CERCLA WORK PLAN
FOR

RE108 AREA HOTSPOT
RECOVERY WELL PHASE I - RW4 AQUIFER TESTING

NAVAL WEAPONS INDUSTRIAL RESERVE PLANT (NWIRP)
BETHPAGE, NEW YORK
AUGUST 2021

1.0 Introduction

This work plan has been prepared for the Mid-Atlantic Division of the Naval Facilities Engineering Systems Command (NAVFAC) pursuant to Contract Task Order (CTO) WE13, issued under Comprehensive Long-term Environmental Action Navy (CLEAN) contract number N6247016D9008. This work plan identifies actions to be taken to evaluate capture of the RE108 Area Hotspot groundwater from recovery well Phase I-RW4 (RW4). It has been developed as an addendum to the June 2021 Final CERCLA Work Plan for RE108 Area Hotspot Aquifer Testing, Operation, and Monitoring of RE137 Groundwater Extraction, Treatment, and Discharge System. The hotspot and recovery wells are located south of the former NWIRP Bethpage property (See Figures 1-1 and 1-2).

This evaluation is being conducted in conjunction with similar testing at recovery well RE137, located approximately 2,000 feet south of RW4. Both of these recovery wells target high concentration (greater than 1,000 micrograms per liter) trichloroethene-impacted groundwater within the northern portion of the RE108 Area Hotspot. Also, moderate to high levels (5 to 15 micrograms per liter) of 1,4-dioxane are present in this groundwater. Recovery well RW4 started intermittent operation in April 2021 and has been in continuous operation since May 2021. The current pumping rate for RW4 is 180 gallons per minute (GPM). This water is conveyed to the GM38 Treatment System, which is located approximately 4,500 feet east of RW4. At the GM38 Treatment System, the RW4 water is blended with 600 to 700 GPM of groundwater from recovery well GM38-RW1. The blended water is treated using a combination of air stripping, advanced oxidation process technology, and granular activated carbon.

The RW4 pumping test is anticipated to start in early October 2021. Recovery well RE137 is anticipated to start operation in the fall of 2021 and run through the end of December 2022. During that time, a similar pumping test of RE137 will be conducted.

The objectives of the RW4 pumping aquifer test are to refine the recovery well capture zone estimate and evaluate mass removal of VOCs to support the RE108 Hotspot Area

Phase I and Phase II Treatment Systems. In addition, the RW4 recovery well, in combination with the RE137 System pump operation, will provide interim control of the migration of the northern portion of the RE108 Area Hotspot groundwater. The tests will also be used to evaluate potential capture zone overlap/interference between RW4 and RE137 well operations and provide an initial evaluation for potential future use of New York State Department of Environmental Conservation recovery wells DECEX01 to DECEX03

2.0 Plume Capture Test and Groundwater Monitoring

This work plan describes a hydraulic testing program to 1) allow additional localized calibration of the Navy's NWIRP Bethpage groundwater computer model, 2) be used to assess plume capture, and 3) also be used to assess potential impacts on the operations of various public water suppliers in the area as well as seasonal effects.

This work plan will also address plume migration and capture via trend analysis of chemical data from various monitoring wells in the area. Due to the large size of the plume and relatively slow movement of the groundwater, trend development is expected to be limited over the first few years of operation. However, this data will be used to support long-term trend analysis of the Phase I Treatment System, as well as be used to help identify any potential data gaps or modifications to the long-term approach.

2.1 Hydraulic Testing

Water levels will be collected from the wells identified in Table 2-1 and on Figure 2-1 using pressure transducers, with a programmed data collection frequency of one reading every 10 minutes. The water level data will be downloaded monthly and plotted on graphs along with RE137 and RW4 pumping data. We will use this data to evaluate the effects of the operation of RE137 (when operational) and RW4 on each well being monitored. The multiple screened intervals at selected well cluster locations will provide information regarding the vertical movement of groundwater across lithologies, which will be useful in projecting both the lateral and vertical hydraulic effects and in capture zone evaluation. The data will also be used for development of the groundwater computer model to calibrate horizontal and vertical hydraulic conductivities in the area. During testing, flow from RW4 or RE137 may be reduced or eliminated to provide a range of input parameters for transient model calibration.

During testing, there will also be an ongoing evaluation of the effects of higher trichloroethene and 1,4-dioxane concentrations in the RW4 water relative to the RW1 water on the GM38 Treatment System operation. This evaluation may require short-term modifications to the pumping rates of RW4 and potentially extend the duration

required for each of the pumping rates. Anticipated pumping rates for RW4 are presented in Table 2-1.

Table 2-1 – Pumping Rates

Runtime Period	RW4 Pumping Rate (gallons per minute)
Month 1	100
Month 2	200
Month 3	300
Month 4	400
Long Term	200 to 400, based on evaluation

2.2 Groundwater Monitoring

Groundwater samples will be collected from the wells indicated in Table 2-2, at the indicated frequencies, and the samples will be analyzed for VOCs and 1,4-dioxane. The groundwater sample data will be used to evaluate concentration changes and potential plume shifts over time from the pumping of RE137 and RW4. RW4 will be sampled monthly as part of the normal GM38 System operation. RE137 will be sampled weekly during startup and then bi-monthly during its operation.

As indicated in Table 2-2 the monitoring wells will be sampled quarterly. Each of these wells are included in the existing off-property sampling program and the sampling will be performed in accordance with the *Letter Work Plan*, *2018 Off-Property VOC and 1,4-Dioxane Groundwater Investigation, Facility Wide.*

2.3 Reporting

The water level data will be assembled into a database. Graphs will be prepared showing water levels over time in the wells monitored. The data will be evaluated to determine which wells were influenced by the pumping of RE137 and RW4, and to what extent. Pumping data for other large-capacity pumping wells in the area will also be obtained to screen against the water level data to identify potential water level changes due to the operation of other wells. The assessment will evaluate the influence of RE137 and RW4 pumping on groundwater levels within the strata that RE137 and RW4 are screened within, as well as depositional sequences/groundwater flow units above and below. The hydraulic data will also be used in the groundwater computer model development currently underway to validate/improve the model and allow better projections on groundwater capture in the area.

Analytical data will be presented in tabular form, with VOC data plotted over time for selected wells. Analytical data will be compared to RE137 and RW4 pumping rates. This comparison will be used to evaluate the degree of influence that the pumping RE137 and RW4 has on the plume configuration, both in terms of concentration and overall footprint.

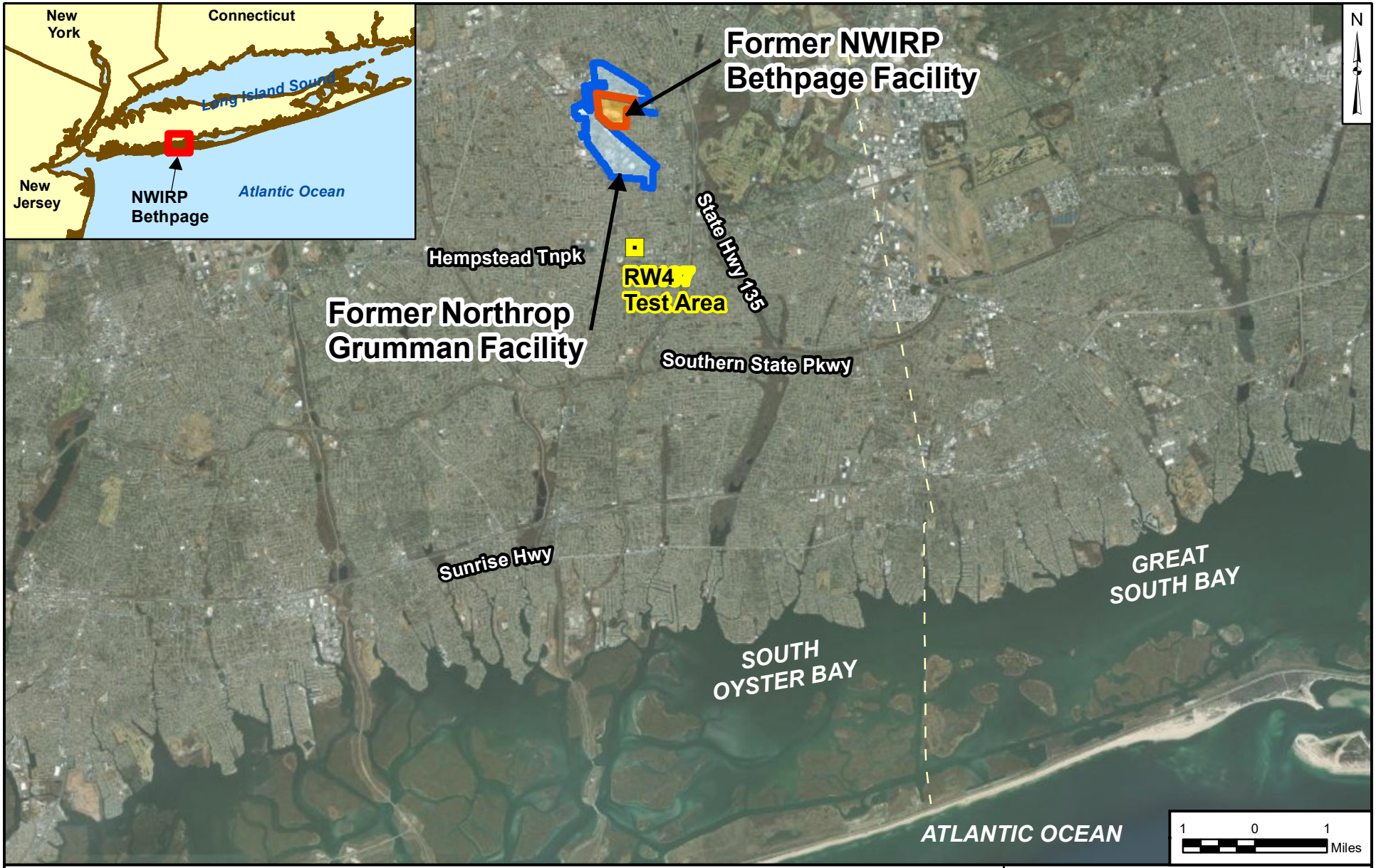
The water level and analytical data will be compared to groundwater computer model projected changes over time. This comparison will be used to evaluate the accuracy of the model in select areas, and, if necessary, be used to adjust model calibrations.

Table 2-2
RW4 Plume Capture Test Groundwater Monitoring Program

Well	Distance from RW4 (feet)	Monitored Interval (feet bgs)	Max 2019 TCE Concentration (ug/L)	Quarterly Sampling
RW4[(1)]	0	570 - 670	556	X
RE103D1	300	625 - 640	1,400	X
RE103D2	300	653 - 673	830	X
RE103D3	300	715 - 730	680	X
RE108D1	1,300	530 - 550	42	X
RE108D2	1,300	630 - 650	3,200	X
RE122D1	1,400	520 - 540	750	X
RE122D2	1,400	590 - 610	6,300	X
RE122D3	1,400	715 - 735	14	X
RE120D1	1,800	630 - 650	1,000	X
RE120D2	1,800	690 - 710	760	X
RE120D3	1,800	740 - 760	200	X
RE125D1	1,800	320 - 340	400	X
RE125D2	1,800	580 - 600	440	X
RE125D3	1,800	670 - 690	270	X
RE134D1	1,900	325 - 345	6	X
RE134D2	1,900	510 - 530	140	X
RE134D3	1,900	600 - 620	180	X
RE134D4	1,900	665 - 685	22	X
RE105D1	2,000	530 - 550	120	X
RE105D2	2,000	730 - 750	2,000	X
RE137[(2)]	2,050	630 - 745	3,100	X
TT-101D2	2,900	740 - 760	1,100	X
GM38RW3-MW01	3,300	475 - 495	21	X
RE132D5	3,400	610 - 630	160	X
RE132D6	3,400	685 - 705	2,600	X
RE132D7	3,400	743 - 758	1,100	X
RE114D1	4,750	535 - 550	400	X
RE114D2	4,750	610 - 630	87	X
RE115D1	5,400	640 - 655	150	X
RE115D2	5,400	730 - 750	610	X

(1) RW4 data is from July 2021.
(2) RE137 will be sampled as part of its sampling program.

Monitoring wells will be used for both the RE 137 and RW 4 evaluations.
bgs - feet below ground surface.
ug/L - micrograms per liter.
TCE - Trichloroethene.
NA - Not available.



PHASE I - RW4 WELL PLUME CAPTURE TEST GENERAL LOCATION MAP
NWIRP BETHPAGE, NEW YORK

NAVFAC Naval Facilities Engineering Systems Command

DRAWN BY	DATE	CTO
MC	01/07/21	112G08005-WE13
CHECKED BY	DATE	FIGURE NUMBER
PL	01/07/21	**1-1**

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Map does not depict HR VOC contamination to OU2 Plume

HR

NG

NWIRP

BCP

RW-1

RW-2

RW-3

RW-4

Well 3R

Well 1

Well 17

Well 18

Well 19

RW-21

RW-20

RW22

RW4

RW5

RW6

RW7

GM38-RW03

GM38-RW01

DECEX-01

DECEX-02

DECEX-03

RE137

HWD-9-3

HWD-9-1

HWD-9-2

HWD-8-3

HWD-8-1

HWD-3-2

BWD-8

BWD-7

BWD-1

BWD-4-1

BWD-4-2

BWD-6-1

BWD-6-2

BWD-5-1

LWD-5A

LWD-7A

LWD-8A

LWD-13

NYAW-3S

NYAW-4S

SFWD-6-1

SFWD-6-2

SFWD-3-1

SFWD-4-1

SFWD-5-1

SFWD-5-2

SFWD-1-4

SFWD-1-2

SFWD-1-3

FWD-11004

FWD-6644

MWD-4

MWD-5

Former GM38 Area Hotspot (OU2)

GM38 Treatment Plant

RE108 Area Hotspot (OU2)

RE108 Treatment Plant

Deep Western Plume (OU2)

Shallow (OU3) Plume

Shallow (OU2) Plume

South Oyster Bay ~ 3.6 Miles

N

Legend

- Recovery Well
- Recovery Well (Proposed)
- Public Water Supply Well
- NYSDEC Proposed Recovery Well
- Groundwater Flow Direction

2019 TCE Plume (All Depths)

- 5 to100 µg/L TCE
- > 100 to1,000 µg/L TCE
- > 1,000 µg/L TCE
- Navy Treatment Plants

Notes:

BCP- Bethpage Community Park (OU3)
BWD- Bethpage Water District
HR- Hooker Ruco Superfund Site
HWD- Hempstead Water District
LWD- Levittown Water District
MWD-Massapequa Water District
NG- Former Northrop Grumman Facility
NWIRP- Former Naval Weapons Industrial Reserve Plant
NYAW- New York American Water
OU- Operable Unit
SFWD- South Farmingdale Water District
TCE- Trichloroethene
µg/L- microgram per liter

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PHASE I - RW4 WELL PLUME CAPTURE TEST
GROUNDWATER PLUME LAYOUT
NWIRP BETHPAGE, NEW YORK

NAVFAC Naval Facilities Engineering Systems Command

DRAWN BY	DATE	CTO
MC	01/18/21	N62470-16-D-9008-WE13
CHECKED BY	DATE	FIGURE NUMBER
EW	01/18/21	1-2

N

RE122D1
RE122D2
RE122D3
RE108D1
RE108D2
RE103D1
RE103D2
RE103D3
RW4
RE134D1
RE134D2
RE134D3
RE134D4
RE105D1
RE105D2
RE125D1
RE125D2
RE125D3
RE120D3
RE120D1
RE120D2
RE137
Hempstead Tpke
Wantagh Ave
TT-101D2
Union Ave
Stewart Ave
RE132D5
RE132D7
RE132D6
Hicksville Rd
RE114D1
RE114D2
Miller Pl
RE115D1
RE115D2
Boundary Ave
135

Legend

- Transducer in Monitoring Well
- Recovery Well RW-4
- Recovery Well RE137
- Monitoring Well
- Water Supply Well
- 1997 Northrop Grumman Property

0 1,000 2,000 Feet

GROUNDWATER MONITORING WELL SAMPLING LOCATIONS FOR RW4 WELL PLUME CAPTURE ZONE NAVAL WEAPONS INDUSTRIAL RESERVE PLANT BETHPAGE, NEW YORK

NAVFAC Naval Facilities Engineering Systems Command

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MC	01/19/21	112G08005-WE13
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PL	01/19/21	2-1

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