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MEETING SUMMARY OF THE 18 APRIL 2017 RESTORATION ADVISORY BOARD MEETING
NCBC GULFPORT MS
4/18/2017
TETRA TECH, INC.

RESTORATION ADVISORY BOARD MEETING: PUBLIC AVAILABILITY SESSION

APRIL 18, 2017
4:00 – 7:00 PM

SENIOR CITIZEN AND RECREATION COMPLEX
20257 DAUGHERTY ROAD
LONG BEACH, MS 39560



Meeting Outreach

— Meeting Announcement —
**NCBC Gulfport
Restoration Advisory Board (RAB)**

—TOPICS—

**Public Comment Period for the Engineering
Evaluation and Cost Analysis of Site 8B
Herbicide Orange Storage Area**

Update on Site 6 – Firefighter Training Area

Environmental Restoration at Building 398

When: Tuesday, April 18, 2017
4:00 - 7:00 pm

Where: Senior Citizen and Recreation Complex
20257 Daugherty Road
Long Beach, MS 39560

This RAB Meeting marks the opening of the Public Comment Period for a proposed remedy to address dioxin-contaminated soils and sediments at Sites 8B and 8C and adjacent drainage ditches. This remedy is proposed in an Engineering Evaluation and Cost Analysis (EE/CA) that is available for public review at the Gulfport Public Library (1708 25th Avenue Gulfport, MS), from April 18 through May 18, 2017. Based on the EE/CA, the Navy's preferred remedy is to excavate and stabilize dioxin-impacted soil and sediment and cap with a concrete cover. Additional information, including a copy of the EE/CA, is available on the NCBC Gulfport Environmental Restoration



For more information please contact
Gordon Crane at:
Phone: 228-229-0446
Email: gordon.crane@navy.mil

A meeting announcement (shown on the left) was placed in the *Sun Herald* on Sunday, April 16, 2017.

Flyers (shown on the right) were mailed to the interested parties on the RAB mailing list.


- Meeting Announcement -
**Restoration Advisory Board (RAB)
NCBC Gulfport**

- Key Topics -
Public Comment Period for the Engineering Evaluation and
Cost Analysis of Site 8B Herbicide Orange Storage Area
Update on Site 6 – Firefighter Training Area
Environmental Restoration at Building 398

Where: Senior Citizen and Recreation Complex
20257 Daugherty Road
Long Beach, MS 39560


When: Tuesday, April 18, 2017
4:00 - 7:00 PM

Topics will be presented in a poster session format. Please arrive any time
between 4 to 7 PM to discuss topics with project scientists and engineers.



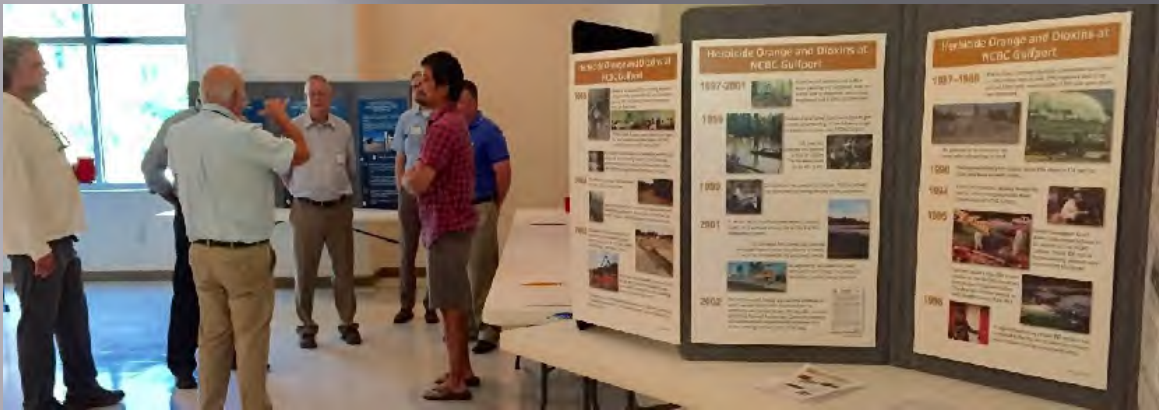
FOR MORE INFORMATION:
Installation Restoration Program Manager:
Gordon Crane
(228) 229-0446
gordon.crane@navy.mil

Additional information is available on the NCBC Gulfport Environmental
Restoration Program website at <http://go.usa.gov/LVGU>.



Meeting Content

The April 2017 RAB meeting was presented in a poster session format to provide an opportunity for community members to engage in an informal dialogue with project team members. There were no significant issues or concerns voiced by participants.



Eighteen presentation boards were on display at the RAB meeting. In addition, fact sheets and handouts were also available for further information. Poster stations included the following:

- ❑ Public Comment Period for the Engineering Evaluation and Cost Analysis of Site 8B Herbicide Orange Storage Area
- ❑ Update on Site 6 – Firefighter Training Area
- ❑ Environmental Restoration at Building 398
- ❑ Chronology of Herbicide Orange at NCBC Gulfport



Meeting Attendees

RAB Members:

Philip Shaw

Joyce Shaw

Jimmy Crellin (Mississippi Department of Environmental Quality)

James (J. D.) Spalding (Navy Community Co-Chair)

Gordon Crane (NCBC Gulfport Representative)

Community Members*:

Al Synowiez

Steve Johnston

Major Dan Schneider

Frank Castiglia

Michelle Masson

Brian and Carmen Sandidge

Charles R. Vonderbruegge

NCBC Gulfport:

Kevin Gillam (Community Liaison)

Matt Gunderson (NCBC Gulfport Public Works Officer)

Lisa Nobel (Environmental Director)

Technical Support:

Steve Carriere (CB&I)

Dave Felter (Resolution Consultants)

Bill Olson (Tetra Tech)

Jeff Parillo (Resolution Consultants)

Greg Roof (Tetra Tech)

Nancy Rouse (Tetra Tech, Community Relations Specialist)

Eric Tidquist (Resolution Consultants)

Madison Witte (CB&I)

* Name spelling may not be correct.

Site 8B Herbicide Orange Storage Area Engineering Evaluation and Cost Analysis Naval Construction Battalion Center Gulfport, Mississippi

What is Site 8?

Site 8 was used by the United States Air Force to store Herbicide Orange between 1968 and 1977. Sites 8B and 8C were periodically used as overflow storage areas while Site 8A was continually in use. Historically, spills and leaks of Herbicide Orange occurred within Site 8, impacting surface soil and sediment at Site 8 and within the drainage system.



What is Herbicide Orange?

Herbicide Orange is an herbicide formulation employed during the Vietnam War to defoliate trees and shrubbery. It is an equal mixture of agricultural herbicides 2,4-dichlorophenoxyacetic acid (2,4-D) and 2,4,5-trichlorophenoxyacetic acid (2,4,5-T) in a diesel or jet fuel mixture. The mixture also contains by-product contaminants dioxins and furans.

Why is remediation necessary?

Remediation is necessary to prevent the migration of dioxin-impacted soil from Site 8B and 8C into the on-base drainage ditch system.

Has any remedial work been completed?

The Navy completed a remedy on Site 8A that involved the following:

- Excavating impacted soil and sediment.
- Stabilizing the excavated material onsite by blending it with Portland cement.
- Placing the stabilized mixture.
- Capping the placed mixture with roller compacted concrete.
- Land use controls and long term monitoring are used to ensure the long term effectiveness of the remedy.

Site 8B Herbicide Orange Storage Area

Engineering Evaluation and Cost Analysis

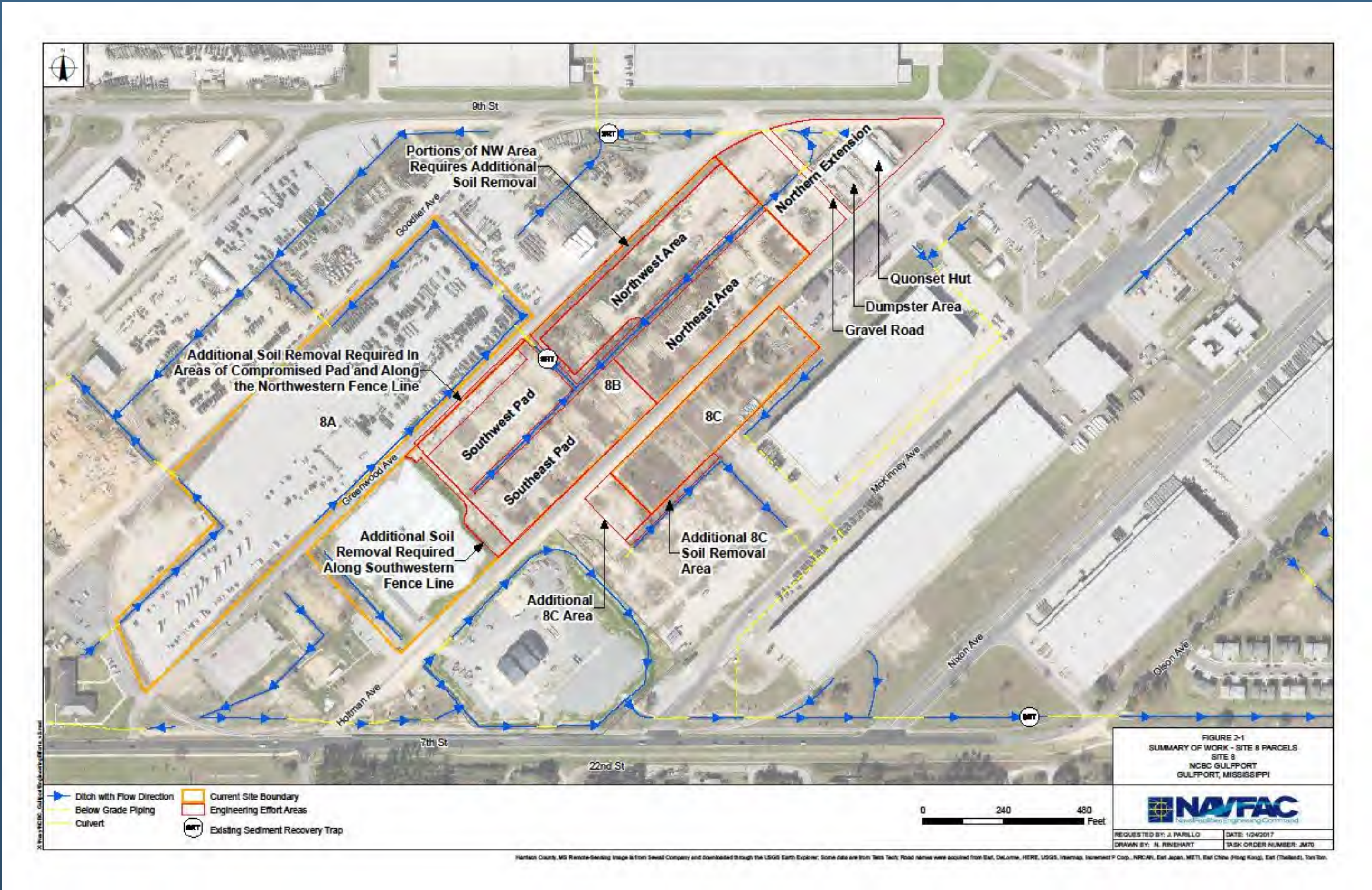
Naval Construction Battalion Center

Gulfport, Mississippi

What is the planned remedy for Site 8B and Site 8C?

The Navy prepared an Engineering Evaluation and Cost Analysis (EE/CA) to identify and evaluate remedial alternatives to address dioxin-impacted soils and sediments on Site 8B, Site 8C, and adjacent drainage ditches. Based on the evaluation presented in the EE/CA, the Navy’s preferred remedy is similar to what was completed on Site 8A and includes the excavation of dioxin-impacted soil and sediment, stabilization of the excavated material within a cement mixture on Site 8B, and cap both Site 8B and Site 8C with concrete.

Where is impacted soil and sediment located?

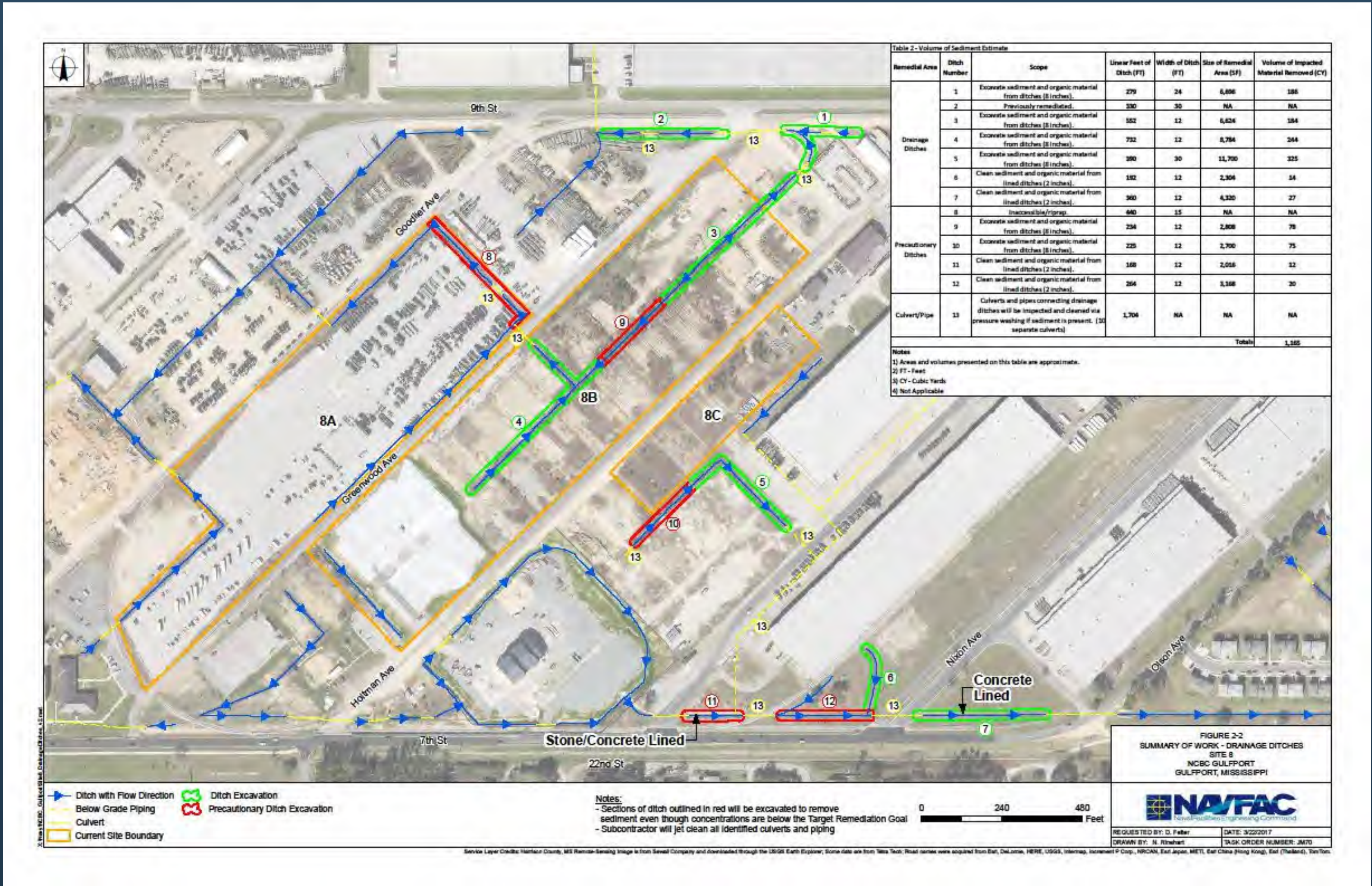


Land Parcels

- Loose soils located above existing cemented soil.
- Soils within historical excavation areas.

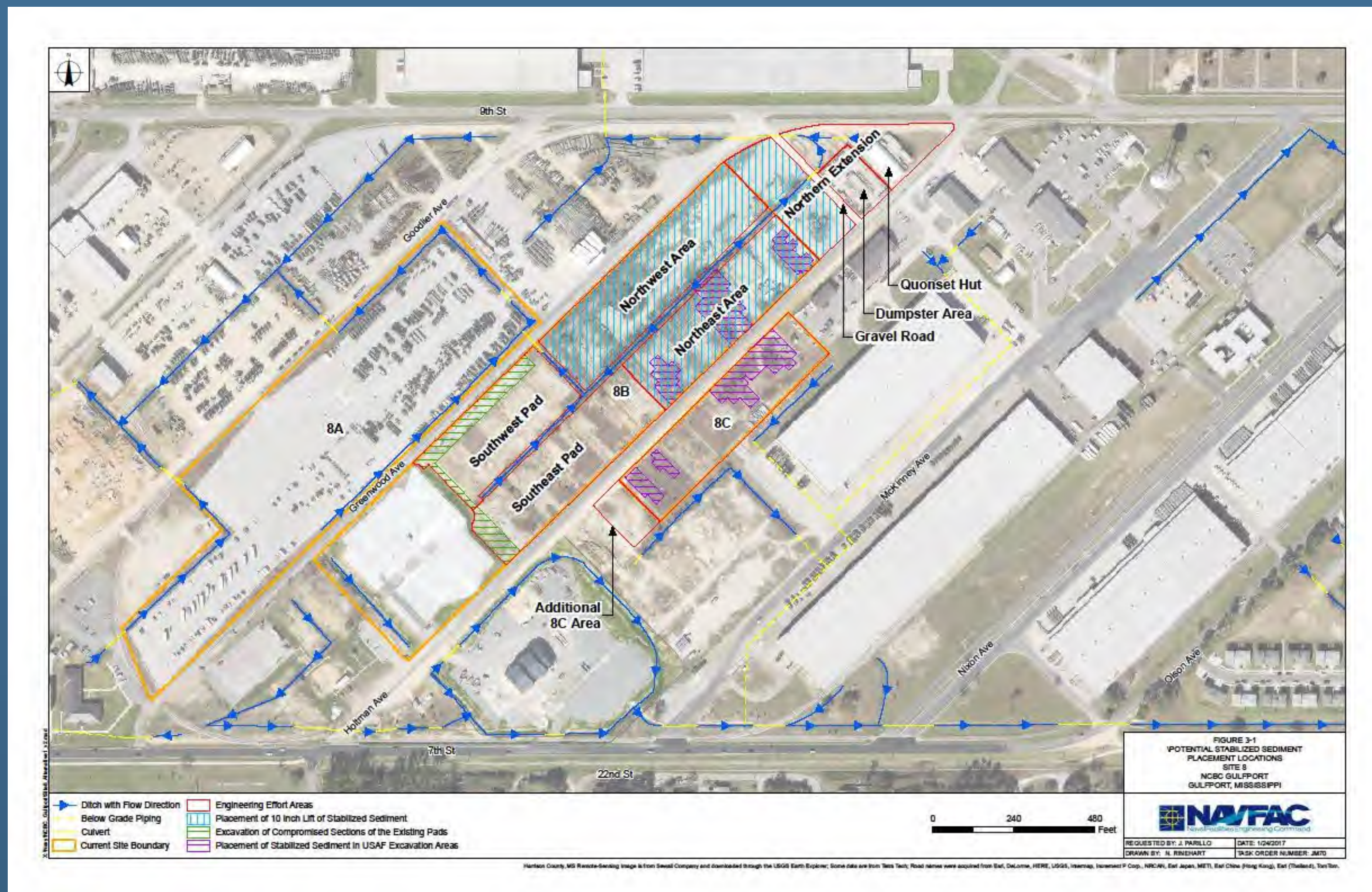
Drainage Ditches

- Organic sediment within drainage ditches (approximately 1 foot deep).



Site 8B Herbicide Orange Storage Area Engineering Evaluation and Cost Analysis Naval Construction Battalion Center Gulfport, Mississippi

Where is the stabilized mixture being placed?



Stabilized Mixture Placement Locations

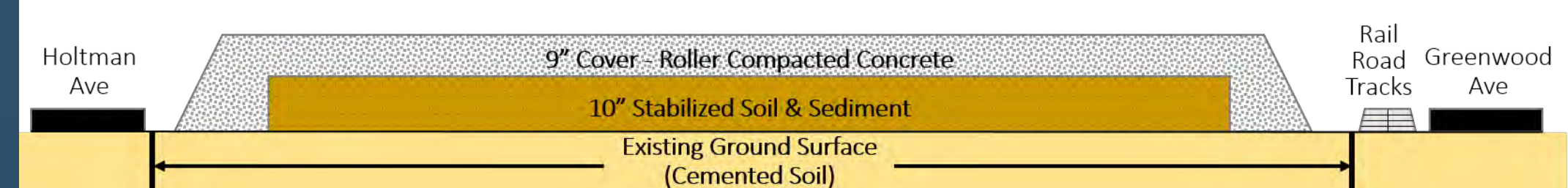
- A uniform, 10 inch lift across Site 8B where test pads currently do not exist.
- As backfill in excavation areas.

What will the Site look Like when the work is finished?

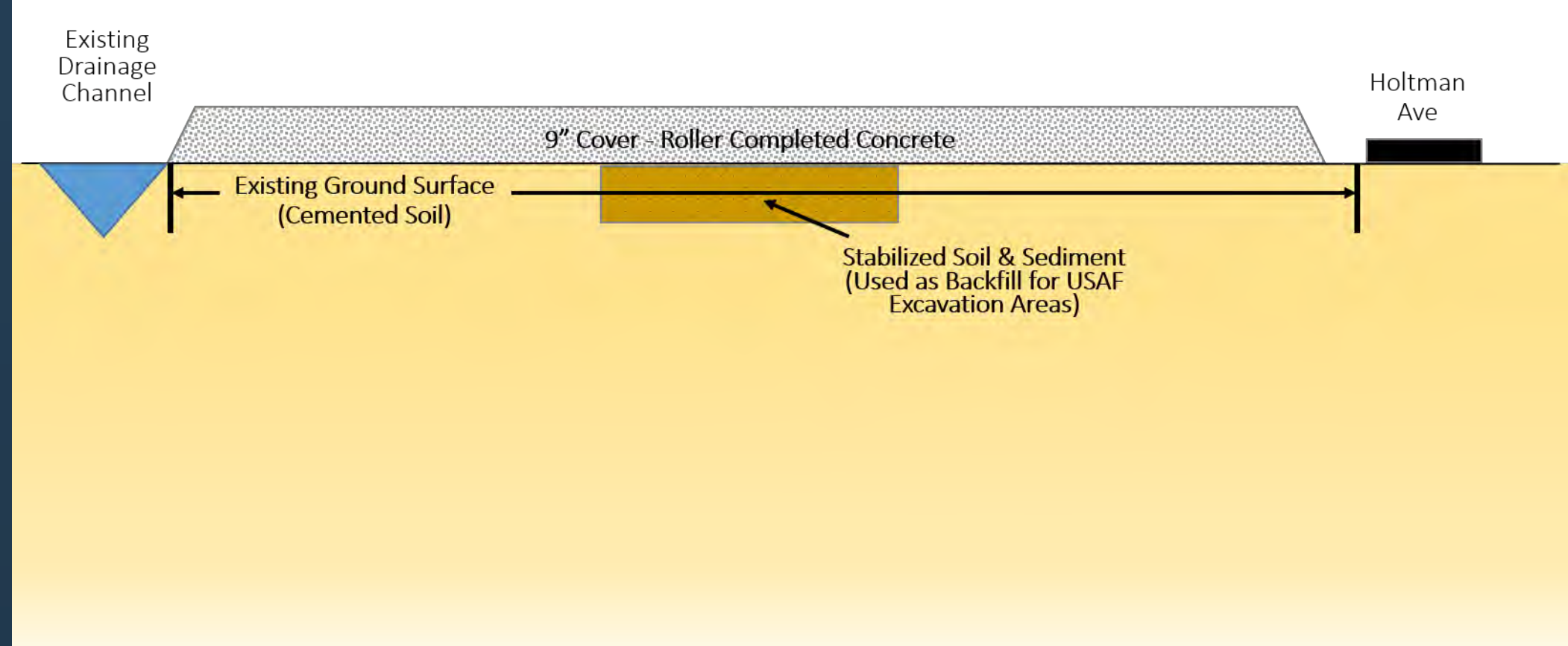
Site 8B

- Stabilized soil will be covered with roller compacted concrete.
- Upon completion, the parcel will be used to store heavy equipment.
- Site will be designed and constructed to maintain storm water drainage and existing flow rates.

Conceptual Cross Section Site 8B



Conceptual Cross Section Site 8C



Site 8C

- Existing surface will be covered with roller compacted concrete.
- Upon completion, the parcel will be used to store military equipment.
- Site will be designed and constructed to maintain storm water drainage and existing flow rates.

Site 8B Herbicide Orange
Sediment Stabilization Pilot Test
Naval Construction Battalion Center, Gulfport, Mississippi

The Navy conducted a sediment stabilization pilot study on Site 8B at the Naval Construction Battalion Center (NCBC) in Gulfport, Mississippi. This project was performed as part of a larger remediation effort to eliminate the transport of dioxin contamination remaining on the former Herbicide Orange storage area at the NCBC. In-situ stabilization prevents contamination from migrating from Site 8B in a cost effective and minimally disruptive method while taking the first step to reclaim restricted property for the NCBC's mission.

The pilot study stabilized a significant portion of restricted land while simultaneously demonstrating that innovative use of existing technology could remediate the remaining area in a timely and cost effective manner without the need for costly offsite disposal.



Stockpiled Sediment Loaded for Screening



Screening of
Dioxin-contaminated Sediment



Application of Screened
Sediment to Stabilization Area



Applying Portland Cement
to Sediment and Hydrating



Compacting Milled Cement/Sediment
Mixture for Final Stabilization



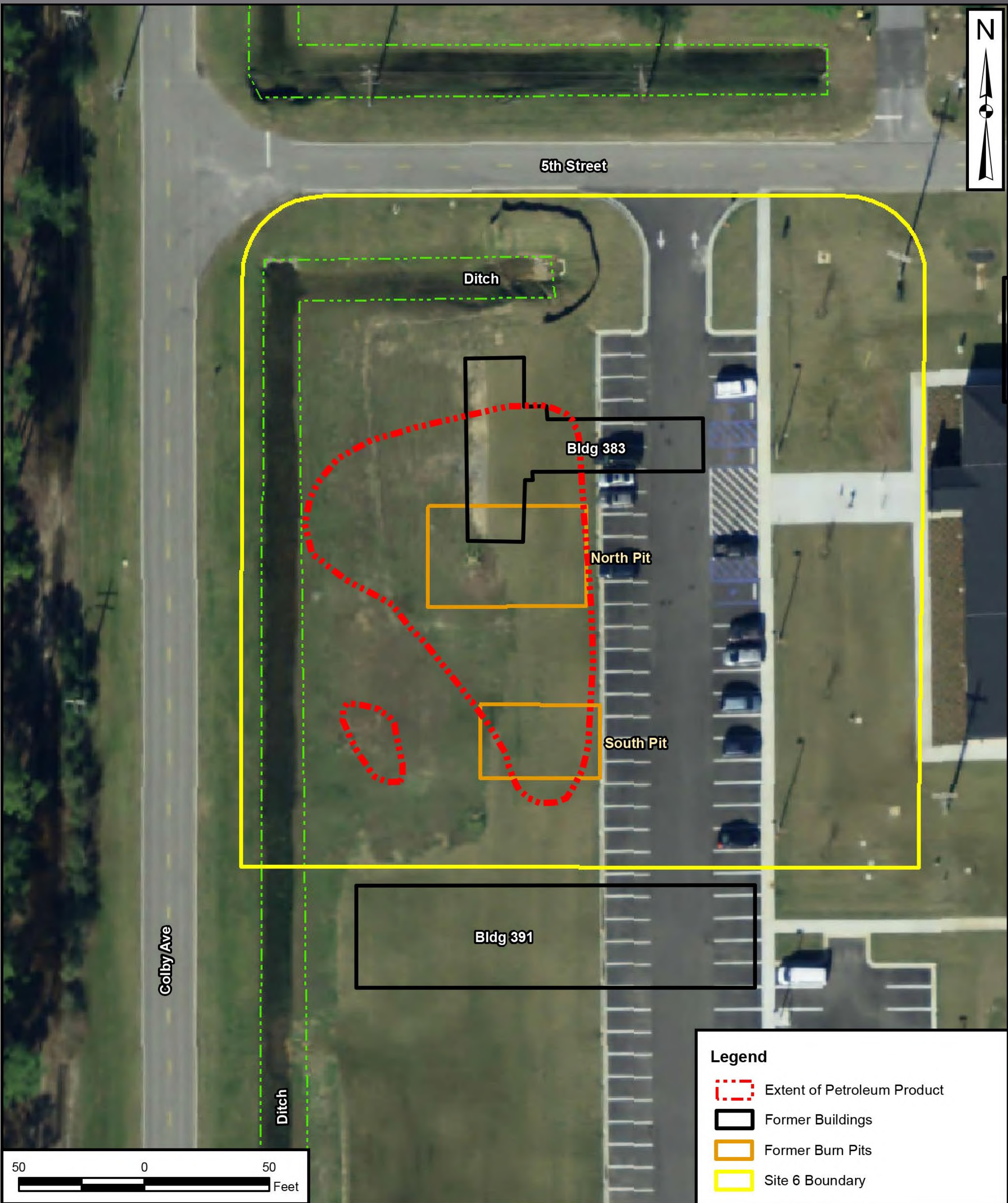
Milling Cement/Sediment Mixture



TREATABILITY STUDY AT SITE 6 FORMER FIRE FIGHTING TRAINING AREA

Site 6 History

- ◆ Site 6 is located southeast of the intersection of Colby Avenue and 5th Street on NCBC Gulfport.
- ◆ The Former Fire Fighting Training Area operated from 1966 -1975.
- ◆ Approximately 500,000 gallons of flammable liquids were used in training. Liquids came from a variety of sources on base.
- ◆ Liquids were released and ignited in two pits, then extinguished with various fire-fighting materials.
- ◆ The site was closed in 1975 and the pits were filled with soil.



Aerial view of Site 6 showing the location of contaminated groundwater.



Historical aerial photograph of Site 6 during fire-fighting exercises. The outline of Site 6 is shown in yellow.



Location of Site 6 on NCBC Gulfport

TREATABILITY STUDY AT SITE 6 FORMER FIRE FIGHTING TRAINING AREA

Prior Investigations and Removal Actions at Site 6

- Groundwater, soil, and sediment samples were collected in 1987, after closing the pits. No significant contamination was found at that time.
- In 1991, during routine basewide testing, 3 feet of petroleum product were found in a monitoring well on the site.
- It was estimated that approximately 33,000 gallons of petroleum product may have been present.
- An interceptor trench system was operated was installed in the mid-90's and operated for four years. This system recovered approximately 5000 gallons of product.
- A **Multi-Phase Extraction** system operated from 2001 to 2004. This system recovered approximately 2330 gallons of product.
- In 2006, the Navy determined that the system was no longer cost-effective. Also, sampling data showed:
 - Contamination was not moving away from the site, and
 - Environmental conditions appeared suitable to allow natural processes to reduce contamination over time.

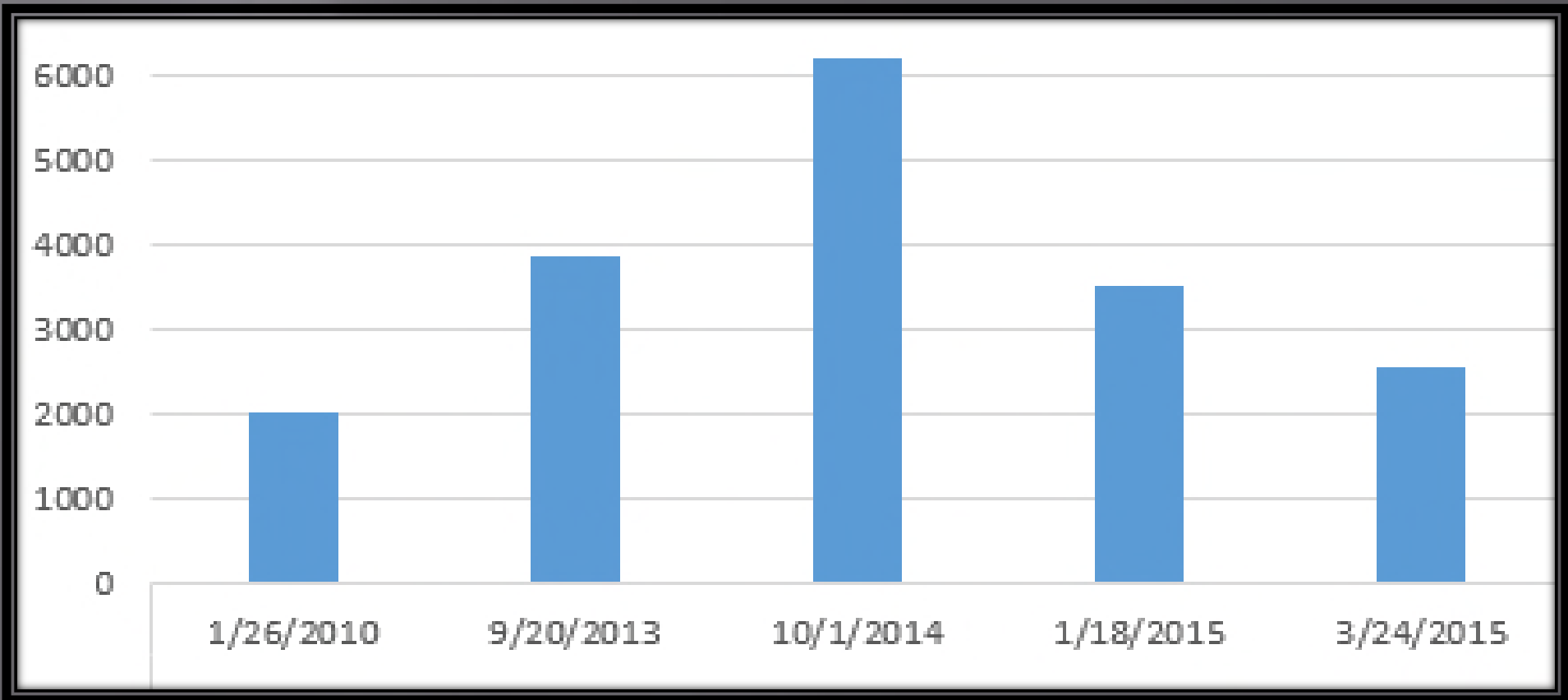
In response, the system was turned off and the effectiveness of the natural processes was monitored.



Surface view of the Multi-Phase Extraction System.

Long Term Monitoring

- In 2008, the Navy began a Long-Term Monitoring program at Site 6. This program involved regularly testing the groundwater to determine if natural processes were effectively breaking down the contaminants.
- Contaminants being monitored include naphthalene, vinyl chloride, and diesel components.
- Based on these results, a more active treatment of the groundwater is currently being evaluated.



Concentrations of diesel components at Site 6 measured during the Long Term Monitoring program. Concentrations are measured in micrograms/liter.



Fire fighters used a variety of flammable materials from different activities around the base to light fires for training. Various fire-fighting materials were used during Site 6 fire-fighting exercises.

Perflourinated Compounds (PFCs)

- The Navy has recently identified PFCs as a potential threat to human health and the environment.
- PFCs are organic compounds that were widely used in a fire-fighting material referred to as an Aqueous Film-Forming Foam (AFFF).
- Historical records show that AFFF was used in at Site 6 for fire-fighting exercises from 1971-1975.
- Groundwater samples from Site 6 have been analyzed for selected PFCs and the data is being evaluated.

TREATABILITY STUDY AT SITE 6 FORMER FIRE FIGHTING TRAINING AREA

Optimization Treatability Study

- ▣ In 2015, an active clean-up approach was evaluated to speed up and optimize the rate of contamination removal at Site 6.
- ▣ An oxygen-based technology, called BIOX™, was selected to treat the soil and groundwater.
- ▣ The optimization program included baseline sampling, application of the BIOX™ material, and sampling to monitor performance of the treatment technology.
- ▣ Over 10,000 pounds of BIOX™ were injected into the soil at Site 6.
- ▣ BIOX™ was injected between 2 to 9 feet below the ground at 341 locations within the contaminated area of Site 6.
- ▣ The effectiveness of this technology is currently being monitored and evaluated with a groundwater sampling program.



Injection Locations: Multi-colored flags show some of the 341 locations selected for BIOX™ injections at Site 6.



Injection Process: Over 10,000 pounds of BIOX™ were injected to depths of 2 to 9 feet in the contaminated area of Site 6.

BIOX™ system equipment used to inject within the contaminated area of Site 6.



TREATABILITY STUDIES AT SITE 6

FORMER FIRE FIGHTING TRAINING AREA



Performance Monitoring Results for Diesel Range Organics at Site 6

Optimization Treatability Study

- ❑ Diesel Range Organics (DRO) concentrations in wells at Site 6 have been greater than the Mississippi Department of Environmental Quality (MDEQ) Target Remediation Goal (TRG) of 0.7 milligram per liter, but are decreasing.
- ❑ DRO concentrations in 06MW006, 06MW008, and 06MW014 increased after the Phase 1 injection, but are decreasing from that level.
- ❑ Naphthalene concentrations have declined, but remain greater than the TRG in 06MW006 and 06MW008.
- ❑ DRO concentrations in 06MW003 and 06MW004 are now less than the MDEQ TRG.
- ❑ COC concentrations in 06MW009 and 06MW015 are less than the TRGs.
- ❑ Vinyl chloride and chloromethane concentrations are now less than the MDEQ TRGs.
- ❑ The Phase 2 injection is planned to address DRO contamination remaining at the site.
- ❑ Land Use Controls (LUC) prevent exposure to the groundwater at the site.

BUILDING 398 FUEL SPILL

Naval Construction Battalion Center Gulfport, Mississippi

The Building 398 site is an active service station located on the north portion of the Naval Construction Battalion Center (NCBC) in Gulfport, Mississippi.

Between 1997 and 2003, fuel dispenser islands and two 12,000-gallon aboveground storage tanks (ASTs) were installed. Similar to a retail service station, Building 398 is used to refuel NCBC fleet vehicles and heavy equipment.



TIMELINE OF EVENTS

2006 Reported releases of approximately 50 to 100 gallons of JP-8 (kerosene-based fuel) and 50 gallons of diesel fuel from leaks in underground fuel piping running from the ASTs to the dispenser island.

Investigations show soil and shallow groundwater impacted by benzene, toluene, ethylbenzene, and xylenes (BTEX), and polycyclic aromatic hydrocarbons (PAHs). Groundwater flow direction in the site area determined to be to the west-southwest.

2007 Removal of 500 tons of contaminated soil near the ASTs and 16,500 gallons of petroleum-contaminated water and free product from the excavation pit.

Residual soil contamination and free product remained in excavation.

BUILDING 398 FUEL SPILL

Naval Construction Battalion Center Gulfport, Mississippi



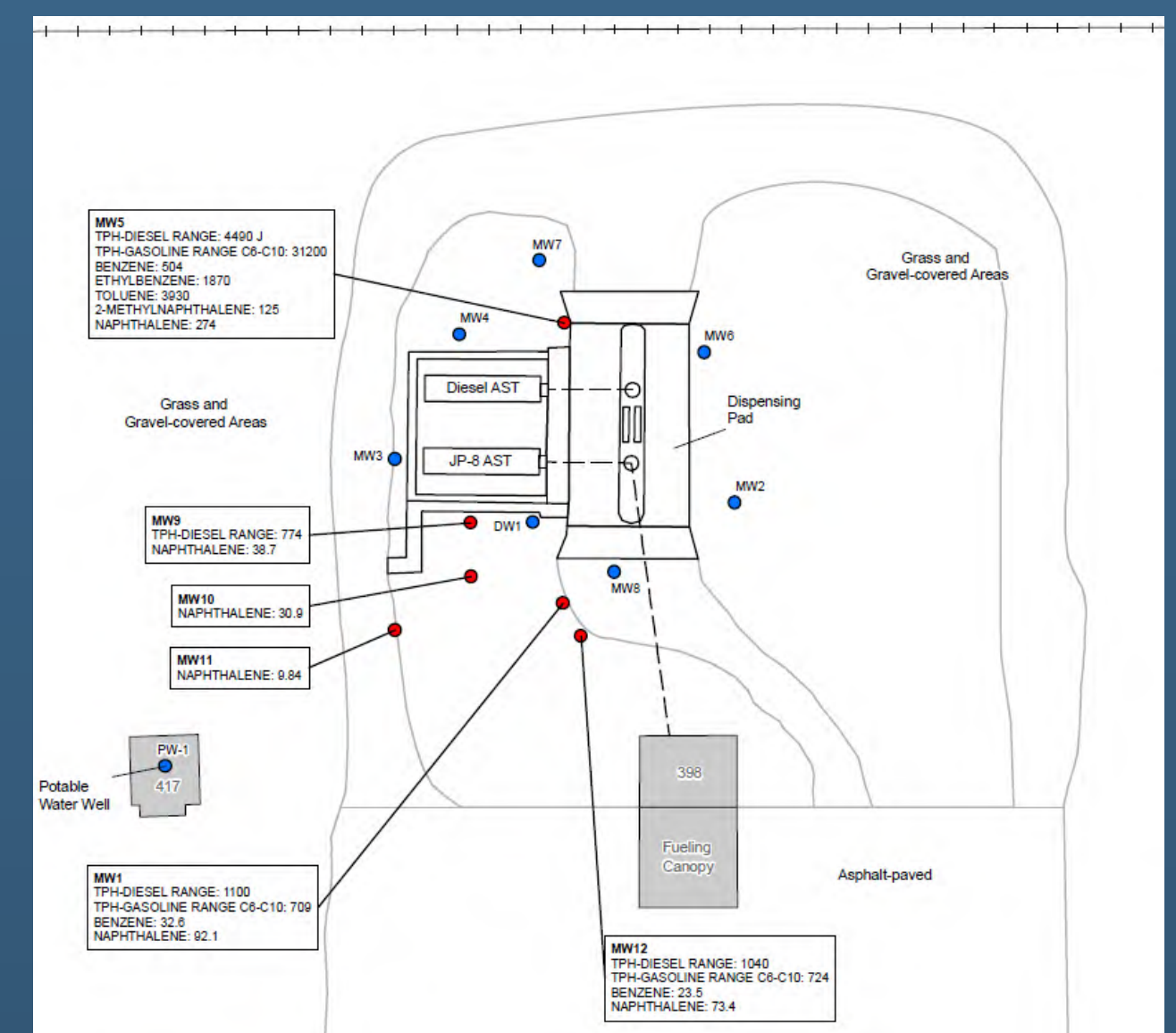
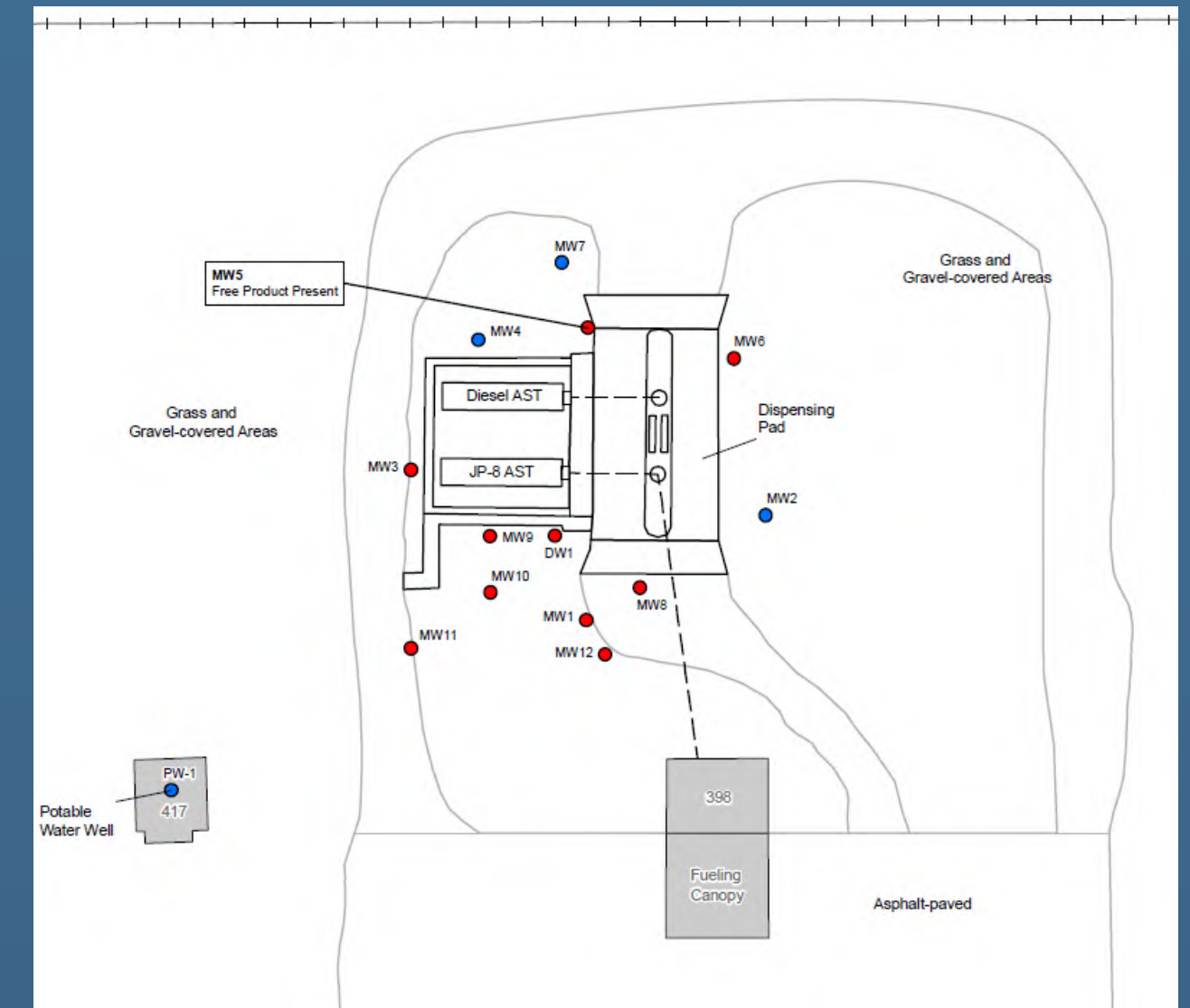
TIMELINE OF EVENTS

2009 Subsurface investigation shows approximately 2 inches of free product in one well (MW-5) and a groundwater plume centered on the ASTs.

2013 Subsurface investigation shows no measurable free product and improvement of groundwater quality compared to 2009.

2014 Installation of in-situ Oxygen Release Compound (ORC) Advanced, to provide a controlled release of oxygen in the subsurface environment, accelerating the rate of naturally occurring aerobic biodegradation of soil contaminants.

2015 Subsurface investigation following AST system upgrades (including canopy installation and product line replacement), shows approximately 4.5 inches of free product in MW-5 and degradation of shallow groundwater quality compared to 2013.



BUILDING 398 FUEL SPILL

Naval Construction Battalion Center Gulfport, Mississippi



TIMELINE OF EVENTS

2016 Two additional wells installed downgradient of contaminant plume and all monitoring wells sampled. Analytical results showed an overall improvement of groundwater quality since 2015. Approximately 1 inch of free product was present in MW-5 and petroleum contaminants were above regulatory limits (MDEQ Tier 1 Target Remediation Goals) in five other monitoring wells. The two new wells were below regulatory limits, resulting in definition of the contaminant plume in all directions.



2017 WellBooms installed into all site monitoring wells, except MW-13 and MW-14, the downgradient sentinel wells without exceedances. WellBooms are designed for deployment in groundwater monitoring wells and are suitable for treating free-phase and aqueous contaminants.



SUMMARY AND CURRENT STATUS

Petroleum contamination from fuel releases in 2006 is confined to soil and groundwater immediately surrounding the fuel tanks. Contamination has not impacted other areas of the base, drinking water sources, or off base properties.

WellBooms will be monitored and replaced semiannually. Groundwater samples may be collected in the future to gauge the effectiveness of the WellBooms.

Herbicide Orange and Dioxins at NCBC Gulfport

1968 – 1977

During the Vietnam war, the United States Air Force used a 30-acre area located in the central portion of NCBC Gulfport for the storage and handling of Herbicide Orange in 55-gallon drums. Some of the drums leaked over time.



1970

In April 1970, the United States Environmental Protection Agency banned the use of Herbicide Orange. The Air Force continued to store Herbicide Orange on NCBC Gulfport until 1977.

1977



In June of 1977, the remaining herbicide was removed from the drums and transported to the Port of Gulfport from the base by train to the incinerator ship *Vulcanus* where it was incinerated at sea.

The Air Force completed a post-removal investigation in 1977. Concentrations of dioxins found were lower than 1 part per billion – EPA's action level for soil and sediment at that time.



1984

Studies of Site 8, the Former Herbicide Storage Area and associated ditches, found dioxins in soil and sediment at levels higher than one part per billion.

Herbicide Orange and Dioxins at NCBC Gulfport

1987–1988

The Air Force incinerated the dioxin-contaminated soil at Site 8 to reduce dioxin levels to meet EPA's regulatory level of one part per billion (ppb). Approximately 27,000 cubic yards of soil were incinerated.



Ash generated by the incinerator was stored within a fenced area on Site 8.



1990

Mississippi established a new, stricter standard for dioxin of 4.26 parts per trillion (ppt) based on health studies.

1994

Routine environmental sampling revealed the need to further investigate possible dioxin contamination on NCBC Gulfport.



1995



Further investigation found dioxin-contaminated sediment in the ditches north of NCBC Gulfport. Nearly 250 tons of dioxin-containing sediment were removed from the ditches.

Sediment recovery traps (SRTs) were installed to slow the flow of sediment from the base through the ditch system. The traps were later tested and shown to be very effective.



1996



A neighborhood survey of over 800 residents was completed as the first step to determine if dioxin contamination could be causing health effects.

Herbicide Orange and Dioxins at NCBC Gulfport

1997-2001



Extensive soil, sediment, and surface water sampling was completed both on and off base to determine where dioxin was present and in what concentrations.

1999



Studies of local fishing habits were done to gain a better understanding of how fish were caught and eaten in the areas near NCBC Gulfport.

Fish were also collected and sampled to test for dioxins. The fish were found to be safe to eat.



1999



Groundwater was sampled on the base. Results showed that dioxin was not leaving the base in the groundwater.

2001

A Human Health Risk Assessment shows a possible health risk if someone were to live on Site 8 or the affected ditch system.

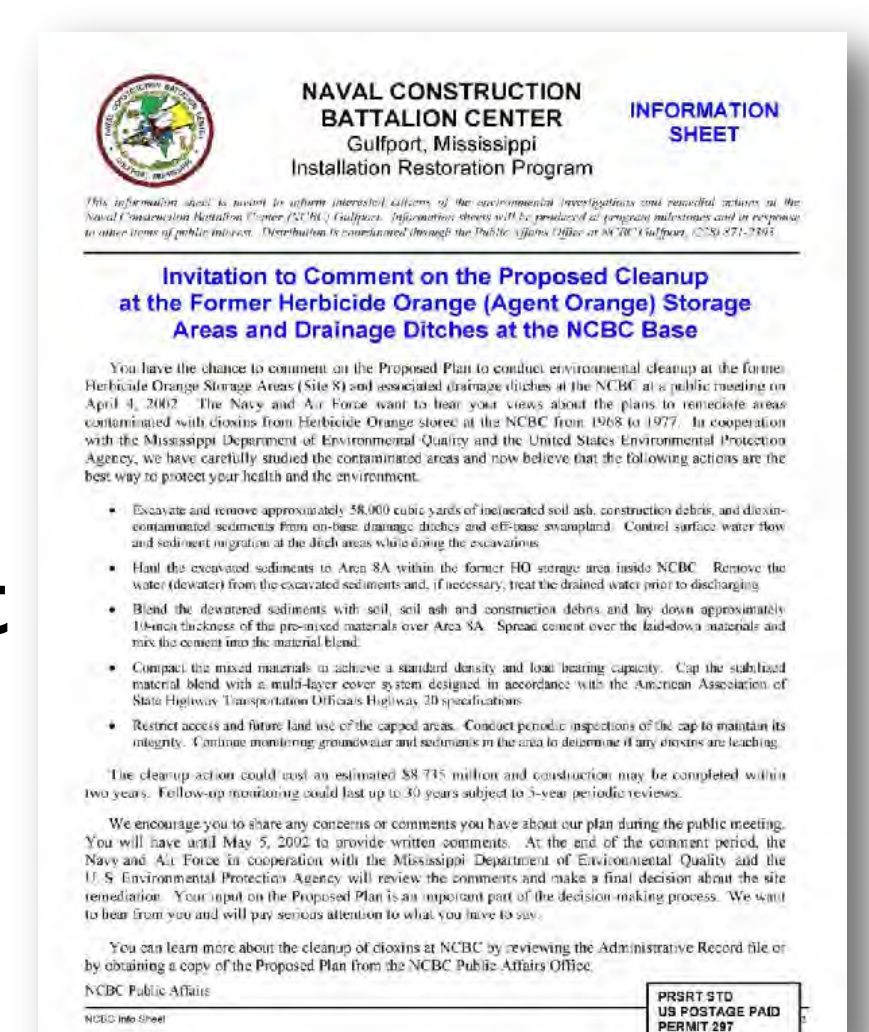
An Ecological Risk showed that potential ecological impacts due to the presence of dioxins would be eliminated by the anticipated remedy.



An engineering and a Feasibility Study were performed to begin the process of identifying a suitable cleanup approach.

2002

The recommended cleanup approach was presented at a public meeting in April 2002. Feedback from the community was received during a 60-day public comment period that followed the meeting. Community feedback included requests for a public health assessment and further sampling north and south of the base.



Herbicide Orange and Dioxins at NCBC Gulfport

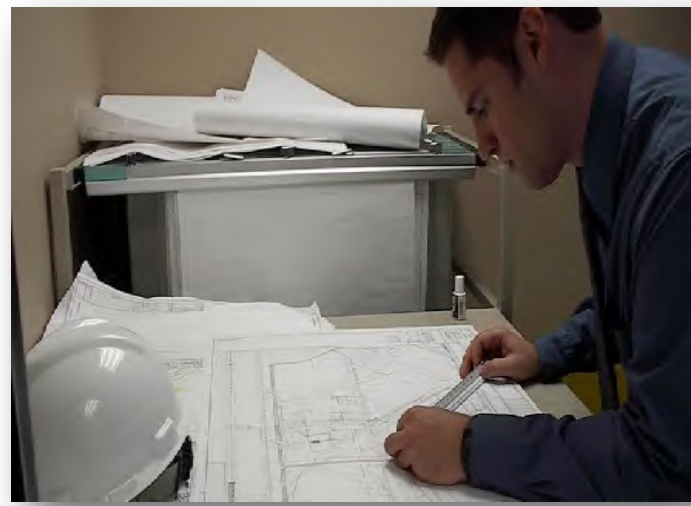
2003



Results of the additional off-base sampling (requested during the Public Comment Period) were presented in January 2003. No evidence of dioxin contamination from Site 8 was found.



A Public Health Assessment was initiated by the Agency for Toxic Substances and Disease Registry (ATSDR). A public meeting was held in October 2003.



A Remedial Design developed the cleanup plans, which included bringing all dioxin-containing material to Site 8, stabilizing it with Portland cement, spreading and compacting the mixture on Site 8, and covering the material with a concrete layer.

2004

The off-base cleanup began with construction of a haul road and clearing of trees.



Based on information from a community member a concurrent investigation was initiated on the west side of Canal Road just north of the base. Low concentrations of dioxins were found.



2005

Cleanup north of the base continued with excavating dioxin-contaminated sediment, transporting it to Site 8A on NCBC Gulfport, and stabilizing it with Portland cement.



The cleanup was interrupted by Hurricane Katrina. Samples were collected immediately after the storm to assess movement of dioxin-containing material as a result of the storm.

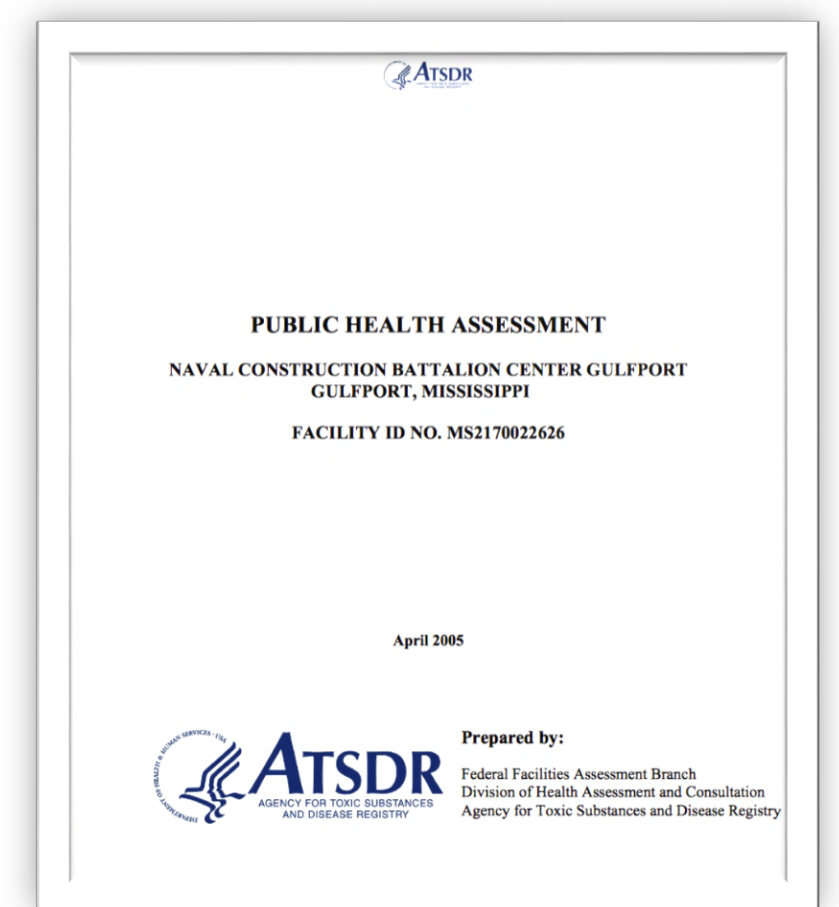


A Wetlands Restoration Committee was formed by the Navy to review plans to restore wetlands after completion of the cleanup. The committee included community leaders and wetlands experts.

Herbicide Orange and Dioxins at NCBC Gulfport

2005

The Public Health Assessment was finalized by the ATSDR in 2005. The report indicated that past exposures to dioxins in soil and sediment off-site did not result in harmful exposures and that current and future exposures did not pose a public health hazard.



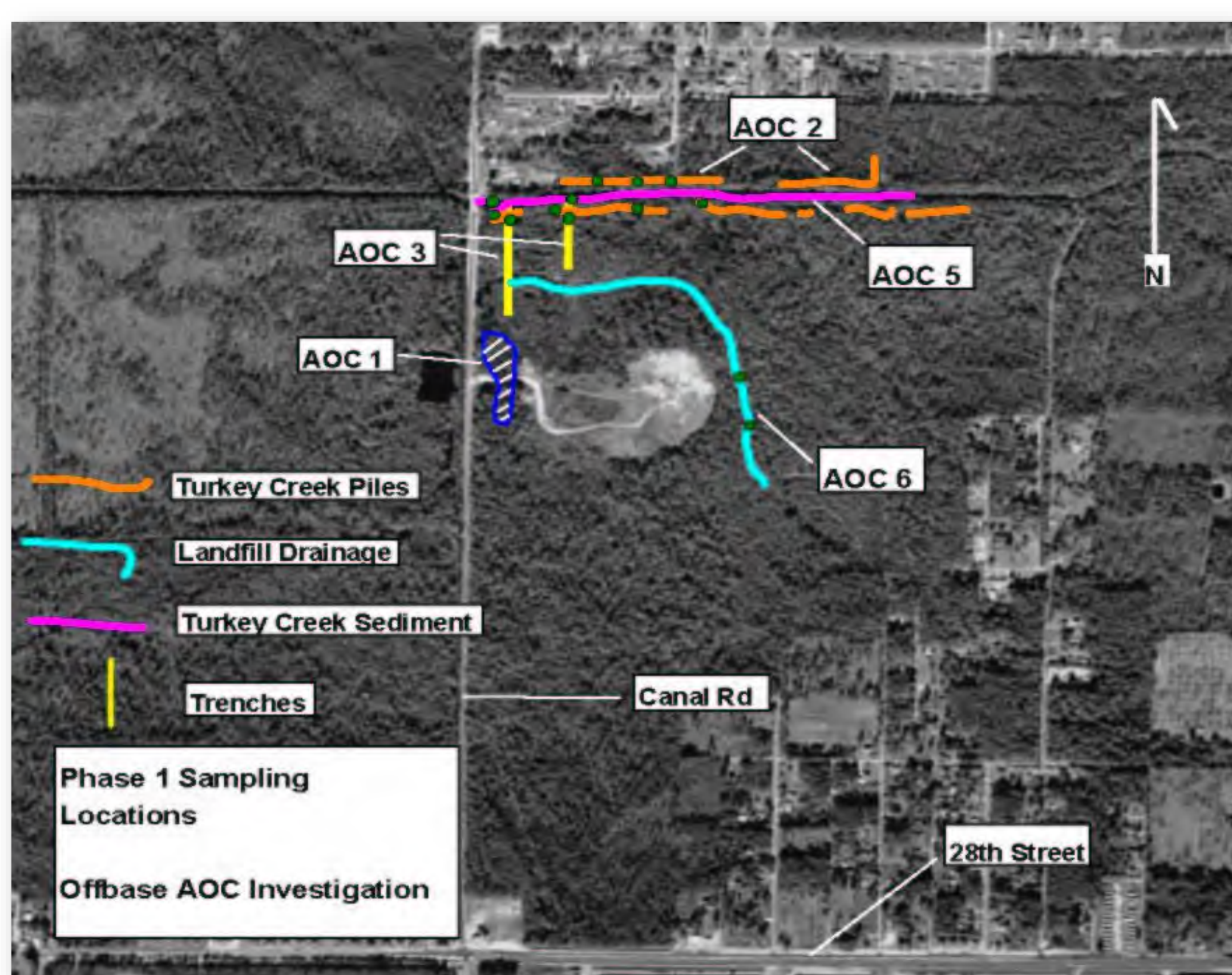
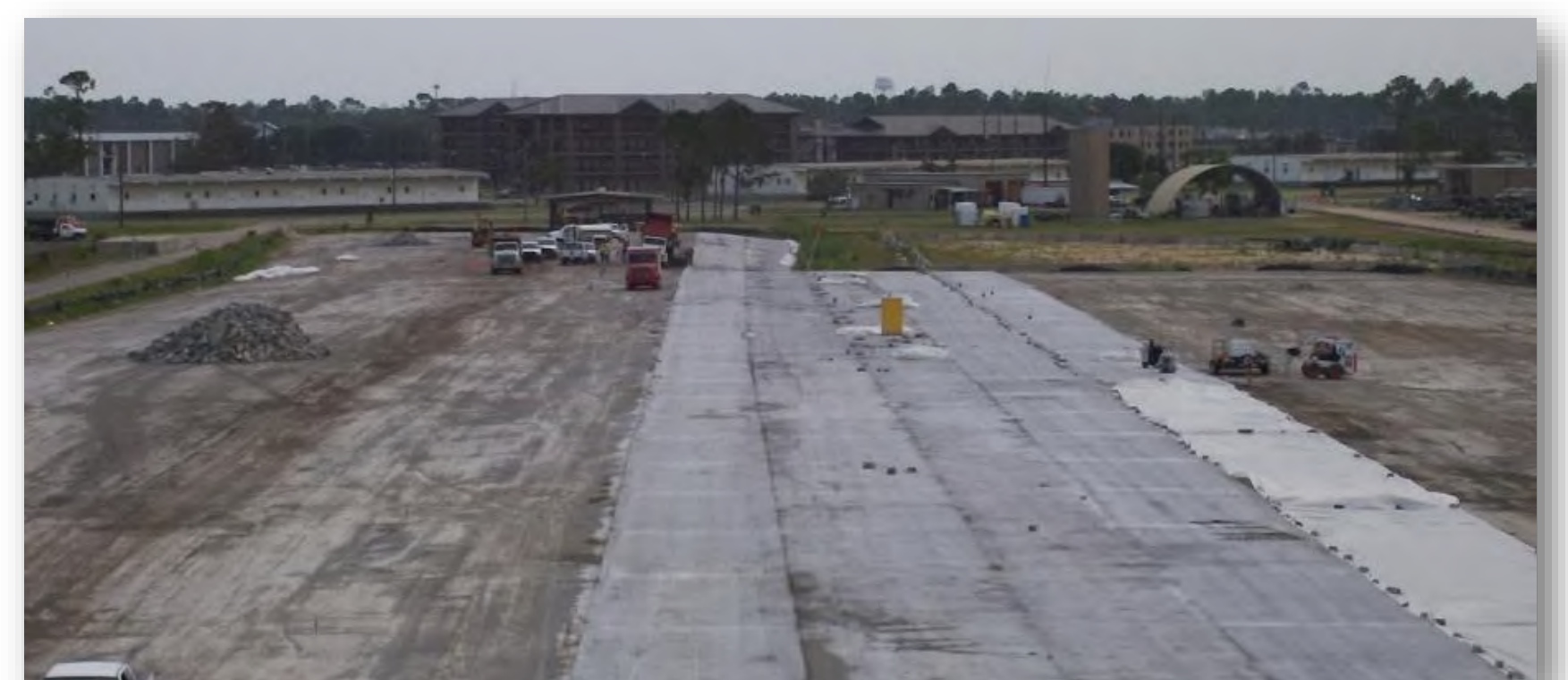
2006



Samples were collected from Dredge Piles located along Canal Road. Dioxin concentrations were lower than levels acceptable at industrial sites, but higher than acceptable in residential locations. In response, the Navy began plans to remove the dioxin-containing soils from the dredge piles.

2007

The off-base excavation and restoration was completed. The contaminated material was placed on the Former Herbicide Orange Storage Area (Site 8) and mixed with Portland cement. The stabilized material is then covered with 12 inches of clean concrete.



Sampling of six additional Off Base Areas of Concern began in September 2007. These additional areas of concern were identified by community members.

Herbicide Orange and Dioxins at NCBC Gulfport

2008



The Canal Road Dredge Pile cleanup began with building a road to access the piles.



Approximately 6000 tons of contaminated soil was excavated and transported to Site 8B.

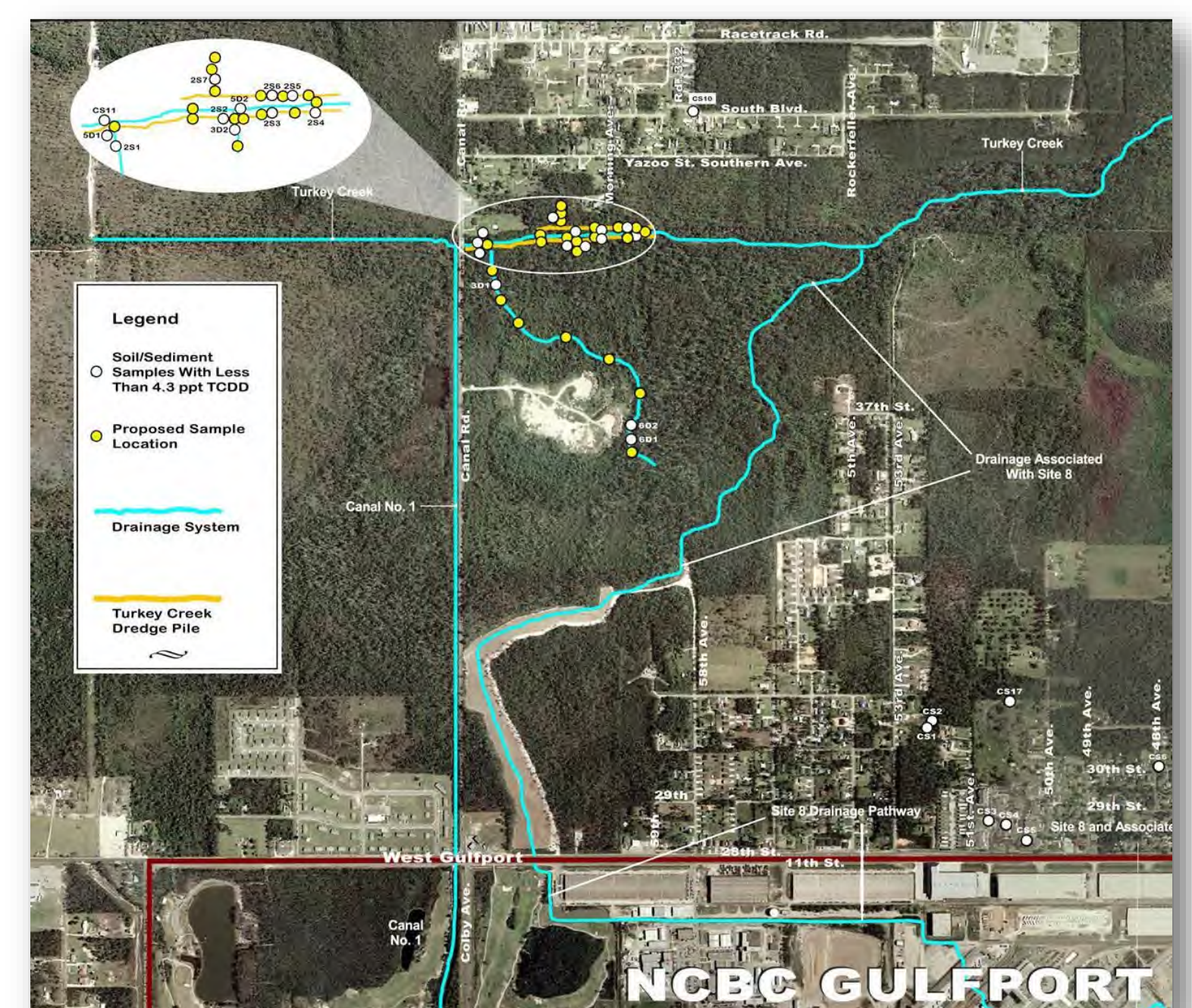
Excavated soil was stabilized by mixing it with Portland cement and spreading it in uniform layers. More than three acres of Site 8B were stabilized.



2009

Results of Off Base Areas of Concern sampling are reported in March 2008. Additional sampling of four of the areas was recommended.

Off Base Area of Concern sampling continued with the collection of a second phase of surface water, sediment, and soil samples. No significant levels of dioxins were found.



Four permanent groundwater wells were installed and sampled off base. No dioxin related to Herbicide Orange was found in the groundwater.

2011



A Five-Year Review of Site 8 was completed. The review found the remedy to be protective of human health and the environment at that time.

2012

The Long Term Monitoring Program began in March 2012 with the collection of groundwater and sediment samples from four monitoring wells and sediment samples from a drainage feature downstream of Site 8.

In July 2012 sediment samples collected at a nearby site (Site 7) contained dioxin. In response, sediments removed during ditch maintenance activities were stockpiled on Site 8B for further evaluation.



Herbicide Orange and Dioxins at NCBC Gulfport

2013



A fence was installed around Sites 8B and 8C to prevent unauthorized use of the site.

Sampling in January found dioxin in a sediment sample collected from a ditch located northeast of Site 8A. Further sampling found dioxin in ditch sediments that were stockpiled at Site 8B and in sediment samples from Sites 8B and 8C.

Sediment data from Site 8B and Site 8C indicated that the selected remedy for these areas (Long Term Monitoring and Land Use Controls) would not continue to be protective of human health and the environment. However, samples collected for Site 8A indicated that the remedy for that area (solidification of dioxin containing material and capping) continued to be protective and was functioning as designed.

2014



Four off-base wells were sampled for dioxin. Only very low concentrations (below the target remediation goal) were found.

2015

A sediment stabilization treatability test was conducted on the stockpiled sediment at Site 8B.



Maintenance of the perimeter ditch around Site 8A included brush removal and rip rap repair.



A Remedial Action Optimization Study confirmed that the selected remedy for Site A was protective of human health and the environment, but that additional work was needed to ensure that contaminants remain on Site 8B and Site 8C.



A pilot study was conducted to follow the treatability study of the stockpiled sediment at Site 8B. This pilot study involved successfully stabilizing 7700 tons of sediment on 3.5 acres at the southwest end of Site 8B.



Example of a Solar Panel Farm

Planned use of Site 8A was changed from vehicle storage to a solar panel farm.