



Infrastructure, environment, buildings

Mr. Mike Boudloche, Trustee
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Subject:

Corrective Measures Study and Corrective Measures Implementation Work Plan
Addendum – Post Excavation Verification Soil Sample Collection and Analysis Plan
(Revised August 30, 2012)

Former Encycle/ASARCO Facility
5500 Up River Road
Corpus Christi, Texas
TCEQ SWR No. 30003; EPA ID No. TXD008117186

Dear Mr. Boudloche:

Date:

August 30, 2012

As part of upcoming soil remediation activities at the former Encycle/ASARCO facility, verification soil samples will be collected following soil excavation. The verification soil samples will be collected to confirm the affected soils have been excavated prior to backfilling the excavations with clean soil. The verification soil sample collection procedures were provided in Appendix E of the May 27, 2005 report entitled “Corrective Measures Study and Corrective Measures Implementation Work Plan” (CMS/CMI) that was approved by the TCEQ on December 16, 2005.

Contact:

Ken Brandner

Phone:

(361) 883-1353

As requested in Item No. 2 of the March 9, 2012 Texas Commission on Environmental Quality (TCEQ) letter regarding the March 2012 Soil Remediation Bid Package for the former Encycle/ASARCO facility in Corpus Christi (Site), provided herein is an addendum to the CMS/CMI. This CMS/CMI addendum provides more detail regarding the post-excavation verification soil sample collection and analyses procedures for each area of proposed soil excavation.

POST-EXCAVATION VERIFICATION SOIL SAMPLE COLLECTION PROCEDURES

As discussed in the CMS/CMI, affected soils that exceed the Preliminary Remediation Goals (PRGs) will be excavated, stabilized on-site, and disposed of at an authorized offsite landfill. The locations and depths of affected soils to be initially excavated on the Meaney Tract are shown on Figure 3, and the locations and depths of affected soils to be initially excavated on the Encycle Northern and Southern Tracts are shown on Figure 4.

Following initial soil excavation as shown on Figures 3 and 4, verification soil samples will be collected from each excavation area to confirm the soils exceeding the PRGs have been excavated. The verification soil samples will be collected from both the floors and walls of each excavation. The verification soil samples from the excavation floors will be collected on a 50-foot square grid pattern, and the verification soil samples from the excavation walls will be collected on a 50-foot spacing. Verification soil sample

locations on the Meaney Tract are shown on Figure 20, and verification soil sample locations on the Encycle Northern and Southern Tracts are shown on Figure 21.

The verification soil samples will be grab samples collected using a stainless steel trowel. Prior to collection of each sample, the trowel will be cleaned using a non-phosphate detergent wash, water rinse, and distilled water final rinse. The equipment cleaning water, which is anticipated to be relatively small in volume (< 55 gallons per month), will be stored in a labeled 55-gallon drum. A representative sample of the equipment cleaning water will be collected for laboratory analysis of PCBs, toxicity characteristic leaching procedure (TCLP) metals, TCLP semivolatle organic compounds (SVOCs), reactivity, ignitability, and pH for waste evaluation purposes. If the equipment cleaning water is non-hazardous, it will be applied to the stockpiled excavated soils as proposed and subsequently disposed of at an authorized offsite landfill with the excavated soils. Using this approach, the equipment cleaning water will assist in dust suppression of the excavated soils.

The verification soil samples from the excavation floors will be collected from the upper six inches of soil. The RCRA Facility Investigation (RFI) involved collection and laboratory analysis of hundreds of soil samples. The RFI data showed that the highest concentrations within the excavation areas were within the uppermost 6 inches of soil and decreased with depth. Therefore the post-excavation verification soil samples from the excavation sidewalls will be collected from the uppermost 6 inches of each excavation sidewall.

For excavation sidewall samples within the Boneyard Area of the Meaney Tract that exceed 6 inches in depth, nested within 0.5 foot areas of excavation, a sidewall sample will be collected from the upper 6 inches of these deeper nested sidewalls, which corresponds to a depth interval of 6 to 12 inches below the original (pre-excavation) ground surface. Revised Figure 20 showing these additional sidewall samples is attached.

The verification soil samples will be transferred directly from the trowel into laboratory-provided widemouth glass jars with Teflon-lined lids. The sample jars will be securely capped, labeled, placed into a cooler with ice, and delivered with chain of custody documentation to a NELAC-accredited analytical laboratory (Test America). Field quality control procedures during verification soil sampling will be conducted as described in the Quality Assurance Plan (QAP), which is provided in Appendix F of the CMS/CMI.

VERIFICATION SOIL SAMPLE ANALYSES

As detailed in the CMS/CMI, the verification soil samples will be analyzed for the constituents that exceeded PRGs at that soil excavation area (solid waste management unit). As shown on attached Table 7 (taken from the CMS/CMI), the verification soil samples from the soil excavations on the Meaney Tract will be analyzed for antimony, arsenic, cadmium, lead, manganese, silver and zinc. The verification soil samples from the soil excavation on the Encycle Northern Tract will be analyzed for arsenic. The verification soil samples from the soil excavations on the Encycle Southern Tract will be analyzed for arsenic and lead.

Verification soil sample analytical test methods, sample holding times, and sample quantitation limits are shown on attached Table 24 (taken from the CMS/CMI). Laboratory quality control procedures during verification soil sampling will be conducted as described in the QAP, which is provided in Appendix F of the CMS/CMI.

VERIFICATION SOIL SAMPLE ANALYTICAL RESULTS EVALUATION AND ADDITIONAL SOIL EXCAVATION PROCEDURES

General

The verification soil sample analytical results from each soil excavation area will be compared to the corresponding PRGs shown on Table 7. If any of the constituents in a verification soil sample exceed the corresponding PRGs, additional soils will be excavated in that area and additional verification soil samples will be collected as described below.

Excavation Floors

If a verification soil sample from an excavation floor contains one or more constituents that exceed the PRGs for that SWMU (per Table 7), the excavation floor at that location will be excavated an additional six inches in depth within a 50-foot by 50-foot area centered at the verification soil sample location. Following this additional soil excavation, another verification soil sample will be collected from the excavation floor as described above, and the verification soil sample will be analyzed for the constituent(s) from that excavation area that exceeded the PRGs. This excavation and verification soil sample collection procedure will be repeated until the constituent concentrations in the verification soil samples no longer exceed the PRGs.

Excavation Sidewalls

If the verification soil sample from an excavation sidewall contains one or more constituents that exceed the PRGs for that SWMU (per Table 7), additional soils will be excavated from that sidewall. For excavation areas with no lateral obstructions (i.e., no buildings, loading docks, sumps, etc.), the excavation sidewall will be excavated an additional ten feet horizontally outward from the excavation and to the same depth as the original sidewall depth. For example, if the initial excavation depth of the sidewall was 1.5 feet, that sidewall will be further excavated an additional ten feet horizontally outward to a depth of 1.5 feet and to a width of 50 feet. Following additional sidewall excavation, two verification soil samples will be collected: (1) one verification soil sample from mid-height on the sidewall, and (2) one verification soil sample on the floor of the additional excavation area, centered at the mid-point on the floor. If one or more constituents in the sidewall soil sample exceed PRGs, that sidewall will be further excavated an additional ten feet. If one or more constituents in the floor sample exceed PRGs, that floor will be excavated another six inches in depth. This excavation and verification soil sample collection procedure will be repeated until the constituent concentrations in the verification soil samples no longer exceed the PRGs.

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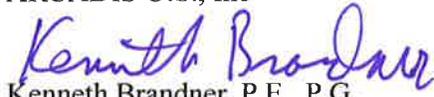
The following excavation areas have potential lateral obstructions:

- The railroad tracks area soil excavation: This soil excavation area is bounded by a steep slope (escarpment) along the railroad right-of-way to the north, a four-foot-high concrete loading dock to the south, and the Lettered Bins Building in the center of the proposed excavation area.
- The storm sewer system soil excavation: The westernmost portion of this soil excavation area is bounded by a four-foot-deep concrete sump.
- The O1 Landfill area soil excavation: The northern portion of this soil excavation area is in relatively close proximity to the Corpus Christi Ship Channel.

During soil excavations that extend to lateral obstructions, if the sidewall verification soil sample adjacent to the obstruction exceeds the PRG for one or more constituents, additional soils will be excavated below the obstruction if possible (i.e., below the loading dock, below the Lettered Bins Building foundation, below the sump) to a distance of up to ten feet, or until the structural integrity of the obstruction could be affected, whichever occurs first, and then verification soil samples will be collected from the excavation sidewall and floor as described above. If a verification sample exceeds the PRG for one or more constituents, with the exception of the Corpus Christi Ship Channel area, the lateral obstruction (sump, loading dock, building floor) will be demolished to the extent possible to allow continued excavation of affected soils exceeding the PRGs.

Sincerely,

ARCADIS U.S., Inc



Kenneth Brandner, P.E., P.G.
Geological Engineer



Attachments

- Table 7: Surface Soil PRGs
- Table 24: Soil Analytical Test Methods – Post-Excavation Verification Soil Samples
- Figure 3: Meaney Tract, Approximate Extent and Depth of Affected Soils to be Excavated
- Figure 4: Encycle Northern and Southern Tracts, Approximate Extent and Depth of Affected Soils to be Excavated, Updated December 2011
- Figure 20: Meaney Tract, Post Excavation Verification Soil Sample Locations, Updated July 2012
- Figure 21: Encycle Northern and Southern Tracts, Post Excavation Verification Soil Sample Locations, Updated May 2012

Table 7. Surface Soil PRGs, Encycle/Texas, Inc., Corpus Christi, Texas

<u>CONSTITUENT</u>	<u>SURFACE SOIL PRG (mg/kg)^a</u>
<u>Meaney Tract^b</u>	
Antimony	54
Arsenic	200
Cadmium	160
Lead	1,600
Manganese	1,400
Silver	160
Zinc	45,000
<u>Northern Tract^c</u>	
Arsenic	200
<u>Southern Tract^d</u>	
Arsenic	200
Lead	1,600

mg/kg Milligrams per kilogram.

PRG Preliminary remediation goal.

a PRG taken from Attachment 3, Table A of the August 27, 2004 Baseline Risk Assessment Addendum.

b Maximum detected concentrations were used as the exposure point concentrations in the risk calculations for the Meaney Tract.

c The calculated 95% Upper Confidence Limit for each COC was used as exposure point concentration in the risk calculations for the Northern Tract.

d The calculated 95% Upper Confidence Limit for each COC was used as exposure point concentration in the risk calculations for the Southern Tract.

Table 24. Soil Analytical Test Methods - Post-Excavation Verification Soil Samples, Encycle/Texas, Inc., Corpus Christi, Texas

Constituent	Analytical Test Method	Holding Time (days)	Sample Container	Estimated Sample Quantitation Limit (mg/kg)
<u>Meaney Tract</u>				
Total Antimony	EPA 6010 or 6020	180	8 ounce glass w/Teflon-lined lid	1.0
Total Arsenic	EPA 6010 or 6020	180	8 ounce glass w/Teflon-lined lid	1.0
Total Cadmium	EPA 6010 or 6020	180	8 ounce glass w/Teflon-lined lid	1.0
Total Lead	EPA 6010 or 6020	180	8 ounce glass w/Teflon-lined lid	5.0
Total Manganense	EPA 6010 or 6020	180	8 ounce glass w/Teflon-lined lid	5.0
Total Silver	EPA 6010 or 6020	180	8 ounce glass w/Teflon-lined lid	1.0
Total Zinc	EPA 6010 or 6020	180	8 ounce glass w/Teflon-lined lid	5.0
<u>Northern Tract</u>				
Total Arsenic	EPA 6010 or 6020	180	8 ounce glass w/Teflon-lined lid	1.0
<u>Southern Tract</u>				
Total Arsenic	EPA 6010 or 6020	180	8 ounce glass w/Teflon-lined lid	1.0
Total Lead	EPA 6010 or 6020	180	8 ounce glass w/Teflon-lined lid	5.0

mg/kg Milligrams per kilogram

Note: Analytical test methods taken from the EPA document "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods (SW-846)"

LEGEND

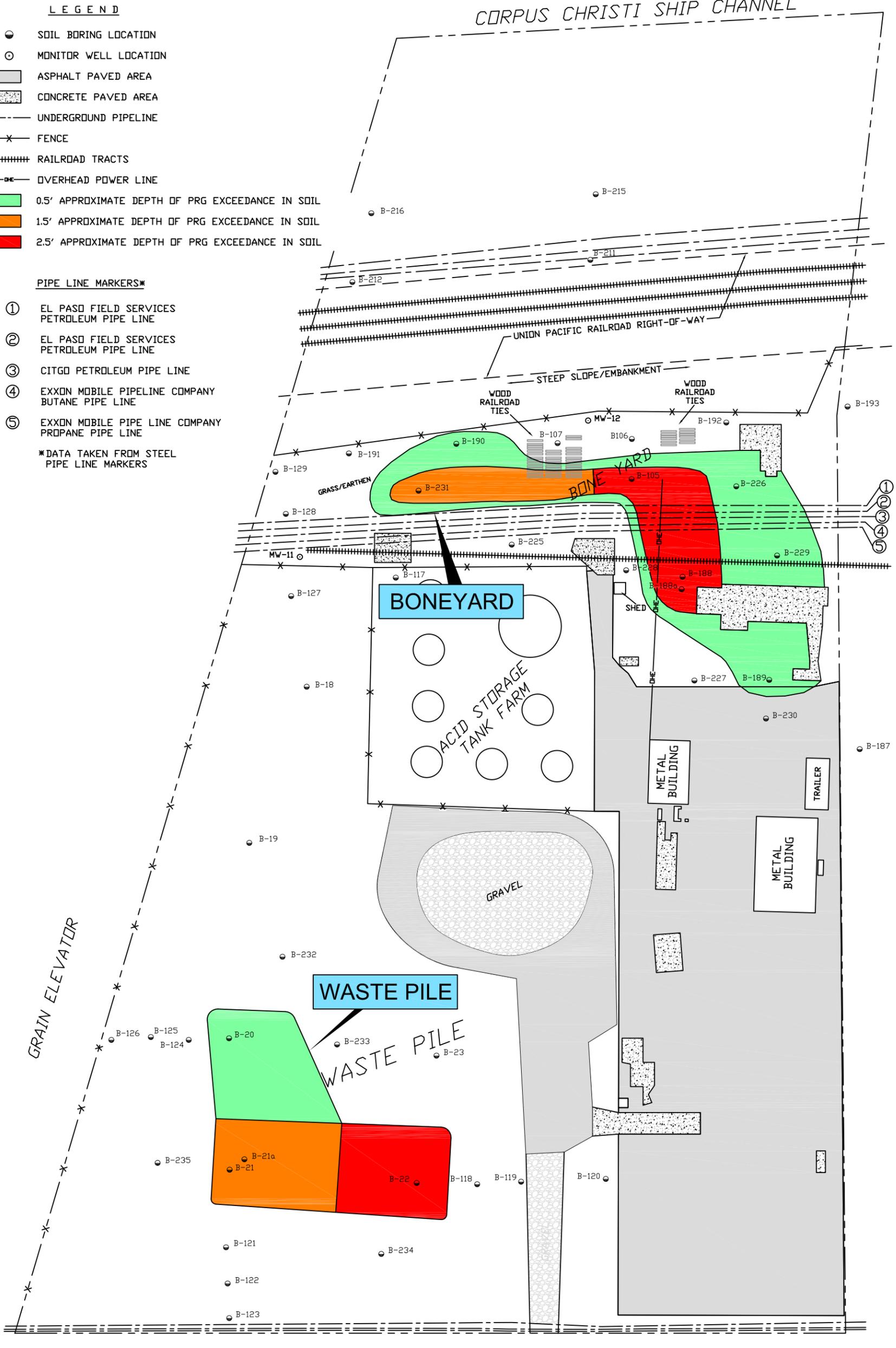
- SOIL BORING LOCATION
- MONITOR WELL LOCATION
- ▒ ASPHALT PAVED AREA
- ▒ CONCRETE PAVED AREA
- UNDERGROUND PIPELINE
- x- FENCE
- ||||| RAILROAD TRACTS
- +— OVERHEAD POWER LINE
- 0.5' APPROXIMATE DEPTH OF PRG EXCEEDANCE IN SOIL
- 1.5' APPROXIMATE DEPTH OF PRG EXCEEDANCE IN SOIL
- 2.5' APPROXIMATE DEPTH OF PRG EXCEEDANCE IN SOIL

PIPE LINE MARKERS*

- ① EL PASO FIELD SERVICES PETROLEUM PIPE LINE
- ② EL PASO FIELD SERVICES PETROLEUM PIPE LINE
- ③ CITGO PETROLEUM PIPE LINE
- ④ EXXON MOBILE PIPELINE COMPANY BUTANE PIPE LINE
- ⑤ EXXON MOBILE PIPE LINE COMPANY PROPANE PIPE LINE

*DATA TAKEN FROM STEEL PIPE LINE MARKERS

CORPUS CHRISTI SHIP CHANNEL



ENCYCLE / TEXAS

UP RIVER ROAD

NOTES:

- 1) BASE MAP SURVEYED BY REGISTERED PUBLIC SURVEYOR (SHINER, MOSLEY AND ASSOCIATES, INC.) DURING SEPTEMBER 2004.
- 2) EXTENT AND DEPTH OF AFFECTED SOILS EXCEEDING PRGs TAKEN FROM SOIL SAMPLE ANALYTICAL RESULTS SHOWN ON CMS TABLE 1. SEE CMS TABLE 4 FOR SUMMARY OF CONSTITUENTS IN SOIL EXCEEDING PRGs ON THE MEANEY TRACT.



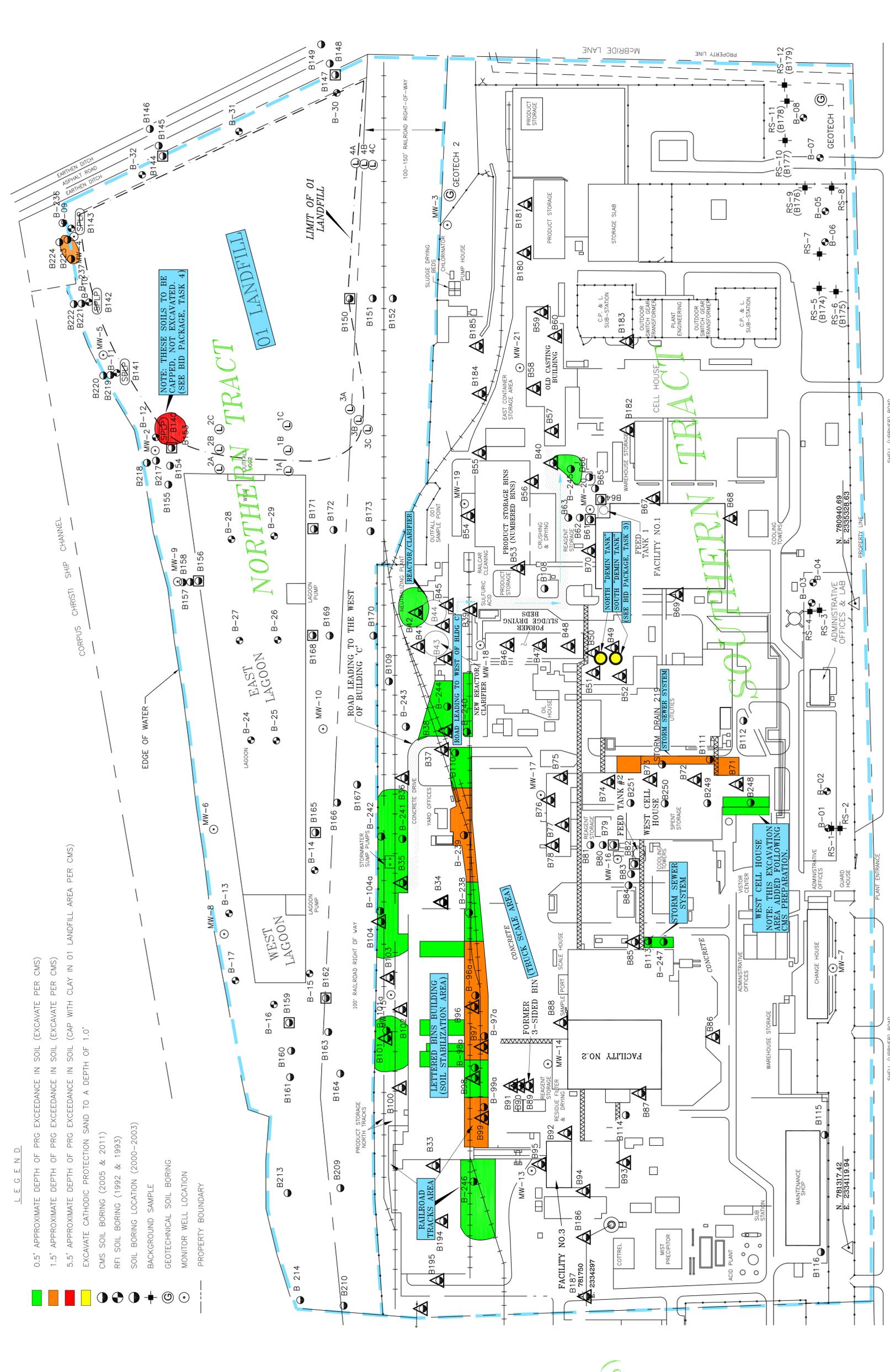
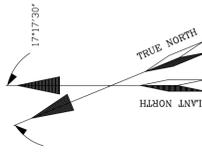
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	APPROVED BY: K. BRANDNER	DATE: 1/27/12

MEANEY TRACT
 APPROXIMATE EXTENT AND DEPTH OF AFFECTED SOILS TO BE EXCAVATED
 ENCYCLE/TEXAS, INC.
 CORPUS CHRISTI, TEXAS

FIGURE
 3



- L.E.G.E.N.D.
- 0.5' APPROXIMATE DEPTH OF PRG EXCEEDANCE IN SOIL (EXCAVATE PER CMS)
 - 1.5' APPROXIMATE DEPTH OF PRG EXCEEDANCE IN SOIL (EXCAVATE PER CMS)
 - 5.5' APPROXIMATE DEPTH OF PRG EXCEEDANCE IN SOIL (CAP WITH CLAY IN 01 LANDFILL AREA PER CMS)
 - EXCAVATE CATHODIC PROTECTION SAND TO A DEPTH OF 1.0'
 - CMS SOIL BORING (2005 & 2011)
 - RFI SOIL BORING (1992 & 1993)
 - SOIL BORING LOCATION (2000-2003)
 - BACKGROUND SAMPLE
 - GEOTECHNICAL SOIL BORING
 - MONITOR WELL LOCATION
 - PROPERTY BOUNDARY

NOTE: THESE SOILS TO BE CAPPED, NOT EXCAVATED. (SEE BID PACKAGE, TASK 4)

NOTE: THIS EXCAVATION AREA ADDED FOLLOWING CMS PREPARATION.

NORTHERN TRACT

SOUTHERN TRACT

MEANEY TRACT (SEE FIGURE 3)

BONEYARD SWMU

WASTE PILE SWMU



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CHECKED BY:	K. BRANDNER	DATE:	
APPROVED BY:	K. BRANDNER	DATE:	

ENCYCLE NORTHERN AND SOUTHERN TRACTS
APPROXIMATE EXTENT AND DEPTH OF
AFFECTED SOILS TO BE EXCAVATED
UPDATED DECEMBER 2011
ENCYCLE/TEXAS, INC.
CORPUS CHRISTI, TEXAS

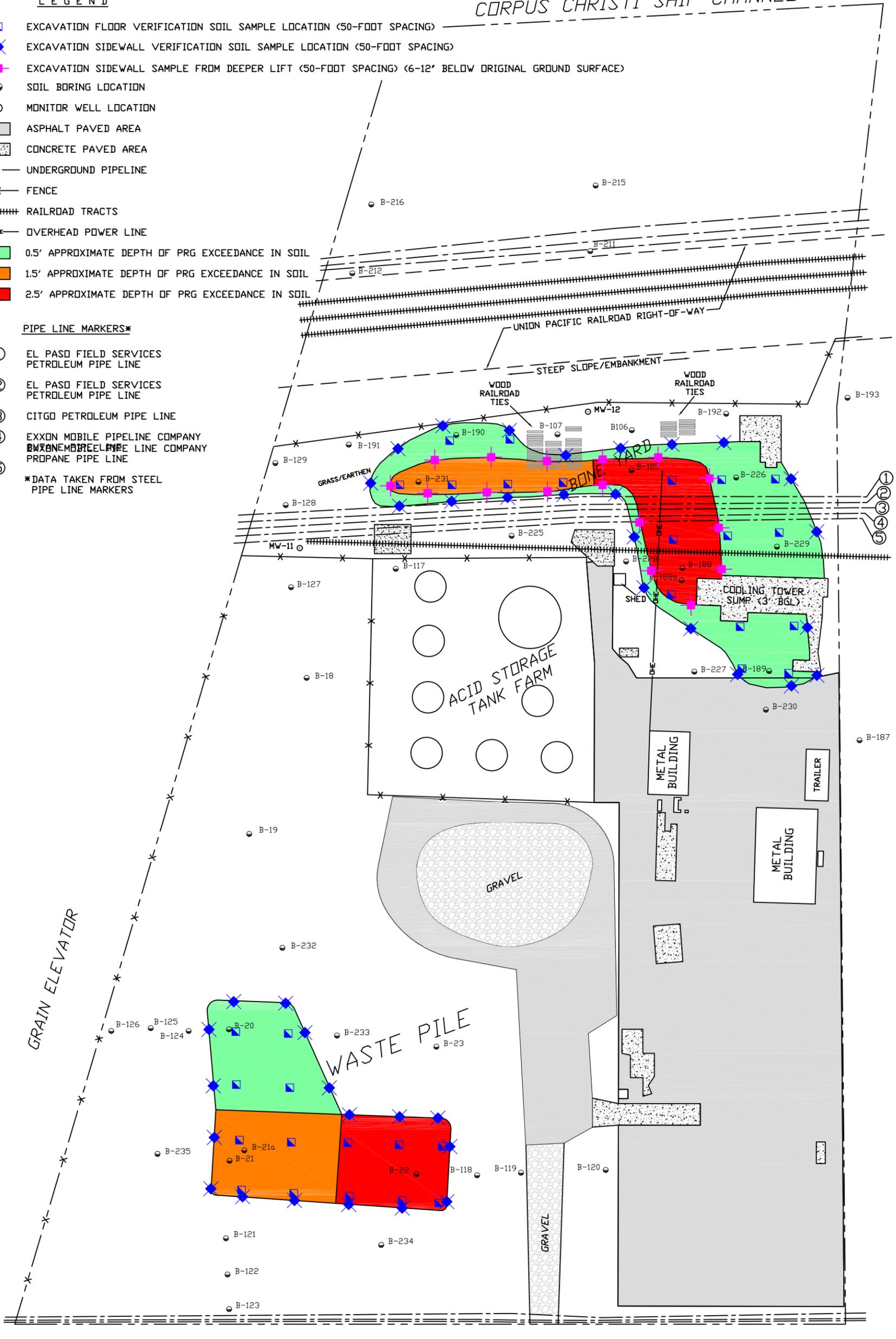
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CORPUS CHRISTI SHIP CHANNEL

- EXCAVATION FLOOR VERIFICATION SOIL SAMPLE LOCATION (50-FOOT SPACING)
- ◆ EXCAVATION SIDEWALL VERIFICATION SOIL SAMPLE LOCATION (50-FOOT SPACING)
- ◆ EXCAVATION SIDEWALL SAMPLE FROM DEEPER LIFT (50-FOOT SPACING) (6-12' BELOW ORIGINAL GROUND SURFACE)
- SOIL BORING LOCATION
- MONITOR WELL LOCATION
- ASPHALT PAVED AREA
- CONCRETE PAVED AREA
- UNDERGROUND PIPELINE
- x- FENCE
- ++++ RAILROAD TRACTS
- OVERHEAD POWER LINE
- 0.5' APPROXIMATE DEPTH OF PRG EXCEEDANCE IN SOIL
- 1.5' APPROXIMATE DEPTH OF PRG EXCEEDANCE IN SOIL
- 2.5' APPROXIMATE DEPTH OF PRG EXCEEDANCE IN SOIL

PIPE LINE MARKERS*

- ① EL PASO FIELD SERVICES PETROLEUM PIPE LINE
 - ② EL PASO FIELD SERVICES PETROLEUM PIPE LINE
 - ③ CITGO PETROLEUM PIPE LINE
 - ④ EXXON MOBILE PIPELINE COMPANY
 - ⑤ BURNINGBELL PIPE LINE COMPANY PROPANE PIPE LINE
- *DATA TAKEN FROM STEEL PIPE LINE MARKERS



UP RIVER ROAD

NOTES:

- 1) BASE MAP SURVEYED BY REGISTERED PUBLIC SURVEYOR (SHINER, MOSLEY AND ASSOCIATES, INC.) DURING SEPTEMBER 2004.
- 2) EXTENT AND DEPTH OF AFFECTED SOILS EXCEEDING PRGs TAKEN FROM SOIL SAMPLE ANALYTICAL RESULTS SHOWN ON TABLE 1. SEE TABLE 4 FOR SUMMARY OF CONSTITUENTS IN SOIL EXCEEDING PRGs ON THE MEANEY TRACT.
- 3) THE COOLING TOWER CONCRETE SUMP EXTENDES 3- FEET BELOW GROUND LEVEL, AND THE CONCRETE SUMP WILL NOT BE EXCAVATED.



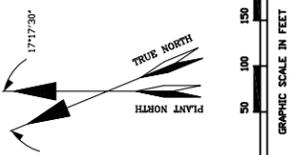
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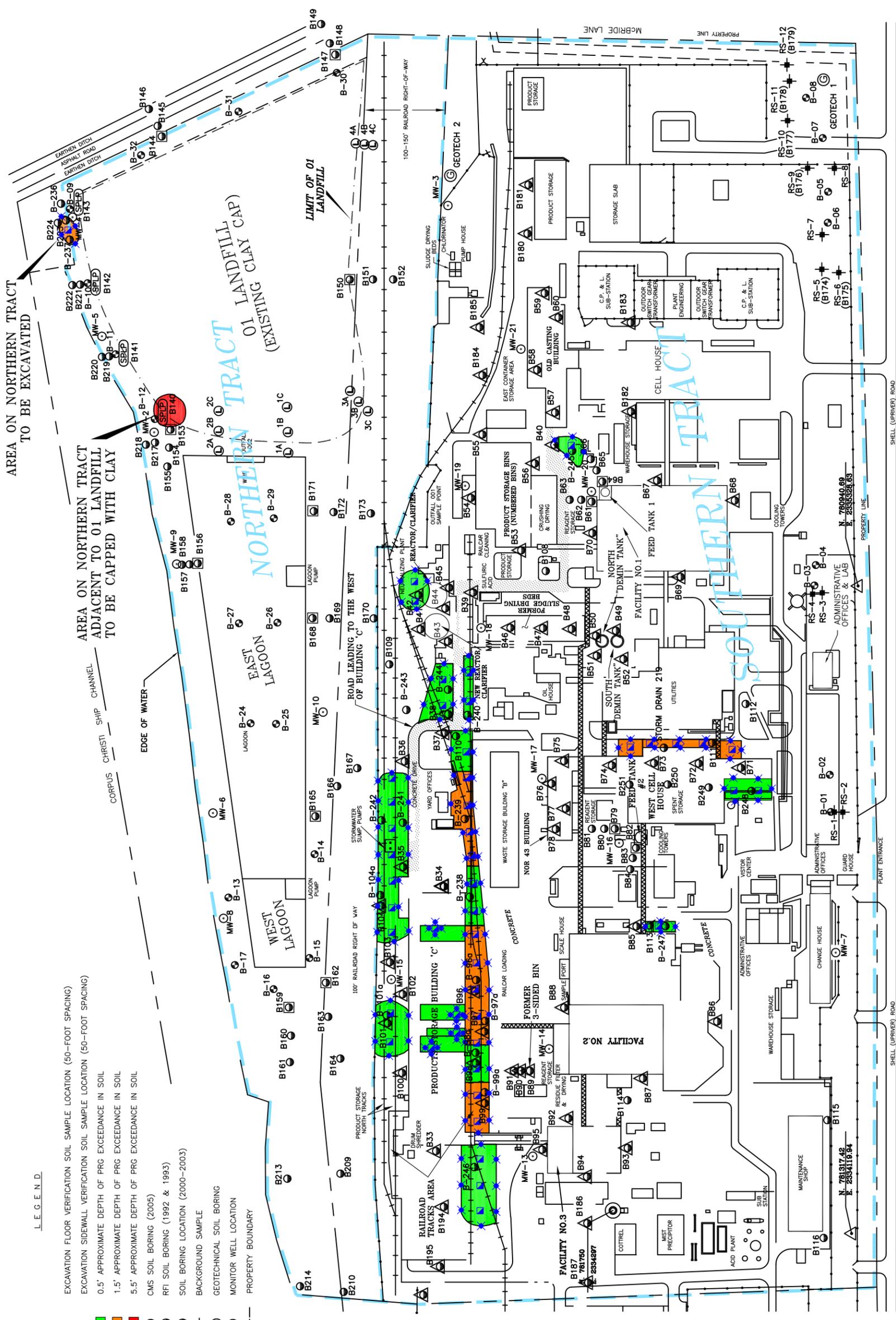
MEANEY TRACT
POST EXCAVATION VERIFICATION
SOIL SAMPLE LOCATIONS
UPDATED JULY 2012
ENCYCLE/TEXAS, INC.
CORPUS CHRISTI, TEXAS

FIGURE
20



L.E.G.E.N.D.

- EXCAVATION FLOOR VERIFICATION SOIL SAMPLE LOCATION (50-FOOT SPACING)
- EXCAVATION SIDEWALL VERIFICATION SOIL SAMPLE LOCATION (50-FOOT SPACING)
- 0.5' APPROXIMATE DEPTH OF PRG EXCEEDANCE IN SOIL
- 1.5' APPROXIMATE DEPTH OF PRG EXCEEDANCE IN SOIL
- 5.5' APPROXIMATE DEPTH OF PRG EXCEEDANCE IN SOIL
- CMS SOIL BORING (2005)
- RFI SOIL BORING (1992 & 1993)
- SOIL BORING LOCATION (2000-2003)
- BACKGROUND SAMPLE
- GEOTECHNICAL SOIL BORING
- MONITOR WELL LOCATION
- PROPERTY BOUNDARY



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 THIS DRAWING REPRESENTS
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 ORIGINAL DRAWING
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0000231.0001	N & S Tracts

DATE	BY	APPROVED BY
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9/9/12	K. Brundage	K. Brundage
9/9/12	K. Brundage	K. Brundage

FIGURE 21
 ENCYCLE
 NORTHERN AND SOUTHERN TRACTS
 POST EXCAVATION VERIFICATION
 SOIL SAMPLE LOCATIONS
 (UPDATED MAY 2012)
 ENCYCLE/TEXAS, INC.
 CORPUS CHRISTI, TEXAS