



Appendix II-J1

Essential Fish Habitat (EFH) Technical Report

March 2024

Note: Atlantic Shores has updated the Project Design Envelope to include the following landfall sites: Monmouth Landfall Site, Asbury Landfall Site, Kingsley Landfall Site, Lemon Creek Landfall Site, Wolfe's Pond Landfall Site, and Fort Hamilton Landfall Site. The information included in this report demonstrates the completeness of Atlantic Shores' multi-year development efforts and should be considered representative for the Project. For additional information regarding the layout of the Project, please refer to COP Volume I Project Information, Sections 1.0 Introduction and 4.7 Landfall Sites, as well as Figure 1.1-2 Project Overview.

Essential Fish Habitat Technical Report

Atlantic Shores Offshore Wind North

Prepared for:



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Prepared by:

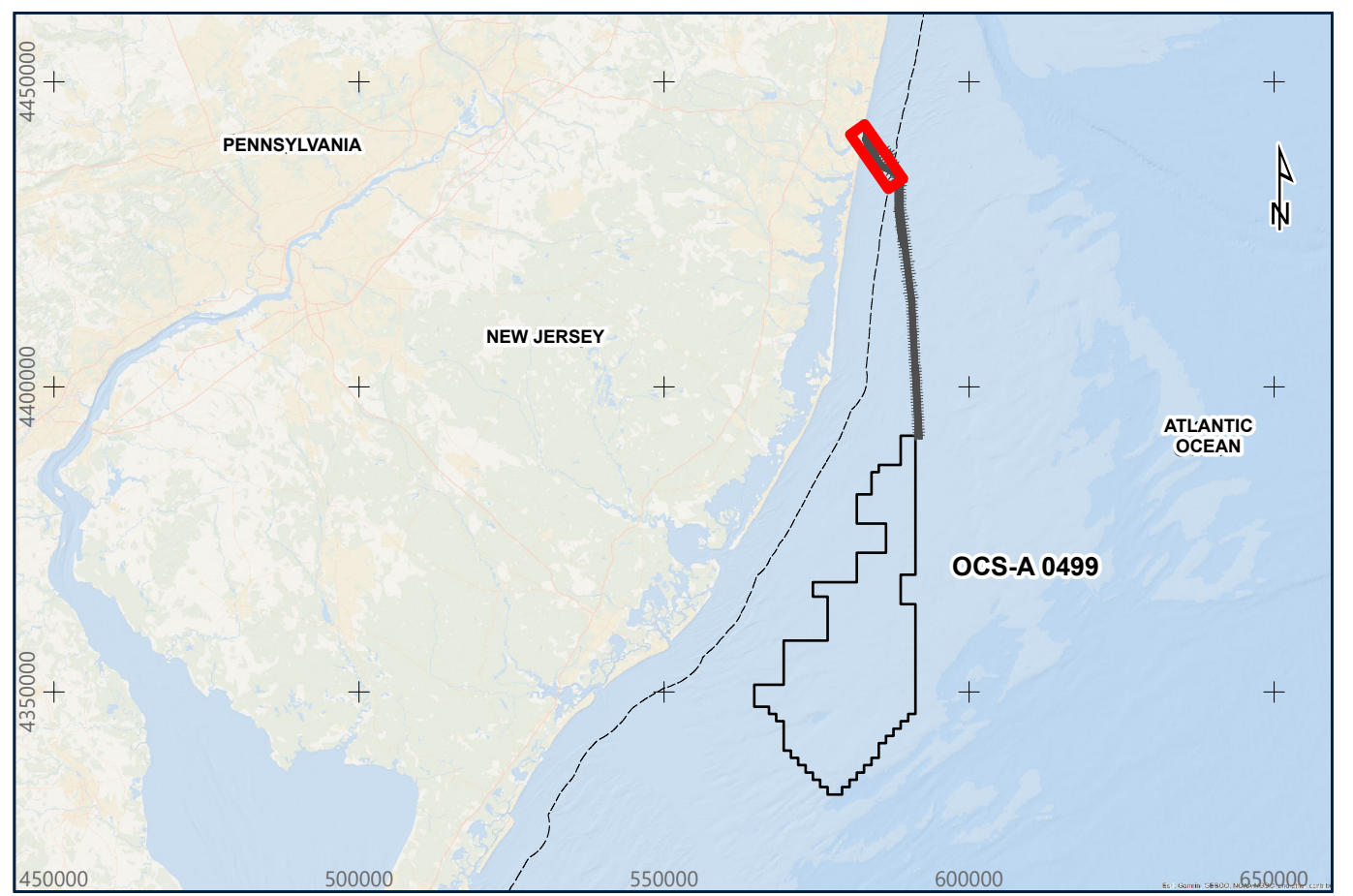
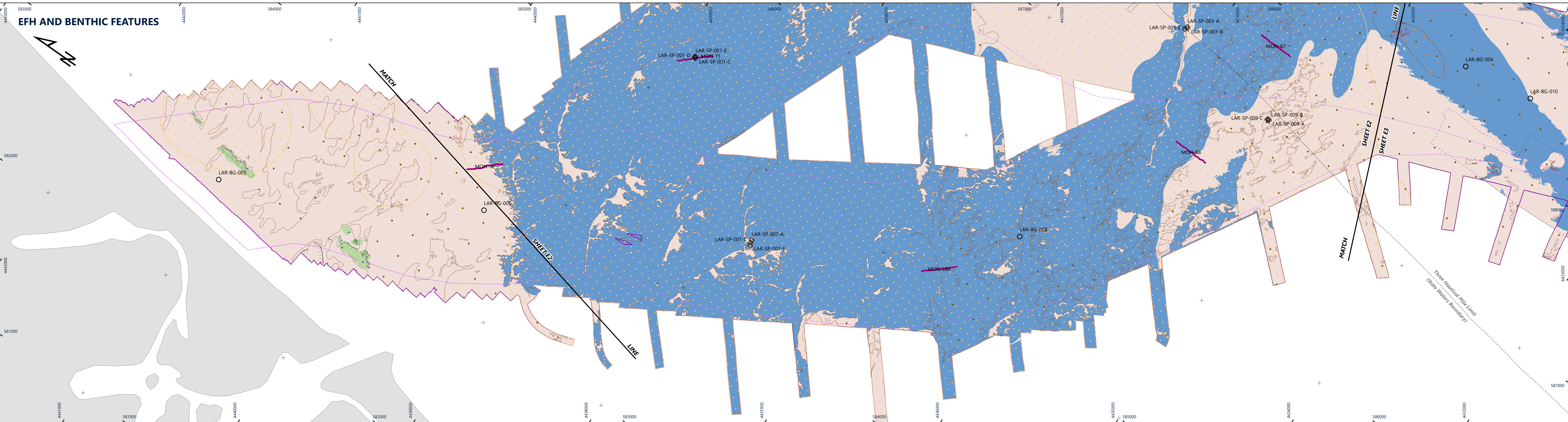
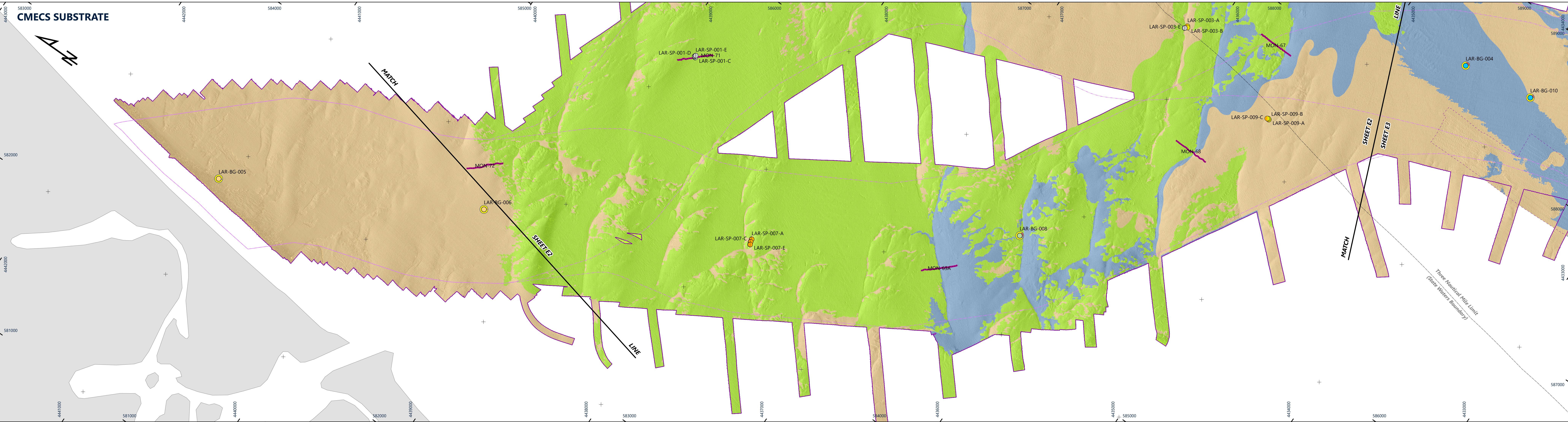
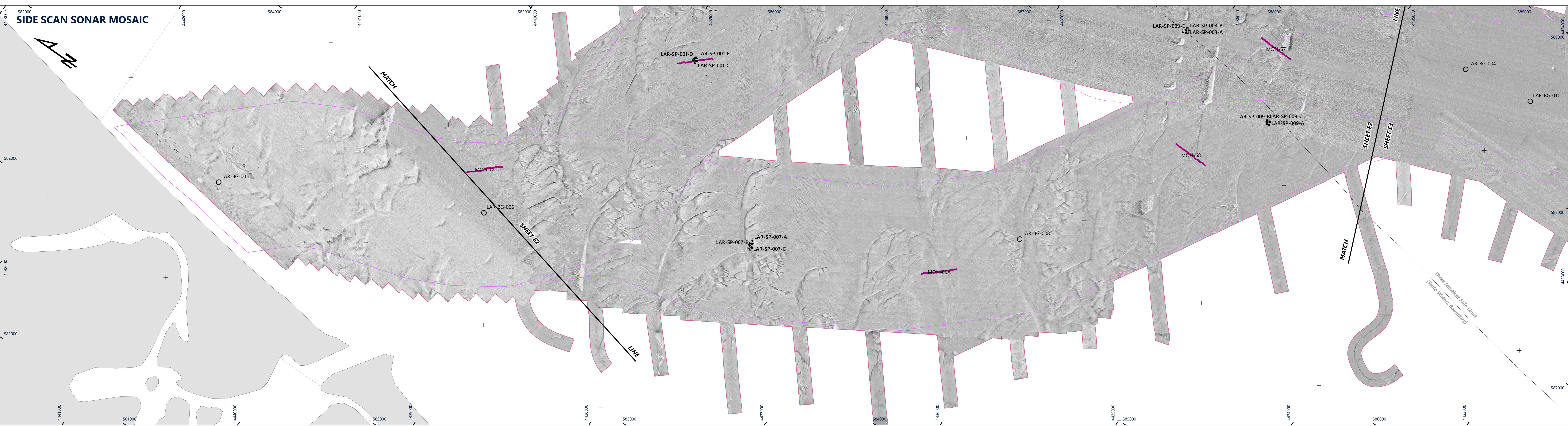


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March 2024

Attachment 3

Benthic Habitat Maps – 1:10,000 Scale
Monmouth Export Cable Corridor – North

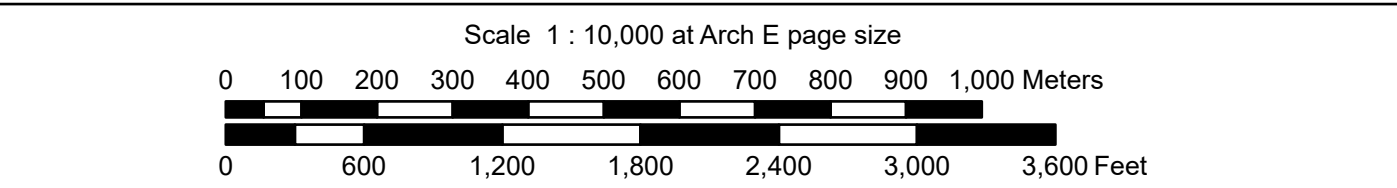


- NOTES**
- Survey data were acquired in geographic coordinates relative to the World Geodetic System 1984 (WGS84) datum. Data were then converted to North American Datum 1983 (NAD83) and projected to the Universal Transverse Mercator Zone 18 North (UTM Zone 18N) projection.
 - Fugro collected (non-continuously) geophysical and geotechnical data in the North Monmouth ECC from June 1, 2020 to June 19, 2021.
 - Reported lease block information is based on Fugro's GIS database.
 - Maritime Boundaries are provided by NOAA Nautical Charts (2019). Federal State Boundaries are provided by BOEM Digital Offshore Catalogue (DOC), Atlantic's, Submerged Lands Act (SALA) Boundary.
 - Interpretation is based on collected seafloor geophysical data (SBS, MBES bathymetry and backscatter) and ground truth sampling results. CMECS substrate, EFH, and benthic features interpretation is based on MBES bathymetry (2021) data extent.
 - EFH habitat delineations and characterization of benthic features charted here are in reference to NMFS' letter to BOEM dated March 29, 2021 regarding "Updated Recommendations for Mapping Fish Habitat".
 - Mobile sediment areas are mapped within the Cable Burial Risk Assessment (CBRA). Refer to Fugro MSBR, Vol. 4, 2021m.
 - No large gravel complex habitats were delineated within the survey area.
 - Benthic classification (NMFS Modified CMECS) of grab samples (Terrasond, 2019 and Fugro, 2020), GrabCam video (Fugro, 2020), and lower video transects (RPS, 2021) are reported in the CDP Volume II - Affected Environment. SPH-PV basic classification is reported in Fugro MDT (2021, Vol. 1), Appendix G.
- EQUIPMENT**
- Vessels:
RV Fugro Enterprise, MV Fugro Breaker, DSV Splash, RV Shearwater
- Navigation System: GPS Primary (Fugro Enterprise) Fugro StarTrack Navigation Satellite System; (Fugro Breaker) Kongsberg Seapath 380 Navigation Satellite System
- Multibeam System:
Kongsberg EM240 MBES for all Vessels
- Side Scan Sonar:
EdgeTech 420S SSS (300/600) kHz frequencies for all Vessels
- USBL System:
Kongsberg Kongsberg 602 USBL system for all Vessels
- SPH-PV (2020)
Ocean Imaging System (OIS) 3731-D REMOTIS digital sediment profiling camera with DSC 2800 plan view camera
- GrabCam (2020)
The Young-Modified Van Veen Grab dual 0.04 m² bucket sampler equipped with Fugro's real-time GrabCam HD video system
- Sediment Grab (2019)
Benthic Grab (Terrasond) 50-20 sampler 0.10 m²
- Towed Video (2021)
(RV Shearwater) Camera sled equipped with altimeter, GoPro Hero 8, and 4K camera

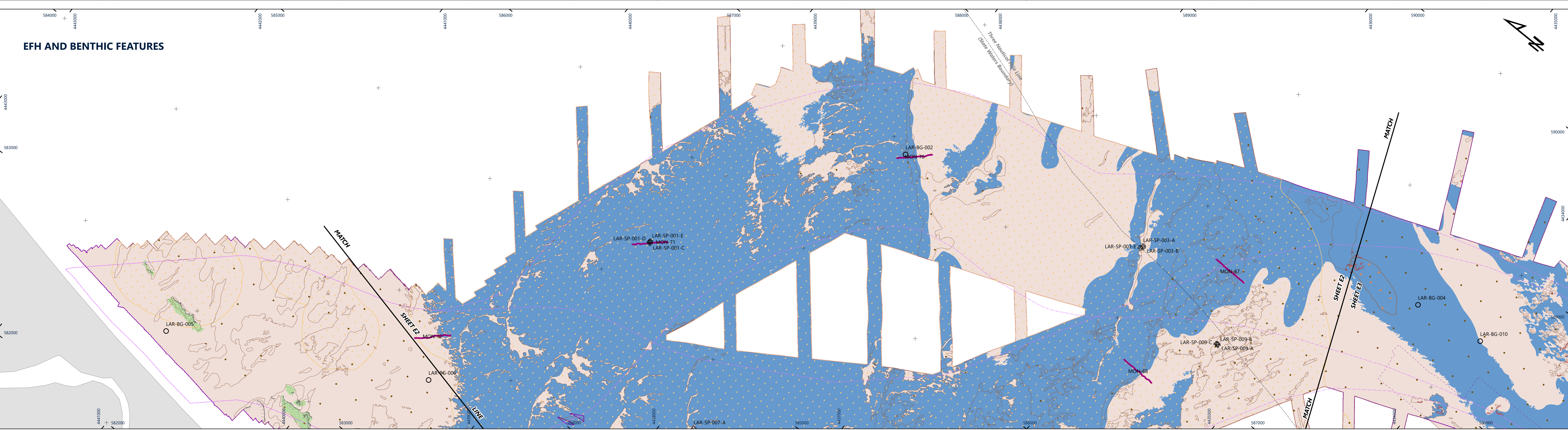
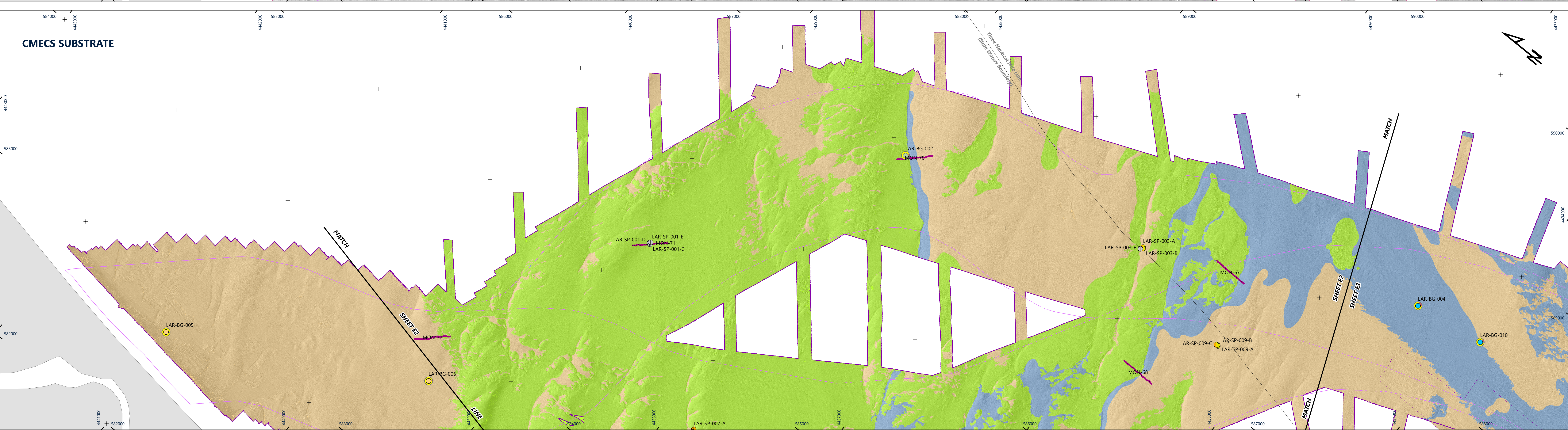
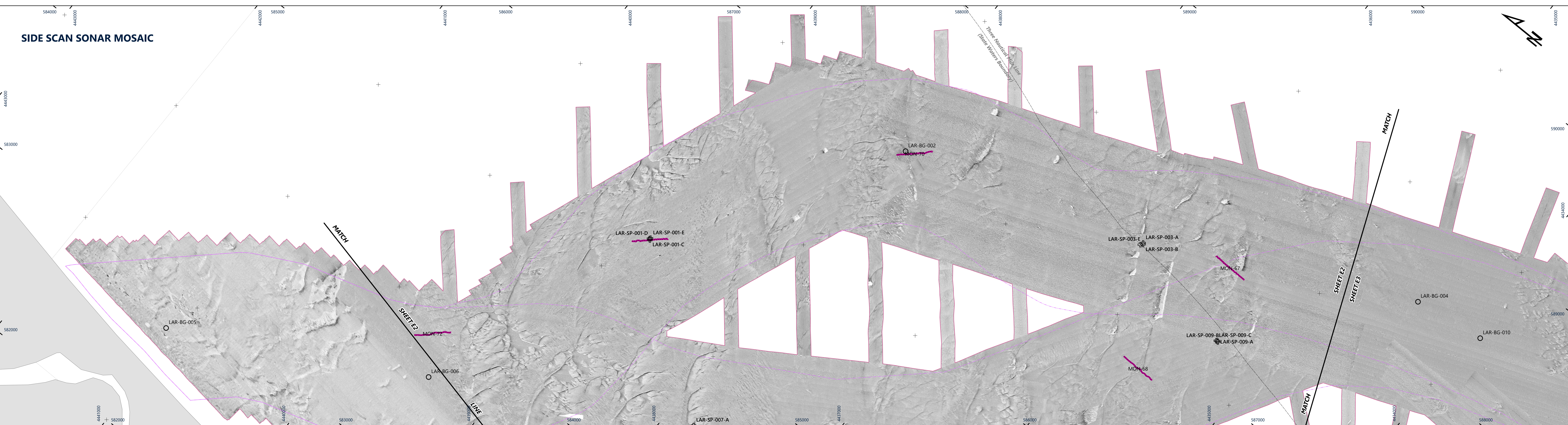
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GEODETTIC PARAMETERS		North American Datum 1983
ELLIPSOID	GRS 1980	
Semi-Major Axis	6,378,137.000 m	
Inverse Flattening	298.257222101	
PROJECTION	UNIVERSAL TRANSVERSE MERCATOR / Zone 18N (EPSG 26918)	
Central Meridian (CM)	75°00'00" W	
Latitude of Origin	00°00'00" N	
False Easting	500,000 E	
False Northing	0 m N	
Scale Factor at CM	0.9998	
VERTICAL DATUM	MEAN LOWER LOW WATER (MLLW)	

Horizontal and vertical units are in meters



Issue No:	Date:	Description:	Drawn:	Checked:	Approved:
01	11/25/2021	DRAFT - For Review	MB	DD	DD
02	12/08/2021	Rev00	MB	DD	DD



ATLANTIC SHORES offshore wind
ATLANTIC SHORES OFFSHORE WIND, LLC
INTEGRATED GEOPHYSICAL & GEOTECHNICAL
MARINE SITE INVESTIGATION REPORT: VOLUME 3
OFFSHORE NEW JERSEY

NORTH MONMOUTH EXPORT CABLE BENTHIC HABITAT CHART
Appendix E: Benthic Technical Memo Chart No. E2

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FUGRO

LEGEND

SURVEY EXTENTS

- Monmouth Export Cable Corridor Extent
- North Monmouth Export Cable Corridor MBES Data Extent (2020)
- North Monmouth Export Cable Corridor MBES Data Extent (2021)

BENTHIC SAMPLING LOCATIONS

- Benthic Grab (Terasond, 2019)
- Benthic GrabCam (Fugro, 2020)
- SPH-PV Image (Fugro, 2020)
- Towed Video Transect (RPS, 2021)

SIDE SCAN SONAR MOSAIC

Relative Reflectivity

High

Low

NMFS ESSENTIAL FISH HABITAT (EFH)

Composite benthic feature layers indicate multiple benthic features are present

BENTHIC FEATURES

- Scarp
- Interbedded Surficial Sediments
- Localized Relief Features (LRFs)
- Sand Ridge Crests
- Sand Waves
- Mega Ripples
- Ripples

ESSENTIAL FISH HABITAT CLASSIFICATION

- Complex
- Heterogenous Complex
- Soft

CMECS SUBSTRATE

SPH-PV SAMPLE LOCATIONS (Fugro, 2020)

CMECS Substrate Group and Substrate Subgroup

- Gravel Mixes, Sandy Gravel
- Gravels, Pebble/Granule
- Gravelly, Pebble/Granule
- Gravelly, Gravelly Sand
- Sand, Gravelly Sand
- Sand, Very Coarse/Coarse Sand
- Sand, Medium Sand
- Sand, Fine/Very Fine Sand

GRAB SAMPLE LOCATIONS (Terasond, 2019 and Fugro, 2020)

Wentworth Grain Size Composition

Center symbol displays CMECS substrate classification

- Gravel (%)
- Sand (%)
- Mud (%)

Hybrid CMECS Substrate / Simplified-Folk Sediment Classification (Fugro, 2020)

- Gravel
- Gravelly Mud, Gravelly Muddy Sand
- Gravelly Sand
- Sand

CMECS SUBSTRATES

Substrate interpretation overlain by shaded relief sun illumination model (azimuth 315 degrees, z factor 1, and 70% transparency).

NOTES

- Survey data were acquired in geographic coordinates relative to the World Geodetic System 1984 (WGS84) datum. Data were then converted to North American Datum 1983 (NAD83) and projected to the Universal Transverse Mercator Zone 18 North (UTM Zone 18N) projection.
- Fugro collected (non-continuous) geophysical and geotechnical data in the North Monmouth ECC from June 1, 2020 to June 10, 2021.
- Reported base block information is based on Fugro's GIS database.
- Maritime boundaries are provided by NOAA Natural Ocean Service (Terasond, 2019 and Fugro, 2020). Federal State Boundaries are provided by BOEM Digital Offshore Cartilage (DOO), Atlantic's, Submerged Lands Act (SLA) Boundary.
- Interpretation is based on collected seafloor geophysical data (SBES, MBES bathymetry and backscatter) and ground truth sampling results. CMECS substrate, EFH, and benthic features interpretation clipped to MBES bathymetry (2021) data extent.
- EFH habitat delineations and characterization of benthic features charted here are in reference to NMFS' letter to BOEM dated March 20, 2021 regarding "Updated Recommendations for Mapping Fish Habitat".
- Mobile sediment areas are mapped within the Cable Burial Risk Assessment (CBRA). Refer to Fugro MSIR, Vol. 4, 2021m.
- No large grained complex habitats were delineated within the survey area.
- Heater vegetated habitats, non-adorned aquatic vegetation (SAV) has been charted in the survey area.
- Benthic classification (NMFS Method CMECS) of grab samples (Terasond, 2019 and Fugro, 2020), GrabCam video (Fugro, 2020), and towed video transects (RPS, 2021) are reported in the CDP Volume 8 - Affected Environment. SPH-PV basic classification is reported in Fugro MSIR (2021, Vol. 1), Appendix C.

EQUIPMENT

Vessels:

- R/V Fugro Enterprise, M/V Fugro Breaker, DSV Splash, R/V Shearwater

Navigation System: GPS Primary (Fugro Enterprise) Fugro StarTrack Navigation Satellite System; (Fugro Breaker) Kongsberg Seapath 380 Navigation Satellite System

Multibeam System: Kongsberg EM240 MBES for all Vessels

Side Scan Sonar: EdgeTech 420S SSS (300/600) kHz frequencies for all Vessels

USBL System: Kongsberg HPAP 602 USBL system for all Vessels

SPH-PV (2020): Ocean Imaging System (OIS) 3731-D REMOTS digital sediment profiling camera with OSC 2400 plan view camera

GrabCam (2020): Teo Young Modified Van Veen Grab dual 0.04 m2 bucket sampler equipped with Fugro's real-time GrabCam HD video system

Sediment Grab (2019): Salmi One Standard SO-20 sampler 0.10 m2

Towed Video (2021): (R/V Shearwater) Camera sled equipped with altimeter, GoPro Hero 9, and 8K camera

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GEODETIC PARAMETERS

North American Datum 1983

ELLIPSOID: GRS 1980

Semi-Major Axis: 6,378,137.000 m

Inverse Flattening: 298.257222101

PROJECTION: UNIVERSAL TRANSVERSE MERCATOR / Zone 18N (EPSG 26918)

Central Meridian (CM): 75°00'00" W

Latitude of Origin: 00°00'00" N

False Easting: 500,000 m

False Northing: 0 m

Scale Factor at CM: 0.9998

VERTICAL DATUM: MEAN LOWER LOW WATER (MLLW)

Horizontal and vertical units are in meters

Scale 1 : 10,000 at Arch E page size

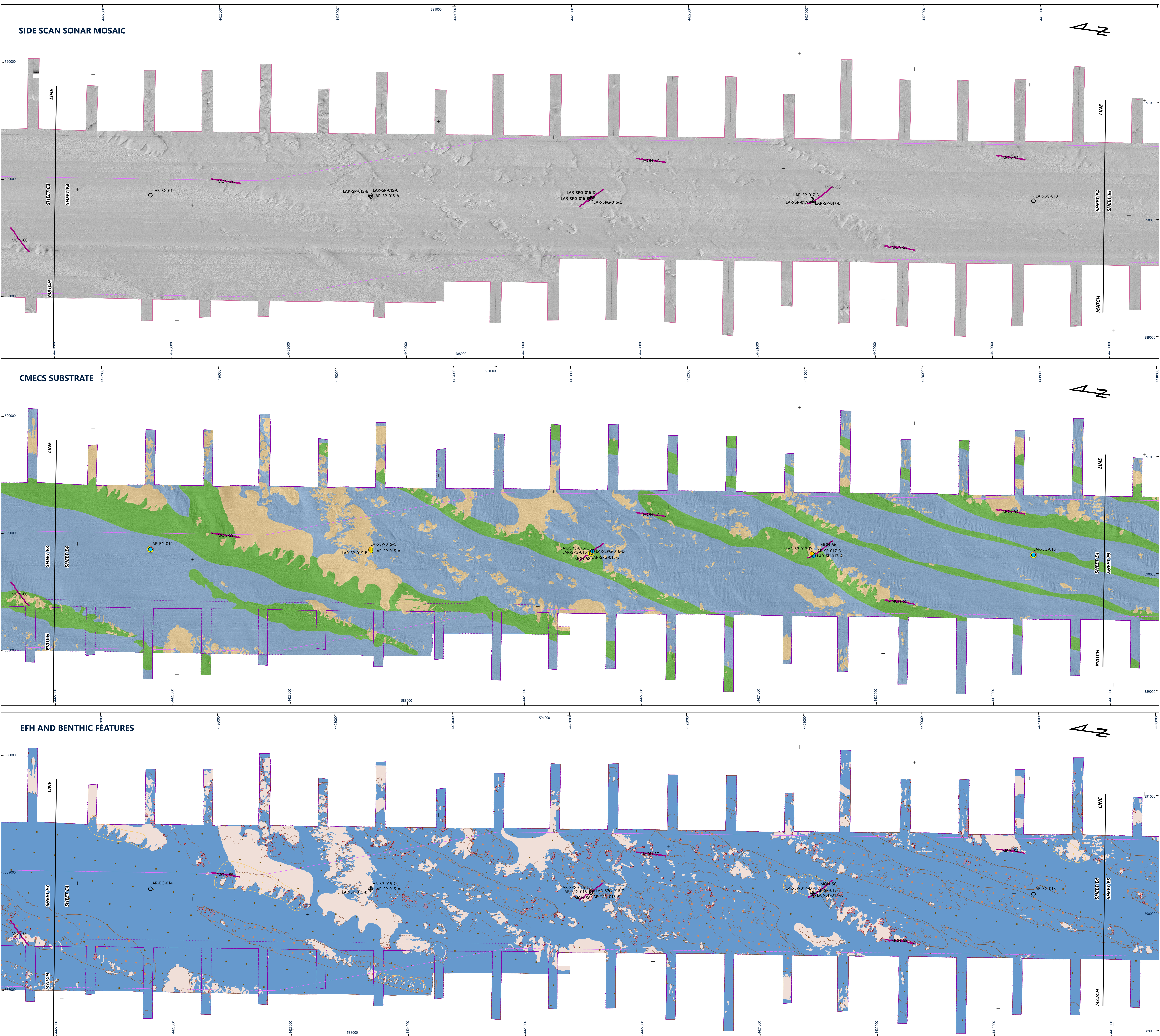
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0 600 1,200 1,800 2,400 3,000 3,600 Feet

Issue No: Date: Description: Drawn: Checked: Approved:

01	11/25/2021	DRAFT - For Review	MB	DD	DD
02	12/08/2021	Rev00	MB	DD	DD

Project No: 02.20030011 **Chart Name:** 20030011_Shell_Monmouth_ECC_E2_Benthic_Alignment_Sheet **Chart No:** E2



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OFFSHORE NEW JERSEY

NORTH MONMOUTH EXPORT CABLE CORRIDOR BENTHIC HABITAT CHART
2021
Appendix E: Benthic Technical Memo
Chart No. E4

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LEGEND
SURVEY EXTENTS
Monmouth Export Cable Corridor Extent
North Monmouth Export Cable Corridor MBES Data Extent (2020)
North Monmouth Export Cable Corridor MBES Data Extent (2021)

BENTHIC SAMPLING LOCATIONS
Benthic samples were taken from several surveys conducted in 2019 thru 2021 by various contractors.
Benthic Grab (TerraSonar, 2019)
Benthic GrabCam (Fugro, 2020)
SPI-PV Image (Fugro, 2020)
Towed Video Transect (RPS, 2021)

CMCCS SUBSTRATE
SPI-PV SAMPLE LOCATIONS (Fugro, 2020)
CMCCS Substrate Group and Substrate Subgroup
Gravel Mixes/Sandy Gravel
Gravels/Pebble/Granule
Gravelly/Pebble/Granule
Gravelly/Gravelly Sand
Sand/Gravelly Sand
Sand/Very Coarse/Coarse Sand
Sand/Medium Sand
Sand/Fine/Very Fine Sand
Gravel (%)
Sand (%)
Mud (%)
Hybrid CMCCS Substrate / Simplified-Folk Sediment Classification (Fugro, 2020)
Gravel
Gravelly Mud, Gravelly Muddy Sand
Gravelly Sand
Sand

GRAB SAMPLE LOCATIONS
(TerraSonar, 2019 and Fugro, 2020)
Wentworth Grain Size Composition
Center symbol displays CMCCS substrate classification
Gravel (%)
Sand (%)
Mud (%)
Hybrid CMCCS Substrate / Simplified-Folk Sediment Classification (Fugro, 2020)
Gravel
Gravelly Mud, Gravelly Muddy Sand
Gravelly Sand
Sand

CMCCS SUBSTRATES
Substrate interpretation overlain by shaded relief sun illumination model (azimuth 315 degrees, z factor 1, and 70% transparency).
Gravel
Gravelly
Gravelly Sand
Sand

BENTHIC FEATURES
Composite benthic feature layers indicate multiple benthic features are present
Scarp
Interbedded Surficial Sediments
Localized Relief Features (LRFs)
Sand Ridge Crests
Sand Waves
Mega Ripples
Ripples
ESSENTIAL FISH HABITAT CLASSIFICATION
Complex
Heterogeneous Complex
Soft

NOTES
1) Survey data were acquired in geographic coordinates relative to the World Geodetic System 1984 (WGS84) datum. Data were then converted to North American Datum 1983 (NAD83) and projected to the Universal Transverse Mercator Zone 18 North (UTM Zone 18N) projection.
2) Fugro collected (non-continuously) geophysical and geotechnical data in the North Monmouth ECC from June 1, 2020 to June 10, 2021.
3) Reported lease block information is based on Fugro's GIS database.
4) Maritime Boundaries are provided by NOAA Nautical Charts (2019). Federal/State Boundaries are provided by BOEM Digital Offshore Cadastre (DOOC), Atlantic's, Submerged Lands Act (SLA) Boundary.
5) Interpretation is based on collected seafloor geophysical data (SSS, MBES bathymetry and backscatter) and ground truth sampling results (CMCCS Substrate, CPT, and benthic feature interpretation - closest to MBES bathymetry (2021) data extent).
6) EFH habitat delineations and characterization of benthic features shared here are in reference to NMFS' letter to BOEM dated March 29, 2021 regarding "Updated Recommendations for Mapping Fish Habitat".
7) Mobile sediment areas are mapped within the Cable Rural Risk Assessment (CBRA). Refer to Fugro MSRP, Vol. 4, 2021m.
8) No large grained complex habitats were delineated within the survey area.
9) Neither vegetated habitats nor submerged aquatic vegetation (SAV) has been charted in the survey area.
10) Biotic classification (NMFS Modified CMCCS) of grab samples (TerraSonar, 2019 and Fugro, 2020), GrabCam video (Fugro, 2020), and towed video transects (RPS, 2021) are reported in the COP Volume II - Affected Environment. SPI-PV biotic classification is reported in Fugro MSRP (2021, Vol. 1), Appendix G.
EQUIPMENT
RV Fugro Enterprise, M/V Fugro Brasils, DSV Splash, R/V Shearwater
Navigation System GPS Primary: (Fugro Enterprise) Fugro StarTrack Navigation Satellite System; (Fugro Brasils) Kongberg Seapack 380 Navigation Satellite System
Multibeam System: Kongberg EM2400 MBES for all Vessels
Side Scan Sonar: Edgetech 420S SSS (300/600) kHz frequencies for all Vessels
USBL System: Kongberg HPNP 502 USBL system for all Vessels
SPLPV (2020): Ocean Imaging System (OIS) 3731-D REMOTS digital sediment profiling camera with DISC 24000 plan view camera
GrabCam (2020): Test Young Modified Van Veen Grab dual 0.04 m2 bucket sampler equipped with Fugro's real-time GrabCam HD video system
Sediment Grab (2019): Salick Grab Standard SG-20 sampler 0.10 m2
Towed Video (2021): (R/V Shearwater) Camera sled equipped with altimeter, GoPro Hero 9, and 4K camera

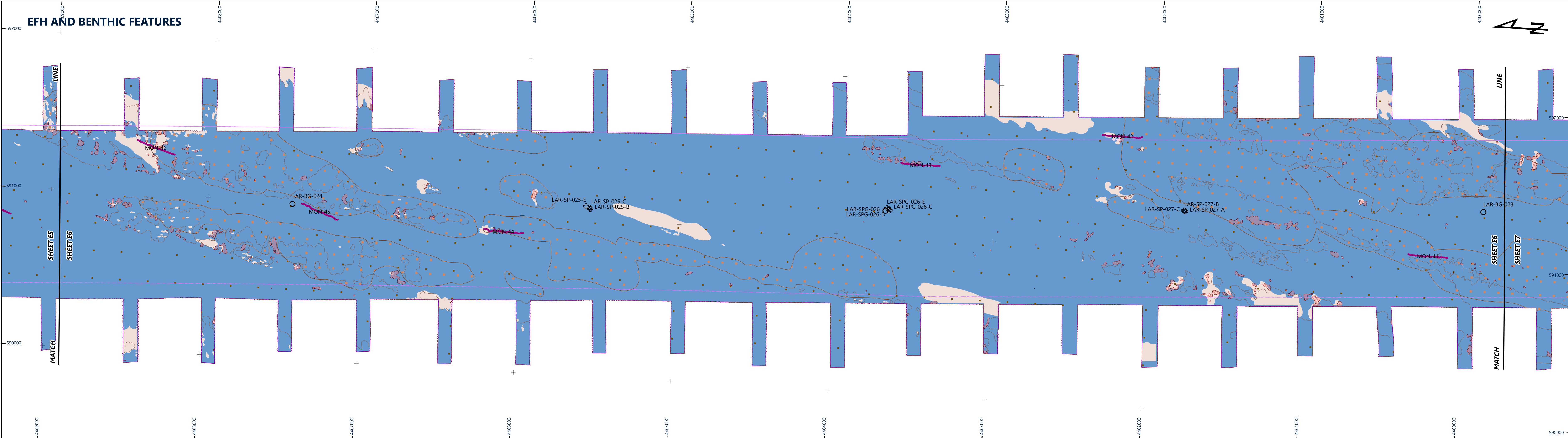
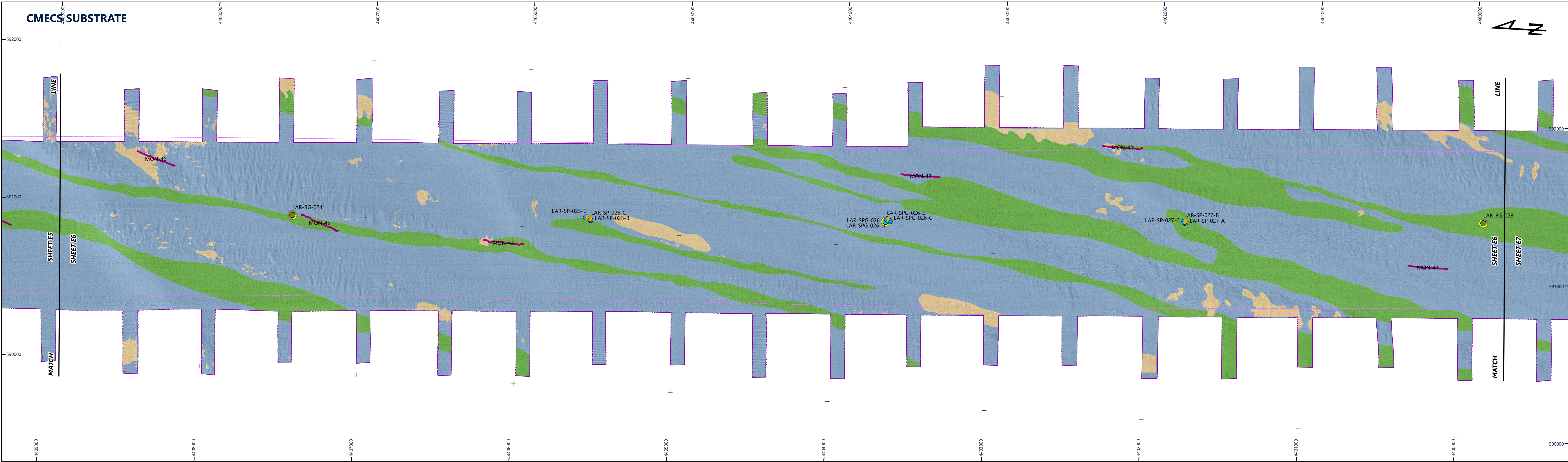
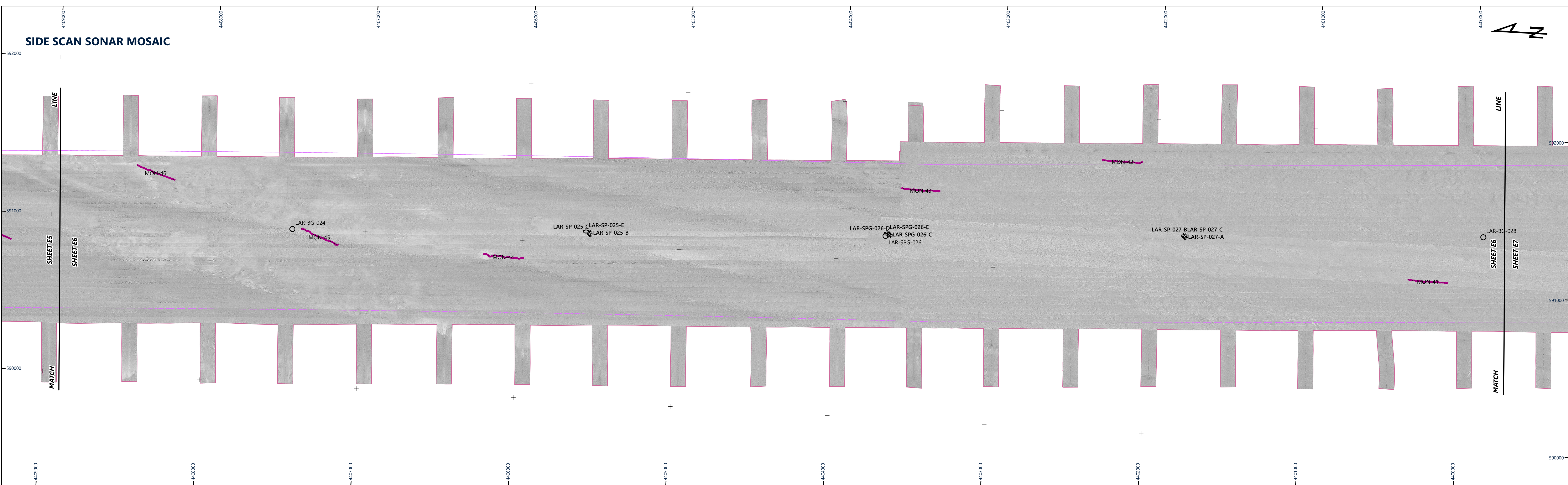
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GEODETIC PARAMETERS
GEODETIC DATUM: North American Datum 1983
ELLIPSOID: GRS 1980
Semi-Major Axis: 6,378,137.000 m
Inverse Flattening: 298.257222101
PROJECTION: UNIVERSAL TRANSVERSE MERCATOR / Zone 18N (EPSG 26918)
Central Meridian (CM): 75°00'00" W
Latitude of Origin: 00°00'00" N
False Easting: 500,000 m E
False Northing: 0 m N
Scale Factor at CM: 0.9996
VERTICAL DATUM: MEAN LOWER LOW WATER (MLLW)
Horizontal and vertical units are in meters

Scale 1 : 10,000 at Arch E page size
0 100 200 300 400 500 600 700 800 900 1,000 Meters
0 600 1,200 1,800 2,400 3,000 3,600 Feet

Issue No:	Date:	Description:	Drawn:	Checked:	Approved:
01	11/25/2021	DRAFT - For Review	MB	DD	DD
02	12/28/2021	Rev00	MB	DD	DD

Project No: 02.20030011
Chart Name: Shell_Monmouth_ECC_E4_Benthic_Alignment_Sheet
Chart No: E4



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MARINE SITE INVESTIGATION REPORT: VOLUME 3
OFFSHORE NEW JERSEY

NORTH MONMOUTH EXPORT CABLE CORRIDOR BENTHIC HABITAT CHART
2021 Appendix E: Benthic Technical Memo Chart No. E6

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FUGRO

LEGEND

SURVEY EXTENTS

- Monmouth Export Cable Corridor Extent
- North Monmouth Export Cable Corridor MBES Data Extent (2020)
- North Monmouth Export Cable Corridor MBES Data Extent (2021)

BENTHIC SAMPLING LOCATIONS

- Benthic Grab (Terraand, 2019)
- Benthic GrabCam (Fugro, 2020)
- SPI-PV Image (Fugro, 2020)
- Towed Video Transect (RPS, 2021)

CMECS SUBSTRATE

SPI-PV SAMPLE LOCATIONS
(Fugro, 2020)

CMECS Substrate Group and Substrate Subgroup

- Gravel Mixes/Sandy Gravel
- Gravels/Pebble/Granule
- Gravelly/Pebble/Granule
- Gravelly/Gravelly Sand
- Sand/Gravelly Sand
- Sand/Very Coarse/Coarse Sand
- Sand/Medium Sand
- Sand/Fine/Very Fine Sand

GRAB SAMPLE LOCATIONS
(Terraand, 2019 and Fugro, 2020)

Wentworth Grain Size Composition
Center symbol displays CMECS substrate classification

- Gravel (%)
- Sand (%)
- Mud (%)

Hybrid CMECS Substrate / Simplified-Folk Sediment Classification
(Fugro, 2020)

- Gravel
- Gravelly Mud, Gravelly Muddy Sand
- Gravelly Sand
- Sand

CMECS SUBSTRATES

Substrate interpretation overlain by shaded relief sun illumination model (azimuth 315 degrees, z factor 1, and 70% transparency).

- Gravel
- Gravelly
- Gravelly Sand
- Sand

BENTHIC FEATURES

- Scarp
- Interbedded Surficial Sediments
- Localized Relief Features (LRFs)
- Sand Ridge Crests
- Sand Waves
- Mega Ripples
- Ripples

ESSENTIAL FISH HABITAT CLASSIFICATION

- Complex
- Heterogenous Complex
- Soft

Hybrid CMECS Substrate and Simplified-Folk Sediment Classification Diagram

NOTES

- Survey data were acquired in geographic coordinates relative to the World Geodetic System 1984 (WGS84) datum. Data were then converted to North American Datum 1983 (NAD83) and projected to the Universal Transverse Mercator Zone 18 North (UTM Zone 18N) projection.
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- EFH habitat delineations and characterization of benthic features charted here are in reference to NMFS' letter to BOEM dated March 29, 2021 regarding "Tentative Recommendations for Mapping Fish Habitat".
- Mobile sediment areas are mapped within the Cable Burial Risk Assessment (CBRA). Refer to Fugro MSIR, Vol. 4, 2021m.
- No large grained complex habitats were delineated within the survey area.
- Neither vegetated habitats nor submerged aquatic vegetation (SAV) has been charted in the survey area.
- Biotic classification (NMFS Modified CMECS) of grab samples (Terraand, 2019 and Fugro, 2020), GrabCam video (Fugro, 2020), and towed video transects (RPS, 2021) are reported in the COP Volume 11 - Affected Environment. SPI-PV biotic classification is reported in Fugro MSIR (2021, Vol. 1, Appendix G).

EQUIPMENT

R/V Fugro Enterprise, MV Fugro Brasilia, DSV Splash, R/V Shearwater

Navigation System GPS Primary:
(Fugro Enterprise) Fugro StarPack Navigation Satellite System; (Fugro Brasilia) Kongsberg SeaPack 380 Navigation Satellite System

Multibeam System:
Kongsberg EM240 MBES for all Vessels

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Test Young Modified Van Veen Grab dual 0.04 m2 bucket sampler equipped with Fugro's real-time GrabCam HD video system

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Sediment Grab Standard SG-20 sampler 0.10 m2

Towed Video (2021)
R/V Shearwater Camera sled equipped with altimeter, GoPro Hero 9, and 4K camera

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GEODETIC PARAMETERS

GEODETIC DATUM North American Datum 1983

ELLIPSOID GRS 1980
Semi-Major Axis 6,378,137.000 m
Semi-Minor Axis 6,356,752.314 m

PROJECTION UNIVERSAL TRANSVERSE MERCATOR / Zone 18N (EPSG 26918)
Latitude of Origin 00°00'00" N
Longitude of Origin 75°00'00" W
False Easting 500,000 m
False Northing 0 m
Scale Factor at CM 0.9996

VERTICAL DATUM MEAN LOWER LOW WATER (MLLW)

Horizontal and vertical units are in meters

Scale 1 : 10,000 at Arch E page size

0 100 200 300 400 500 600 700 800 900 1,000 Meters
0 600 1,200 1,800 2,400 3,000 3,600 Feet

Issue No: Date: Description: Drawn: Checked: Approved:

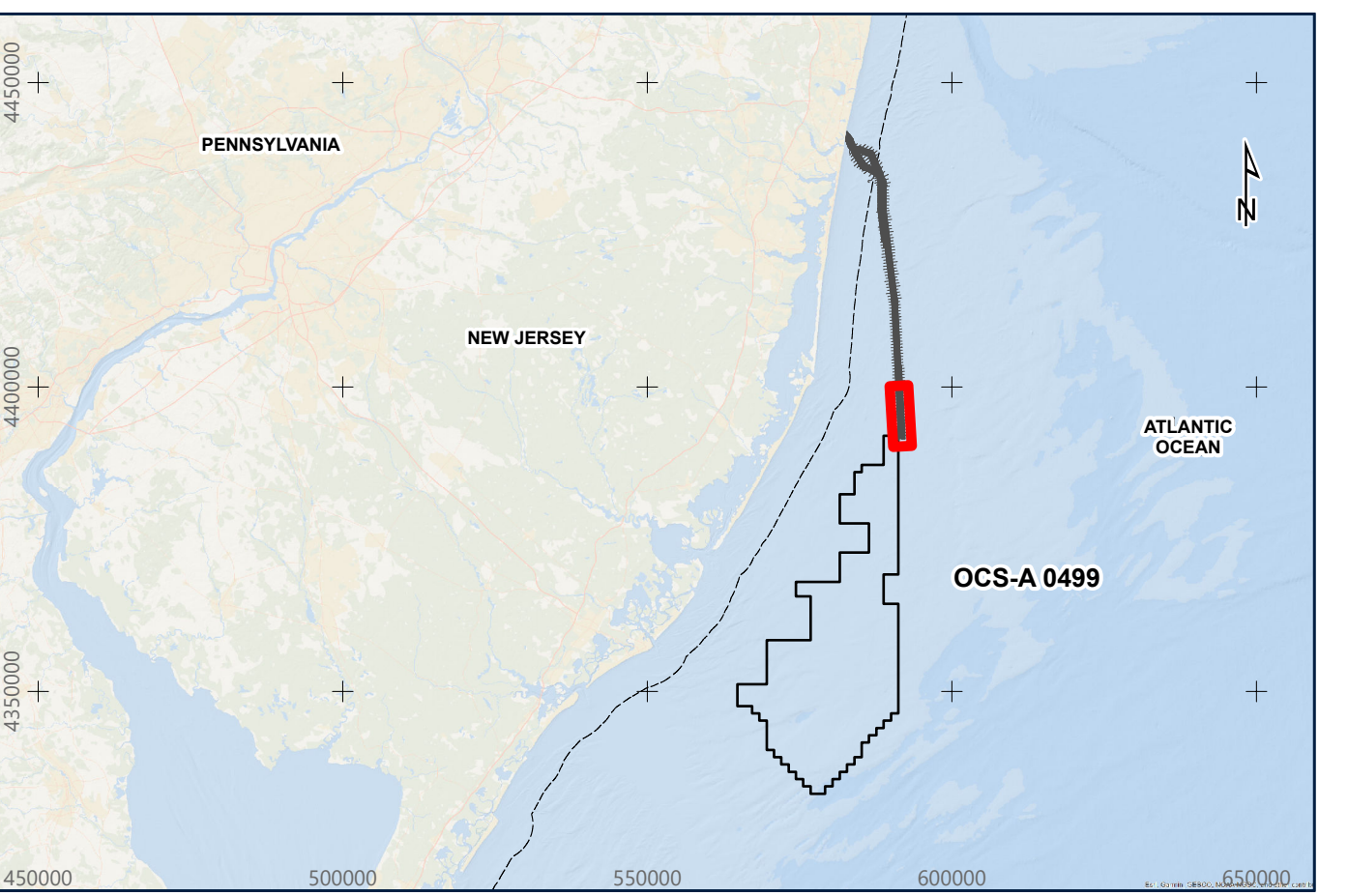
01	11/25/2021	DRAFT - For Review	MB	DD	DD
02	12/08/2021	Rev00	MB	DD	DD

Project No: 2020030011 **Chart Name:** 20030011_Shell_Monmouth_ECC_E6_Benthic_Alignment_Sheet **Chart No:** E6

This figure is a side scan sonar mosaic showing a bridge structure. The mosaic is oriented horizontally, with the bridge piers visible as vertical columns. The water surface is indicated by a dashed line at the top. The sonar data is presented in a grayscale format, with a color scale on the right side ranging from 0 to 100. The mosaic is divided into sections labeled 'SHEET 6' and 'SHEET 7'. A north arrow is located in the top right corner. The mosaic shows the bridge piers and the surrounding water, with some areas marked as 'MON-35' and 'MON-36'. The bridge structure is labeled with 'LAR-BG-028', 'LAR-SP-029-A', 'LAR-SP-029-D', 'LAR-SP-029-E', 'LAR-BG-030', 'LAR-SPG-031-CLAR-SPG-031-D', 'LAR-SPG-031-CLAR-SPG-031-B', and 'LAR-BG-032'. The mosaic is bounded by a coordinate system with values ranging from 438000 to 439000 on the horizontal axis and 590000 to 591000 on the vertical axis.

This map displays the Effluent and Benthic Features of a waterway. The map includes a coordinate grid with Easting (439000 to 439500) and Northing (591000 to 592000) values. Key features include:

- Sampling Locations:** LAR-BG-028, LAR-BG-030, LAR-BG-032, LAR-SPG-031-A, LAR-SPG-031-B, LAR-SPG-031-C, LAR-SPG-031-D, LAR-SPG-031-E, LAR-SPG-031-F, LAR-SPG-031-G, LAR-SPG-031-H, LAR-SPG-031-I, LAR-SPG-031-J, LAR-SPG-031-K, LAR-SPG-031-L, LAR-SPG-031-M, LAR-SPG-031-N, LAR-SPG-031-O, LAR-SPG-031-P, LAR-SPG-031-Q, LAR-SPG-031-R, LAR-SPG-031-S, LAR-SPG-031-T, LAR-SPG-031-U, LAR-SPG-031-V, LAR-SPG-031-W, LAR-SPG-031-X, LAR-SPG-031-Y, LAR-SPG-031-Z.
- Geographic Features:** MON-41, MON-42, MON-43, MON-44, MON-45, MON-46, MON-47, MON-48, MON-49, MON-50, MON-51, MON-52, MON-53, MON-54, MON-55, MON-56, MON-57, MON-58, MON-59, MON-60, MON-61, MON-62, MON-63, MON-64, MON-65, MON-66, MON-67, MON-68, MON-69, MON-70, MON-71, MON-72, MON-73, MON-74, MON-75, MON-76, MON-77, MON-78, MON-79, MON-80, MON-81, MON-82, MON-83, MON-84, MON-85, MON-86, MON-87, MON-88, MON-89, MON-90, MON-91, MON-92, MON-93, MON-94, MON-95, MON-96, MON-97, MON-98, MON-99, MON-100.
- Map Elements:** A vertical line labeled "LINE" and "MATCH" is shown on the left. A horizontal line labeled "SHEET 6" and "SHEET 7" is shown. A north arrow is located in the top right corner.



SURVEY EXTENTS

- Monmouth Export Cable Corridor Extent
- North Monmouth Export Cable Corridor MBES Data Extent (2020)
- North Monmouth Export Cable Corridor MBES Data Extent (2021)

BENTHIC SAMPLING LOCATIONS

- Benthic Grab (Terrasound, 2019)
- Benthic Grab/Cam (Fugro, 2020)
- SPI-PV Image (Fugro, 2020)
- Towed Video Transect (RPS, 2021)

SPI-PV SAMPLE LOCATIONS
(Fugro, 2020)

CMECS Substrate Group and Substrate Subgroup

High
Relative Reflectivity
Low

- NMFs ESSENTIAL FISH HABITAT (EFH)**

Composite benthic feature layers indicate multiple benthic features are present

BENTHIC FEATURES

 - Scarp
 - Interbedded Surficial Sediments
 - Localized Relief Features (LRFs)
 - Sand Ridge Crests
 - Sand Waves
 - Mega Ripples
 - Ripples

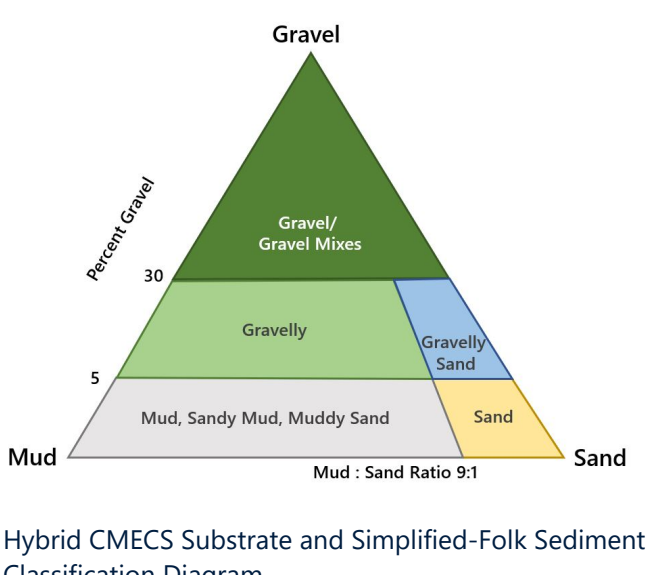
GRAB SAMPLE LOCATIONS
(Terrasond, 2019 and Fugro, 2020)

Wentworth Grain Size Composition
Center symbol displays CMCSs substrate classification

Hybrid CMECS Substrate / Simplified-Folk
Sediment Classification (Fugro, 2020)

- Gravel
Gravelly Mud, Gravelly Muddy Sand
Gravelly Sand
Sand
- Gravel

Gravelly

 Gravel 

- 1 Survey data were acquired in geographic coordinates relative to the World Geodetic System 1984 (WGS84) datum. Data were then converted to the Universal Transverse Mercator (UTM) projection and the UTM zone 18Q projection.
- 2 Survey data were (non-continuously) georeferenced and georeferenced data from the November ECMC from June 1, 2020 to June 19, 2021.
- 3 Reported lake block information is based on the Google GIS database.
- 4 Maritime Boundaries are provided by NOAA Nautical Chart (2019). Federal-State Borderlines are provided by BOEM Digital Offshore Catalogue (DOC), Atlantic, Submerged Lands Act (SLA) Boundary.
- 5 Information is based on collected surface geophysical data (SSB, EMES bathymetry and backscatter) and ground truth sampling results. The bathymetry, EPI and benthic NODAL data were collected by the EMES bathymetry (SSB) data sets.
- 6 EPI bath data characteristics and characterization of benthic features charted here are in reference to NODAL report to BOEM dated March 29, 2021 regarding "Updated Recommendations for Mapping EPI Data".
- 7 Habitat system codes are mapped with the National Ocean Service's Coastal and Estuarine Science Center (CERES) (CERES, 2017).
No large grained complex habitats were delineated within the survey area.
- 8 Neither vegetated habitats nor submerged aquatic vegetation (SAV) has been charted in the survey area.
- 9 Bioturbation (NEMO) and CAMEB1 are categories of grab samples (Tennison, 2019; 2020), GrainScan video (Figueroa, 2020) and lower video transects (RPS, 2021) are reported in the COP Volume 1 – Affected Environment. SPI-VI bathymetric classification is reported in the COP Volume 2 – Affected Environment.

R/Vs: Enterprise, MW Bravo Brakes, DSV System, RV Shearwater

Navigation System (DRS) (R/Vs)

FuGo Enterprise/FuGo StarLine Navigation Satellite System (FuGo Brakes) Kongberg Seapath 380 Navigation Satellite System

Multibeam System

Kongsberg EM240 MBES for all Vessels

Side Scan Beam

EdgeTech 425S SSS (300060) kHz frequencies for all Vessels

USBL System

Kongsberg HRPAP 502 USBL system for all Vessels

SLR/PDP (200)

Ocean Imaging System (OIS) 3731-0 REMOTS digital segment profiling camera with DSC 24000 plain view camera

Grabcam (2020)

Real Time Motion Compensation (RTMC) 3731-0 REMOTS digital segment profiling camera with DSC 24000 plain view camera

Sediment Grab (2019)

Swiss Grab Standard SG-20 sampler: 0 to 0.12 m

Trawl Vessels (2021)

DSV Shearwater Camera and equipped with altimeter, GoPro Hero 5, and 4K camera

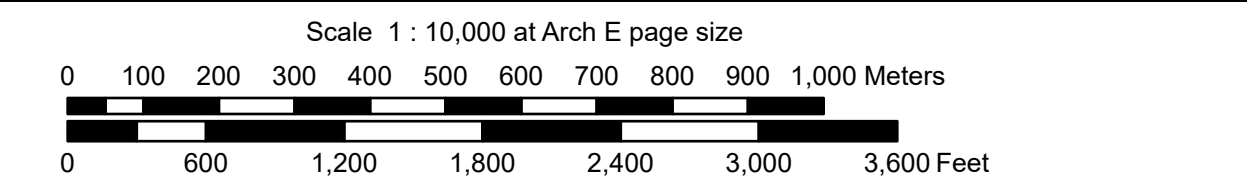
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GEODETIC DATUM	North American Datum 1983
ELLIPSOID	GRS 1980
Semi-Major Axis	6,378,137.000 m
Inverse Flattening	298.257222101

PROJECTION	UNIVERSAL TRANSVERSE MERCATOR / Zone 18N (EPSG 26918)
Central Meridian (CM)	75°00'00" W
Latitude of Origin	00°00'00" N
False Easting	500,00m E
False Northing	0m N
Scale Factor at CM	0.9996

VERTICAL DATUM MEAN LOWER LOW WATER (MLLW)

Horizontal and vertical units are in meters



Issue No:	Date:	Description:	Drawn:	Checked:	Approved:
1	11/25/2021	DRAFT - For Review	MB	DD	DD
2	12/08/2021	Rev00	MB	DD	DD

Project No:	Chart Name:	Chart No:
2.20030011	20030011 Shell Monmouth ECC E7 Benthic Alignment Sheet	E7