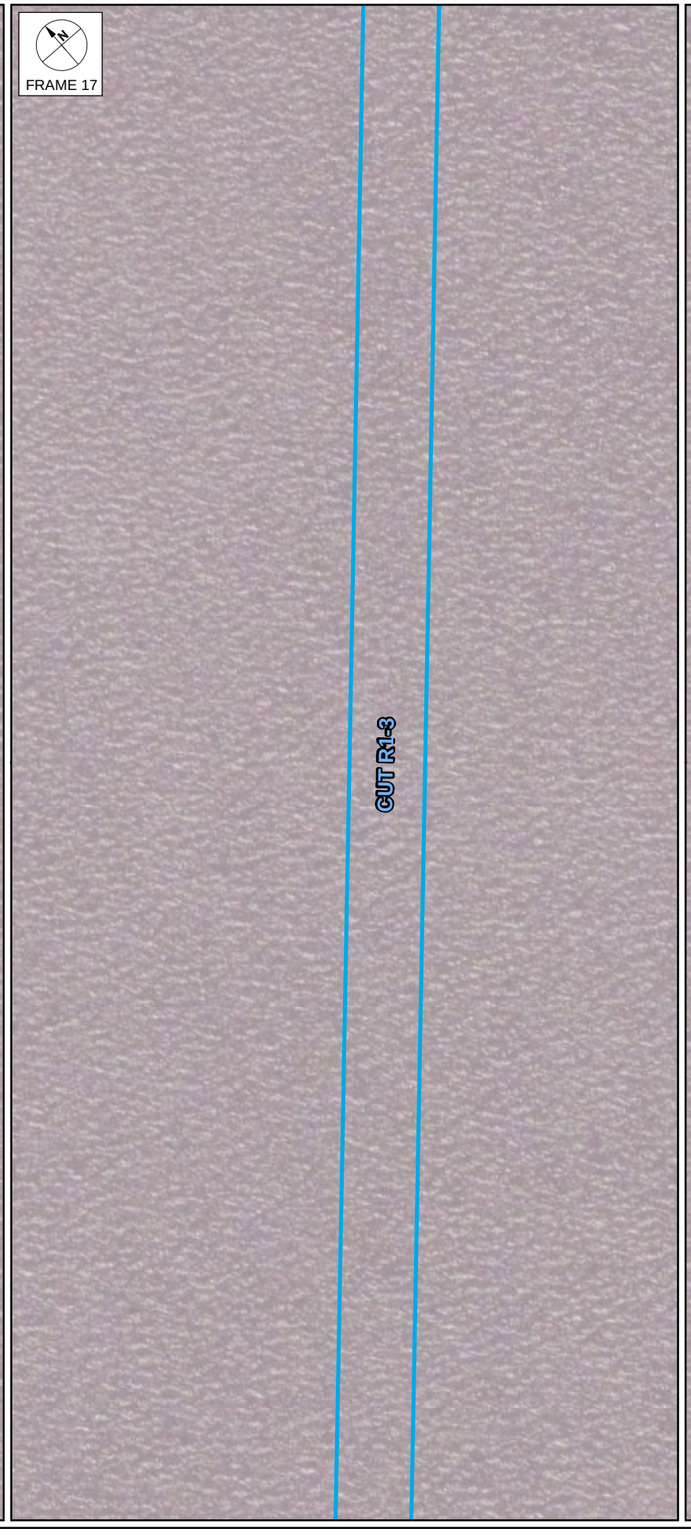
Geologic Classification

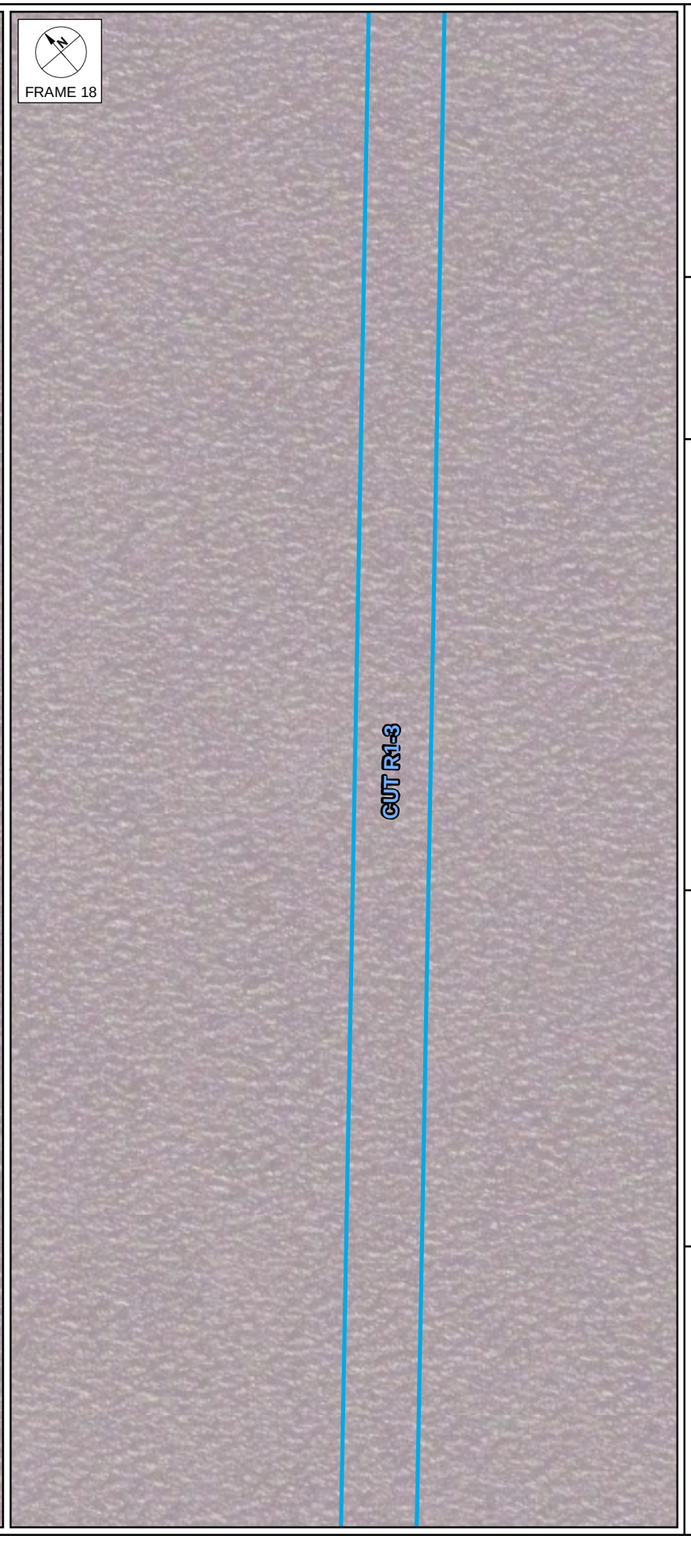
- Limestone Rock
- Unconsolidated Sediment
- *Shoaling above -10-ft LOD

0 200 400
FEET

ATLANTIC INTRACOASTAL
FLORIDA INLAND NAVIGATION DISTRICT







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FLORIDA INLAND NAVIGATION DISTRICT
LAKE OKEECHOBEE
ROUTE 1 CHANNEL
SHOAL COMPOSITION

Legend

- SPT Locations
- Grab Sample Locations
- OWW/Route 1 Channel/Cuts

Geologic Classification

- Limestone Rock
- Unconsolidated Sediment

*Shoaling above -10-ft LOD

0 200 400
FEET

ATLANTIC
FLORIDA INLAND
NAVIGATION DISTRICT
INTRACOASTAL

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FLORIDA INLAND NAVIGATION DISTRICT LAKE OKEECHOBEE ROUTE 1 CHANNEL SHOAL COMPOSITION

Legend

- SPT Locations
- Grab Sample Locations
- OWW/Route 1 Channel/Cuts

Geologic Classification

- Limestone Rock
- Unconsolidated Sediment

*Shoaling above -10-ft LOD

0 200 400
FEET

ATLANTIC FLORIDA INLAND NAVIGATION DISTRICT INTRACOASTAL

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FLORIDA INLAND NAVIGATION DISTRICT
LAKE OKEECHOBEE
ROUTE 1 CHANNEL
SHOAL COMPOSITION

Legend

- SPT Locations
- Grab Sample Locations
- OWW/Route 1 Channel/Cuts

Geologic Classification

- Limestone Rock
- Unconsolidated Sediment
- *Shoaling above -10-ft LOD

0 200 400
FEET

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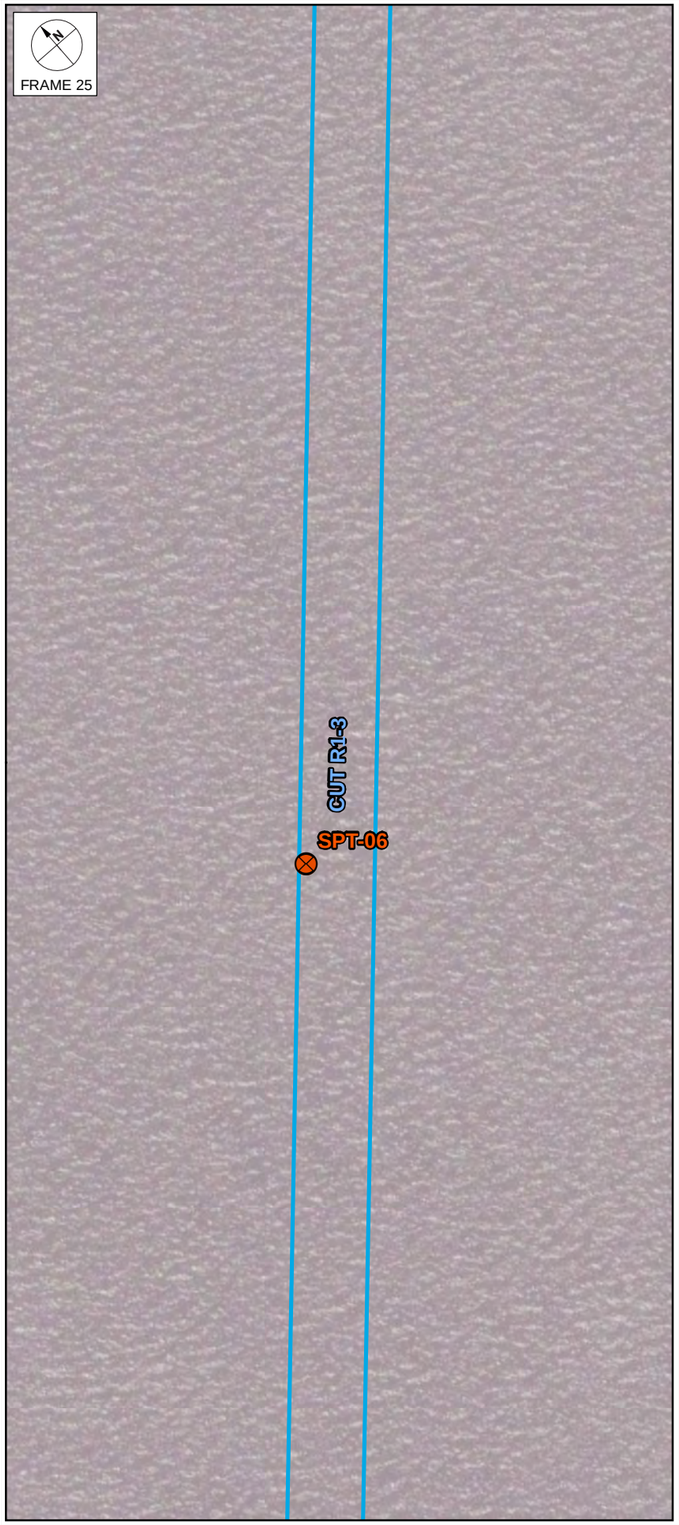
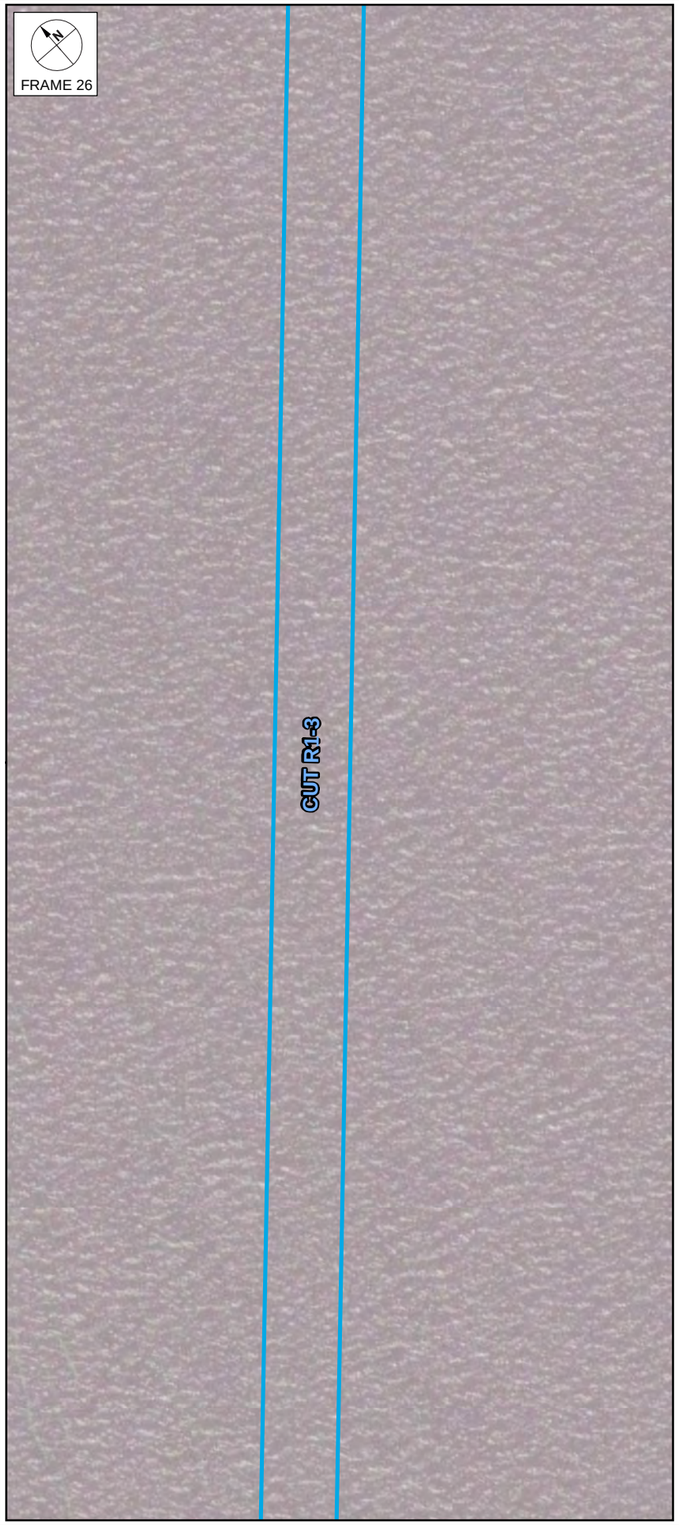
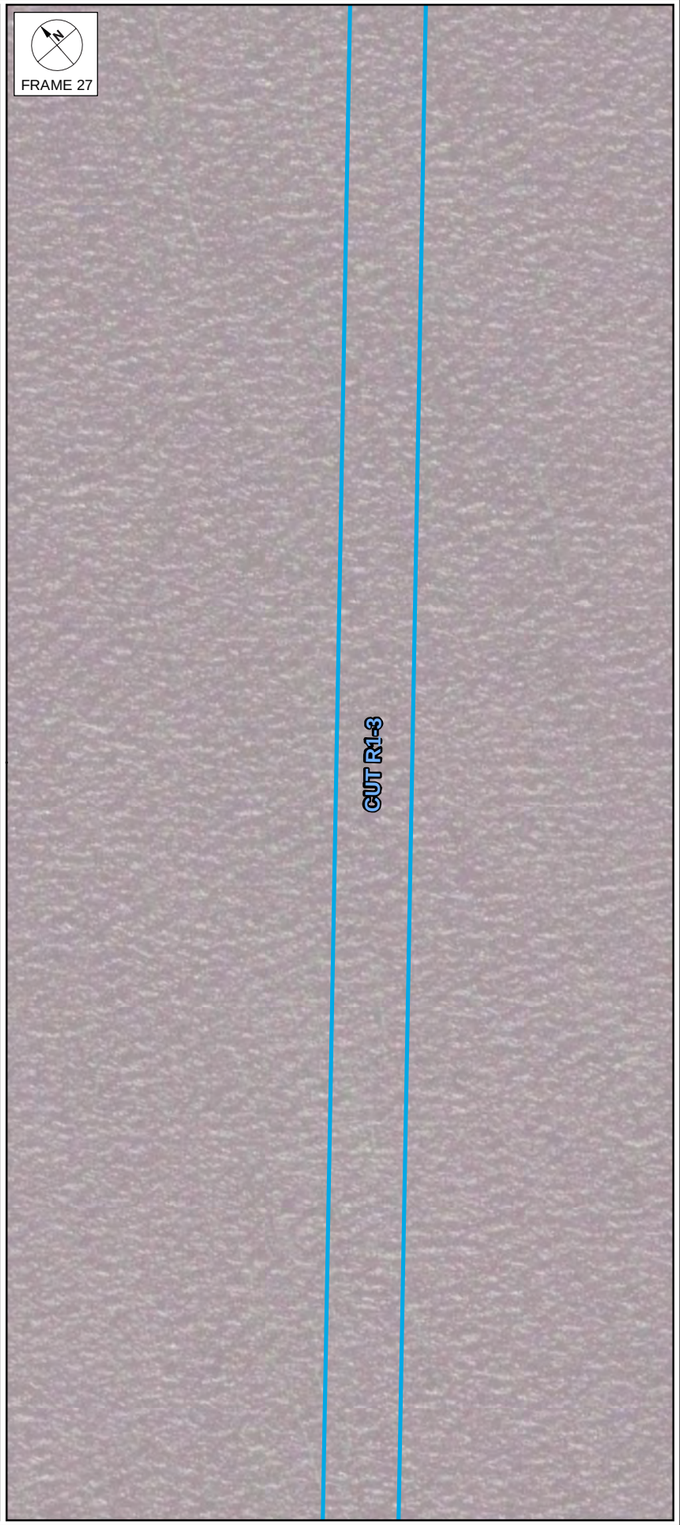
FLORIDA INLAND NAVIGATION DISTRICT







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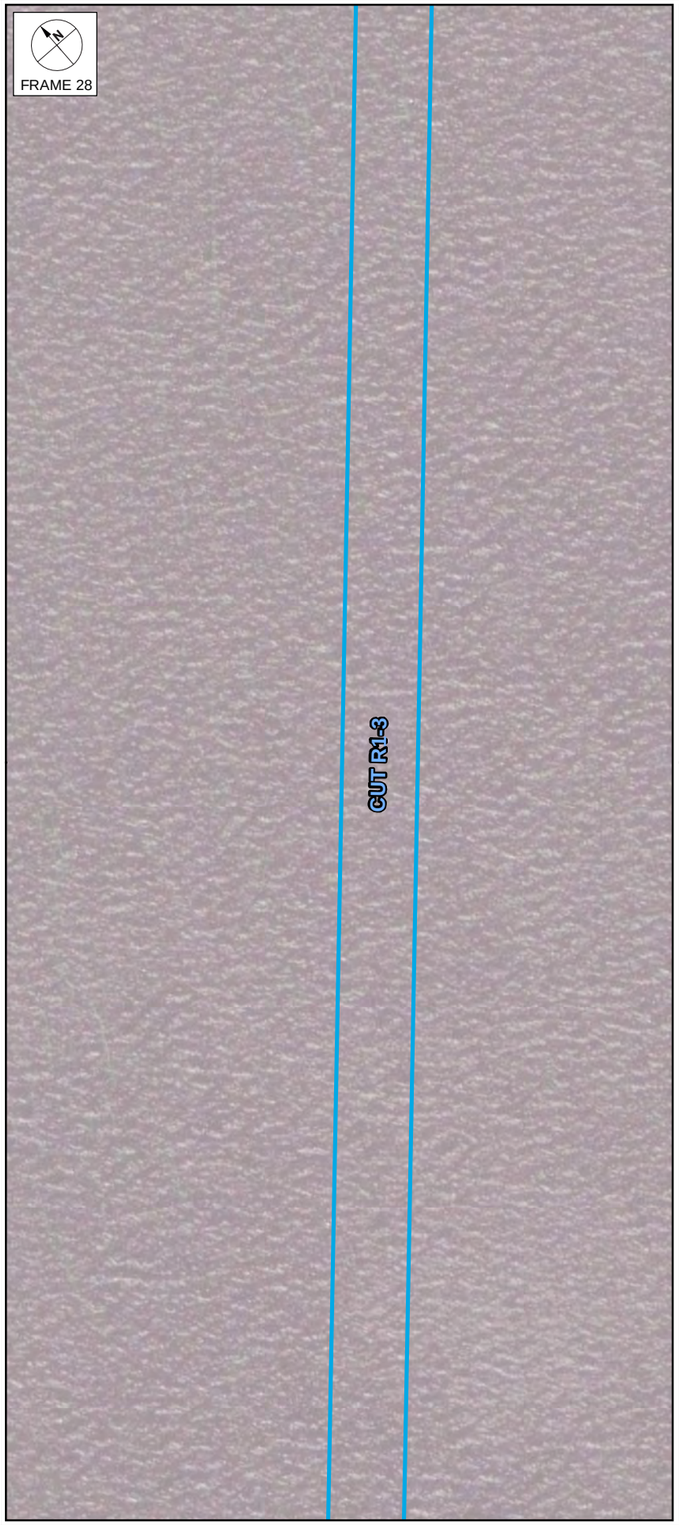

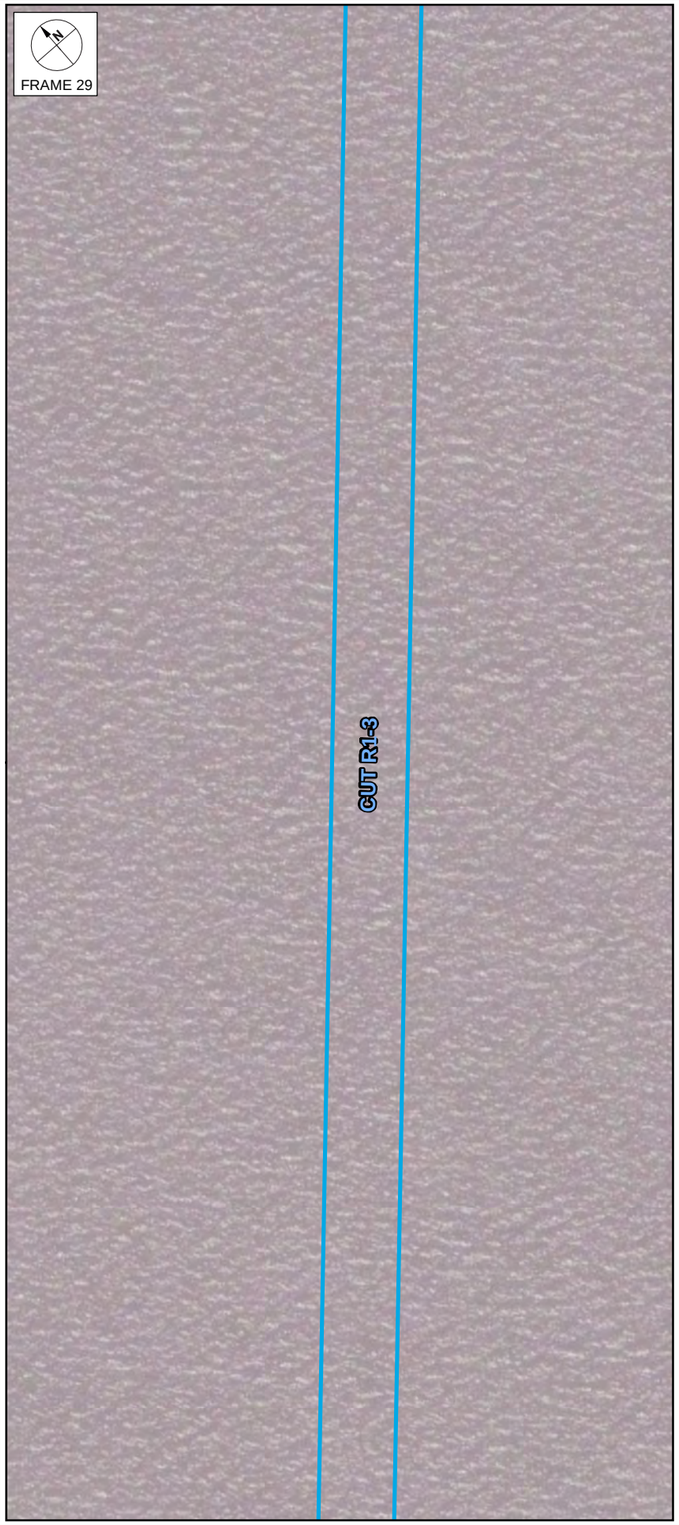

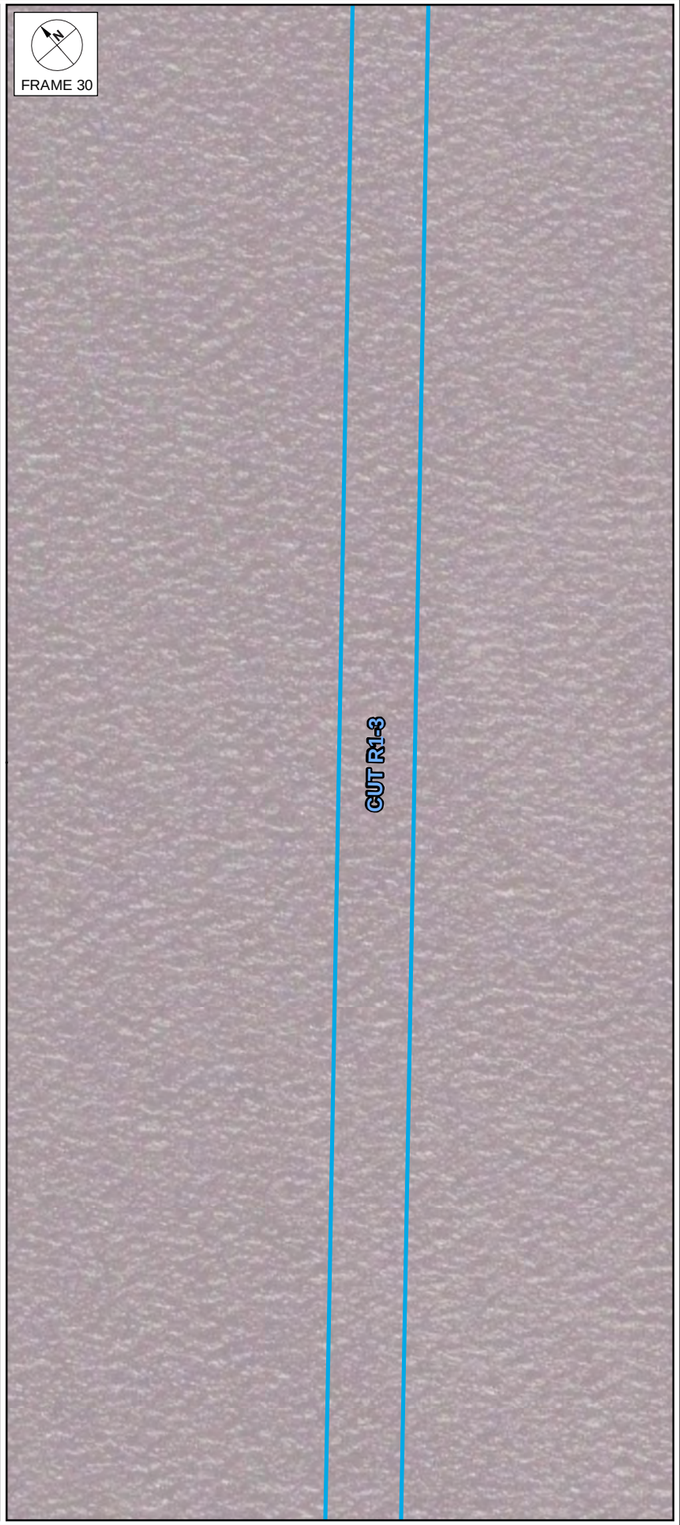

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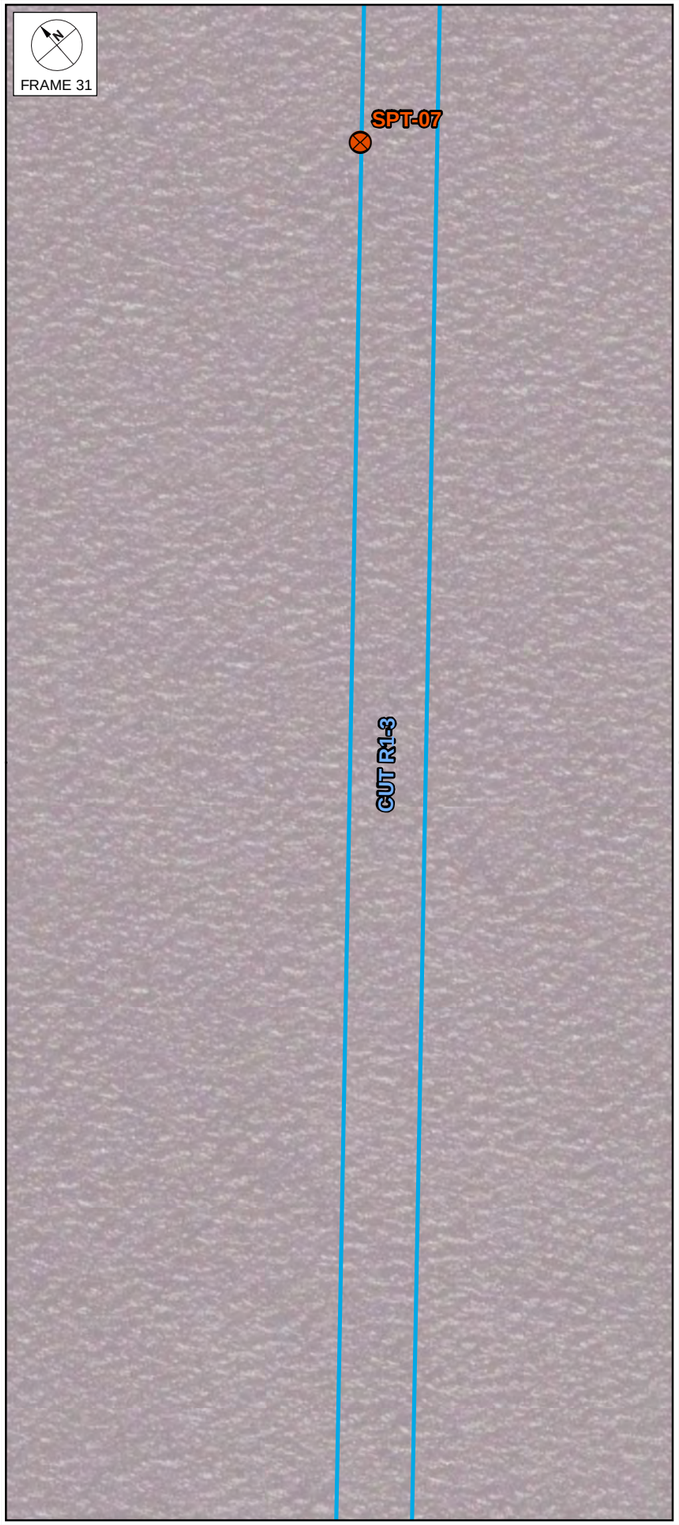

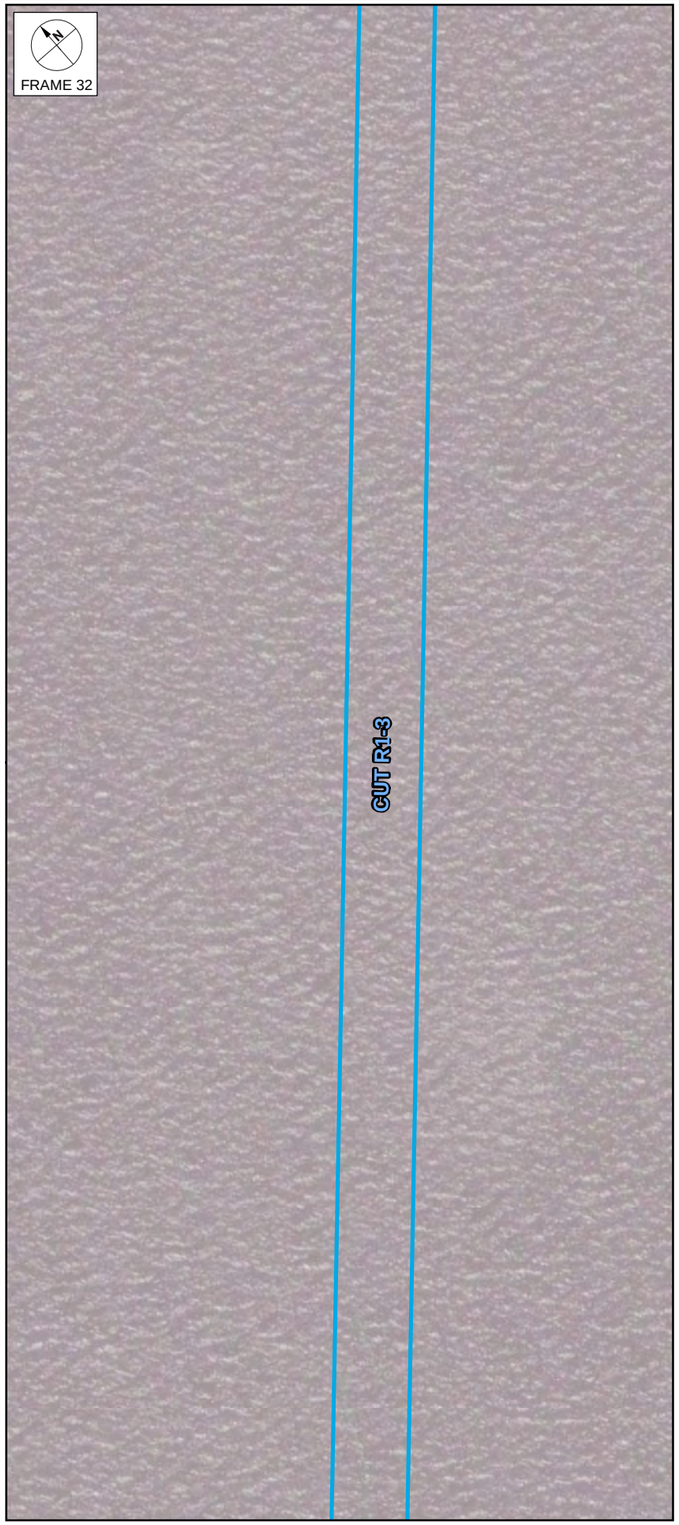

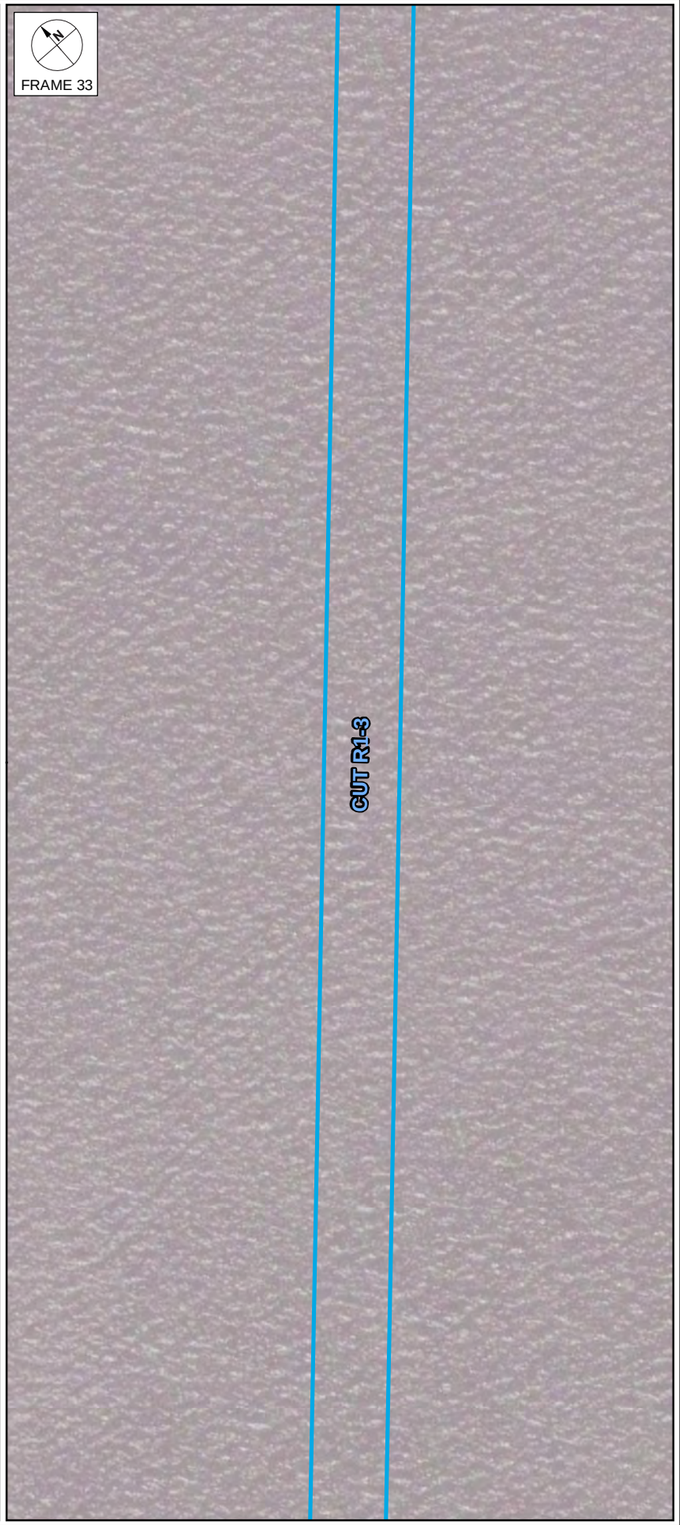

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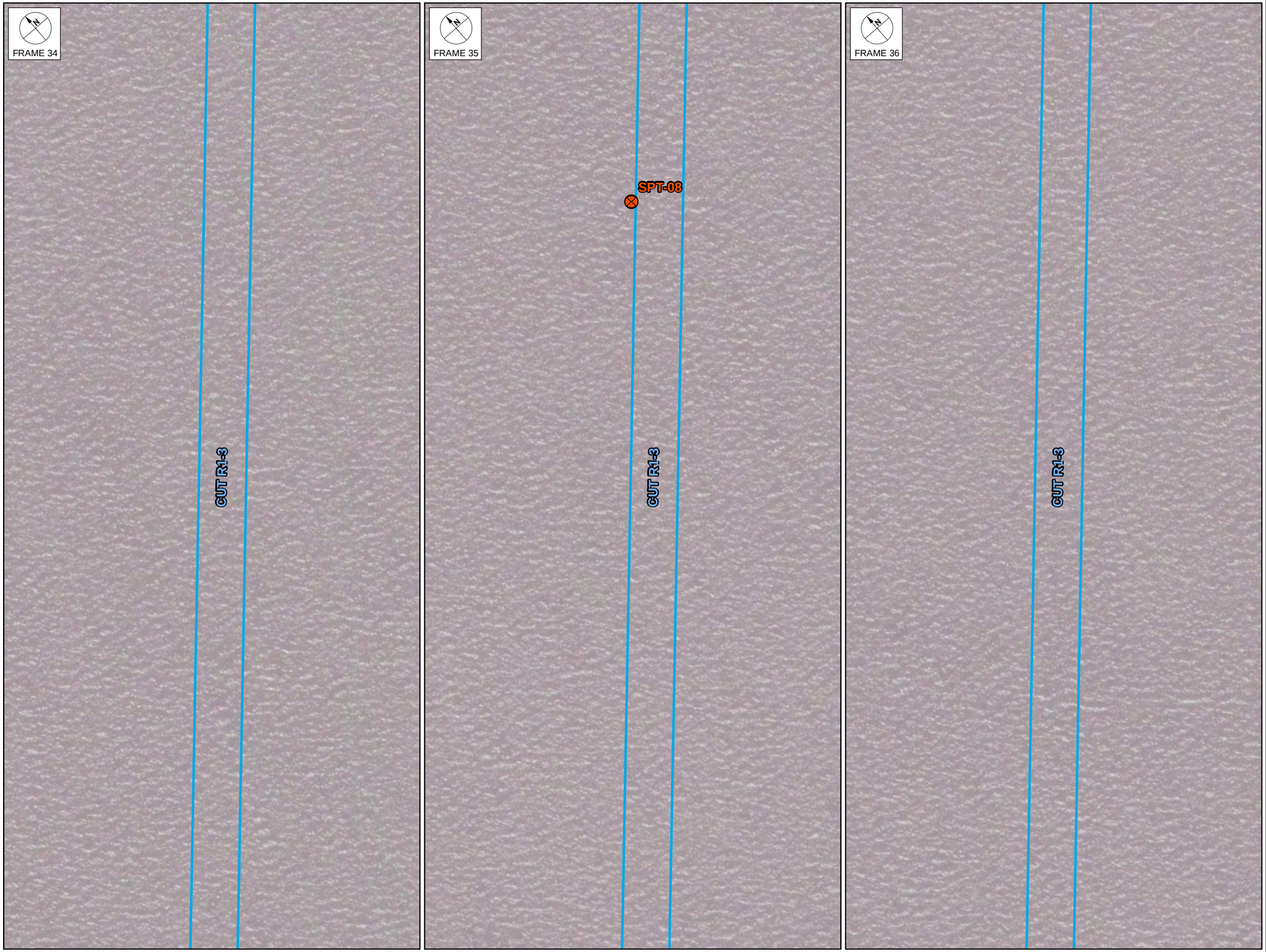

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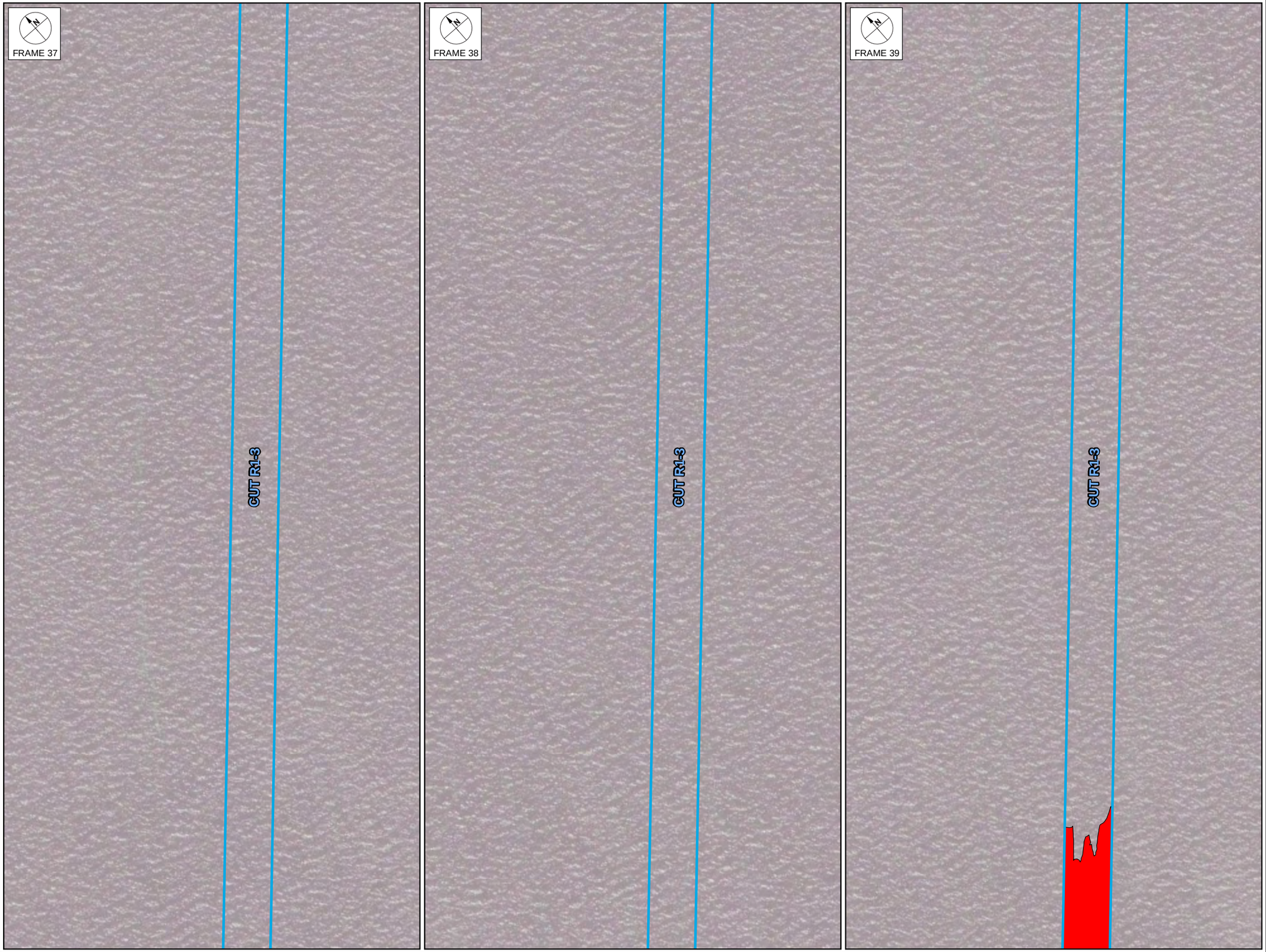

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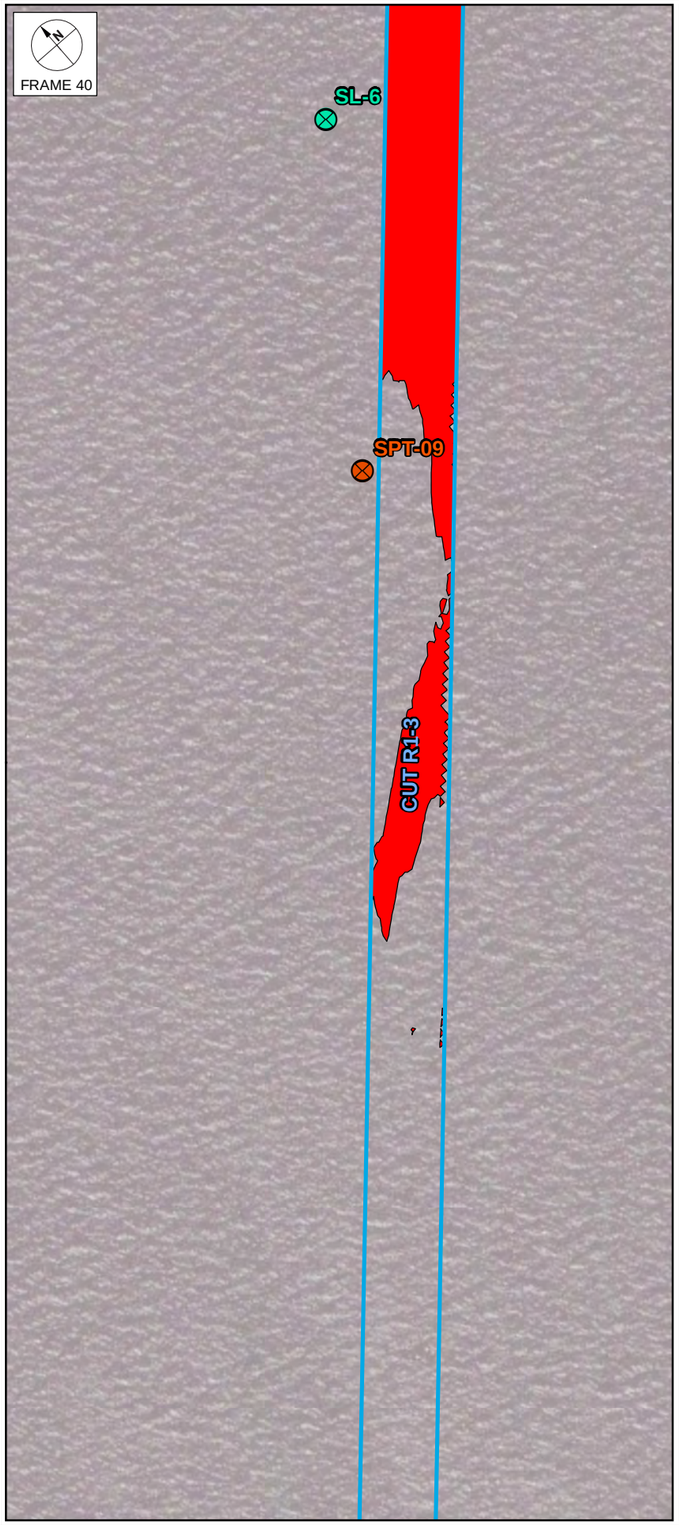

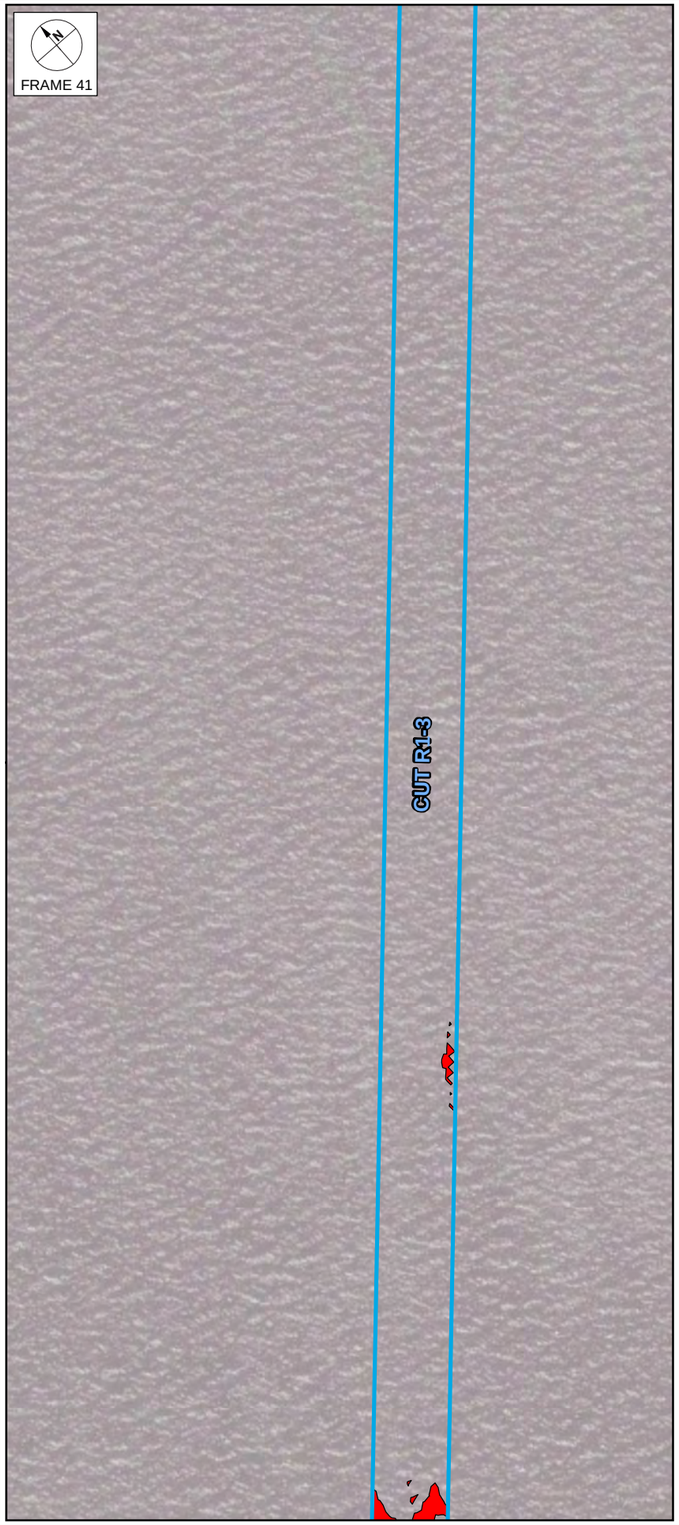

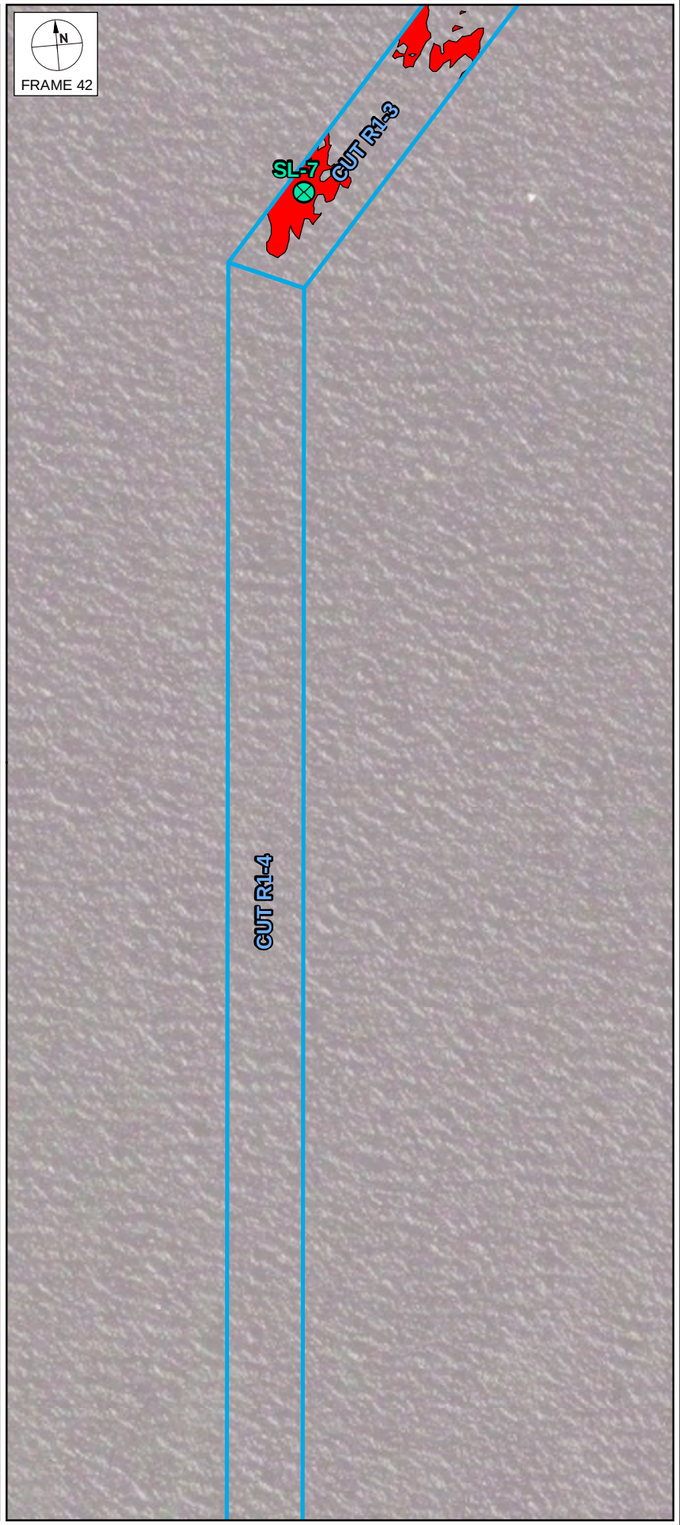

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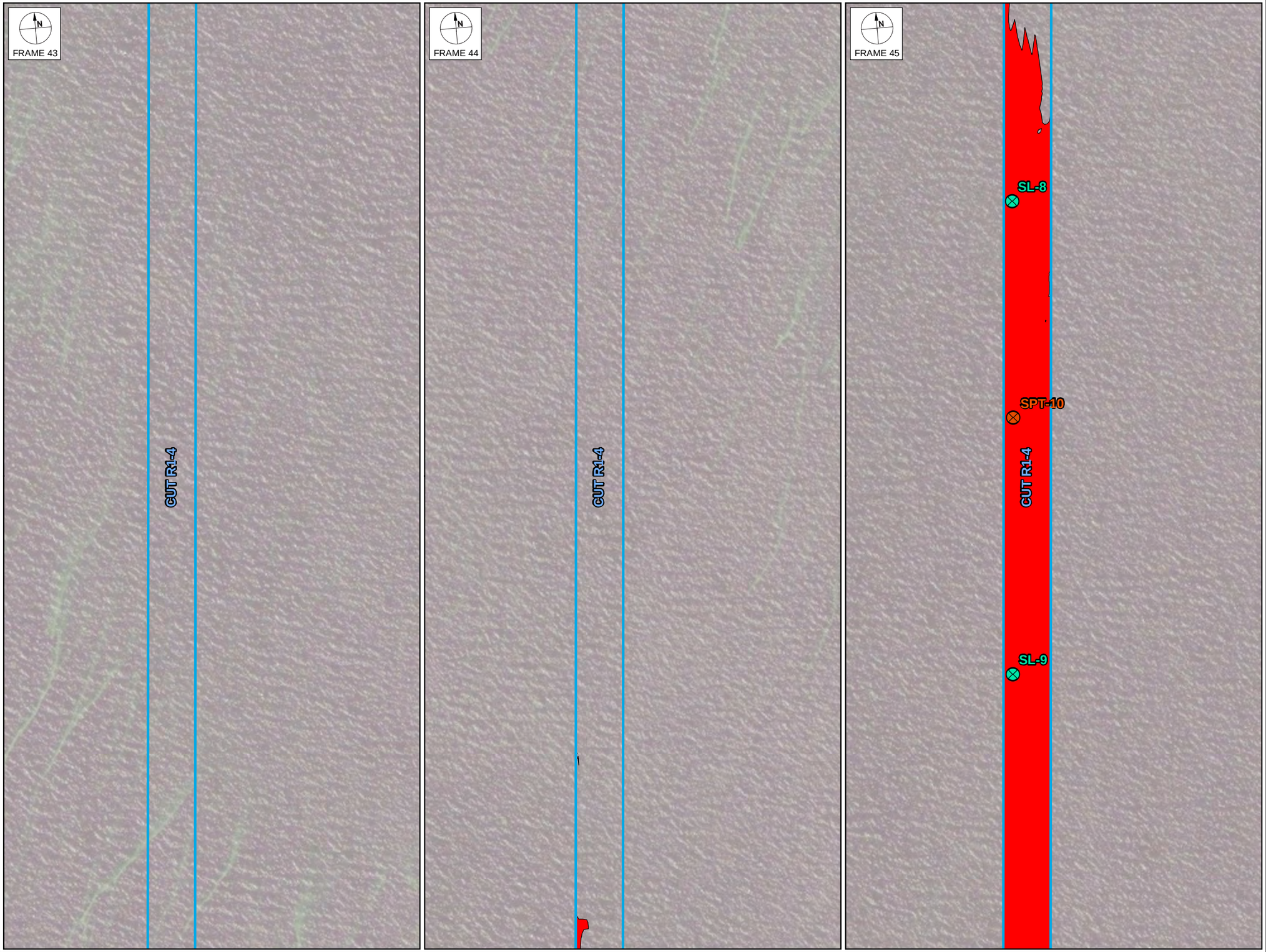

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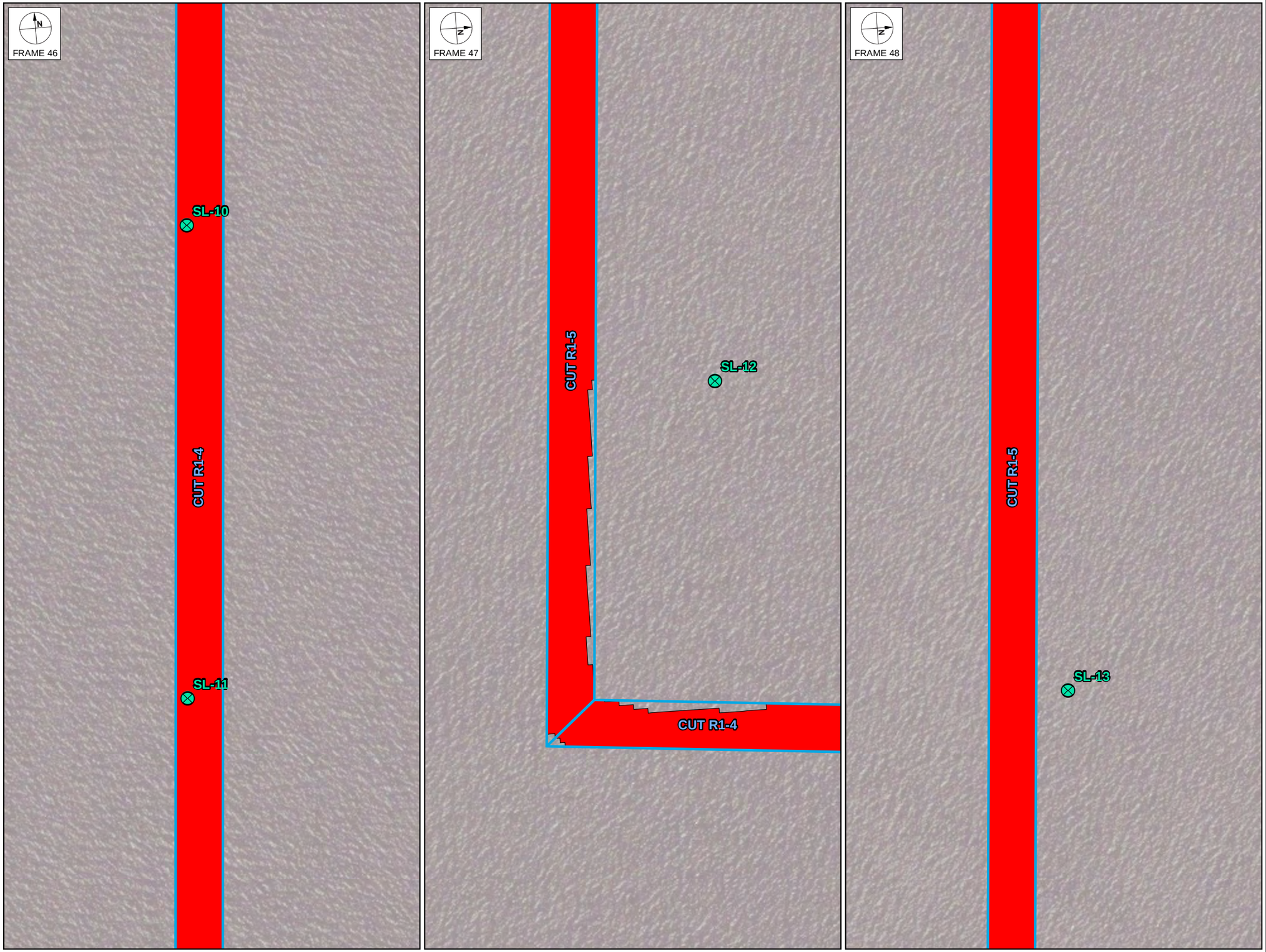

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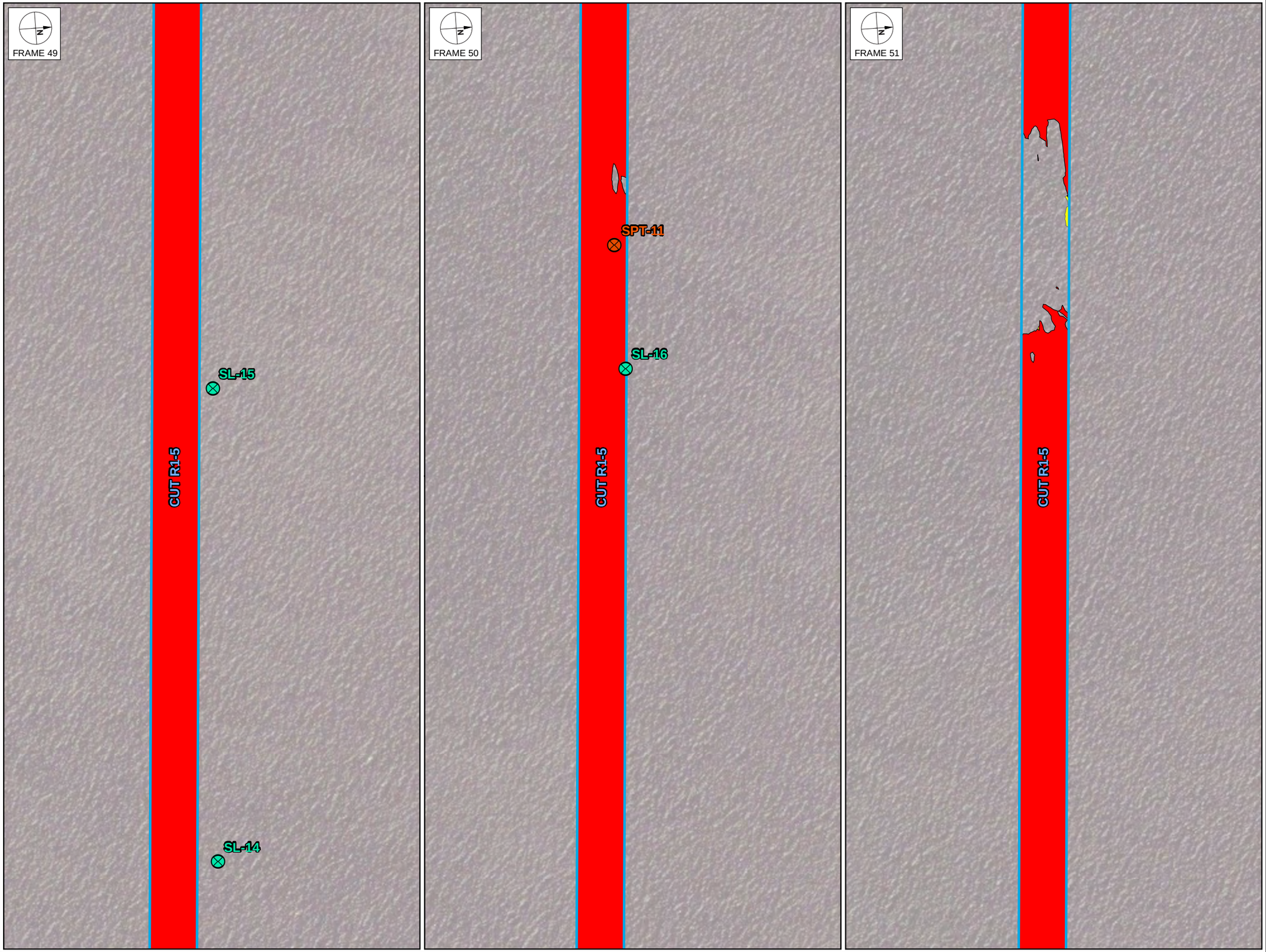

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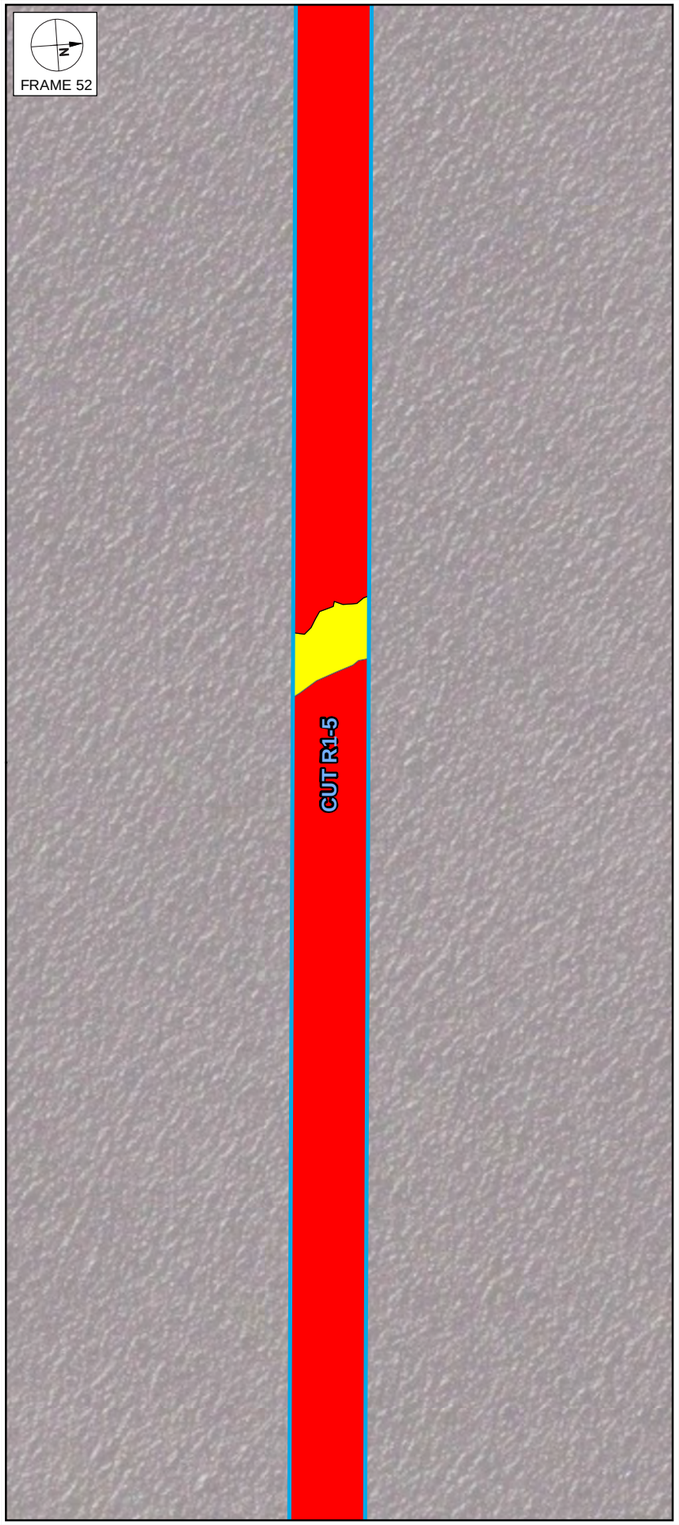

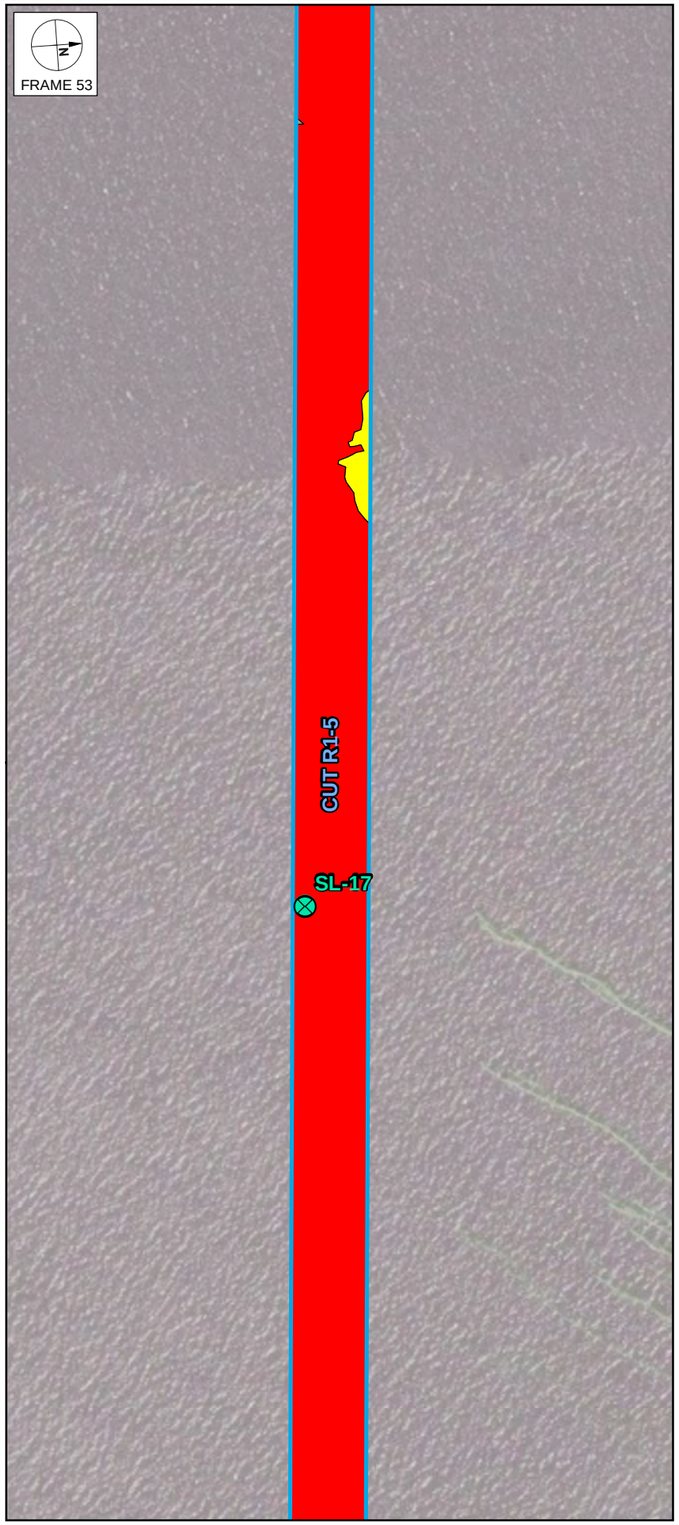

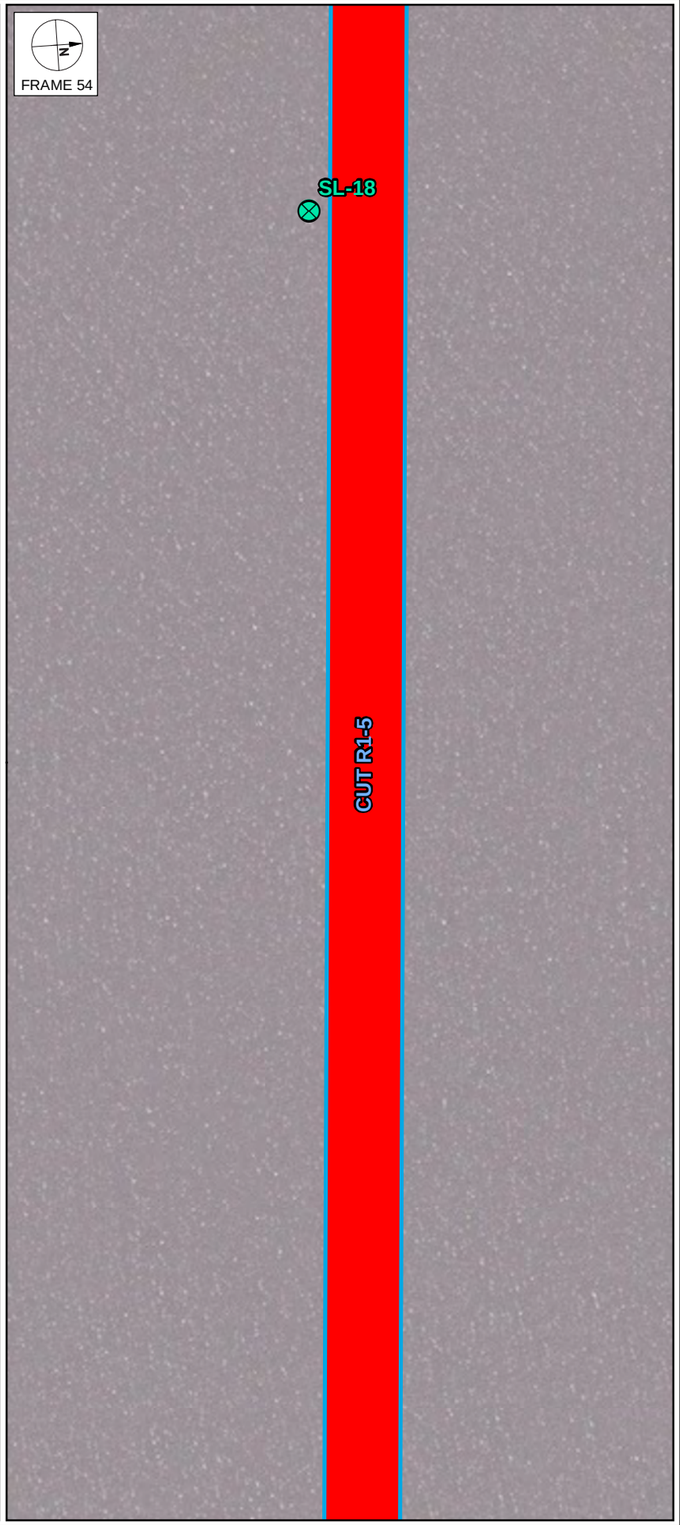

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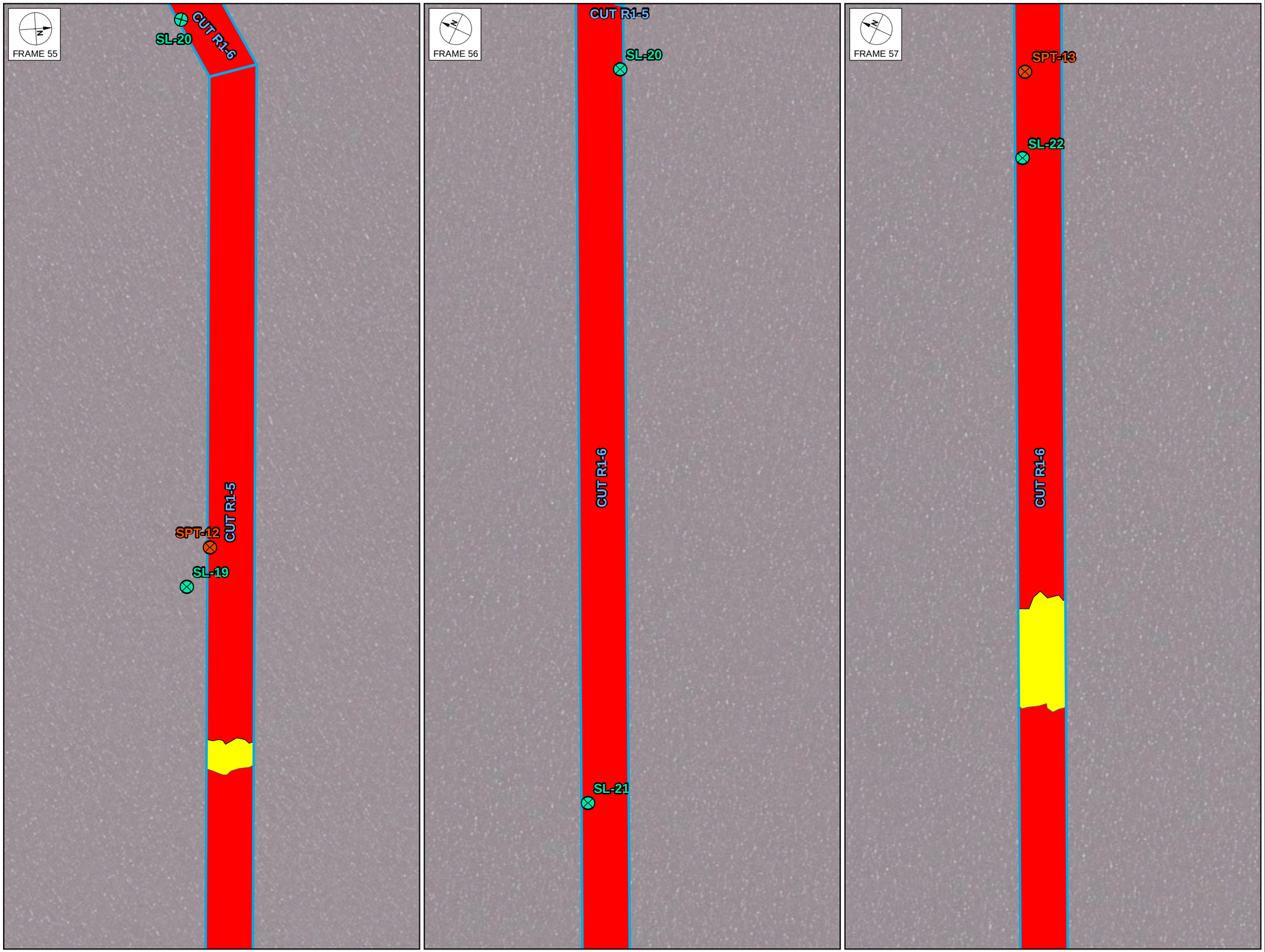

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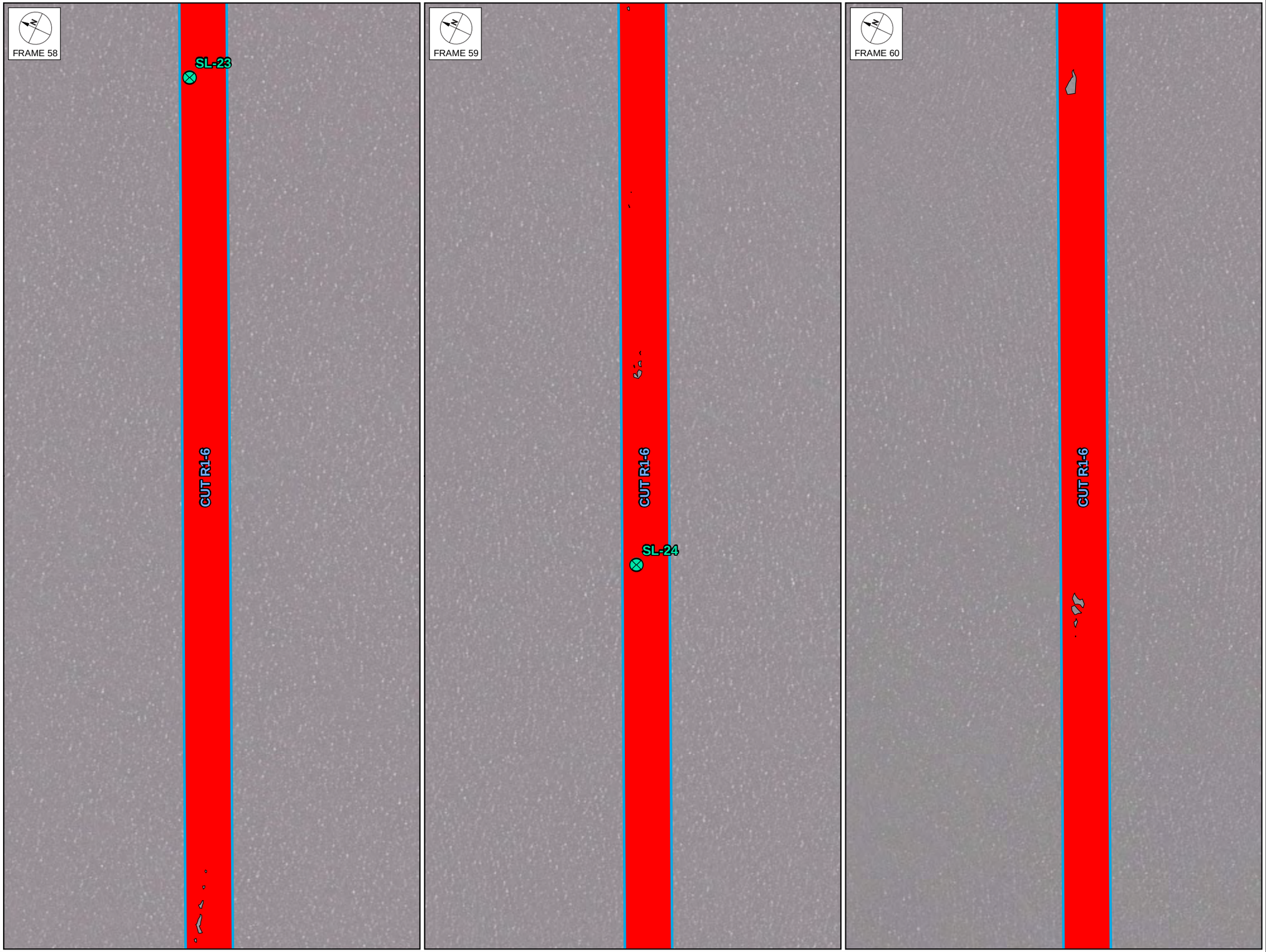

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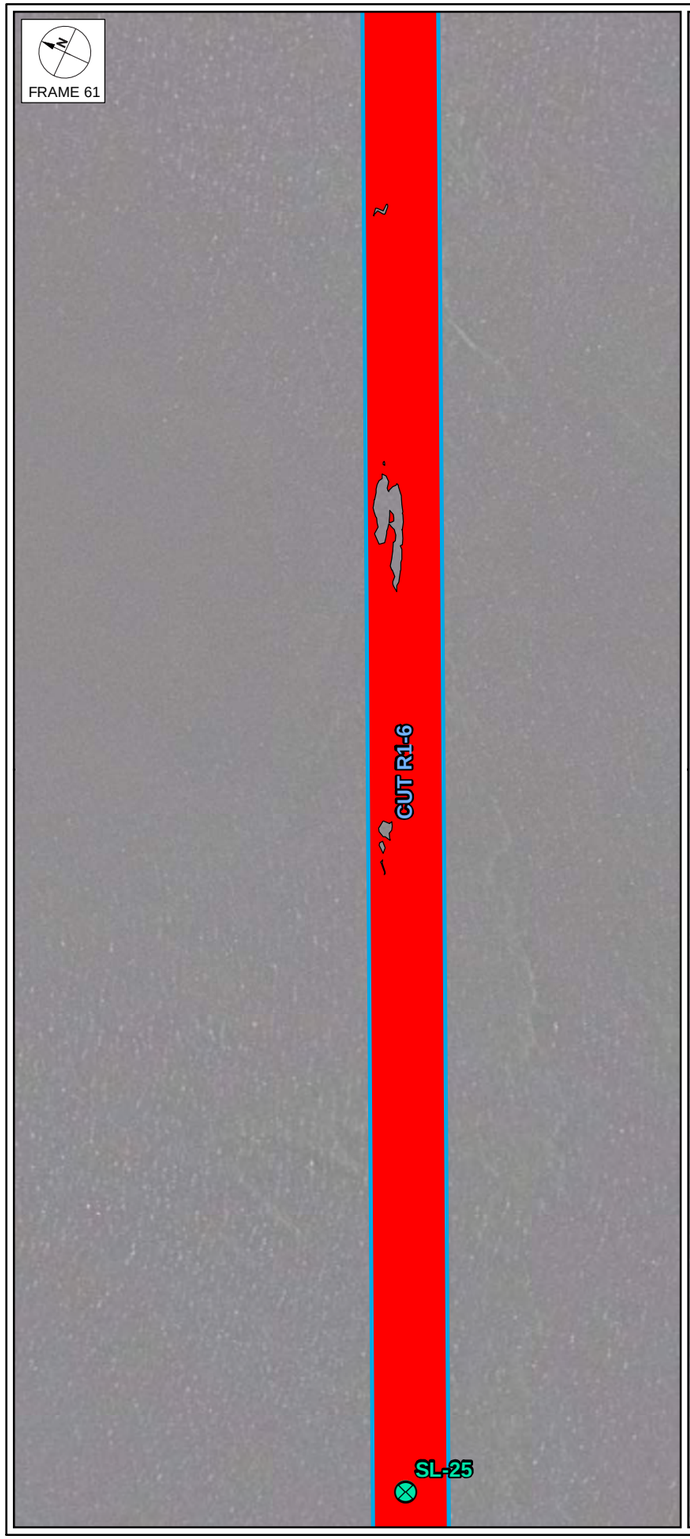

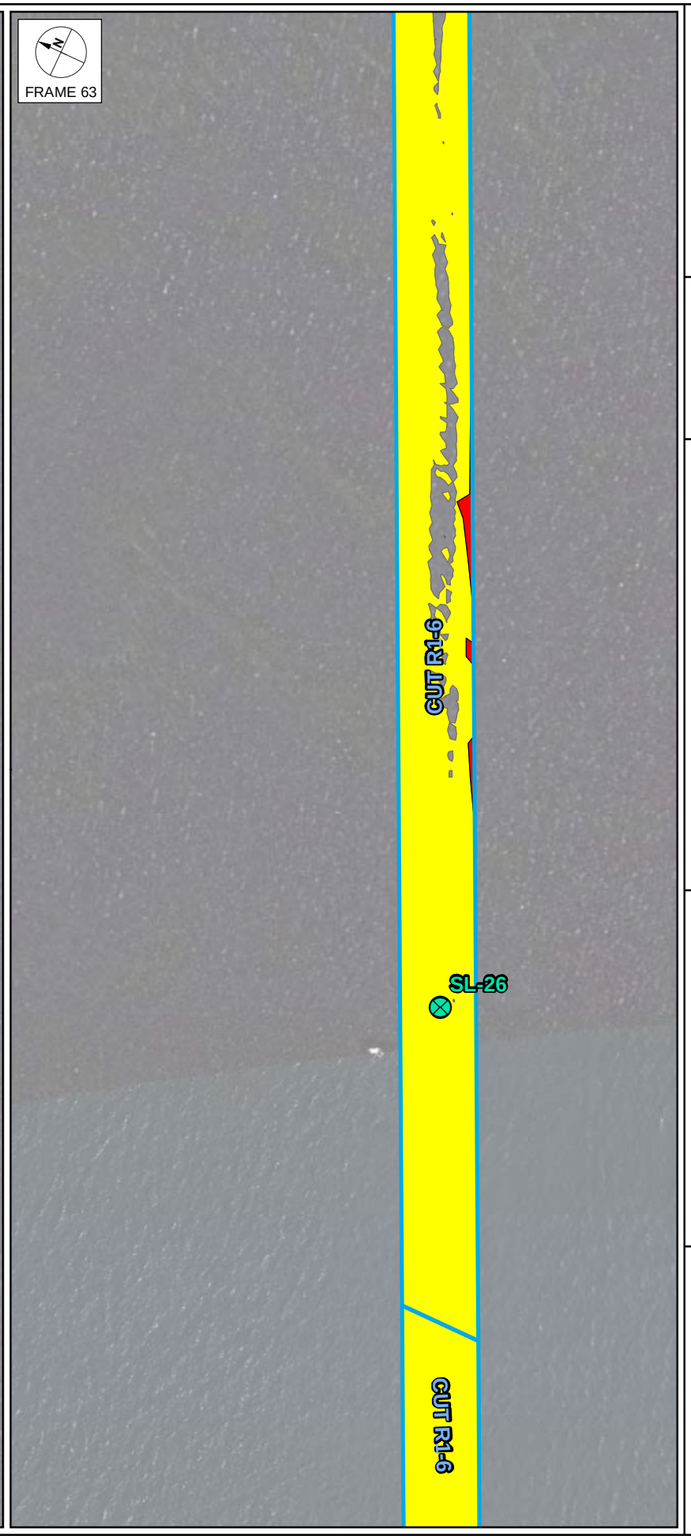

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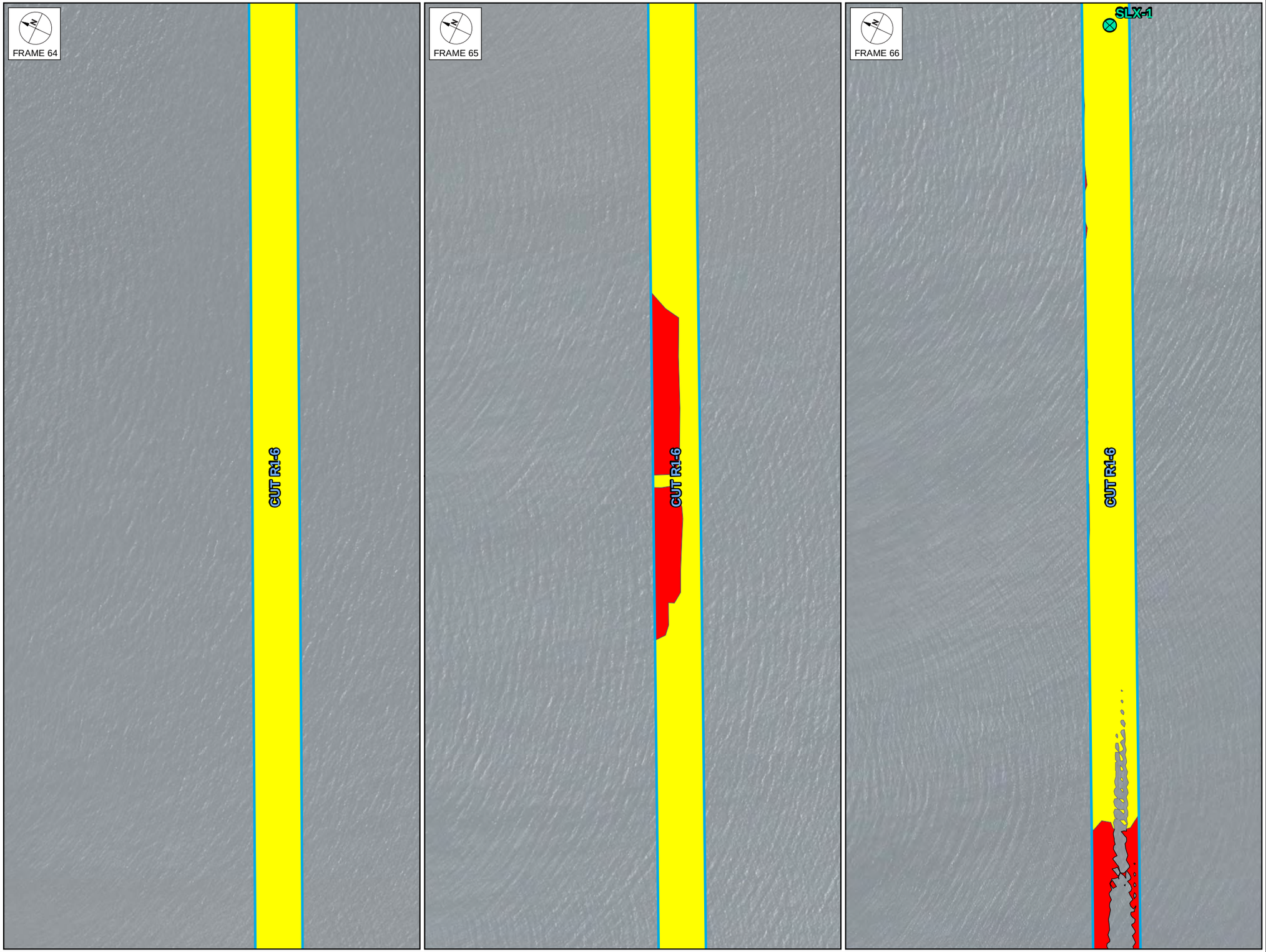

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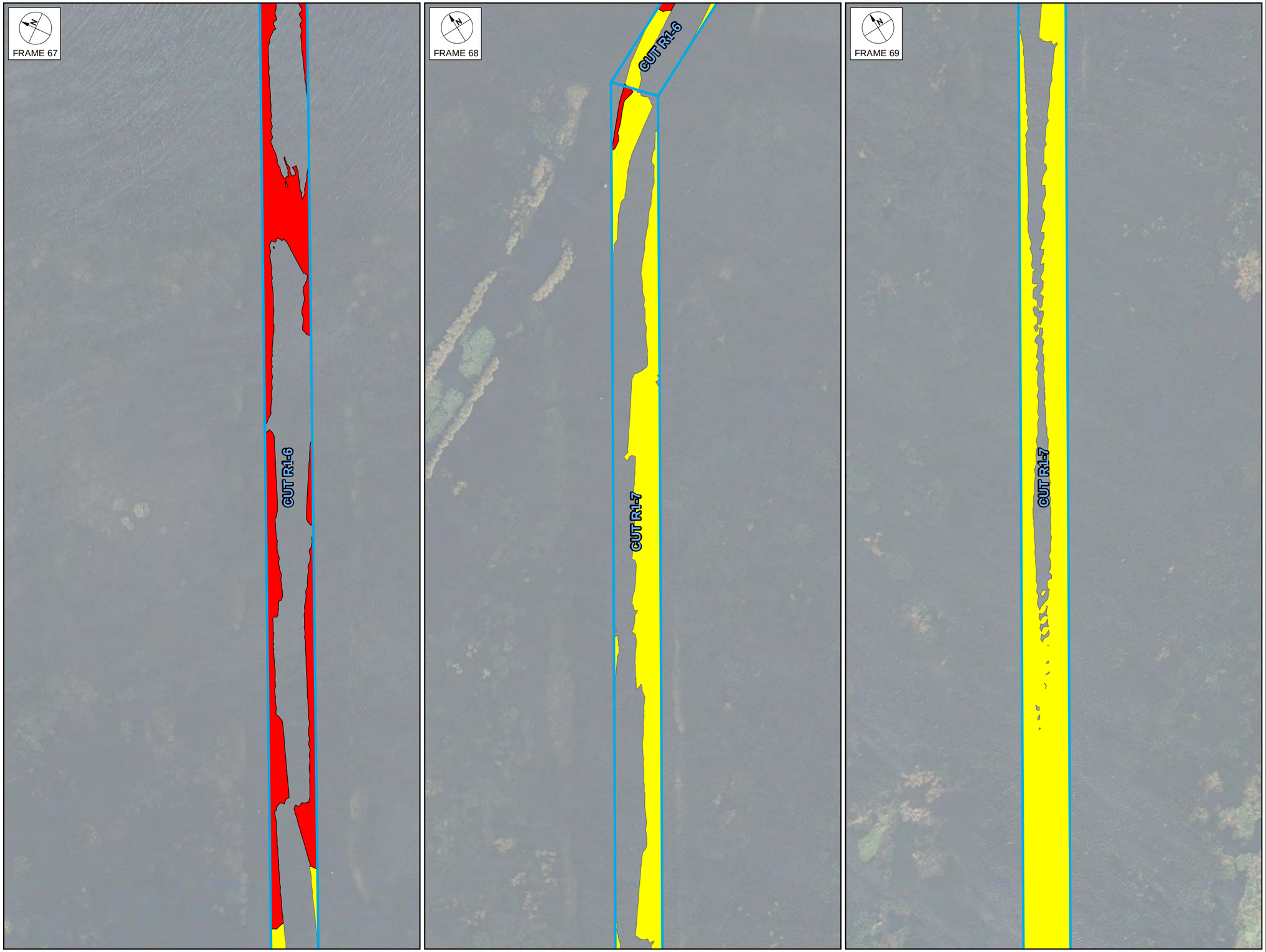

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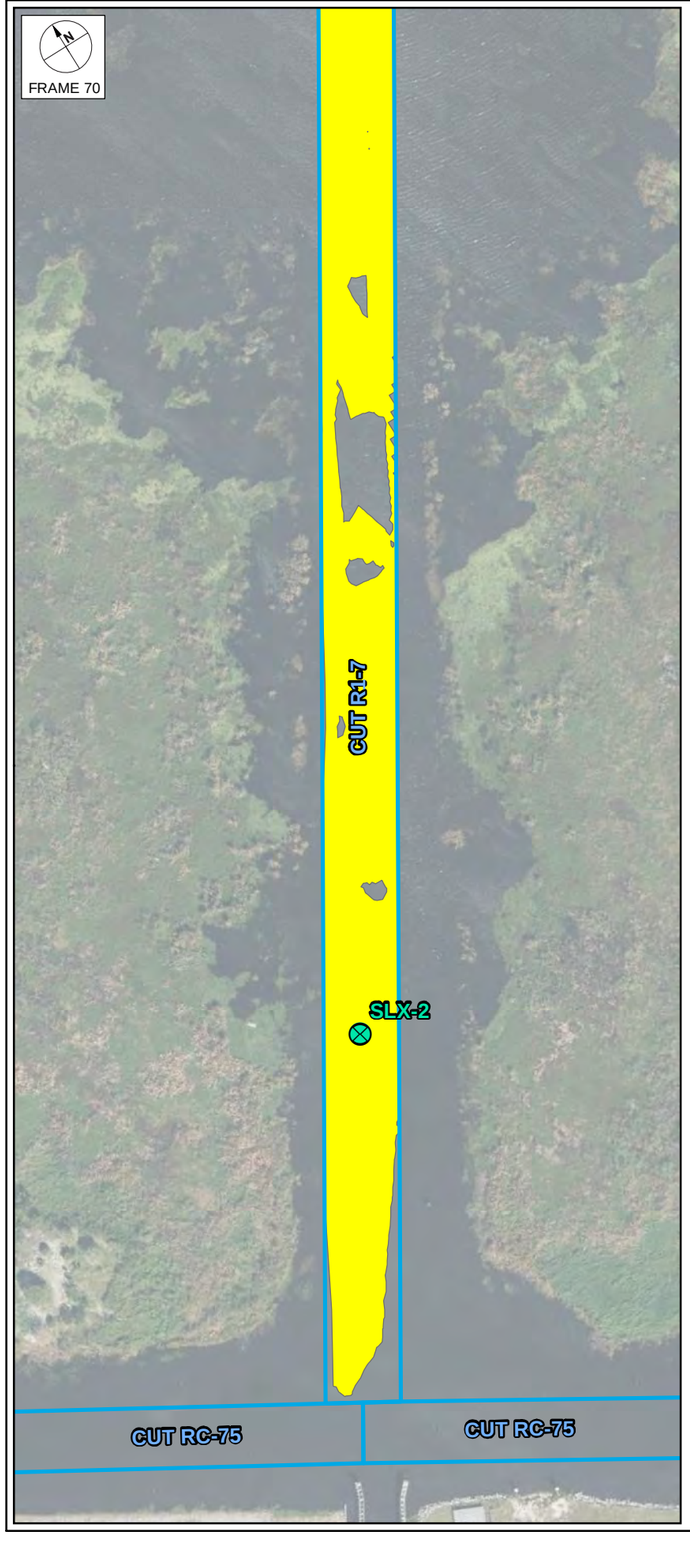

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ATLANTIC INTRACOASTAL FLORIDA INLAND NAVIGATION DISTRICT

APPENDIX E

Aids to Navigation Coordination Memo

Memo via Electronic Mail

To: Mark Crosley, Executive Director, FIND

From: Jerry Scarborough, P.E.

Date: Friday, July 27, 2021

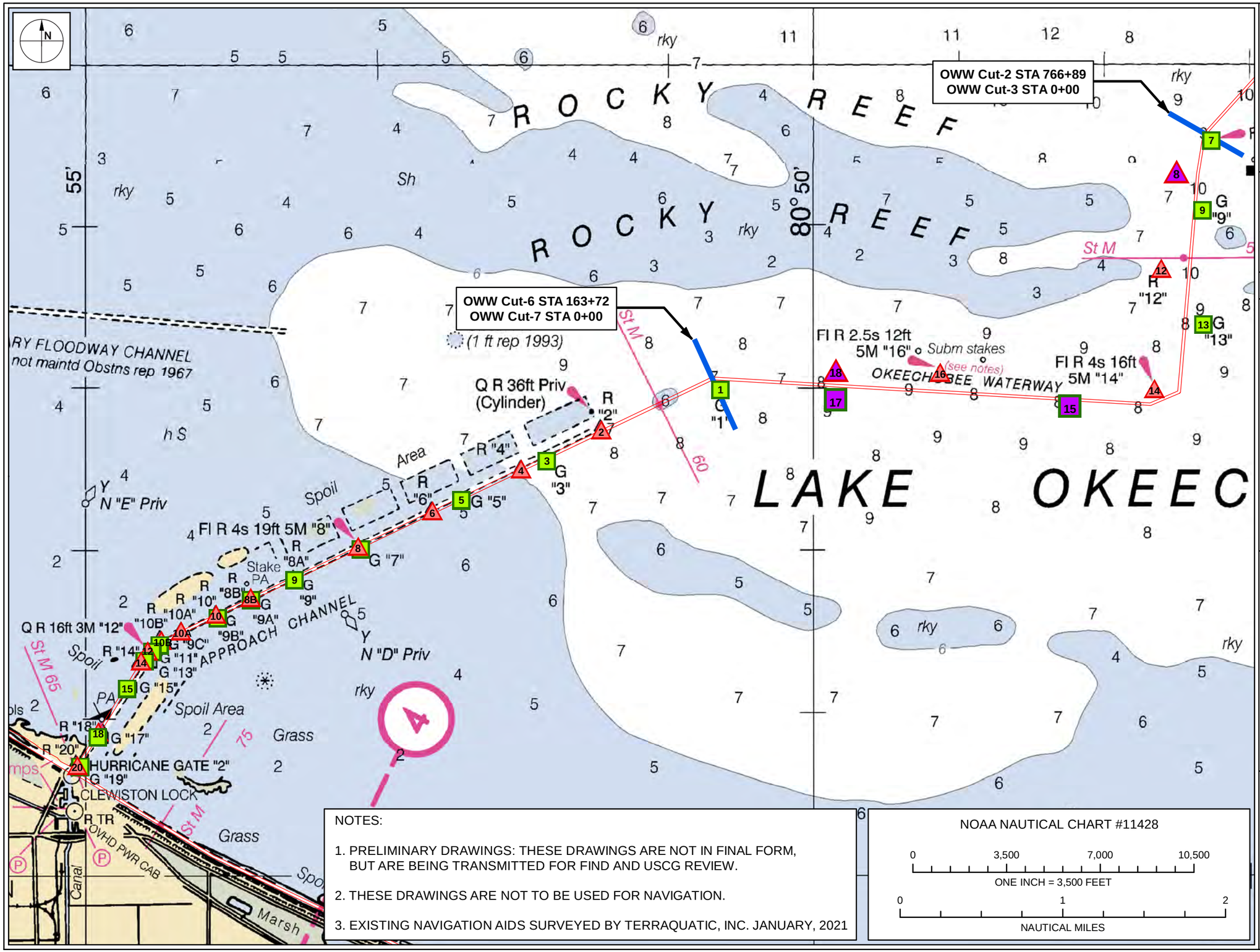
Re: Lake Okeechobee Route 1 Cross Lake Channel Aids to Navigation Coordination (Work Order Number 20-11)

Taylor Engineering is contracted by the Florida Inland Navigation District (FIND) to locate and review existing Aids to Navigation (ATONs) on the Okeechobee Route 1 Cross Lake Channel and coordinate potential modifications with FIND and the US Coast Guard (USCG). On January 13–14, 2021, Taylor Engineering's subcontractor, Terraquatic, Inc. located and photographed existing ATONs along Route 1 Cross Lake Channel and Clewiston Channel Route 1B. Attachment A – ATON Location Maps provides the surveyed locations over NOAA Nautical Chart (#11428) and photographs are provided Attachment B – ATON Photographs.

Taylor Engineering reviewed the ATON photographs and cataloged the type and observed condition of each ATON. This review excludes structural assessment or review of navigation lights. An overlay of ATON locations over NOAA Nautical charts, available bathymetric data, and side scan data provided tools for assessing the navigable channel conditions. Attachment C – ATON Summary, provides these observations and potential corrective actions as recommendations. Notably, these observations are limited and do not include structural inspection.

Taylor Engineering initiated coordination with the USCG and the US Army Corps of Engineers at Port Mayaca to gather known navigation issues along Route 1. The USCG reported that there are no documented navigation issues or marine incidents along Route 1. However, based on onsite observations and brief discussion with Port Mayaca staff, Taylor identified some potential for navigation issues along the "Rocky Reef" identified in the Nautical Chart. Distance between beacons and channel orientation changes, particularly where OWW Cut-6 ends and OWW Cut-7 begins near the reef, create potential for navigation error. Vessels traveling northeast, toward the OWW Cut-6 and Cut-7 connection, have potential for grounding if realignment of the channel is bypassed and a northeasterly course is maintained. Similarly, there is a lesser potential for navigation issues approaching the rocky reef traveling southwesterly at the Route 1 Cross Lake channel realignment near Beacon #7, where OWW Cut-2 ends and Cut 3 begins. To support future discussions with the USCG and FIND, Attachment A provides potential additional ATON locations to reduce possibility of navigation error around Rocky Reef.

Attachment A
ATON Location Maps



NOTES:

1. PRELIMINARY DRAWINGS: THESE DRAWINGS ARE NOT IN FINAL FORM, BUT ARE BEING TRANSMITTED FOR FIND AND USCG REVIEW.
2. THESE DRAWINGS ARE NOT TO BE USED FOR NAVIGATION.
3. EXISTING NAVIGATION AIDS SURVEYED BY TERRAQUATIC, INC. JANUARY, 2021

NOAA NAUTICAL CHART #11428

0 — 3,500 — 7,000 — 10,500

ONE INCH = 3,500 FEET

0 — 1 — 2

NAUTICAL MILES

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FLORIDA INLAND NAVIGATION DISTRICT LAKE OKEECHOBEE ROUTE 1 CHANNEL AIDS TO NAVIGATION LOCATIONS

SHEET 1 OF 4

Legend

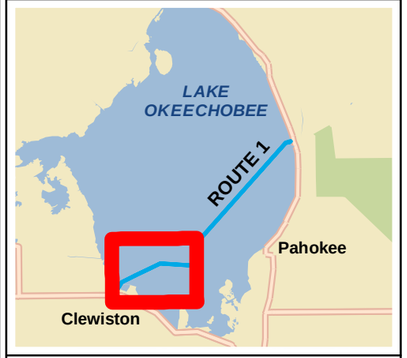
- USACE Channel

Existing Aids to Navigation

- Beacon
- Beacon
- Other

Potential Aids to Navigation

- Beacon
- Beacon



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Q Y 19ft "B"
PA Priv

Fl R 4s 16ft 5M "6"

St M

50

51′

30″

44′

rky

Cy

Sh

h

OWW Cut-2 STA 766+89
OWW Cut-3 STA 0+00

Fl G 4s 16ft 5M "7"

Platform PA
(lighted)

G
"9"

R
"60"

R
8 "56"

G "5

R "5

8 R
"62"

G "61"

3½ ft

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FLORIDA INLAND NAVIGATION DISTRICT LAKE OKEECHOBEE ROUTE 1 CHANNEL AIDS TO NAVIGATION LOCATIONS

SHEET 2 OF 4

Legend

- USACE Channel

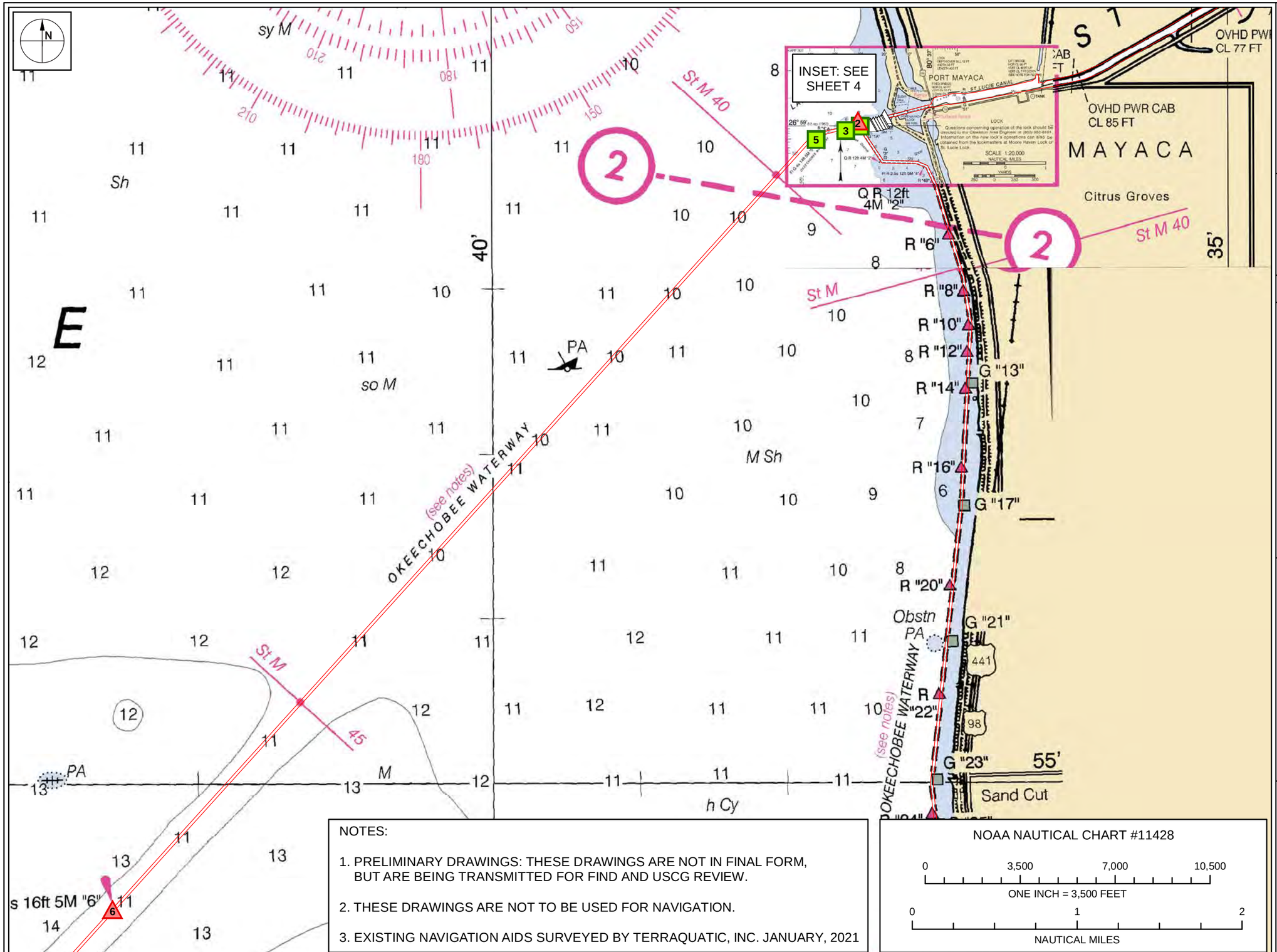
Existing Aids to Navigation

- Beacon
- Beacon
- Other

Potential Aids to Navigation

- Beacon
- Beacon

ATLANTIC INTRACOASTAL
FLORIDA INLAND NAVIGATION DISTRICT



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ONE INCH = 3,500 FEET

0 — 1 — 2

NAUTICAL MILES

Taylor Engineering, Inc.
10199 Southside Blvd. Suite 310
Jacksonville, FL 32256
CERTIFICATE OF AUTHORIZATION # 4815

FLORIDA INLAND NAVIGATION DISTRICT
LAKE OKEECHOBEE
ROUTE 1 CHANNEL
AIDS TO NAVIGATION LOCATIONS

SHEET 3 OF 4

Legend

- USACE Channel

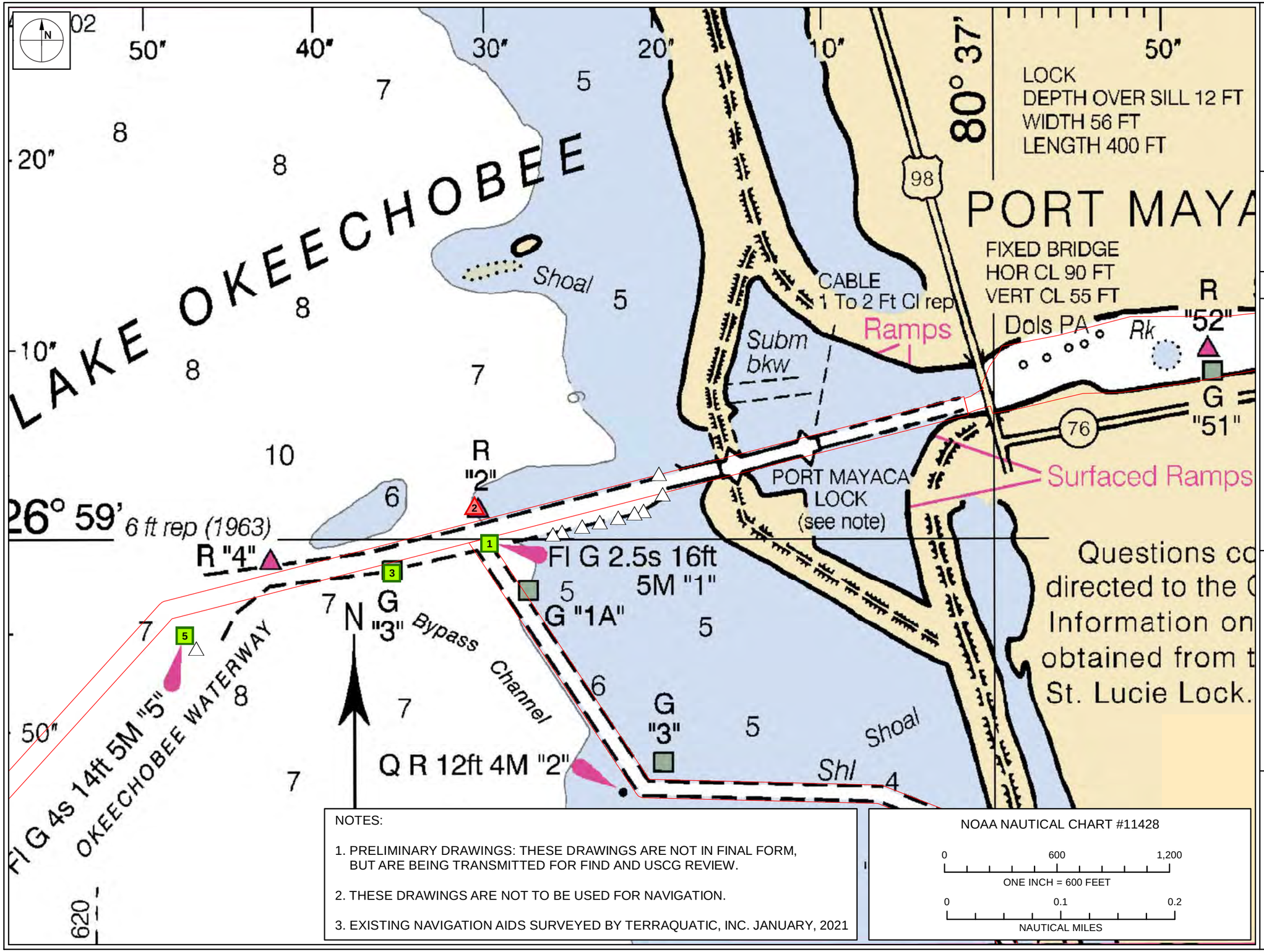
Existing Aids to Navigation

- Beacon
- Beacon
- Other

Potential Aids to Navigation

- Beacon
- Beacon

ATLANTIC INTRACOASTAL
FLORIDA INLAND NAVIGATION DISTRICT



NOTES:

1. PRELIMINARY DRAWINGS: THESE DRAWINGS ARE NOT IN FINAL FORM, BUT ARE BEING TRANSMITTED FOR FIND AND USCG REVIEW.
2. THESE DRAWINGS ARE NOT TO BE USED FOR NAVIGATION.
3. EXISTING NAVIGATION AIDS SURVEYED BY TERRAQUATIC, INC. JANUARY, 2021

NOAA NAUTICAL CHART #11428

0 600 1,200
ONE INCH = 600 FEET

0 0.1 0.2
NAUTICAL MILES

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CERTIFICATE OF AUTHORIZATION # 4815

FLORIDA INLAND NAVIGATION DISTRICT
LAKE OKEECHOBEE
ROUTE 1 CHANNEL
AIDS TO NAVIGATION LOCATIONS

SHEET 4 OF 4

Legend

- USACE Channel

Existing Aids to Navigation

- Beacon
- Beacon
- Other

Potential Aids to Navigation

- Beacon
- Beacon

ATLANTIC INTRACOASTAL
FLORIDA INLAND NAVIGATION DISTRICT

Attachment B
ATON Photographs

Terraquatic, Inc.
6836 Bayshore Drive
Lantana, Florida 33462

Okeechobee Route 1
Navigation Aid Location

Terraquatic, Inc.
6836 Bayshore Drive
Lantana, Florida 33462

TERRAQUATIC
SURVEYING AND MAPPING

Okeechobee Route 1
Navigation Aid Location

Terraquatic, Inc.
6836 Bayshore Drive
Lantana, Florida 33462

Okeechobee Route 1
Navigation Aid Location

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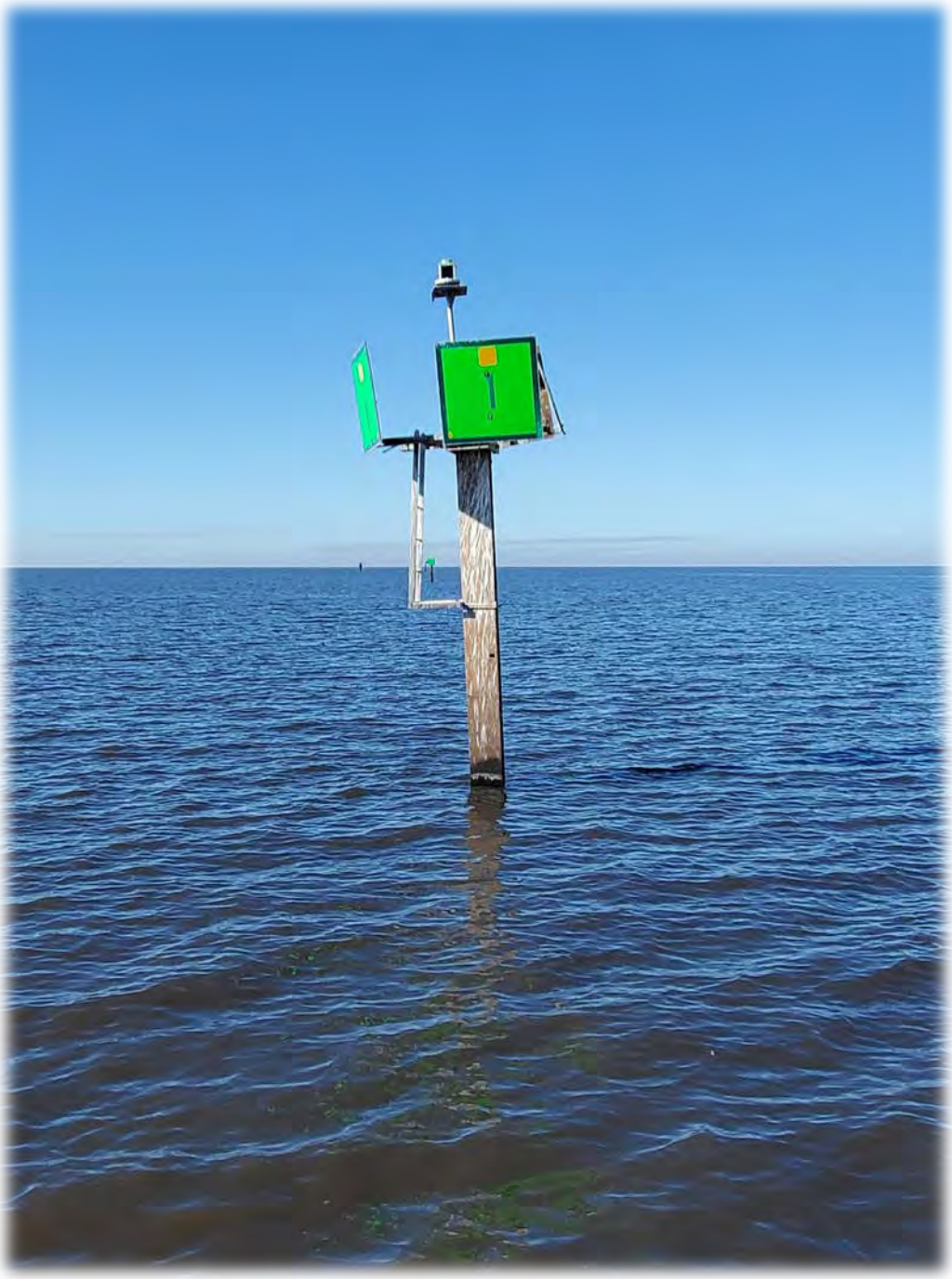
Okeechobee Route 1
Navigation Aid Location



Terraquatic, Inc.
6836 Bayshore Drive
Lantana, Florida 33462

Okeechobee Route 1
Navigation Aid Location

Terraquatic, Inc.
6836 Bayshore Drive
Lantana, Florida 33462

Okeechobee Route 1
Navigation Aid Location

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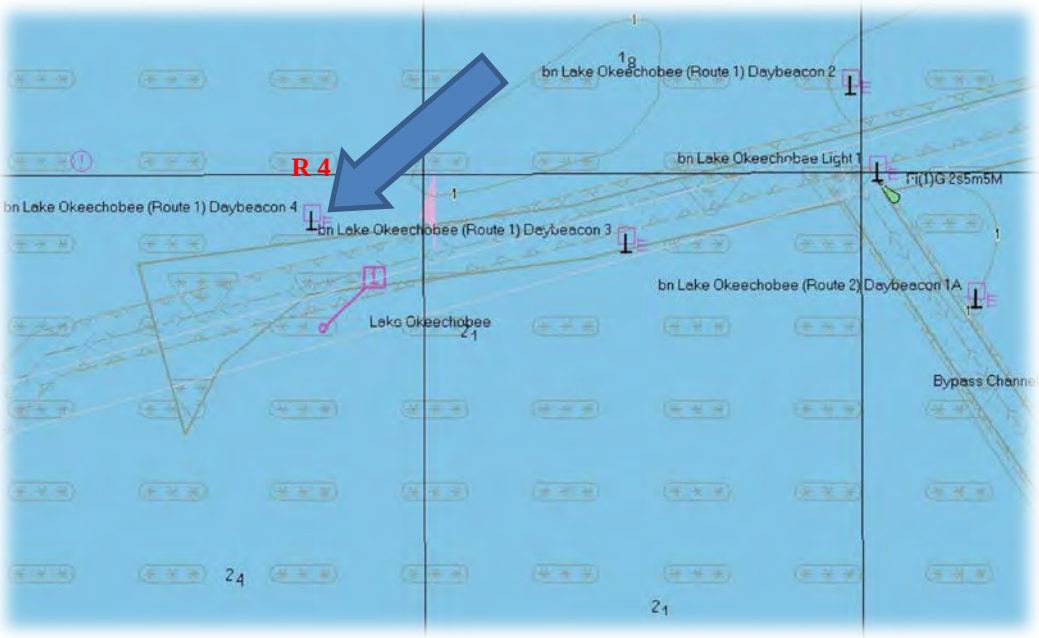
6836 Bayshore Drive
Lantana, Florida 33462

TERRAQUATIC
SURVEYING AND MAPPING

Okeechobee Route 1
Navigation Aid Location

4

Not Found
Missing / Destroyed



Terraquatic, Inc.
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Okeechobee Route 1
Navigation Aid Location

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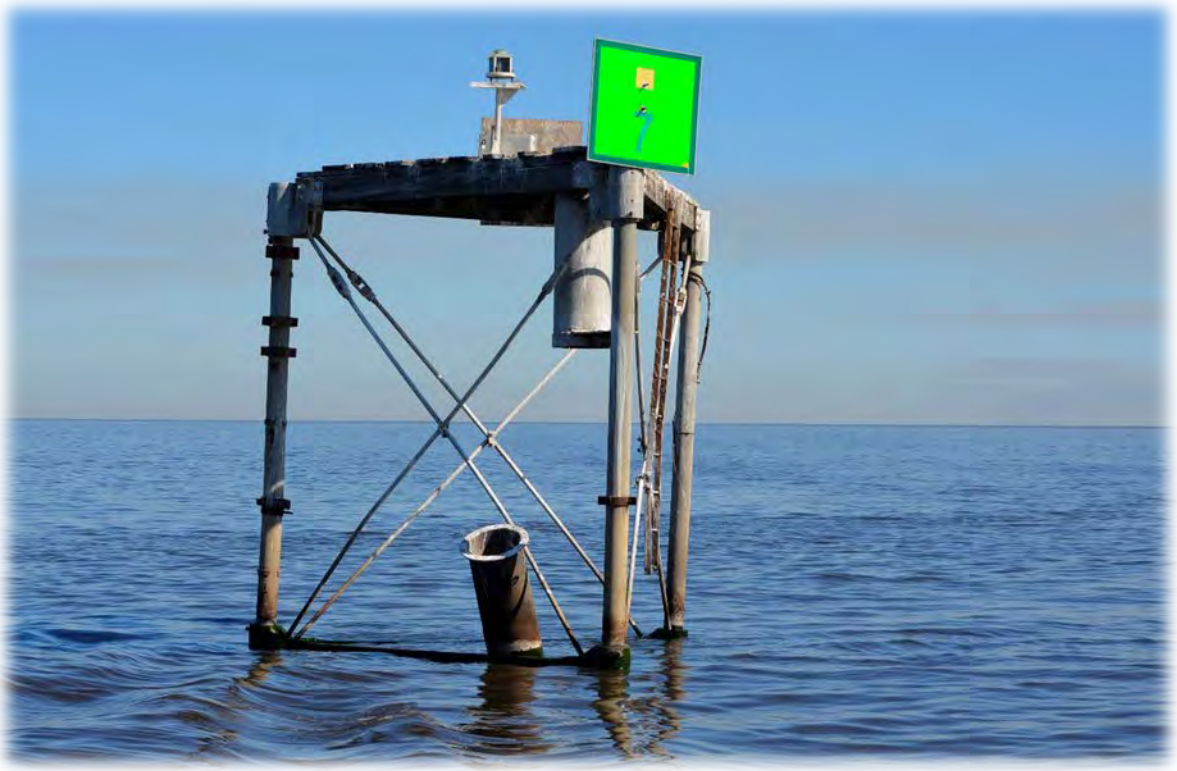

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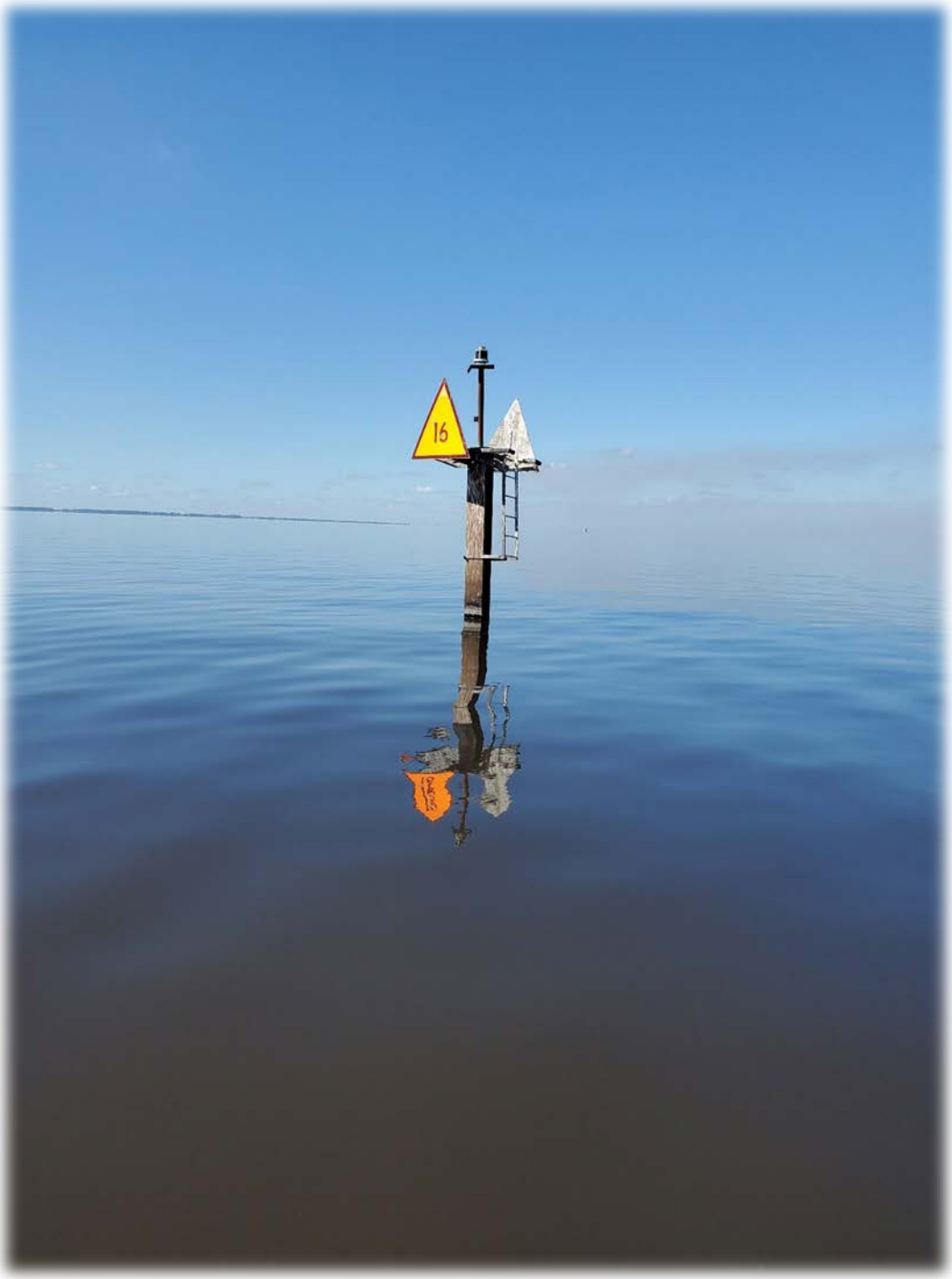

Terraquatic, Inc.
6836 Bayshore Drive
Lantana, Florida 33462

Okeechobee Route 1
Navigation Aid Location
Clewiston Channel Route 1B

Terraquatic, Inc.
6836 Bayshore Drive
Lantana, Florida 33462

Okeechobee Route 1
Navigation Aid Location
Clewiston Channel Route 1B

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Navigation Aid Location

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Lantana, Florida 33462

Okeechobee Route 1
Navigation Aid Location

Attachment C
ATON Summary

Lake Okeechobee Route 1 Cross Lake Channel Existing Aids to Navigation Summary

Photograph (Attachment B)	Aid to Navigation	Type	Material	Observation	Reccomendation
Page 1	Port Mayaca Lock Entrance South Side; Pt. Mayaca Lock & Dam Open 6:00 AM Closed 9:00 PM	Daybeacon	Timber Dolphin Pile	Daymark damaged and faded	Replace Daymark
Page 2	Port Mayaca Lock Entrance North Side Sign; Pt. Mayaca Lock & Dam Open 6:00 AM Closed 9:00 PM	Daybeacon	Timber Dolphin Pile	Daymark missing / Destroyed	Replace Daymark
Page 3	Dolphin pile (non-ATON)	Dolphin	Timber Dolphin Pile	Loose cable wrap, pile deterioration, pile configuration atypical	Structural inspection
Page 4	Dolphin pile (non-ATON)	Dolphin	Timber Dolphin Pile	Broken pile, pile deterioration	Structural inspection
Page 5	Dolphin pile; Idle Speed, No Wake	Daybeacon	Timber Dolphin Pile		Structural inspection
Page 6	Dolphin pile (non-ATON)	Dolphin	Timber Dolphin Pile	Pile deterioration	Structural inspection
Page 7	Dolphin pile (non-ATON)	Dolphin	Timber Dolphin Pile	Pile deterioration	Structural inspection
Page 8	Dolphin pile (non-ATON)	Dolphin	Timber Dolphin Pile	Pile deterioration	Structural inspection
Page 9	Dolphin pile (non-ATON)	Dolphin	Timber Dolphin Pile	Pile deterioration	Structural inspection
Page 10	G 1 LIGHT (Route 1 & Route 2)	Daybeacon with Light; 3 Daymarks	Steel H-Pile	Out of plumb, faded daymark, light function unknown	Structural inspection
Page 11	R 2	Daybeacon; 2 Daymarks	Steel H-Pile	Out of plumb	Structural inspection
Page 12	G 3	Daybeacon; 2 Daymarks	Steel H-Pile	Out of plumb	Structural inspection
Page 13	R 4	N/A; 2 Daymarks	N/A	Missing / Destroyed	Replace ATON
Page 14	G 5 LIGHT	Daybeacon with Light; 2 Daymarks	Steel H-Pile	Out of plumb, light function unknown	Structural inspection;
Page 15	Arival Point; Locks Monitor Channel 13; Lock Hours 7AM to 5PM Daily	Daybeacon	Steel Round-Pile	Detoriated Daymark, Operation hours differ from N Entrance Sign	Replace Sign; Update information
Page 16	R 6 LIGHT	Daybeacon; 2 Daymarks	Steel Round-Pile	Out of plumb, light function unknown	Structural and light function inspection
Page 17	G 7 LIGHT STRUCTURE	Daybeacon with Light; 2 Daymarks	Steel Frame	Broken central round steel pile, light function unknown	Structural inspection; Replace or Repair ATON
Page 18	G 9	Daybeacon; 2 Daymarks	Timber Pile	Out of plumb	Structural inspection
Page 19	R 12	Daybeacon; 2 Daymarks	Steel H-Pile		
Page 20	G 13	Daybeacon; 2 Daymarks	Timber Pile		
Page 21	R 14 LIGHT STRUCTURE	Daybeacon with Light; 2 Daymarks	Steel Frame	Light function unknown	Light function inspection
Page 22	R 16 LIGHT	Daybeacon with Light; 2 Daymarks	Steel H-Pile		
Page 23	G 1	Daybeacon; 2 Daymarks	Timber Pile	Out of Plumb	Structural inspection
Page 24	R 2	Daybeacon; 2 Daymarks	Steel H-Pile	Out of Plumb	Structural inspection
Page 25	G 3	Daybeacon; 2 Daymarks	Steel H-Pile	Out of Plumb	Structural inspection
Page 26	R 4	Daybeacon; 2 Daymarks	Steel Round-Pile		
Page 27	G 5	Daybeacon; 2 Daymarks	Steel H-Pile	Damaged (Significantly out of plumb)	Structural inspection; Replace or Repair ATON
Page 27	WR 5 (LIGHT BUOY)	Buoy with Light	Steel	Light function unknown	Light function inspection
Page 28	R 6	Daybeacon; 2 Daymarks	Steel H-Pile	Faded daymark	
Page 29	G 7	Daybeacon; 2 Daymarks	Steel Round-Pile		
Page 30	R 8 LIGHT STRUCTURE	Daybeacon with Light; 2 Daymarks	Steel Frame	Light function unknown	Light function inspection
Page 31	G 9	Daybeacon; 2 Daymarks	Steel H-Pile		
Page 32	R 8B	Daybeacon; 2 Daymarks	Steel H-Pile	Damaged (Significantly out of plumb)	Structural inspection; Replace or Repair ATON; Remove potential obstruction in channel limits
Page 33	G 9A	Daybeacon; 2 Daymarks	Steel H-Pile		
Page 34	G 9B	Daybeacon; 2 Daymarks	Steel H-Pile	Out of Plumb	Structural inspection
Page 35	R 10	Daybeacon; 2 Daymarks	Steel H-Pile		
Page 36	R 10A	Daybeacon; 2 Daymarks	Timber Pile		
Page 37	R 10B	Daybeacon; 2 Daymarks	Timber Pile		
Page 38	G 9C	Daybeacon; 2 Daymarks	Timber Pile	Damaged (Significantly out of plumb)	Structural inspection
Page 39	G 11	Daybeacon; 2 Daymarks	Steel H-Pile		
Page 40	R 12 LIGHT	Daybeacon with Light; 2 Daymarks	Steel H-Pile	Damaged (Significantly out of plumb), Faded Daymark, Light function unknown	Structural and light function inspection
Page 41	G 13	Daybeacon; 2 Daymarks	Timber Pile		
Page 42	R 14	Daybeacon; 2 Daymarks	Timber Pile	Faded daymark	
Page 43	G 15	Daybeacon; 2 Daymarks	Steel H-Pile		
Page 44	R 18	Daybeacon; 2 Daymarks	Timber Pile		
Page 45	G 17	Daybeacon; 2 Daymarks	Timber Pile	Faded Daymark	
Page 46	G 19	Daybeacon; 2 Daymarks	Timber Pile	Out of Plumb	Structural inspection
Page 46	Slow Speed Minimum Wake; Resume Normal Safe Operation	Daybeacon; 2 Daymarks	Timber Pile		
Page 47	R 20	Daybeacon; 2 Daymarks	Timber Pile		