ENVIRONMENTAL CONSULTING & MANAGEMENT
**ROUX ASSOCIATES INC**

ROUX

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March 27, 2000

0038
001

Mr. John E. Cofman
Manager
Environmental Technology and Compliance
Grumman Corporate Operations
Bethpage, New York 11714-3586

Re: Status of Ongoing Investigations and Proposed Scope of Work
for the Delineation of PCB Contamination
Plant 3 Dry Wells 20-08 and 34-07
Northrop Grumman Corporation, Bethpage, New York

Dear Mr. Cofman:

Roux Associates, Inc. (Roux Associates) has prepared this letter report for the Northrop Grumman Corporation (NGC) to summarize the status of ongoing investigations and detail the proposed scope of work for the delineation of polychlorinated biphenyl (PCB) contamination at the NGC Plant 3 (Plant 3) Dry Wells 20-08 and 34-07 Bethpage, New York.

NGC has conducted several Phase I and Phase II environmental site assessments of the Plant 3, which identified areas requiring remediation. Areas identified in these assessments included soil in the vicinity of Dry Wells 20-08 and 34-07 (Figure 1). Based on these assessments, NGC developed and implemented a remedial program at each Dry Well to remove contaminated soil within the structures to depths that were deemed feasible using a conventional shoring system. Upon the completion of these remediation efforts and, subsequent post-excavation sampling efforts to delineate soil contamination beneath each Dry Well, NGC requested from the USEPA on June 26, 1998 and, again, on September 14, 1998 that no further action be required for these Dry Wells. The USEPA denied both requests, requiring that NGC perform additional remediation via excavation or other innovative remediation technology. The USEPA also required groundwater conditions in the vicinity of each Dry Well be characterized.

In response to the USEPA requirements, NGC has completed additional investigations at Dry Wells 20-08 and 34-07. These investigations were performed in accordance with the following work plans.

- Plant 3 Dry Wells 20-08 and 34-07 Soil Remediation Engineering Services Final Work Plan (Roux Associates, October 1999); and
- Plant 3 Dry Wells 20-08 and 34-07 Soil Investigation Supplemental Field Characterization Final Work Plan (Roux Associates, November 1999).

These investigations were performed to delineate the lateral and vertical extent of polychlorinated biphenyl (PCB) contamination in the vicinity of each dry well, if present, and to determine the impact of PCB contamination if any, on groundwater. These investigations were also performed to gather information that could be used to assist in determining whether additional remediation via excavation or other innovative technologies is feasible.

**Investigation Overview**

The investigative efforts consisted of soil and groundwater sampling, both if which are described below.

Soil Investigation

Overall, a total of 14 post-excavation soil borings, seven at each dry well (including one boring previously performed through the center of each dry well), have been performed for Dry Wells 20-08 and 34-07 at the Site. These borings were located to delineate the extent of PCB contamination at each of the respective dry wells. Site location plans for these borings, including proposed borings, for Dry Wells 20-08 and 34-07 are presented in Figures 2 and 3, respectively. The twelve perimeter borings, were sampled and analyzed for PCBs continuously from the surface to groundwater. The remaining two borings, installed through the center of the dry wells, were sampled and analyzed for PCBs continuously from the bottom of the dry well excavations to groundwater. The analytical results, summarized on figures 4, 5, 6 and 7, for the samples collected from the borings provide insight into the subsurface extent of PCB contamination located in the vicinity of the dry well areas. The data show a significant decrease in the level of PCBs with depth and distance away from the drywells. Despite the reduction in levels, the data continue to show levels of PCBs which exceed the NYSDEC regulatory standard. Therefore, additional soil borings shall be installed at the locations shown on figures 2 and 3 to refine the estimated horizontal and vertical limits of contamination as shown in figures 4, 5, 6 and 7.

Groundwater Investigation

A total of four groundwater-monitoring wells (two monitoring wells at each location) were installed in the vicinity of each Dry Well 20-08 and 34-07 (Figure 1). Filtered and unfiltered groundwater samples were obtained from each groundwater monitoring well

and analyzed for PCBs. The results of the analysis for the groundwater monitoring well samples indicate that PCB contamination has not significantly impacted the groundwater.

**Field Characterization Results for Soil**

The soil analysis results for each boring in the dry well areas are presented graphically in the cross-sections provided in Figures 4 through 7.

Dry Well 20-08

The general limits of PCB contamination in the vicinity of Dry Well 20-08 have been delineated based on the information obtained during current and prior investigations. However, additional investigation is required to more discretely delineate PCB Levels approaching the NYSDEC regulatory standard.

Seven soil borings were performed in the vicinity of Dry Well 20-08 (Figure 2). The results of the PCB analysis for soil from these borings are presented in Figures 4 and 5. These figures depict cross sections A-A' and B-B' in the vicinity of Dry Well 20-08 to show a vertical and horizontal picture of the analytical results collected from these seven borings.

Cross-section A-A' (Figure 4) through soil borings SB-1, SB-2, SB-5 and SB-6 indicates a PCB concentration pattern diminishing with distance away from Dry Well 20-08 towards soil boring SB-6. More importantly, this pattern reveals only low levels of PCB contamination (1.1 to 20 parts per million (ppm)) within the 24 to 32-foot sampling interval at SB-6. In addition, Cross-section A-A' indicates that there were no PCB detections above the 10 ppm NYSDEC Regulatory Standard in any sampling interval for soil boring SB-2.

Cross-section B-B' (Figure 5) through soil borings SB-7 and SB-8 also indicates a PCB concentration pattern diminishing with distance away from Dry Well 20-08 towards SB-7 and SB-8. These patterns, however, reveal levels of PCB contamination (94 to 770 ppm) within the 24 to 32-foot sampling interval at SB-7 and similar levels of PCB contamination (410 to 1,300 ppm) within the 44 to 54-foot sampling interval at SB-8.

As shown in Figure 2, SB-13 and SB-14 are proposed to be installed as part of a phase II supplemental field characterization program to respectively refine the limits of contamination in the direction of SB-7 and SB-8 (refer to figure 5). Based on the knowledge previously gained from the performance of the previous field characterization investigations, samples will be collected and analyzed at selected intervals where contamination above the NYSDEC Regulatory Standard may possibly exist. A total of 17 split spoon samples will be obtained from soil borings SB-13 and SB-14. The soil samples from intervals described in the following schedule will be analyzed for PCBs using USEPA Method 8082. The balance of the samples will be held at the laboratory for future analysis if it is deemed necessary after a review of the sampled intervals has been completed.

| Soil Boring | Sample Collection Interval (ft) | Sample Analysis Interval (ft) |
|---|---|---|
| SB-13 | 20 to 40 (every two ft interval) | 24 to 34 (every two ft interval) |
| SB-14 | 40 to 54 (every two ft interval) | 44 to 54 (every two ft interval) |
| Total | 17 samples collected | 10 samples analyzed |

Dry Well 34-07

The general limits of PCB contamination in the vicinity of Dry Well 34-07 have been delineated based on the information obtained during the current and previous investigations. However, additional investigation is required to more discretely delineate PCB levels approaching the NYSDEC regulatory standard.

Similar to Dry Well 20-08, seven soil borings were performed in the vicinity of Dry Well 34-07 (Figure 3). The results of the PCB soil analysis for these borings are presented in Figures 6 and 7. These figures depict cross sections C-C' and D-D' in the vicinity of Dry Well 34-07 to show a vertical and horizontal picture of the soil analytical results collected from these seven borings.

Cross-section C-C' (Figure 6) through soil borings SB-3, SB-4, SB-9 and SB-11 indicates a PCB concentration pattern diminishing with distance away from Dry Well 34-07 towards soil borings SB-9 and SB-11. These patterns, however, reveal levels of PCB contamination (110 to 1,100 ppm) within the 24 to 28-foot sampling interval at SB-9 and low levels of PCB contamination (86 ppm) within the 24 to 26-foot sampling interval at SB-11.

Cross-section D-D' (Figure 7) through soil borings SB-10 and SB-12 also indicates a PCB concentration pattern diminishing with distance away from Dry Well 34-07 towards SB-10 and SB-12. These patterns, however, reveal levels of PCB contamination (810 to 4,600 ppm) within the 14 to 40-foot sampling interval at SB-10 and similar levels of PCB contamination (110 to 9,400 ppm) within the 24 to 30-foot sampling interval at SB-12.

As shown on Figure 3, SB-15, SB-16 and SB-17 are proposed to be installed as part of a phase II supplemental field characterization program to respectively refine the limits of contamination in the direction of SB-9, SB-10 and SB-12 (refer to figures 6 and 7). Based on the knowledge previously gained from the performance of the previous field characterization investigations, samples will be collected and analyzed at selected intervals where contamination above the NYSDEC Regulatory Standard may possibly exist. A total of 39 split spoon samples will be obtained from soil borings SB-15, SB-16 and SB-17. The soil samples from intervals described in the following schedule will be analyzed for PCBs using USEPA Method 8082. The balance of the samples will be held at the laboratory for future analysis if it is deemed necessary after a review of the sampled intervals has been completed.

| Soil Boring | Sample Collection Interval (ft) | Sample Analysis Interval (ft) |
|---|---|---|
| SB-15 | 20 to 38(every two ft interval) | 24 to 32 (every two ft interval) |
| SB-16 | 10 to 50 (every two ft interval) | 14 to 44 (every two ft interval) |
| SB-17 | 20 to 40 (every two ft interval) | 24 to 34 (every two ft interval) |
| Total | 39 samples collected | 24 samples analyzed |

Please note that the phase II supplemental field characterization program will be performed in accordance with the protocols specified in the "Plant 3 Dry Wells 20-08 and 34-07 Soil Investigation Supplemental Field Characterization Final Work Plan" dated November 18, 1999.

**Field Characterization Results for Groundwater**

As part of the field characterization for groundwater, four monitoring wells were installed. Two permanent groundwater monitoring wells MW-1 and MW-2 were installed in the vicinity of Dry Well 20-08 (Figure 2) and two permanent groundwater monitoring wells MW-3 and MW-4 were installed in the vicinity of Dry Well 34-07 (Figure 3). To obtain a better understanding of the groundwater quality, filtered and unfiltered groundwater samples were obtained from each monitoring well and analyzed for PCBs. The analytical results of groundwater analysis are presented in Table 1.

PCBs were detected in all of the unfiltered groundwater samples. The presence of PCBs within these samples can be attributed to the adherence of PCBs to the fine soil particles that are typically captured within the samples. No PCBs were detected in the analysis of filtered samples from monitoring wells MW-1, 3 and 4. PCBs were detected in low concentrations (1.5 to 2.1 ppm) in the filtered groundwater sample collected from monitoring well MW-2. The results of the analysis are presented in Table 1.

Monitoring well MW-2 is hydraulically further down gradient (Figure 8) than monitoring well MW-1 and approximately 75 feet from Dry Well 20-08. Based on the absence of PCBs present within the filtered groundwater samples from monitoring well MW-1 and the downgradient monitoring wells MW-3 and MW-4, it appears that the low level of PCBs present in monitoring well MW-2 is not significant.

**Summary**

Based on the information obtained during the initial and supplemental field characterizations in the vicinity of Dry Wells 20-08 and 34-07, the general extent of lateral and vertical PCB contamination in the soil and groundwater within these areas is delineated. However, additional information collected from the analysis of soil borings installed at the locations proposed in Figures 2 and 3 would provide the necessary information to refine the limits of contamination in areas of uncertainty as highlighted on Figures 4, 5, 6 and 7. No further investigation of groundwater within each area is warranted. Upon the completion of the installation and sampling of the additional proposed soil borings and review of the analytical results of these samples, the Field

Characterization Report for Dry Wells 20-08 and 34-07 will be finalized. The report will describe the details of the initial and supplemental field activities performed at each dry well, summarize the analytical data collected and delineate the lateral and vertical extents of PCB contamination in the soil within each area.

With the completion of this additional investigative phase of work and subsequent field characterization report in the dry well areas at the site, we will proceed with the next phase of work based on the knowledge obtained during these investigations once the approval of the NYSDEC is received. The next phase of work, as outlined in the Plant 3 Dry Wells 20-08 and 34-07 Soil Remediation Engineering Services Final Work Plan, consists of an exposure assessment and focussed feasibility study.

If you have any questions or comments regarding the above, please don't hesitate to call.

Sincerely,

ROUX ASSOCIATES, INC.

Omar Ramotar
Project Engineer

Peter J. Gerbasi, P.E.
Principal Engineer

Table 1. Summary of Poly-chlorinated Biphenyls Detected in Ground-water, Plant 3 Dry Wells 20-08 and 34-07
Northrup Grumman Corporation, Plant 3, Bethpage, New York.

| Parameter / Concentration (µg/L) | Designation: / Sample Date: / NYSDEC[1] Ground-water Cleanup Objectives (µg/L) | MW-1 10/14/99 | MW-1F 10/14/99 | MW-2 10/14/99 | MW-2DL 10/14/99 | MW-2F 10/14/99 | MW-2 1/6/2000 | MW-2F 1/6/2000 | MW-3 10/15/99 |
|---|---|---|---|---|---|---|---|---|---|
| Aroclor-1016 | NS | 0.5 U | 0.6 U | 0.5 U | 1.0 U | 0.5 U | 1.0 U | 1.0 U | 0.5 U |
| Aroclor-1221 | NS | 0.5 U | 0.6 U | 0.5 U | 1.0 U | 0.5 U | 1.0 U | 1.0 U | 0.5 U |
| Aroclor-1232 | NS | 0.5 U | 0.6 U | 0.5 U | 1.0 U | 0.5 U | 1.0 U | 1.0 U | 0.5 U |
| Aroclor-1242 | NS | 3.9 | 0.6 U | 5.3 E | 3.4 DP | 2.1 | 1.0 U | 1.0 U | 14 E |
| Aroclor-1248 | NS | 0.5 U | 0.6 U | 0.5 U | 1.0 U | 0.5 U | 4.7 | 1.5 | 0.5 U |
| Aroclor-1254 | NS | 1.0 U | 1.1 U | 1.0 U | 2.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U |
| Aroclor-1260 | NS | 1.0 U | 1.1 U | 1.0 U | 2.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U |
| Total PCBs | 0.1 | **3.9** | 0 | **5.3** | **3.4** | **2.1** | **4.7** | **1.5** | **14** |

**Notes:**

1 - New York State Department of Environmental Conservation (NYSDEC) Recommended Cleanup Objectives Technical and Administrative Guidance Memorandum revised January 24, 1996.

µg/L - Micrograms per Liter

NS - No standard

F - This suffix indicates a filtered sample

DL - This suffix indicates a diluted sample

U - This qualifier indicates compound analyzed for but not detected

J - This qualifier indicates an estimated value

E - This qualifier indicates compounds whose concentrations exceed the calibration range of the instrument

D - This qualifier indicates all compounds identified in an analysis at a secondary dilution factor

P - This qualifier is used when there is a greater than 25% difference for detected concentrations between two GC columns

**Bold** - Data highlighted in bold represents results detected above the NYSDEC Recommended Cleanup Objectives

Table 1. Summary of Poly-chlorinated Biphenyls Detected in Ground-water, Plant 3 Dry Wells 20-08 and 34-07
Northrup Grumman Corporation, Plant 3, Bethpage, New York.

| Parameter / Concentration (µg/L) | Designation: / Sample Date: / NYSDEC[1] Ground-water Cleanup Objectives (µg/L) | MW-3DL 10/15/1999 | MW-3F 10/14/99 | MW-4 10/15/99 | MW-4F 10/14/99 |
|---|---|---|---|---|---|
| Aroclor-1016 | NS | 5 U | 0.6 U | 0.5 U | 0.5 U |
| Aroclor-1221 | NS | 5 U | 0.6 U | 0.5 U | 0.5 U |
| Aroclor-1232 | NS | 5 U | 0.6 U | 0.5 U | 0.5 U |
| Aroclor-1242 | NS | 12 | 0.6 U | 1.4 | 0.5 U |
| Aroclor-1248 | NS | 5 U | 0.6 U | 0.5 U | 0.5 U |
| Aroclor-1254 | NS | 10.0 U | 1.1 U | 1.0 U | 1.0 U |
| Aroclor-1260 | NS | 10.0 U | 1.1 U | 1.0 U | 1.0 U |
| Total PCBs | 0.1 | **12** | 0 | **1.4** | 0 |

**Notes:**

1 - New York State Department of Environmental Conservation (NYSDEC) Recommended Cleanup Objectives Technical and Administrative Guidance Memorandum revised January 24, 1996.

µg/L - Micrograms per Liter

NS - No standard

F - This suffix indicates a filtered sample

DL - This suffix indicates a diluted sample

U - This qualifier indicates compound analyzed for but not detected

J - This qualifier indicates an estimated value

E - This qualifier indicates compounds whose concentrations exceed the calibration range of the instrument

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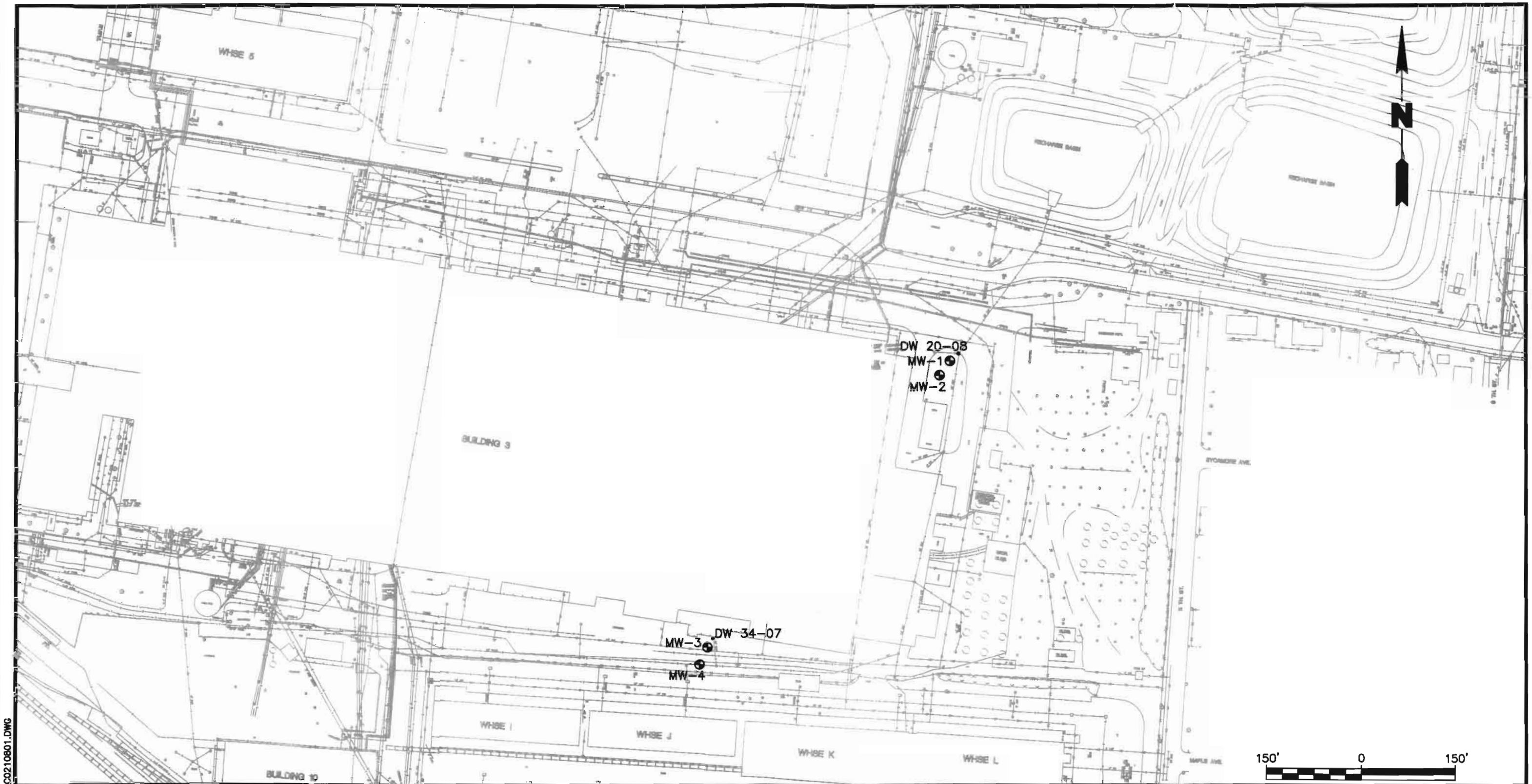
P - This qualifier is used when there is a greater than 25% difference for detected concentrations between two GC columns

**Bold** - Data highlighted in bold represents results detected above the NYSDEC Recommended Cleanup Objectives

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DW 20–08 • APPROXIMATE LOCATION AND DESIGNATION OF NAVAL PROPERTY DRY WELL

MW–1 ◔ APPROXIMATE LOCATION AND DESIGNATION OF MONITORING WELL

Title:

# SITE PLAN

PLANT 3 DRY WELLS 20–08 AND 34–07
SITE CHARACTERIZATION

Prepared For: NORTHROP GRUMMAN CORPORATION
SOUTH OYSTER BAY ROAD
BETHPAGE, NEW YORK

| | | | |
|---|---|---|---|
| ROUX ASSOCIATES, INC. Environmental Consulting & Management | Compiled by: N.G. | Date: 3NOV99 | FIGURE 1 |
| | Prepared by: G.M./R.K. | Scale: AS SHOWN | |
| | Project Mgr: B.F. | Office: NY | |
| | File No: NGC0210801 | Project: 70902Y | |

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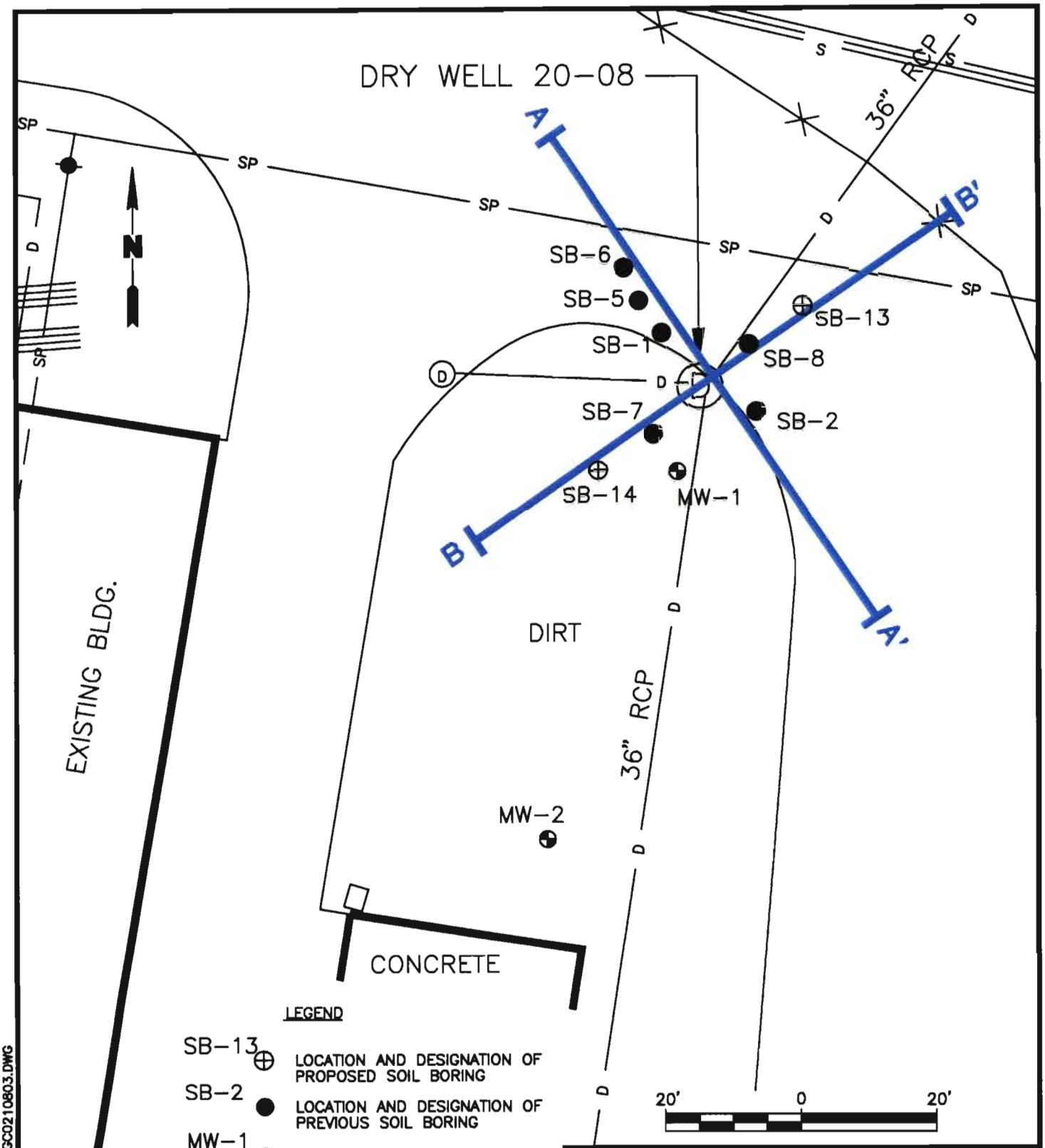


Title:

# DRY WELL 20-08 SOIL BORING LOCATION PLAN

PLANT 3 DRY WELLS 20-08 AND 34-07
SITE CHARACTERIZATION

Prepared For: NORTHROP GRUMMAN CORPORATION
SOUTH OYSTER BAY ROAD
BETHPAGE, NEW YORK

ROUX ASSOCIATES, INC.
Environmental Consulting & Management

| | | |
|---|---|---|
| Compiled by: O.R. | Date: 07MAR00 | FIGURE 2 |
| Prepared by: R.K. | Scale: AS SHOWN | |
| Project Mgr: W.F. | Office: NY | |
| File No: NGC0210803 | Project: 70902Y | |

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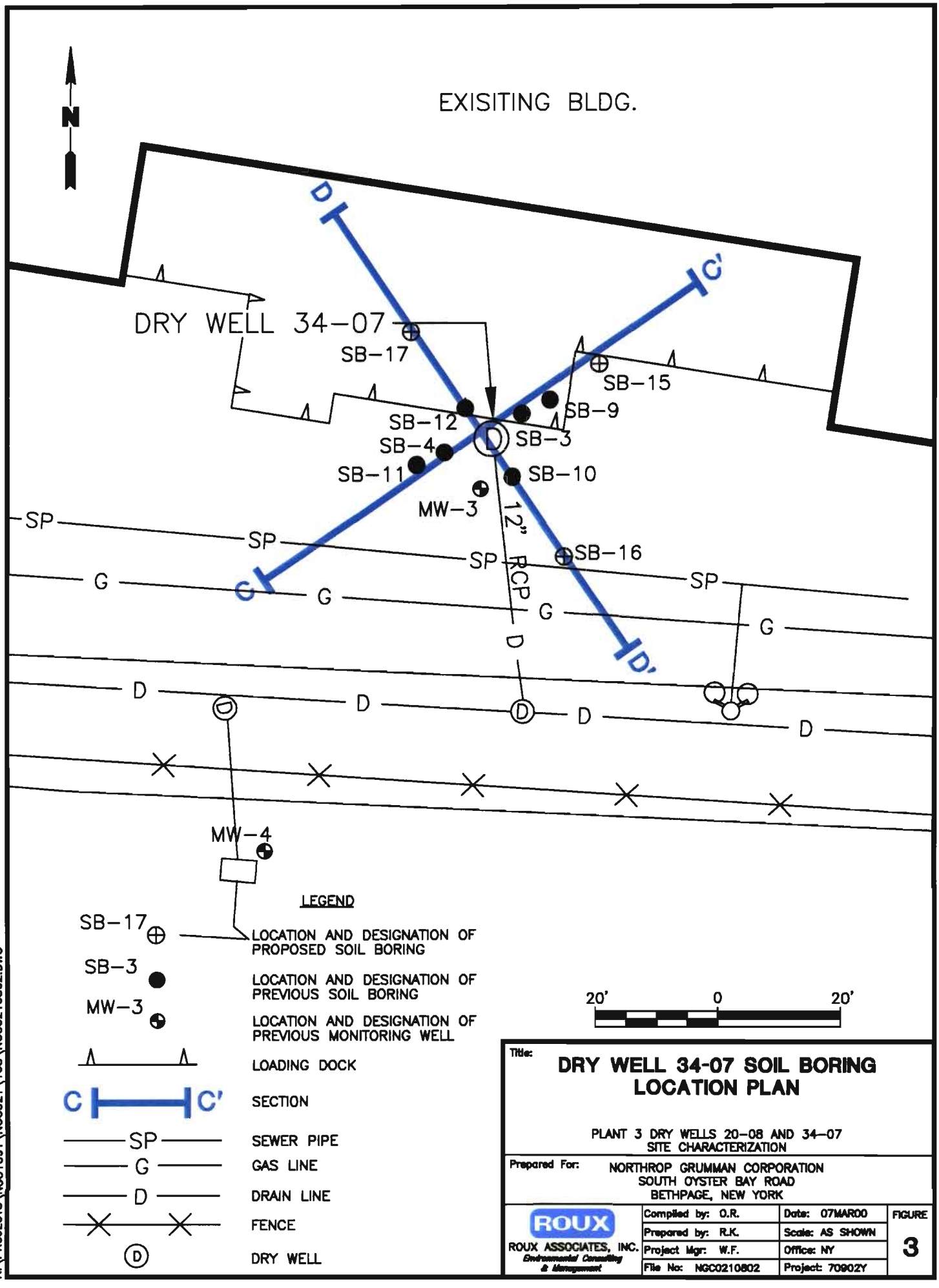


Title: **DRY WELL 34-07 SOIL BORING LOCATION PLAN**

PLANT 3 DRY WELLS 20-08 AND 34-07
SITE CHARACTERIZATION

Prepared For: NORTHROP GRUMMAN CORPORATION
SOUTH OYSTER BAY ROAD
BETHPAGE, NEW YORK

ROUX ASSOCIATES, INC.
Environmental Consulting & Management

| | | | |
|---|---|---|---|
| Compiled by: O.R. | Date: 07MAR00 | FIGURE |
| Prepared by: R.K. | Scale: AS SHOWN | 3 |
| Project Mgr: W.F. | Office: NY | |
| File No: NGC0210802 | Project: 70902Y | |

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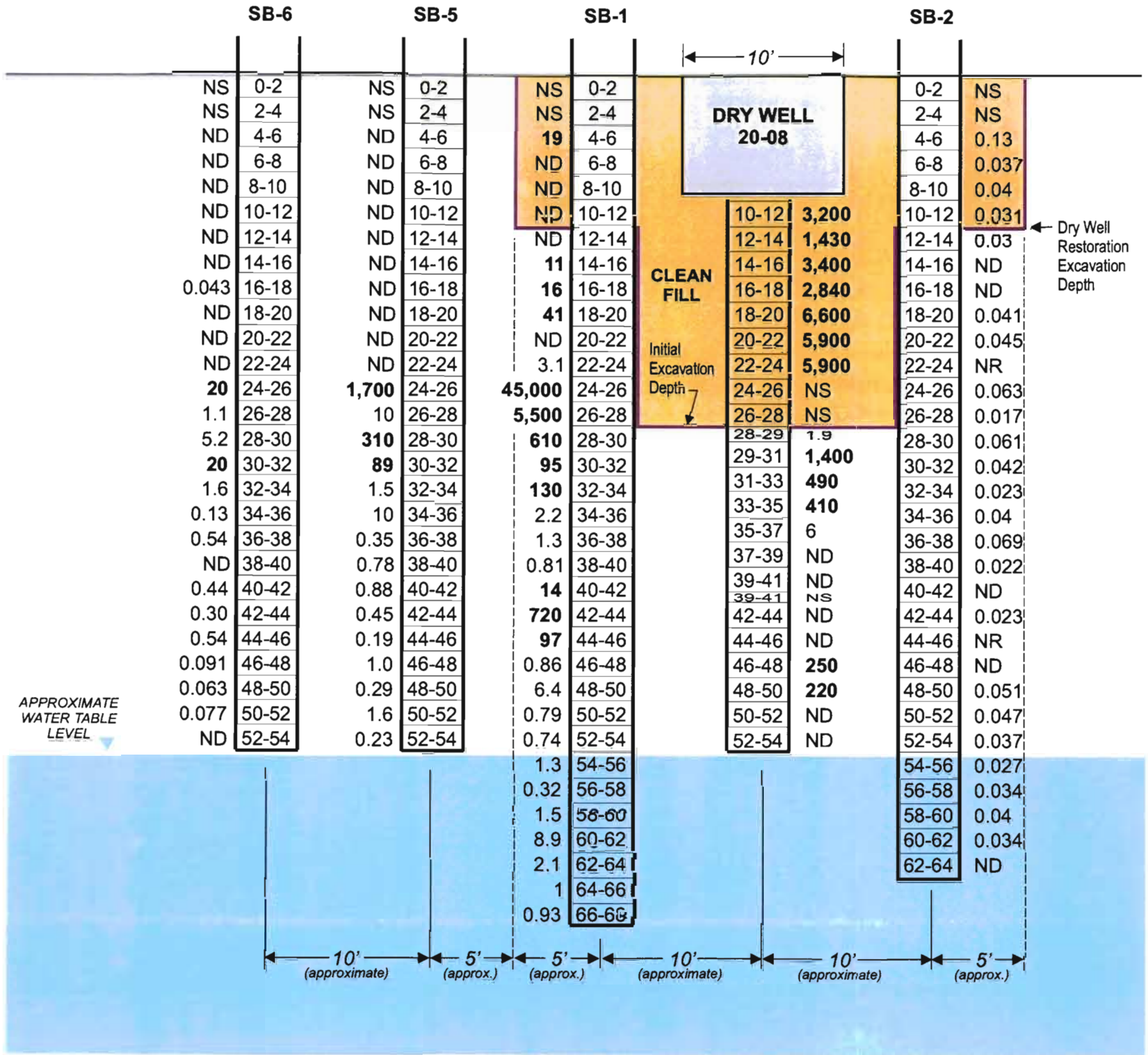


| SB-6 | | SB-5 | | SB-1 | | | SB-2 | |
|---|---|---|---|---|---|---|---|---|
| NS | 0-2 | NS | 0-2 | NS | 0-2 | | 0-2 | NS |
| NS | 2-4 | NS | 2-4 | NS | 2-4 | | 2-4 | NS |
| ND | 4-6 | ND | 4-6 | **19** | 4-6 | | 4-6 | 0.13 |
| ND | 6-8 | ND | 6-8 | ND | 6-8 | | 6-8 | 0.037 |
| ND | 8-10 | ND | 8-10 | ND | 8-10 | | 8-10 | 0.04 |
| ND | 10-12 | ND | 10-12 | ND | 10-12 | 10-12 **3,200** | 10-12 | 0.031 |
| ND | 12-14 | ND | 12-14 | ND | 12-14 | 12-14 **1,430** | 12-14 | 0.03 |
| ND | 14-16 | ND | 14-16 | **11** | 14-16 | 14-16 **3,400** | 14-16 | ND |
| 0.043 | 16-18 | ND | 16-18 | **16** | 16-18 | 16-18 **2,840** | 16-18 | ND |
| ND | 18-20 | ND | 18-20 | **41** | 18-20 | 18-20 **6,600** | 18-20 | 0.041 |
| ND | 20-22 | ND | 20-22 | ND | 20-22 | 20-22 **5,900** | 20-22 | 0.045 |
| ND | 22-24 | ND | 22-24 | 3.1 | 22-24 | 22-24 **5,900** | 22-24 | NR |
| **20** | 24-26 | **1,700** | 24-26 | **45,000** | 24-26 | 24-26 NS | 24-26 | 0.063 |
| 1.1 | 26-28 | 10 | 26-28 | **5,500** | 26-28 | 26-28 NS | 26-28 | 0.017 |
| 5.2 | 28-30 | **310** | 28-30 | **610** | 28-30 | 28-29 1.9 | 28-30 | 0.061 |
| **20** | 30-32 | **89** | 30-32 | **95** | 30-32 | 29-31 **1,400** | 30-32 | 0.042 |
| 1.6 | 32-34 | 1.5 | 32-34 | **130** | 32-34 | 31-33 **490** | 32-34 | 0.023 |
| 0.13 | 34-36 | 10 | 34-36 | 2.2 | 34-36 | 33-35 **410** | 34-36 | 0.04 |
| 0.54 | 36-38 | 0.35 | 36-38 | 1.3 | 36-38 | 35-37 6 | 36-38 | 0.069 |
| ND | 38-40 | 0.78 | 38-40 | 0.81 | 38-40 | 37-39 ND | 38-40 | 0.022 |
| 0.44 | 40-42 | 0.88 | 40-42 | **14** | 40-42 | 39-41 ND | 40-42 | ND |
| 0.30 | 42-44 | 0.45 | 42-44 | **720** | 42-44 | 39-41 NS<br>42-44 ND | 42-44 | 0.023 |
| 0.54 | 44-46 | 0.19 | 44-46 | **97** | 44-46 | 44-46 ND | 44-46 | NR |
| 0.091 | 46-48 | 1.0 | 46-48 | 0.86 | 46-48 | 46-48 **250** | 46-48 | ND |
| 0.063 | 48-50 | 0.29 | 48-50 | 6.4 | 48-50 | 48-50 **220** | 48-50 | 0.051 |
| 0.077 | 50-52 | 1.6 | 50-52 | 0.79 | 50-52 | 50-52 ND | 50-52 | 0.047 |
| ND | 52-54 | 0.23 | 52-54 | 0.74 | 52-54 | 52-54 ND | 52-54 | 0.037 |
| | | | | 1.3 | 54-56 | | 54-56 | 0.027 |
| | | | | 0.32 | 56-58 | | 56-58 | 0.034 |
| | | | | 1.5 | 58-60 | | 58-60 | 0.04 |
| | | | | 8.9 | 60-62 | | 60-62 | 0.034 |
| | | | | 2.1 | 62-64 | | 62-64 | ND |
| | | | | 1 | 64-66 | | | |
| | | | | 0.93 | 66-68 | | | |

LEGEND

| | |
|---|---|
| 5.2 | PCB concentration below 10 ppm NYSDEC Regulatory Standard[1] |
| **20** | PCB concentration above 10 ppm NYSDEC Regulatory Standard[1] |
| ND | non detect |
| NR | no recovery |
| NS | no sample collected |
| **SB-1** | soil boring designation |
| 52-54 0.74 | PCB concentration for sample taken above water table at sample depth interval of 52-54 ft below land surface |
| 54-56 1.3 | PCB concentration for sample taken below water table at sample depth interval of 54-56 ft below land surface |
| | polyethylene plastic sheet lining |

NOTES:

1. NYSDEC Regulatory Standard based on *Technical and Administrative Guidance Memorandum HWR-94-4046 on the Determination of Soil Cleanup Objectives and Cleanup Levels, as revised January 24, 1994.*
2. Soil borings within and through Drywell 20-08 were installed and sampled according to the following schedule:

| Date | Sampling Interval | Consultant |
|---|---|---|
| October 9, 1997 | 10 to 14-foot | Radian International, Herdon, Virginia |
| April 4, 1998 | 14 to 24-foot | H2M, P.C., Melville, New York |
| June 23, 1998 | 28 to 29-foot | H2M, P.C., Melville, New York |
| July 30, 1998 | 29 to 54-foot | H2M, P.C., Melville, New York |

3. Roux Associates, Inc. installed and sampled soil borings SB-1 and SB-2 on August 17, 1999.
4. Roux Associates, Inc. installed and sampled soil borings SB-5 on November 23, 1999 and SB-6 on November 25, 1999.

Title:

# CROSS-SECTION A-A' OF PCB CONCENTRATIONS AT DRY WELL 20-08

PLANT 3 DRY WELLS 20-08 AND 34-07
SITE CHARACTERIZATION

Prepared for: NORTHROP GRUMMAN CORPORATION
SOUTH OYSTER BAY ROAD
BETHPAGE, NEW YORK

ROUX ASSOCIATES, INC.
*Environmental Consulting & Management*

| | | | |
|---|---|---|---|
| Compiled by: N.G. | Date: 07MAR00 | FIGURE |
| Prepared by: B.H.CICIO | Scale: AS SHOWN | 4 |
| Project Mgr.: W.F. | Office: NY | |
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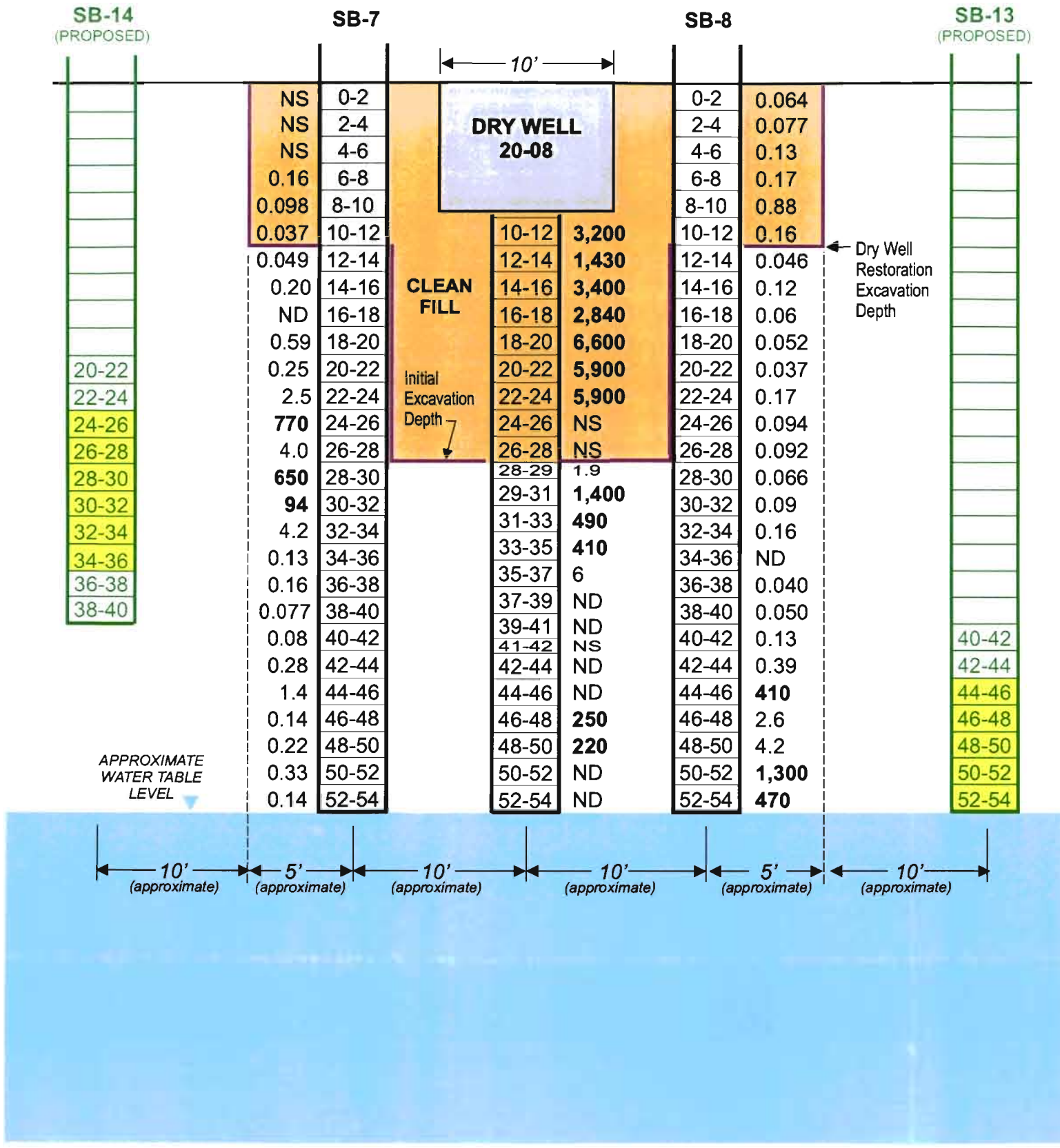


| SB-14 (PROPOSED) | SB-7 | | SB-8 | | SB-13 (PROPOSED) |
|---|---|---|---|---|---|
| | NS | 0-2 | 0-2 | 0.064 | |
| | NS | 2-4 | 2-4 | 0.077 | |
| | NS | 4-6 | 4-6 | 0.13 | |
| | 0.16 | 6-8 | 6-8 | 0.17 | |
| | 0.098 | 8-10 | 8-10 | 0.88 | |
| | 0.037 | 10-12 | 10-12 | 0.16 | |
| | 0.049 | 12-14 | 12-14 | 0.046 | |
| | 0.20 | 14-16 | 14-16 | 0.12 | |
| | ND | 16-18 | 16-18 | 0.06 | |
| | 0.59 | 18-20 | 18-20 | 0.052 | |
| 20-22 | 0.25 | 20-22 | 20-22 | 0.037 | |
| 22-24 | 2.5 | 22-24 | 22-24 | 0.17 | |
| 24-26 | **770** | 24-26 | 24-26 | 0.094 | |
| 26-28 | 4.0 | 26-28 | 26-28 | 0.092 | |
| 28-30 | **650** | 28-30 | 28-30 | 0.066 | |
| 30-32 | **94** | 30-32 | 30-32 | 0.09 | |
| 32-34 | 4.2 | 32-34 | 32-34 | 0.16 | |
| 34-36 | 0.13 | 34-36 | 34-36 | ND | |
| 36-38 | 0.16 | 36-38 | 36-38 | 0.040 | |
| 38-40 | 0.077 | 38-40 | 38-40 | 0.050 | |
| | 0.08 | 40-42 | 40-42 | 0.13 | 40-42 |
| | 0.28 | 42-44 | 42-44 | 0.39 | 42-44 |
| | 1.4 | 44-46 | 44-46 | **410** | 44-46 |
| | 0.14 | 46-48 | 46-48 | 2.6 | 46-48 |
| | 0.22 | 48-50 | 48-50 | 4.2 | 48-50 |
| | 0.33 | 50-52 | 50-52 | **1,300** | 50-52 |
| | 0.14 | 52-54 | 52-54 | **470** | 52-54 |

| | | |
|---|---|---|
| | 10-12 | **3,200** |
| | 12-14 | **1,430** |
| | 14-16 | **3,400** |
| | 16-18 | **2,840** |
| | 18-20 | **6,600** |
| | 20-22 | **5,900** |
| | 22-24 | **5,900** |
| | 24-26 | NS |
| | 26-28 | NS |
| | 28-29 | 1.9 |
| | 29-31 | **1,400** |
| | 31-33 | **490** |
| | 33-35 | **410** |
| | 35-37 | 6 |
| | 37-39 | ND |
| | 39-41 | ND |
| | 41-42 | NS |
| | 42-44 | ND |
| | 44-46 | ND |
| | 46-48 | **250** |
| | 48-50 | **220** |
| | 50-52 | ND |
| | 52-54 | ND |

## LEGEND

| | |
|---|---|
| 4.2 | PCB concentration below 10 ppm NYSDEC Regulatory Standard[1] |
| **94** | PCB concentration above 10 ppm NYSDEC Regulatory Standard[1] |
| ND | non detect |
| NS | no sample collected |
| **SB-7** | soil boring designation |
| 22-24 \| 2.5 | PCB concentration for sample taken above water table at sample depth interval of 22-24 ft below land surface |
| SB-13 | PROPOSED SOIL BORING |
| 42-44 | sample to be collected at sample depth interval of 42-44 ft below land surface |
| 44-46 | sample to be collected and analyzed at sample depth interval of 44-46 ft below land surface |
| | polyethylene plastic sheet lining |

NOTES:

1. NYSDEC Regulatory Standard based on *Technical and Administrative Guidance Memorandum HWR-94-4046 on the Determination of Soil Cleanup Objectives and Cleanup Levels, as revised January 24, 1994.*
2. Soil borings within and through Drywell 20-08 were installed and sampled according to the following schedule:

| Date | Sampling Interval | Consultant |
|---|---|---|
| October 9, 1997 | 10 to 14-foot | Radian International, Herdon, Virginia |
| April 4, 1998 | 14 to 24-foot | H2M, P.C., Melville, New York |
| June 23, 1998 | 28 to 29-foot | H2M, P.C., Melville, New York |
| July 30, 1998 | 29 to 54-foot | H2M, P.C., Melville, New York |

3. Roux Associates, Inc. installed and sampled soil borings SB-7 on November 29, 1999 and SB-8 on November 30, 1999.

Title:

# CROSS-SECTION B-B' OF PCB CONCENTRATIONS AT DRY WELL 20-08

PLANT 3 DRY WELLS 20-08 AND 34-07
SITE CHARACTERIZATION

Prepared for: NORTHROP GRUMMAN CORPORATION
SOUTH OYSTER BAY ROAD
BETHPAGE, NEW YORK

ROUX ASSOCIATES, INC.
*Environmental Consulting & Management*

| | | | |
|---|---|---|---|
| Compiled by: N.G. | Date: 07MAR00 | FIGURE |
| Prepared by: B.H.CICIO | Scale: AS SHOWN | 5 |
| Project Mgr.: W.F. | Office: NY | |
| File No.: NGC0210805.CDR | Project No.: 70902Y | |

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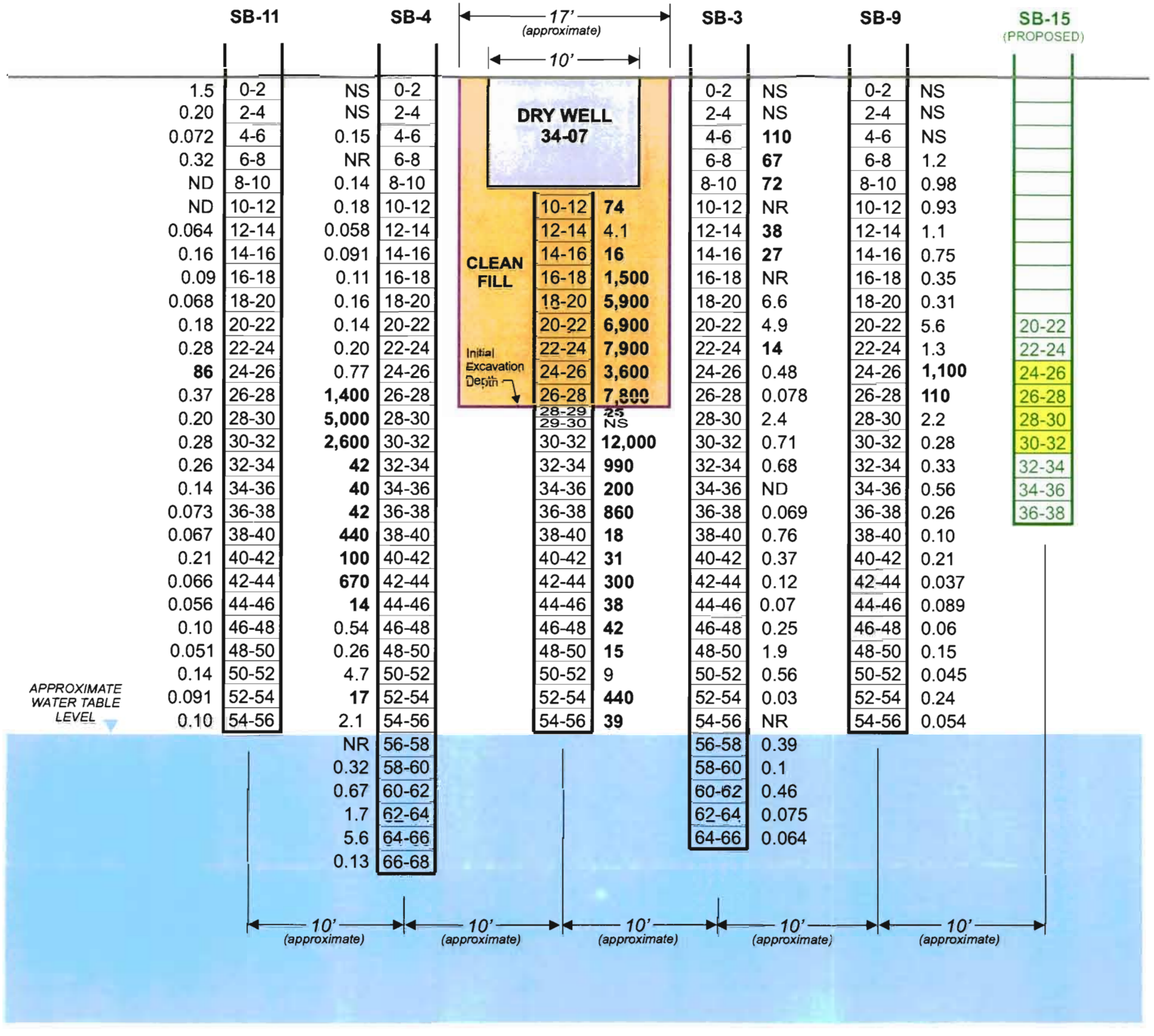


| SB-11 | | SB-4 | | SB-3 | | SB-9 | | SB-15 (PROPOSED) |
|---|---|---|---|---|---|---|---|---|
| 1.5 | 0-2 | NS | 0-2 | 0-2 | NS | 0-2 | NS | |
| 0.20 | 2-4 | NS | 2-4 | 2-4 | NS | 2-4 | NS | |
| 0.072 | 4-6 | 0.15 | 4-6 | 4-6 | **110** | 4-6 | NS | |
| 0.32 | 6-8 | NR | 6-8 | 6-8 | **67** | 6-8 | 1.2 | |
| ND | 8-10 | 0.14 | 8-10 | 8-10 | **72** | 8-10 | 0.98 | |
| ND | 10-12 | 0.18 | 10-12 | 10-12 | NR | 10-12 | 0.93 | |
| 0.064 | 12-14 | 0.058 | 12-14 | 12-14 | **38** | 12-14 | 1.1 | |
| 0.16 | 14-16 | 0.091 | 14-16 | 14-16 | **27** | 14-16 | 0.75 | |
| 0.09 | 16-18 | 0.11 | 16-18 | 16-18 | NR | 16-18 | 0.35 | |
| 0.068 | 18-20 | 0.16 | 18-20 | 18-20 | 6.6 | 18-20 | 0.31 | |
| 0.18 | 20-22 | 0.14 | 20-22 | 20-22 | 4.9 | 20-22 | 5.6 | 20-22 |
| 0.28 | 22-24 | 0.20 | 22-24 | 22-24 | **14** | 22-24 | 1.3 | 22-24 |
| **86** | 24-26 | 0.77 | 24-26 | 24-26 | 0.48 | 24-26 | **1,100** | 24-26 |
| 0.37 | 26-28 | **1,400** | 26-28 | 26-28 | 0.078 | 26-28 | **110** | 26-28 |
| 0.20 | 28-30 | **5,000** | 28-30 | 28-30 | 2.4 | 28-30 | 2.2 | 28-30 |
| 0.28 | 30-32 | **2,600** | 30-32 | 30-32 | 0.71 | 30-32 | 0.28 | 30-32 |
| 0.26 | 32-34 | **42** | 32-34 | 32-34 | 0.68 | 32-34 | 0.33 | 32-34 |
| 0.14 | 34-36 | **40** | 34-36 | 34-36 | ND | 34-36 | 0.56 | 34-36 |
| 0.073 | 36-38 | **42** | 36-38 | 36-38 | 0.069 | 36-38 | 0.26 | 36-38 |
| 0.067 | 38-40 | **440** | 38-40 | 38-40 | 0.76 | 38-40 | 0.10 | |
| 0.21 | 40-42 | **100** | 40-42 | 40-42 | 0.37 | 40-42 | 0.21 | |
| 0.066 | 42-44 | **670** | 42-44 | 42-44 | 0.12 | 42-44 | 0.037 | |
| 0.056 | 44-46 | **14** | 44-46 | 44-46 | 0.07 | 44-46 | 0.089 | |
| 0.10 | 46-48 | 0.54 | 46-48 | 46-48 | 0.25 | 46-48 | 0.06 | |
| 0.051 | 48-50 | 0.26 | 48-50 | 48-50 | 1.9 | 48-50 | 0.15 | |
| 0.14 | 50-52 | 4.7 | 50-52 | 50-52 | 0.56 | 50-52 | 0.045 | |
| 0.091 | 52-54 | **17** | 52-54 | 52-54 | 0.03 | 52-54 | 0.24 | |
| 0.10 | 54-56 | 2.1 | 54-56 | 54-56 | NR | 54-56 | 0.054 | |
| | | NR | 56-58 | 56-58 | 0.39 | | | |
| | | 0.32 | 58-60 | 58-60 | 0.1 | | | |
| | | 0.67 | 60-62 | 60-62 | 0.46 | | | |
| | | 1.7 | 62-64 | 62-64 | 0.075 | | | |
| | | 5.6 | 64-66 | 64-66 | 0.064 | | | |
| | | 0.13 | 66-68 | | | | | |

| SB-4 | | | |
|---|---|---|---|
| | 10-12 | **74** | |
| | 12-14 | 4.1 | |
| | 14-16 | **16** | |
| | 16-18 | **1,500** | |
| | 18-20 | **5,900** | |
| | 20-22 | **6,900** | |
| | 22-24 | **7,900** | |
| | 24-26 | **3,600** | |
| | 26-28 | **7,800** | |
| | 28-29 | **25** | |
| | 29-30 | NS | |
| | 30-32 | **12,000** | |
| | 32-34 | **990** | |
| | 34-36 | **200** | |
| | 36-38 | **860** | |
| | 38-40 | **18** | |
| | 40-42 | **31** | |
| | 42-44 | **300** | |
| | 44-46 | **38** | |
| | 46-48 | **42** | |
| | 48-50 | **15** | |
| | 50-52 | 9 | |
| | 52-54 | **440** | |
| | 54-56 | **39** | |

## LEGEND

| | |
|---|---|
| 4.9 | PCB concentration below 10 ppm NYSDEC Regulatory Standard[1] |
| **14** | PCB concentration above 10 ppm NYSDEC Regulatory Standard[1] |
| ND | non detect |
| NR | no recovery |
| NS | no sample collected |
| **SB-4** | soil boring designation |

54-56 2.1 — PCB concentration for sample taken above water table at sample depth interval of 54-56 ft below land surface

56-58 NR — PCB concentration for sample taken below water table at sample depth interval of 56-58 ft below land surface

**SB-15**

PROPOSED SOIL BORING

22-24 — sample to be collected at sample depth interval of 22-24 ft below land surface

24-26 — sample to be collected and analyzed at sample depth interval of 24-26 ft below land surface

polyethylene plastic sheet lining

NOTES:

1. NYSDEC Regulatory Standard based on *Technical and Administrative Guidance Memorandum HWR-94-4046 on the Determination of Soil Cleanup Objectives and Cleanup Levels, as revised January 24, 1994.*
2. Soil borings within and through Drywell 34-07 were installed and sampled according to the following schedule:

| Date | Sampling Interval | Consultant |
|---|---|---|
| September 10, 1997 | 10 to 16-foot | Radian International, Herdon, Virginia |
| October 9, 1997 | 16 to 22-foot | Radian International, Herdon, Virginia |
| April 30, 1998 | 22 to 28-foot | H2M, P.C., Melville, New York |
| June 9, 1998 | 28 to 29-foot | H2M, P.C., Melville, New York |
| July 29, 1998 | 30 to 56-foot | H2M, P.C., Melville, New York |

3. Roux Associates, Inc. installed and sampled soil borings SB-3 on August 18, 1999 and SB-4 August 20, 1999.
4. Roux Associates, Inc. installed and sampled soil borings SB-9 on November 30, 1999 and SB-11 on December 2 and 5, 1999.

Title:

# CROSS-SECTION C-C' OF PCB CONCENTRATIONS AT DRY WELL 34-07

PLANT 3 DRY WELLS 20-08 AND 34-07
SITE CHARACTERIZATION

Prepared for: NORTHROP GRUMMAN CORPORATION
SOUTH OYSTER BAY ROAD
BETHPAGE, NEW YORK

ROUX ASSOCIATES, INC.
*Environmental Consulting & Management*

| | | |
|---|---|---|
| Compiled by: N.G. | Date: 07MAR00 | FIGURE |
| Prepared by: B.H.CICIO | Scale: AS SHOWN | 6 |
| Project Mgr.: W.F. | Office: NY | |
| File No.: NGC0210805.CDR | Project No.: 70902Y | |

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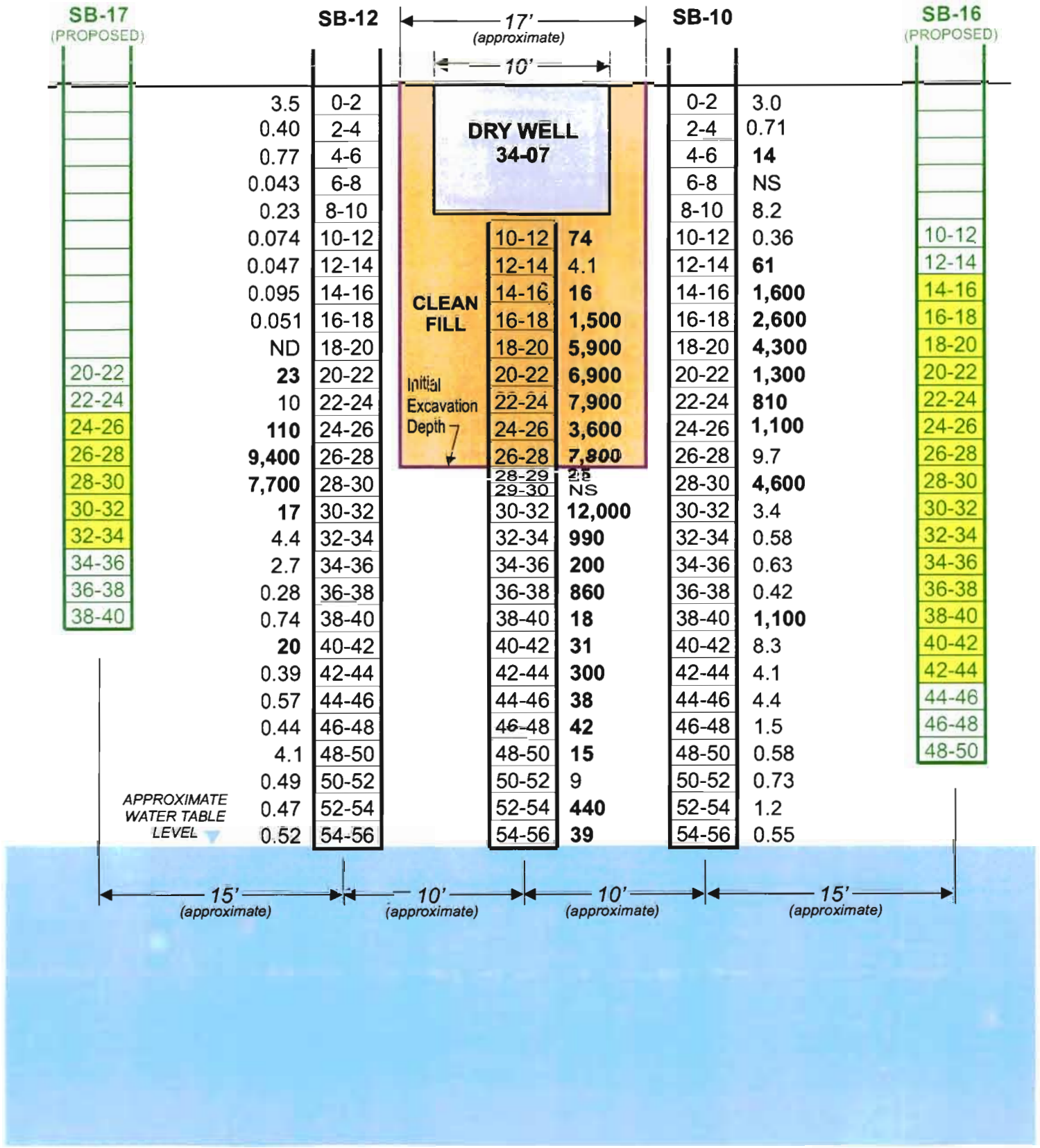


| SB-12 | | SB-10 | | SB-16 (PROPOSED) |
|---|---|---|---|---|
| 3.5 | 0-2 | 0-2 | 3.0 | |
| 0.40 | 2-4 | 2-4 | 0.71 | |
| 0.77 | 4-6 | 4-6 | **14** | |
| 0.043 | 6-8 | 6-8 | NS | |
| 0.23 | 8-10 | 8-10 | 8.2 | |
| 0.074 | 10-12 | 10-12 | 0.36 | 10-12 |
| 0.047 | 12-14 | 12-14 | **61** | 12-14 |
| 0.095 | 14-16 | 14-16 | **1,600** | 14-16 |
| 0.051 | 16-18 | 16-18 | **2,600** | 16-18 |
| ND | 18-20 | 18-20 | **4,300** | 18-20 |
| **23** | 20-22 | 20-22 | **1,300** | 20-22 |
| 10 | 22-24 | 22-24 | **810** | 22-24 |
| **110** | 24-26 | 24-26 | **1,100** | 24-26 |
| **9,400** | 26-28 | 26-28 | 9.7 | 26-28 |
| **7,700** | 28-30 | 28-30 | **4,600** | 28-30 |
| **17** | 30-32 | 30-32 | 3.4 | 30-32 |
| 4.4 | 32-34 | 32-34 | 0.58 | 32-34 |
| 2.7 | 34-36 | 34-36 | 0.63 | 34-36 |
| 0.28 | 36-38 | 36-38 | 0.42 | 36-38 |
| 0.74 | 38-40 | 38-40 | **1,100** | 38-40 |
| **20** | 40-42 | 40-42 | 8.3 | 40-42 |
| 0.39 | 42-44 | 42-44 | 4.1 | 42-44 |
| 0.57 | 44-46 | 44-46 | 4.4 | 44-46 |
| 0.44 | 46-48 | 46-48 | 1.5 | 46-48 |
| 4.1 | 48-50 | 48-50 | 0.58 | 48-50 |
| 0.49 | 50-52 | 50-52 | 0.73 | |
| 0.47 | 52-54 | 52-54 | 1.2 | |
| 0.52 | 54-56 | 54-56 | 0.55 | |

| SB-12 (DRY WELL 34-07) | |
|---|---|
| 10-12 | **74** |
| 12-14 | 4.1 |
| 14-16 | **16** |
| 16-18 | **1,500** |
| 18-20 | **5,900** |
| 20-22 | **6,900** |
| 22-24 | **7,900** |
| 24-26 | **3,600** |
| 26-28 | **7,800** |
| 28-29 | 2.5 |
| 29-30 | NS |
| 30-32 | **12,000** |
| 32-34 | **990** |
| 34-36 | **200** |
| 36-38 | **860** |
| 38-40 | **18** |
| 40-42 | **31** |
| 42-44 | **300** |
| 44-46 | **38** |
| 46-48 | **42** |
| 48-50 | **15** |
| 50-52 | 9 |
| 52-54 | **440** |
| 54-56 | **39** |

## LEGEND

| | |
|---|---|
| 3.4 | PCB concentration below 10 ppm NYSDEC Regulatory Standard[1] |
| **14** | PCB concentration above 10 ppm NYSDEC Regulatory Standard[1] |
| ND | non detect |
| NS | no sample collected |
| **SB-10** | soil boring designation |
| 6-8 NS | PCB concentration for sample taken above water table at sample depth interval of 6-8 ft below land surface |
| SB-16 | PROPOSED SOIL BORING |
| 12-14 | sample to be collected at sample depth interval of 12-14 ft below land surface |
| 14-16 | sample to be collected and analyzed at sample depth interval of 14-16 ft below land surface |
| | polyethylene plastic sheet lining |

NOTES:

1. NYSDEC Regulatory Standard based on *Technical and Administrative Guidance Memorandum HWR-94-4046 on the Determination of Soil Cleanup Objectives and Cleanup Levels, as revised January 24, 1994.*
2. Soil borings within and through Drywell 34-07 were installed and sampled according to the following schedule:

| Date | Sampling Interval | Consultant |
|---|---|---|
| September 10, 1997 | 10 to 16-foot | Radian International, Herdon, Virginia |
| October 9, 1997 | 16 to 22-foot | Radian International, Herdon, Virginia |
| April 30, 1998 | 22 to 28-foot | H2M, P.C., Melville, New York |
| June 9, 1998 | 28 to 29-foot | H2M, P.C., Melville, New York |
| July 29, 1998 | 30 to 56-foot | H2M, P.C., Melville, New York |

3. Roux Associates, Inc. installed and sampled soil borings SB-10 on December 1 and 2, 1999 and SB-12 on December 5, 1999.

Title:

# CROSS-SECTION D-D' OF PCB CONCENTRATIONS AT DRY WELL 34-07

PLANT 3 DRY WELLS 20-08 AND 34-07
SITE CHARACTERIZATION

Prepared for: NORTHROP GRUMMAN CORPORATION
SOUTH OYSTER BAY ROAD
BETHPAGE, NEW YORK

ROUX ASSOCIATES, INC.
*Environmental Consulting & Management*

| | | |
|---|---|---|
| Compiled by: N.G. | Date: 07MAR00 | FIGURE |
| Prepared by: B.H.CICIO | Scale: AS SHOWN | 7 |
| Project Mgr.: W.F. | Office: NY | |
| File No.: NGC0210805.CDR | Project No.: 70902Y | |

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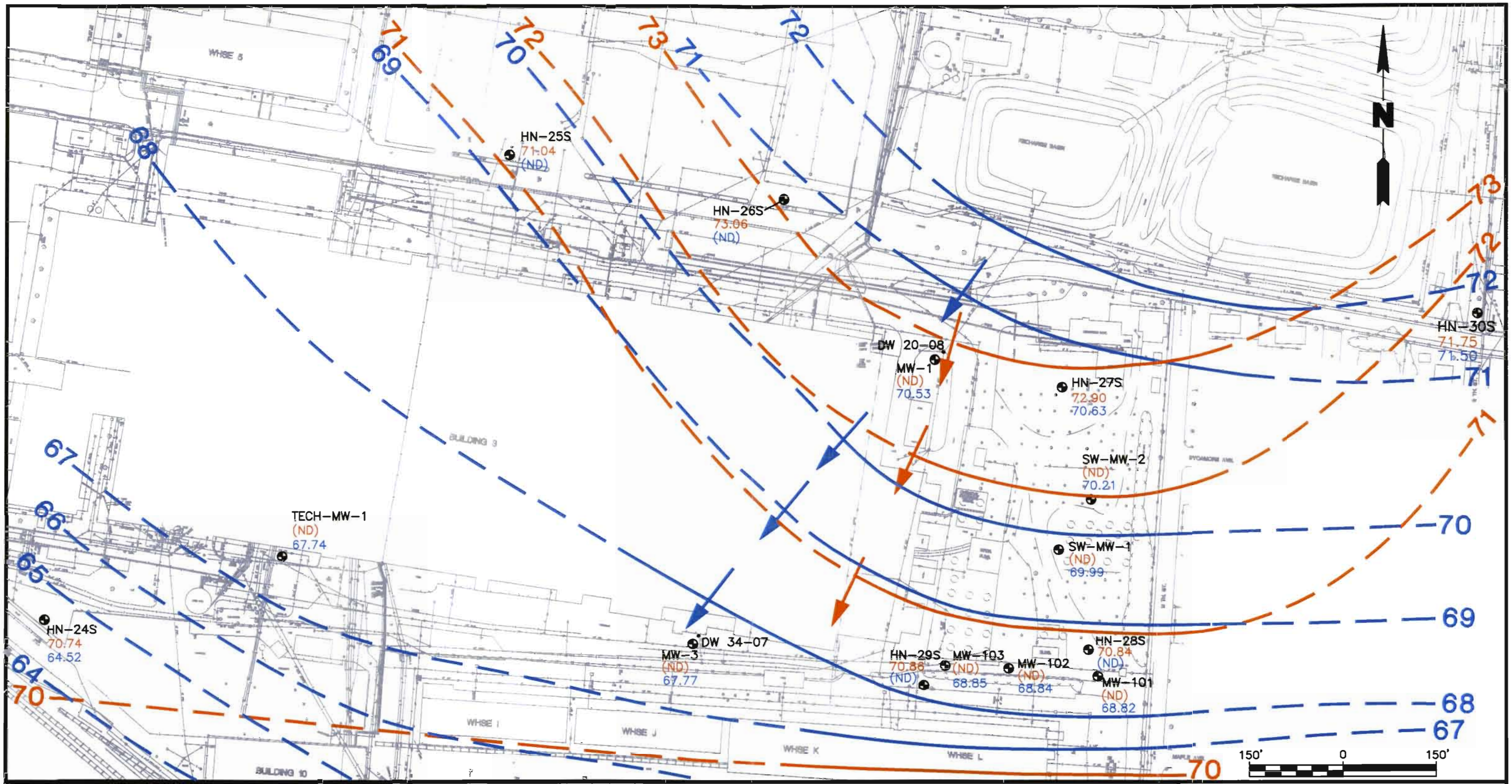


LEGEND

DW 20-08 • APPROXIMATE LOCATION AND DESIGNATION OF NAVAL PROPERTY DRY WELL

HN-27S ⊕ APPROXIMATE LOCATION AND DESIGNATION OF NAVAL PROPERTY MONITORING WELL

72.90 — HISTORICAL (4/30/93) WATER LEVEL RELATIVE TO MEAN SEA LEVEL

70.63 — CURRENT (10/5/99) WATER LEVEL RELATIVE TO MEAN SEA LEVEL

(ND) DATA NOT AVAILABLE (WELL WAS DRY, UNLOCATED OR DID NOT EXIST WHEN WATER LEVELS WERE COLLECTED ON 10/5/99)

70 HISTORICAL LINE OF EQUAL WATER-LEVEL ELEVATION (DASHED WHERE INFERRED)

70 CURRENT LINE OF EQUAL WATER-LEVEL ELEVATION (DASHED WHERE INFERRED)

HISTORICAL DIRECTION OF GROUND-WATER FLOW

CURRENT DIRECTION OF GROUND-WATER FLOW

Title:

**WATER LEVEL ELEVATION AND DIRECTION OF GROUND-WATER FLOW**

PLANT 3 DRY WELLS 20-08 AND 34-07
SITE CHARACTERIZATION

Prepared For: NORTHROP GRUMMAN CORPORATION
SOUTH OYSTER BAY ROAD
BETHPAGE, NEW YORK

ROUX ASSOCIATES, INC.
Environmental Consulting & Management

| | | | |
|---|---|---|---|
| Compiled by: N.G. | Date: 15MAR00 | FIGURE |
| Prepared by: G.M./R.K. | Scale: AS SHOWN | 8 |
| Project Mgr: B.F. | Office: NY | |
| File No: NGC0210804 | Project: 70902Y | |