

April 1, 2015

Memo To: File

From: Michael Wentzel

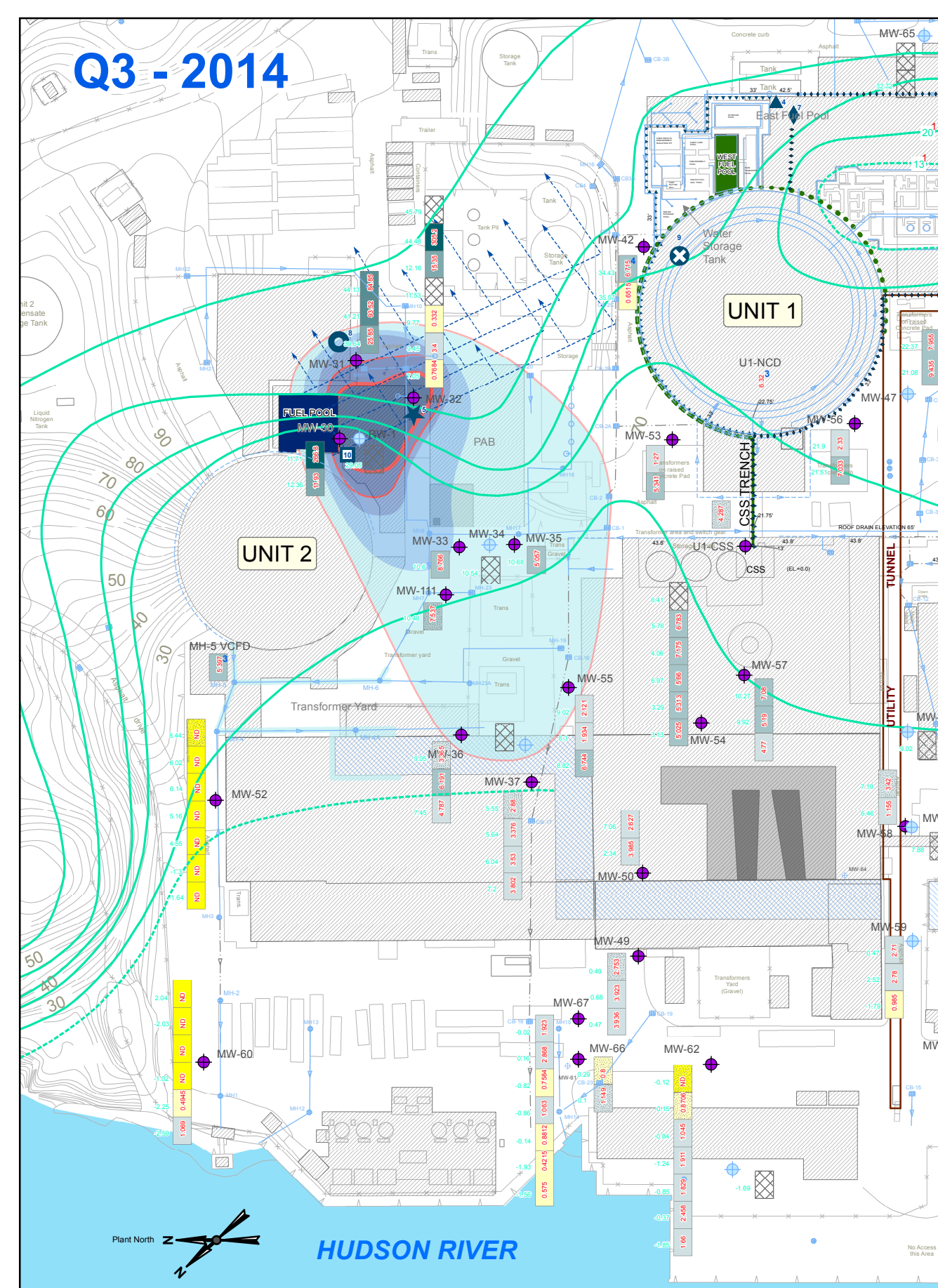
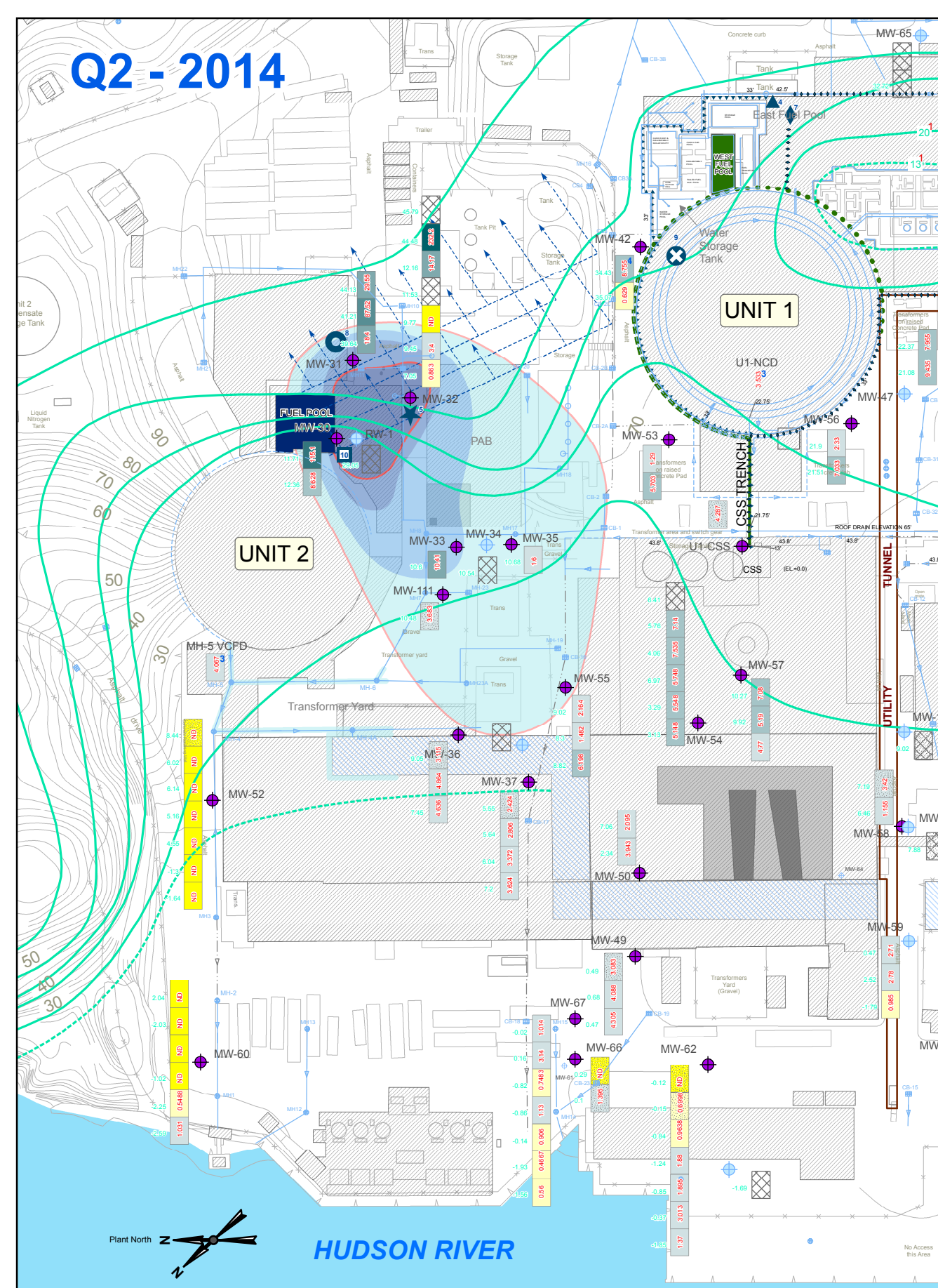
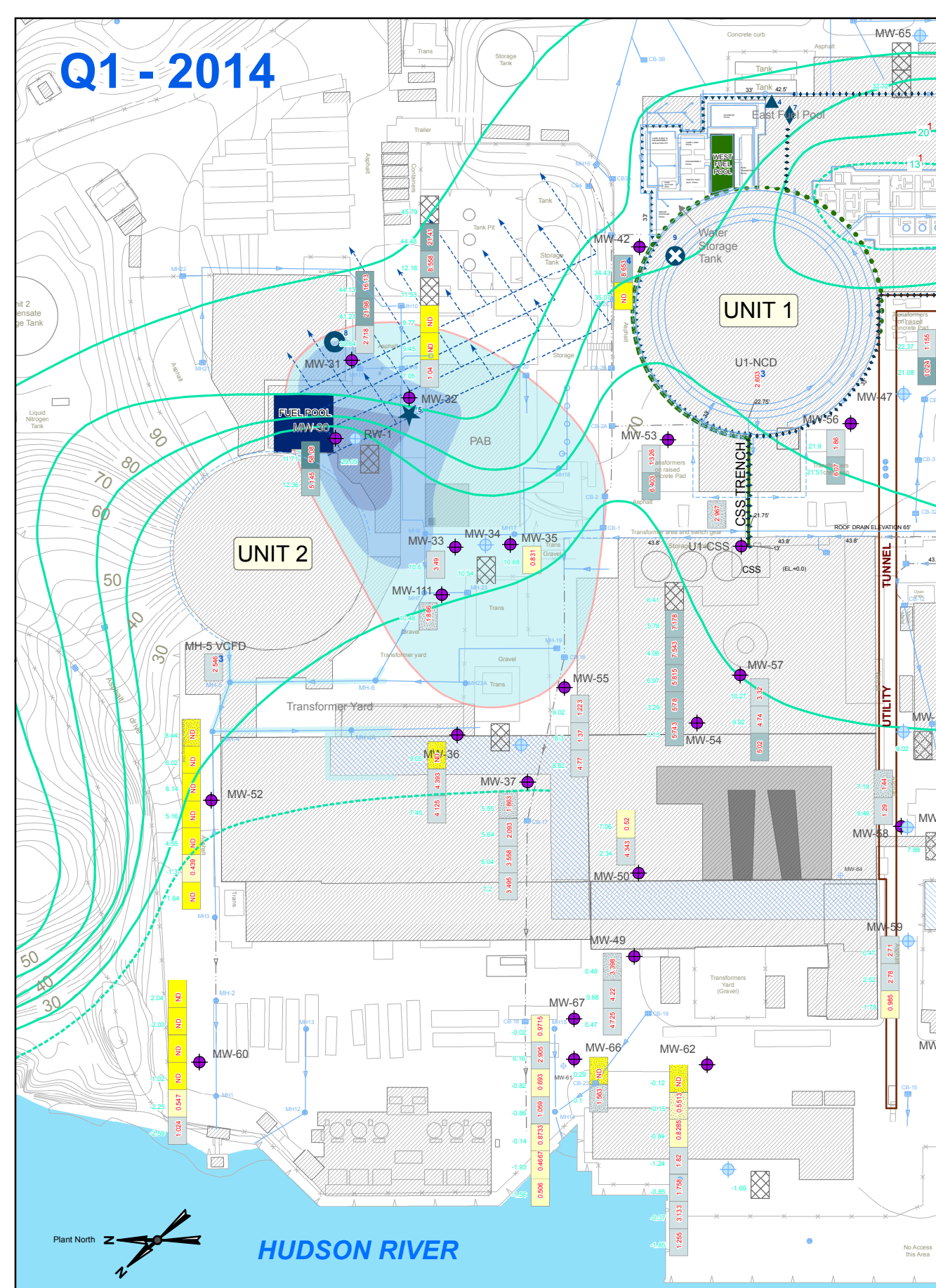
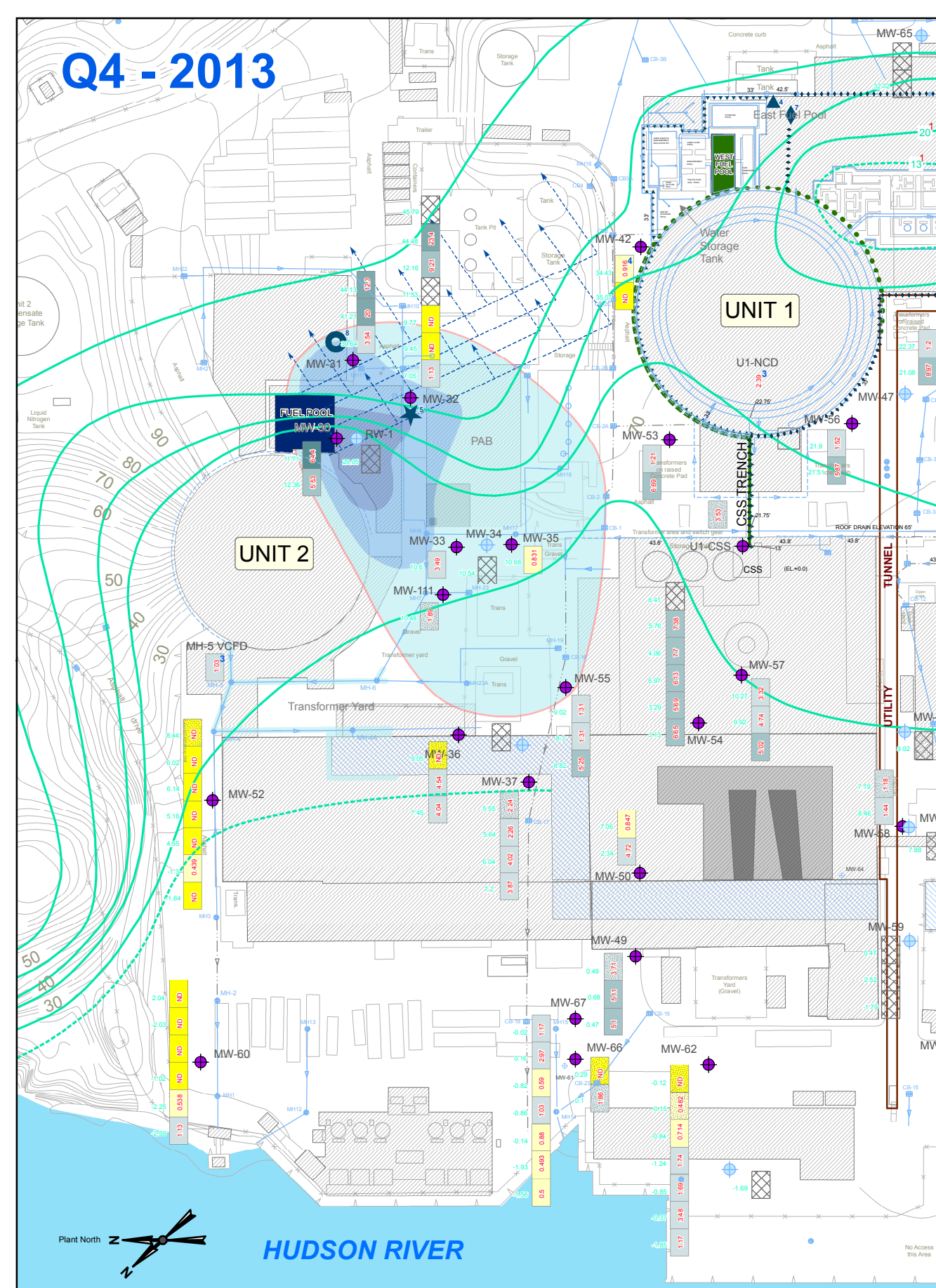
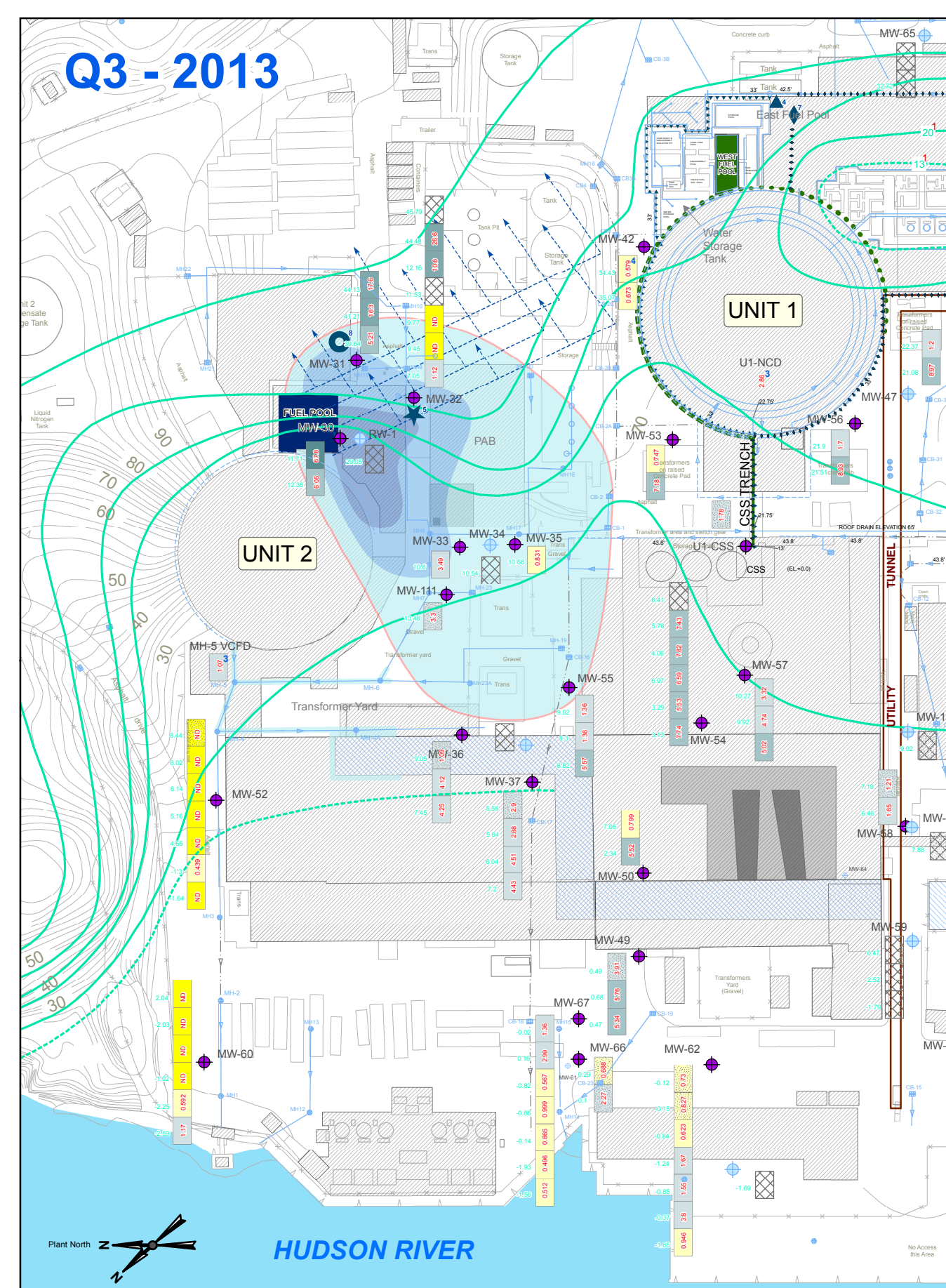
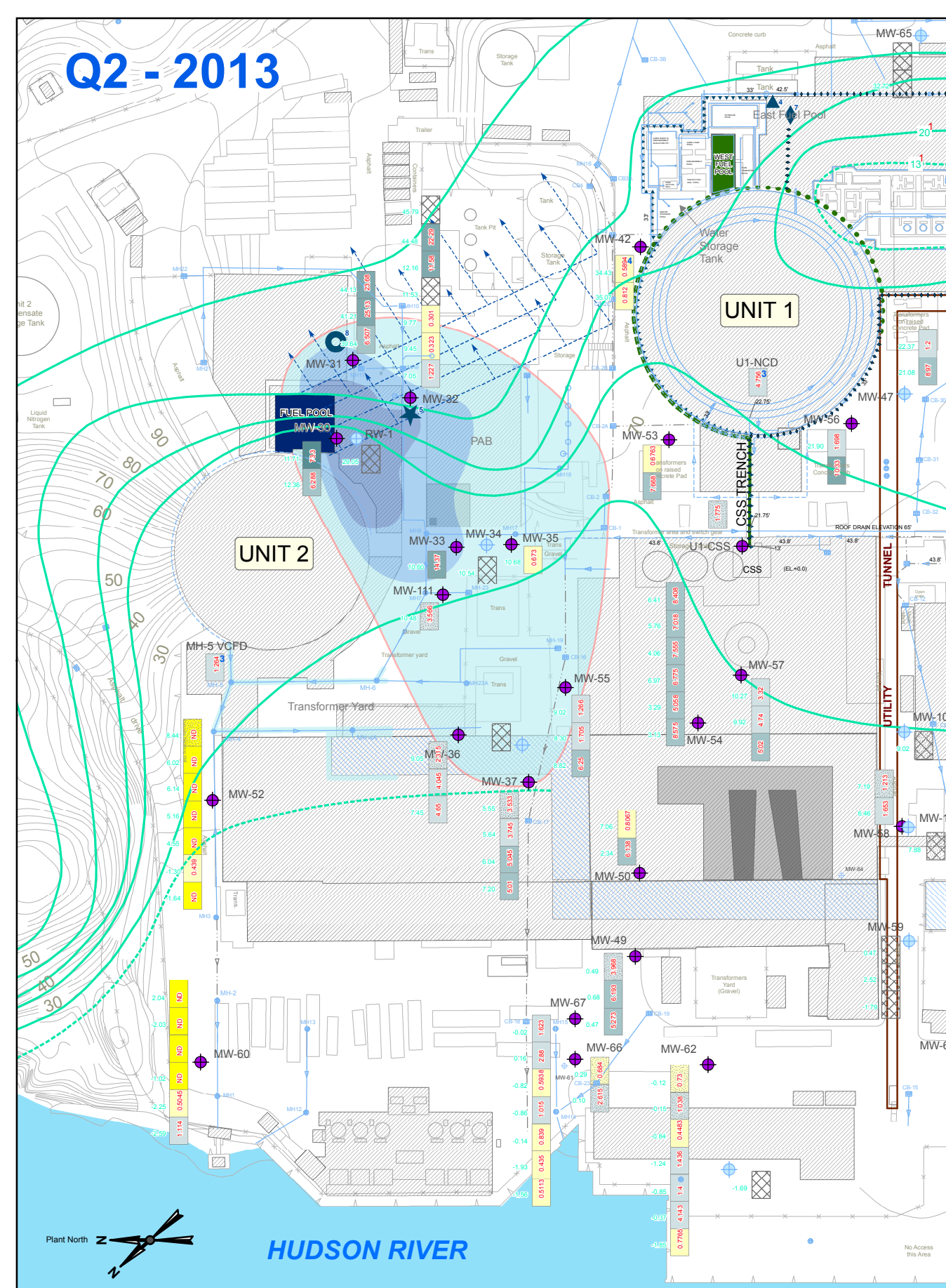
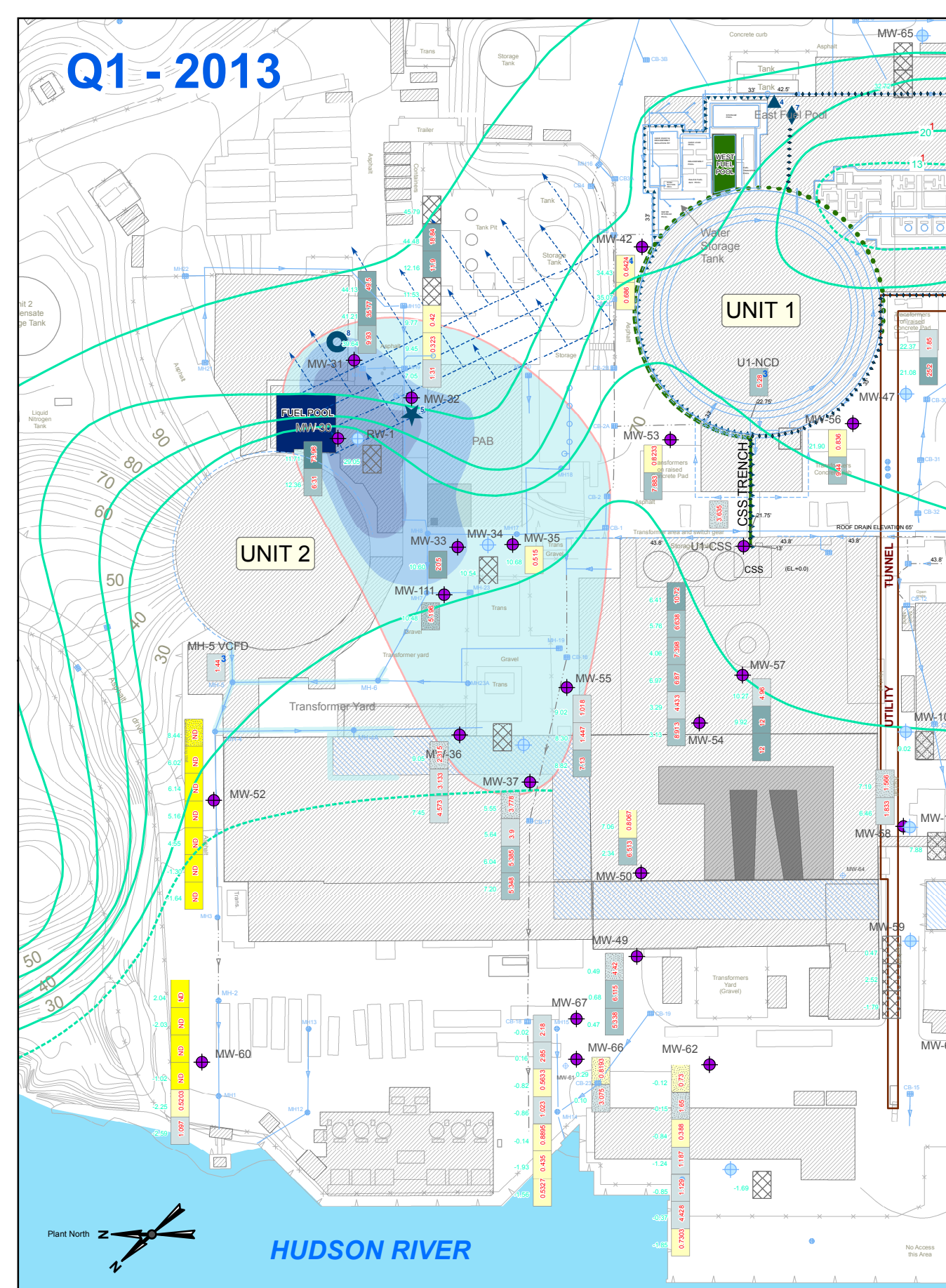
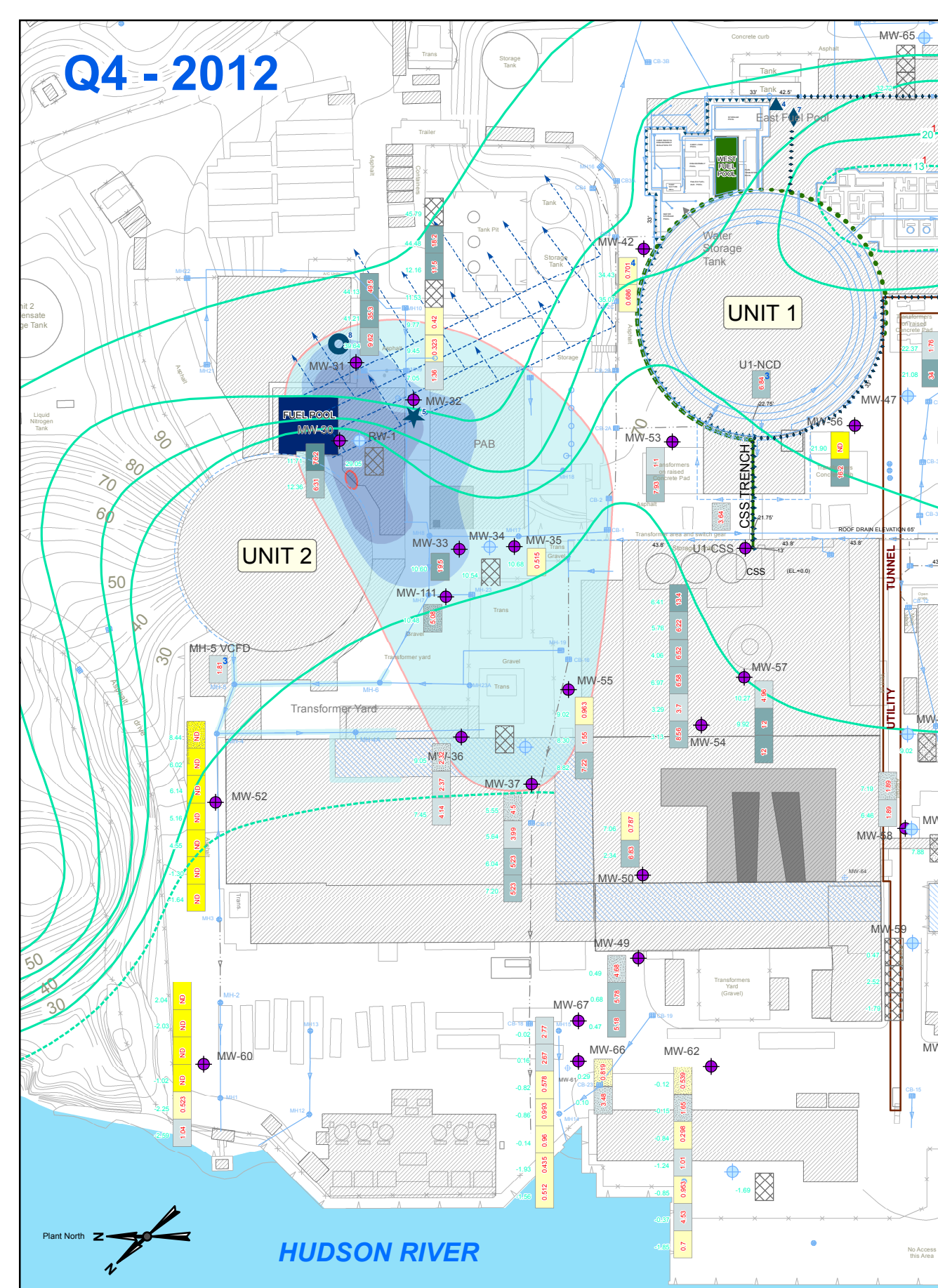
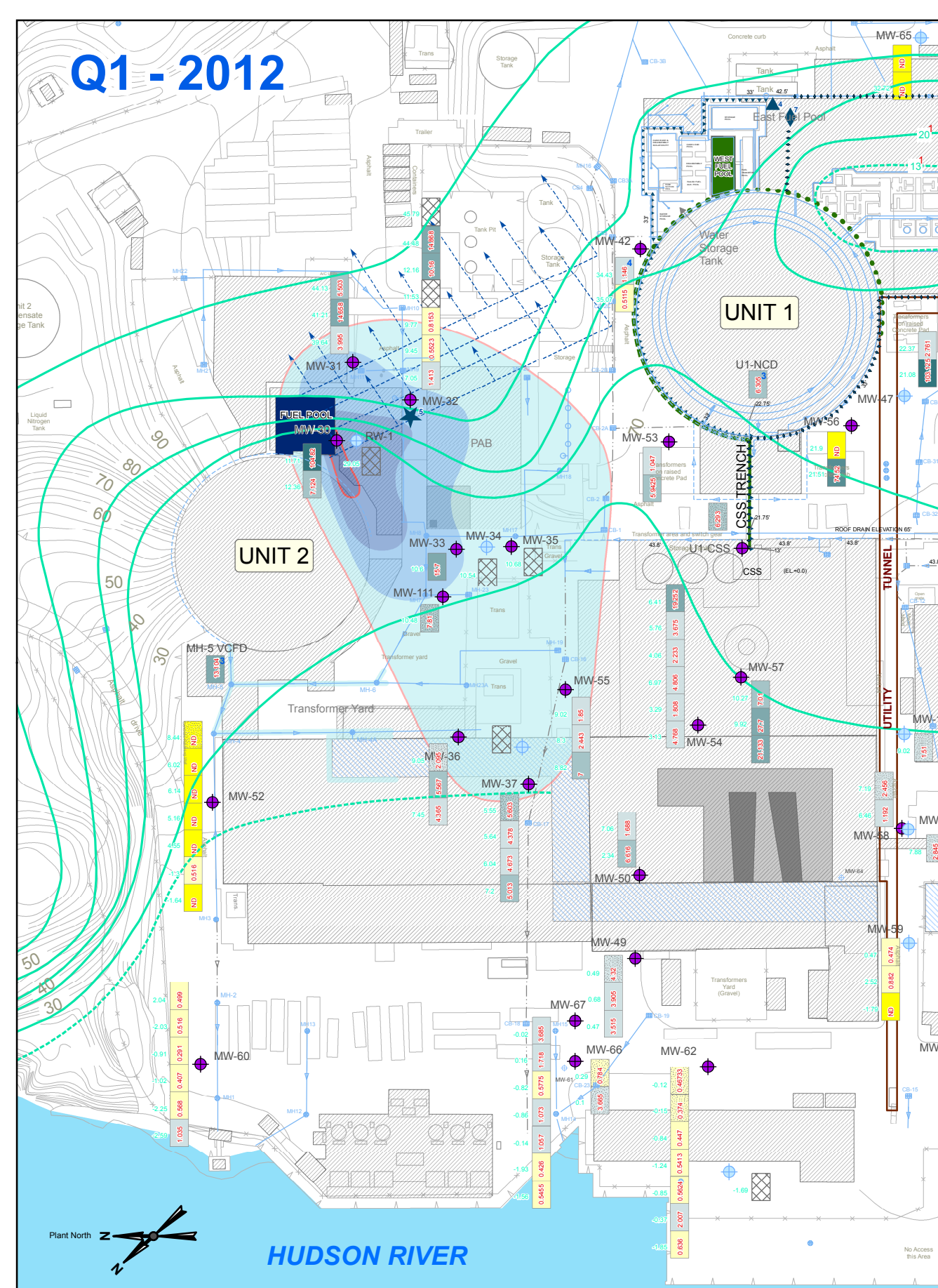
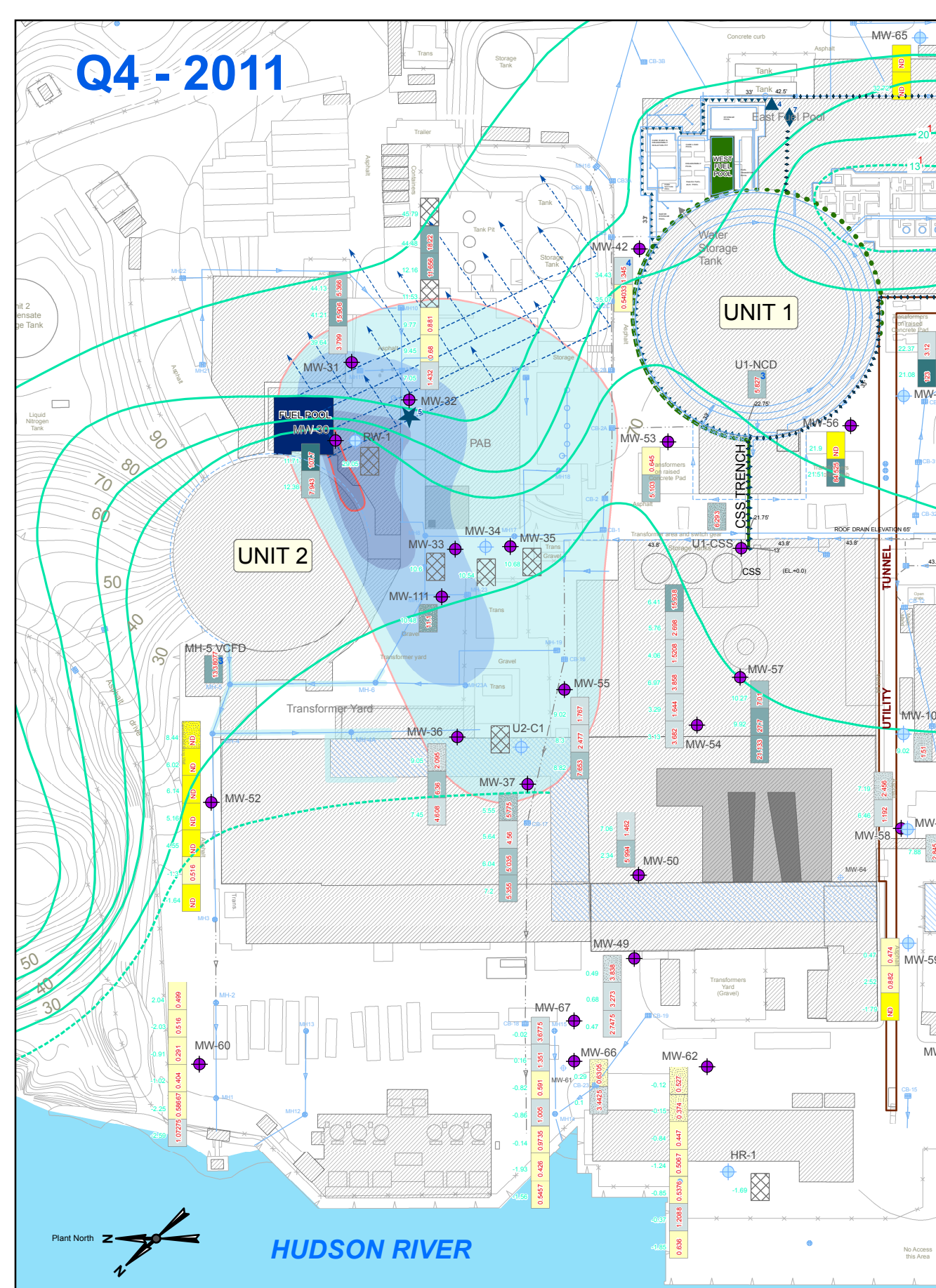
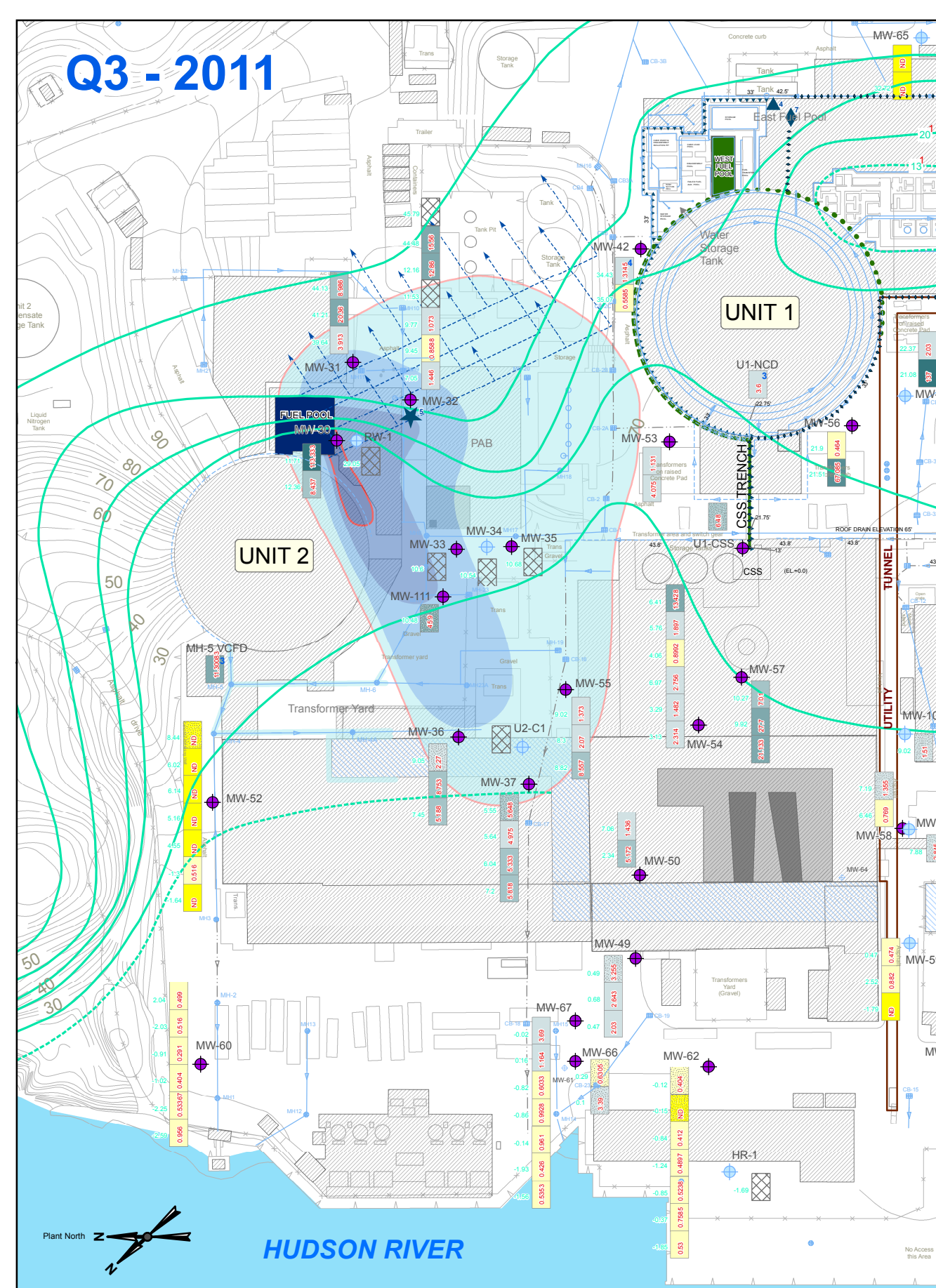
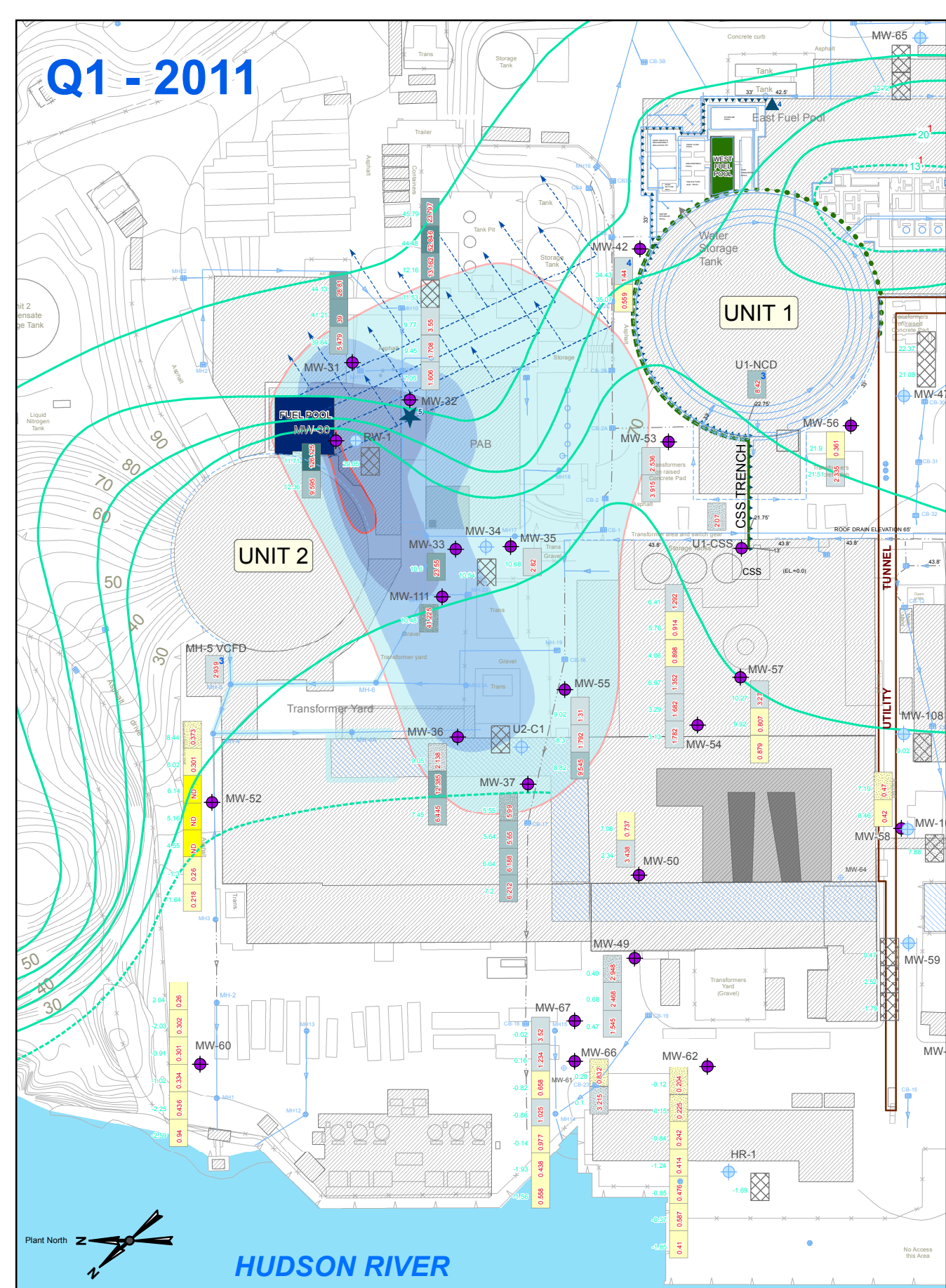
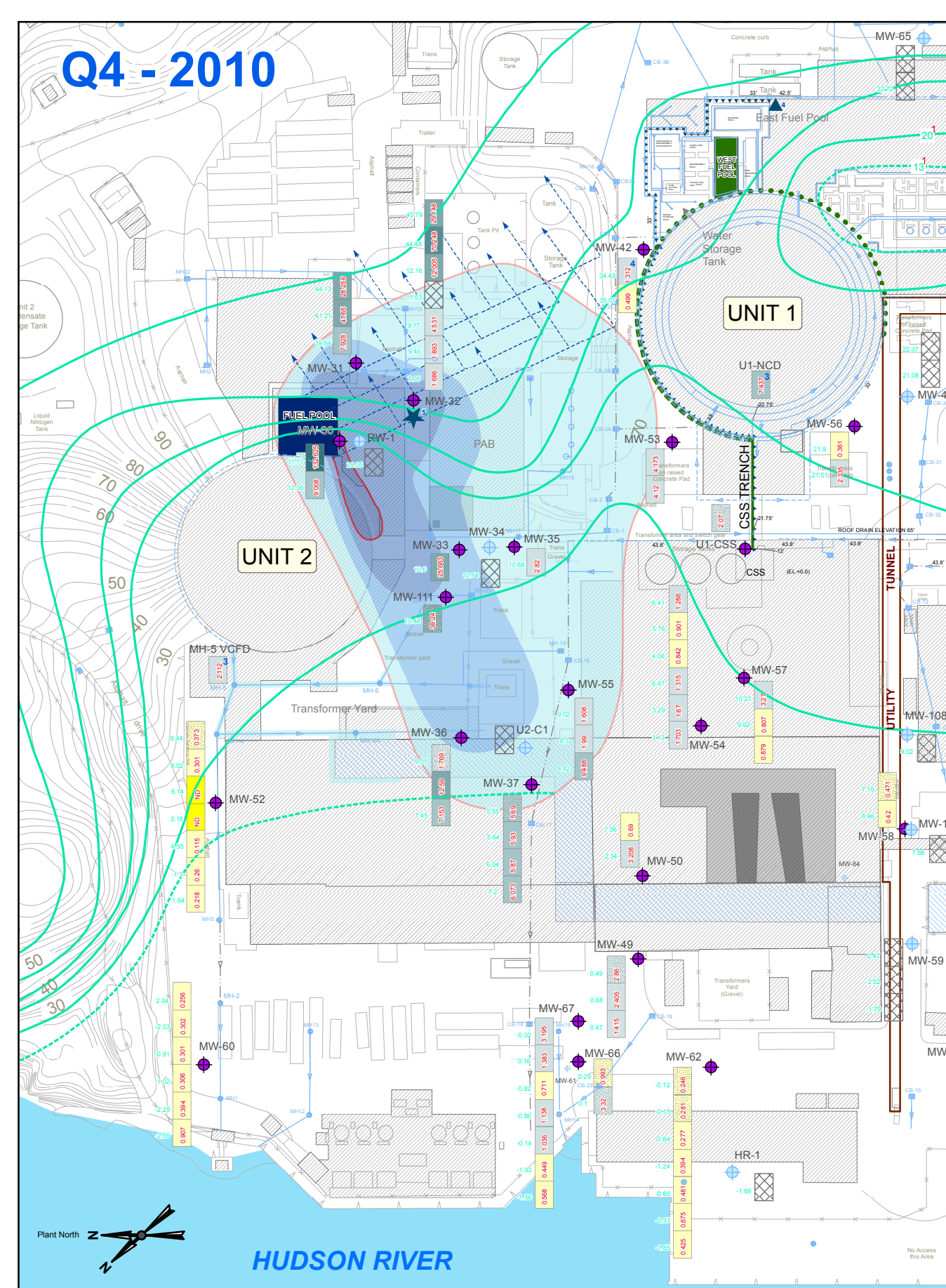
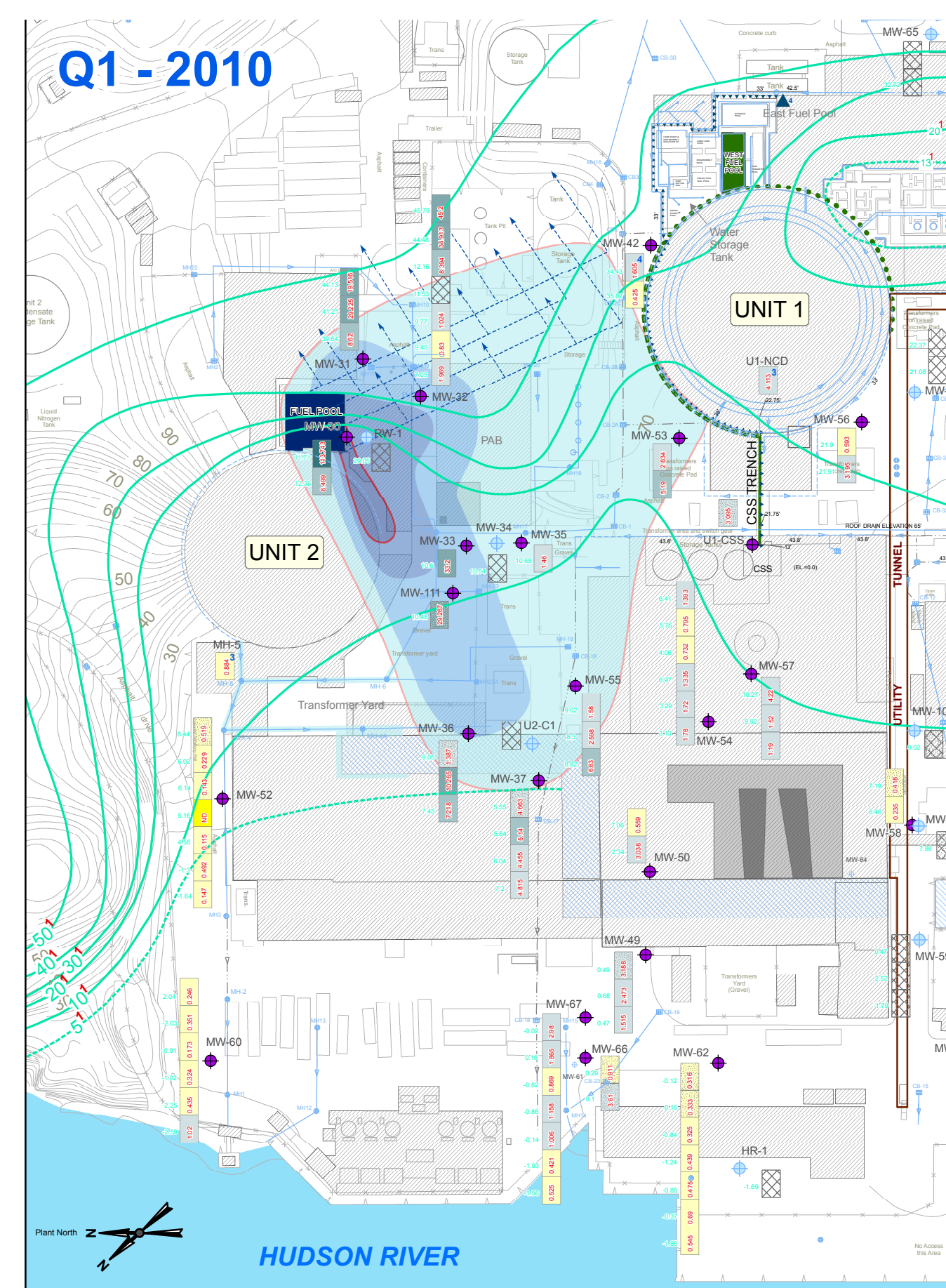
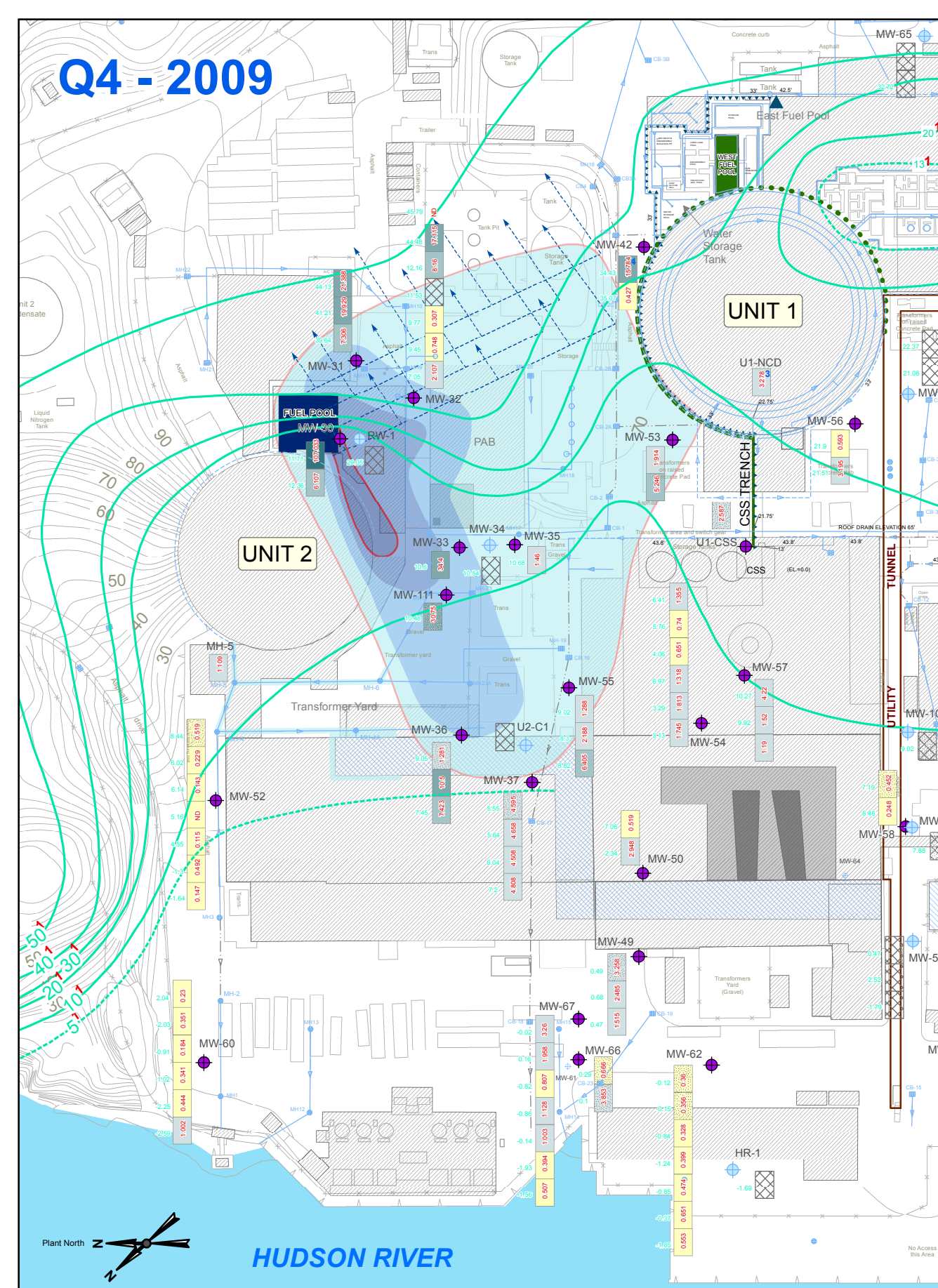
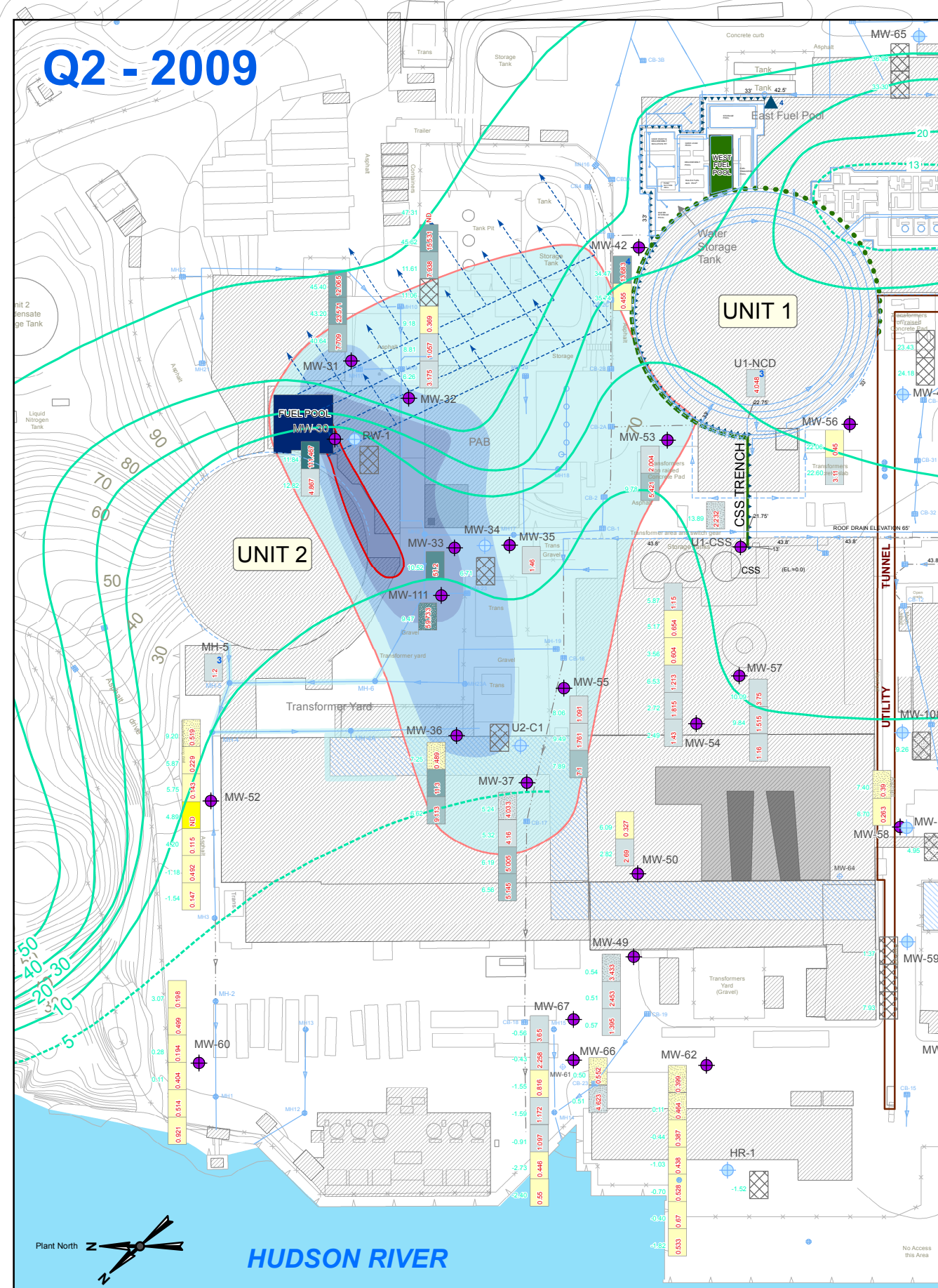
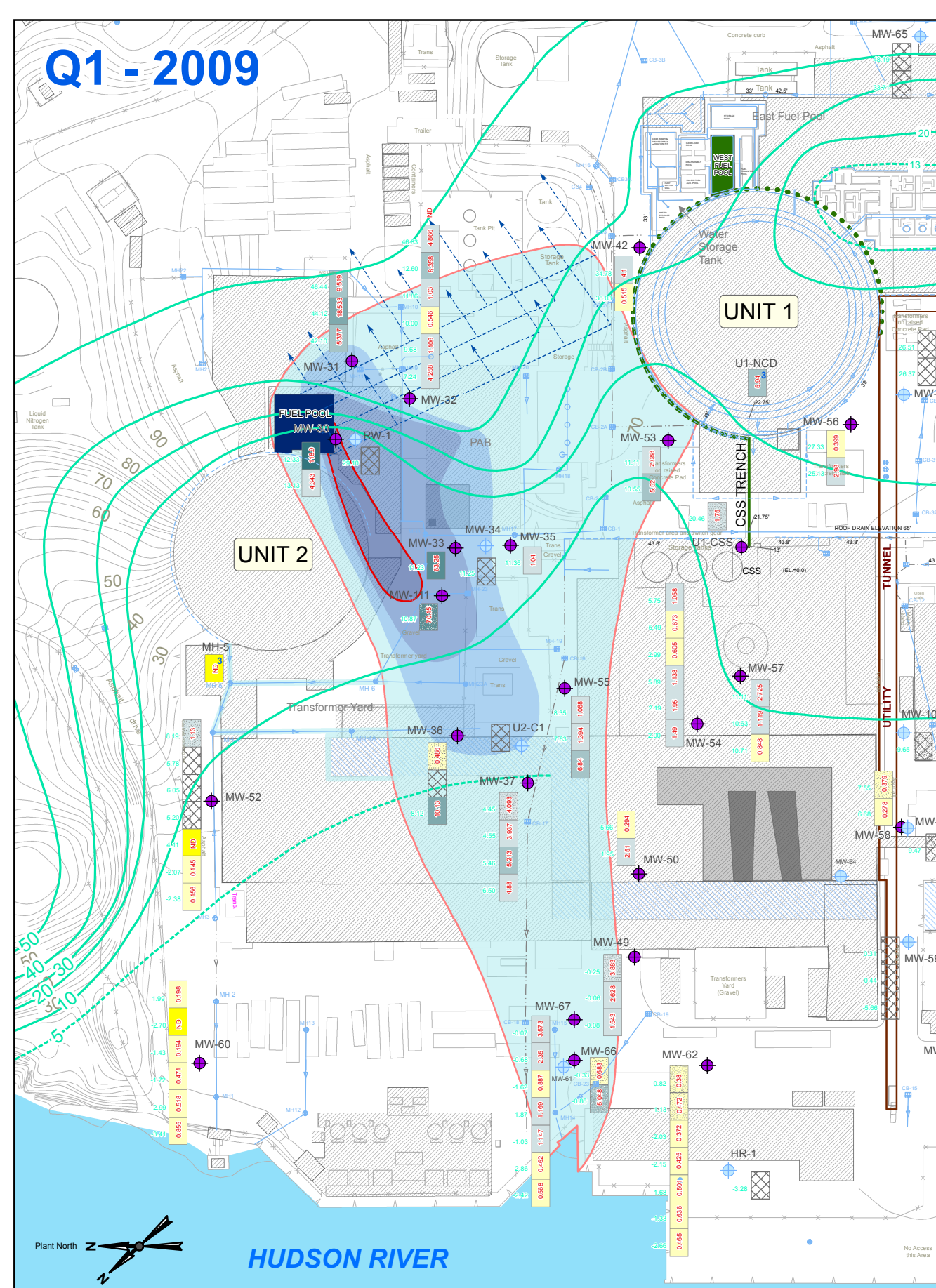
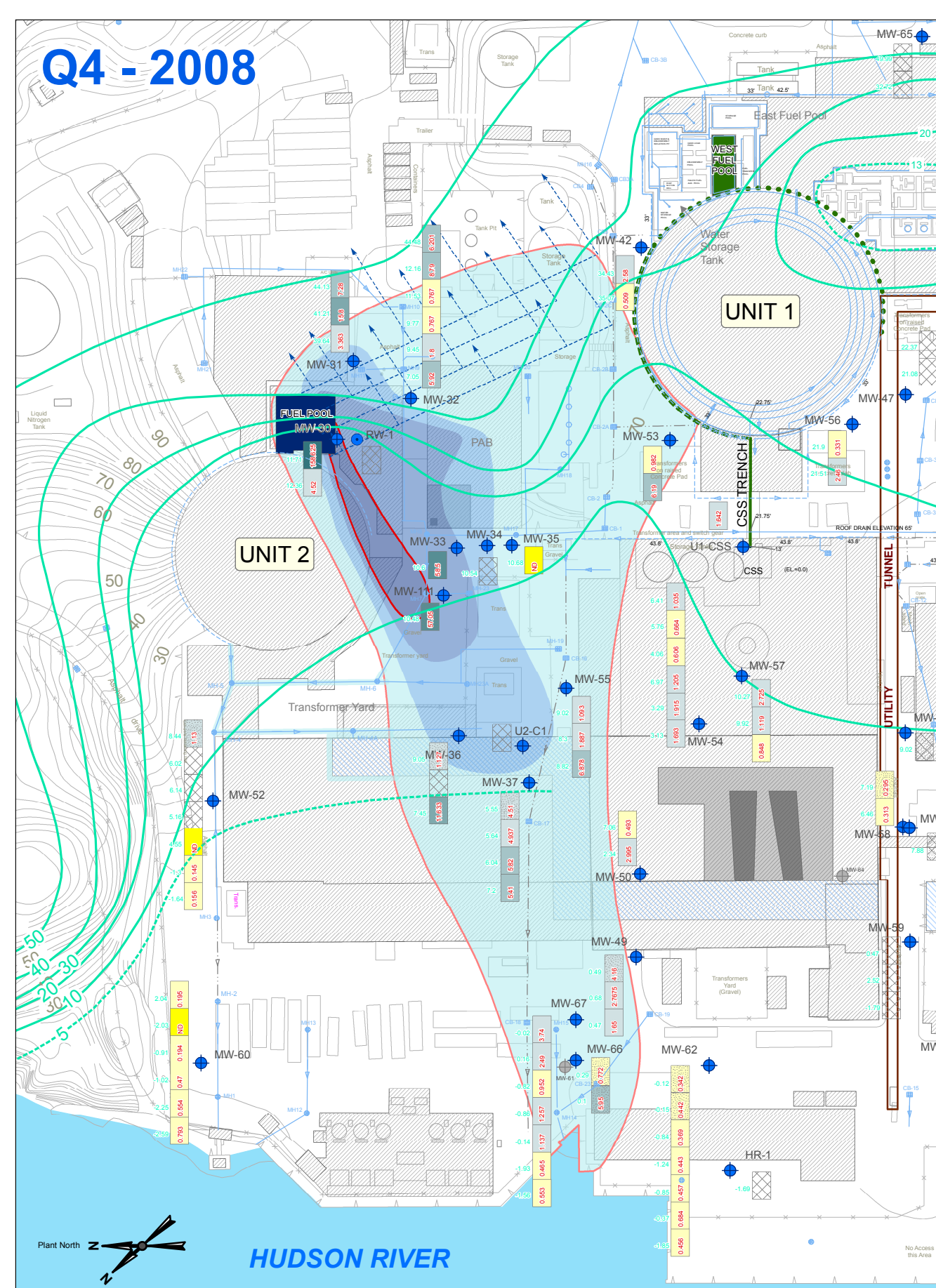
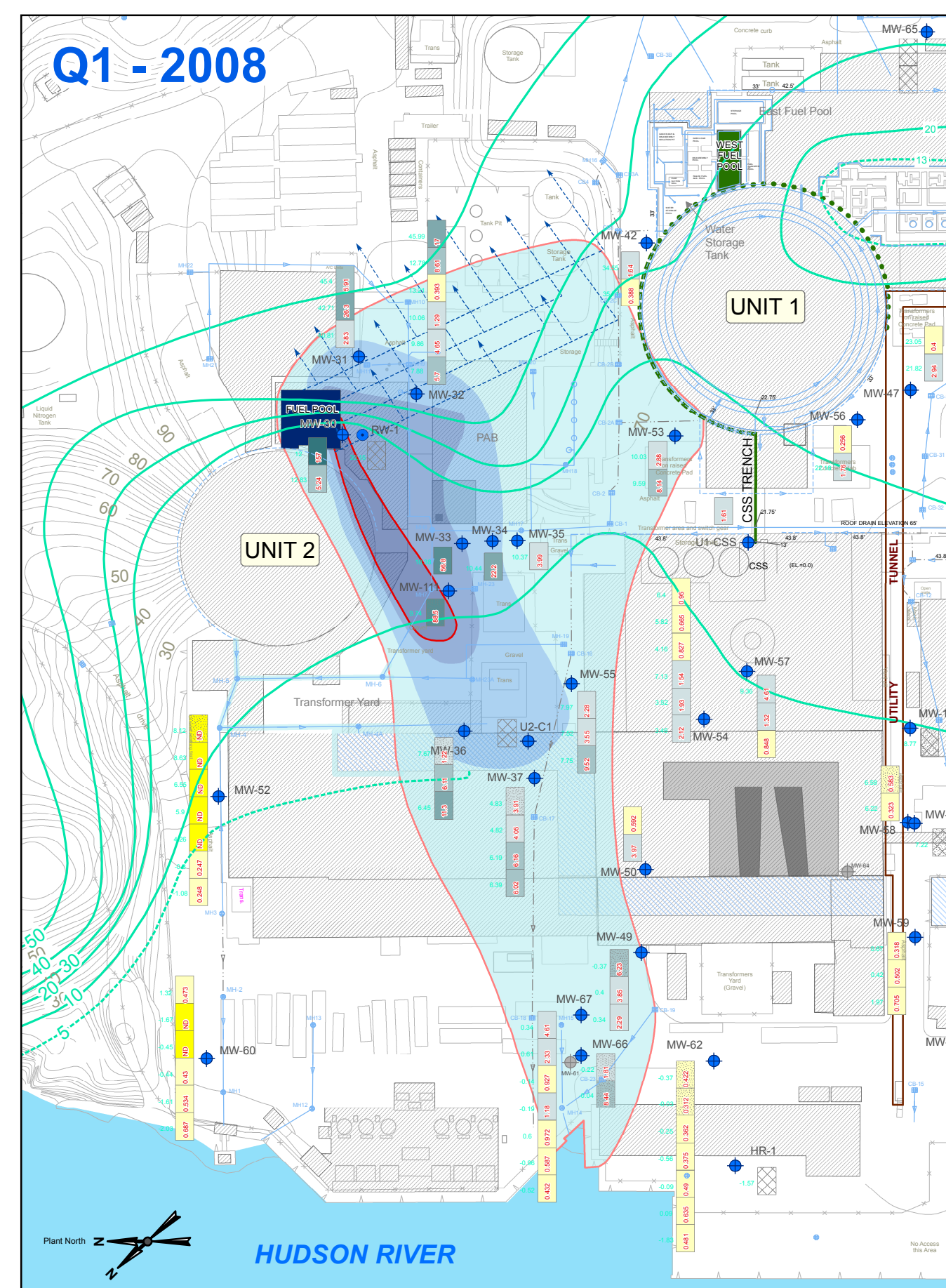
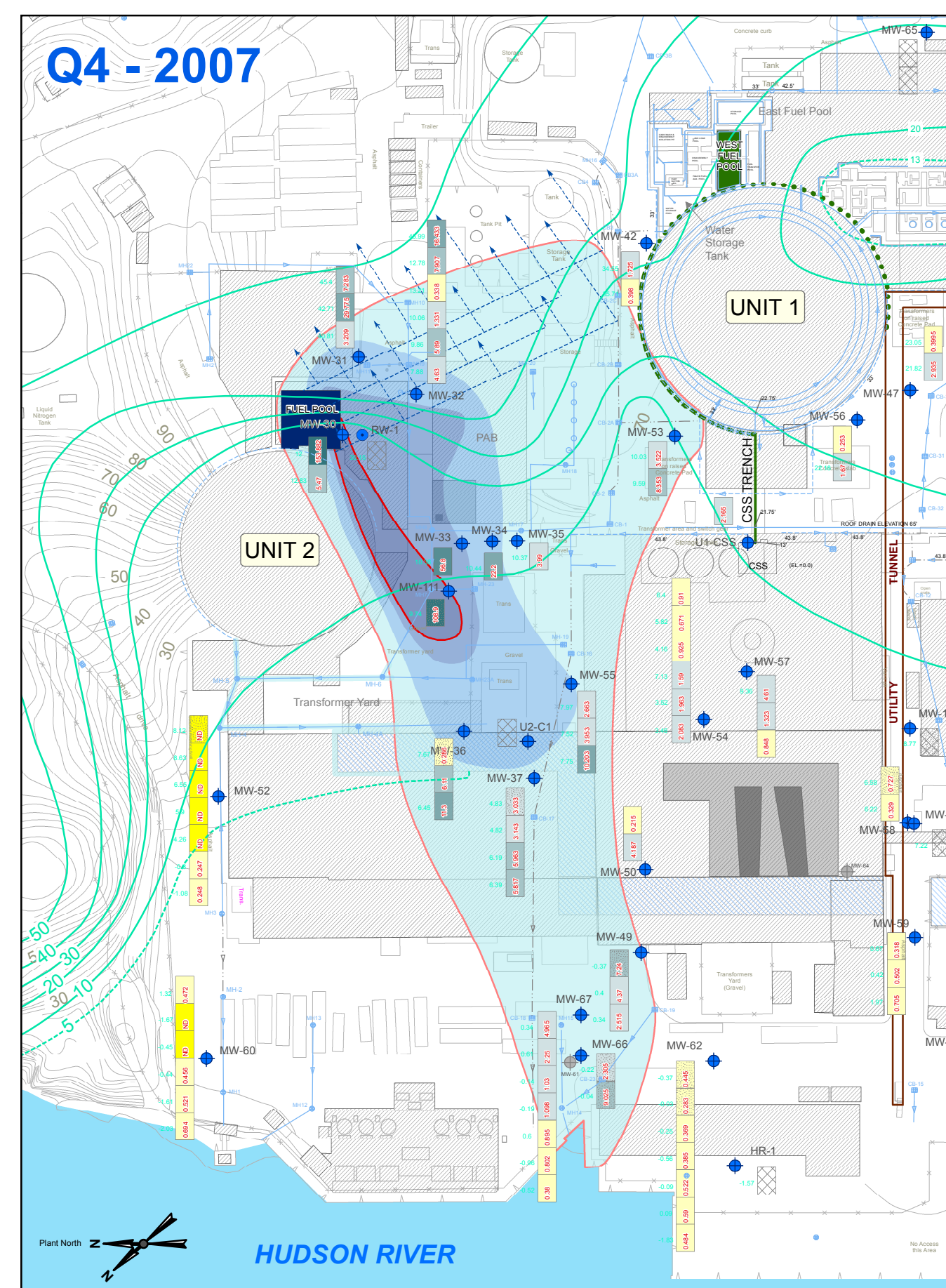
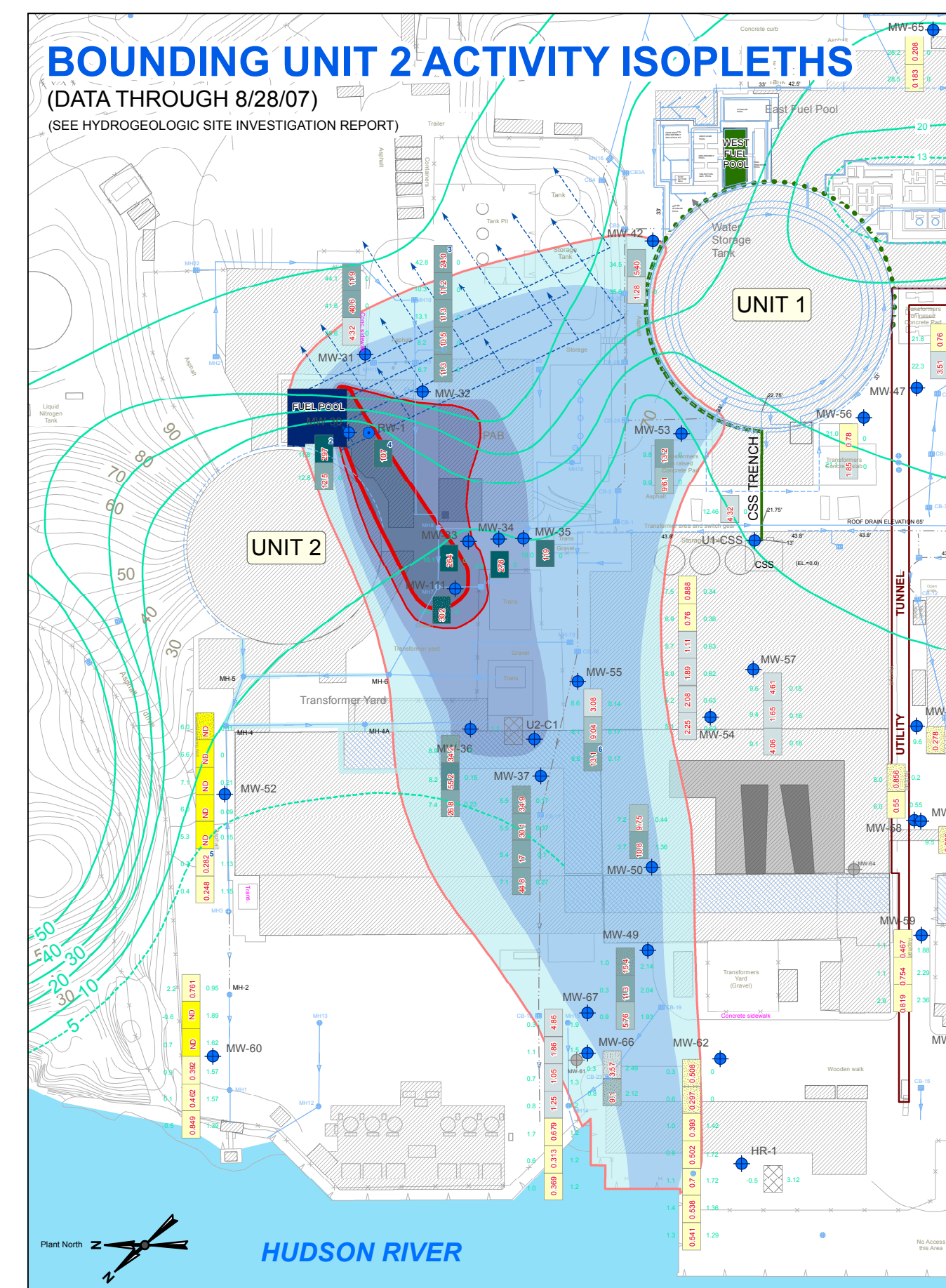
Subject: Figures from Indian Point Quarter 3 2014 Groundwater Monitoring Report

The following figures are from the 3rd quarter 2014 groundwater monitoring report for Indian Point (available at <http://www.safesecurevital.com/uploads/15-3-20.pdf>) and were made available to NRC staff by request as documented in an email from Dara Gray, Entergy, to Michael Wentzel, NRC, dated March 31, 2015. The files listed below, which were identified in the March 31, 2015 email, are not included because the NRC staff was unable to open the files:

FINAL Figure 4 - Q3 2014 Current and Potential Future SSC Source Locations.pdf

FINAL Figure 5A - Q3 2014 Longterm Transducer Monitoring Evaluation Map.pdf

FINAL Figure 5A - Q3 2014 Longterm Transducer Monitoring Evaluation M...LY].pdf



- MW-30
- Boring / Monitoring Installation Designation
 - Longterm Radionuclide Monitoring Installation
 - Standby Radionuclide Monitoring Installation
 - Active Storm Drain
 - - - Abandoned Storm Drain
 - Catch Basin
 - - - Footing Drain

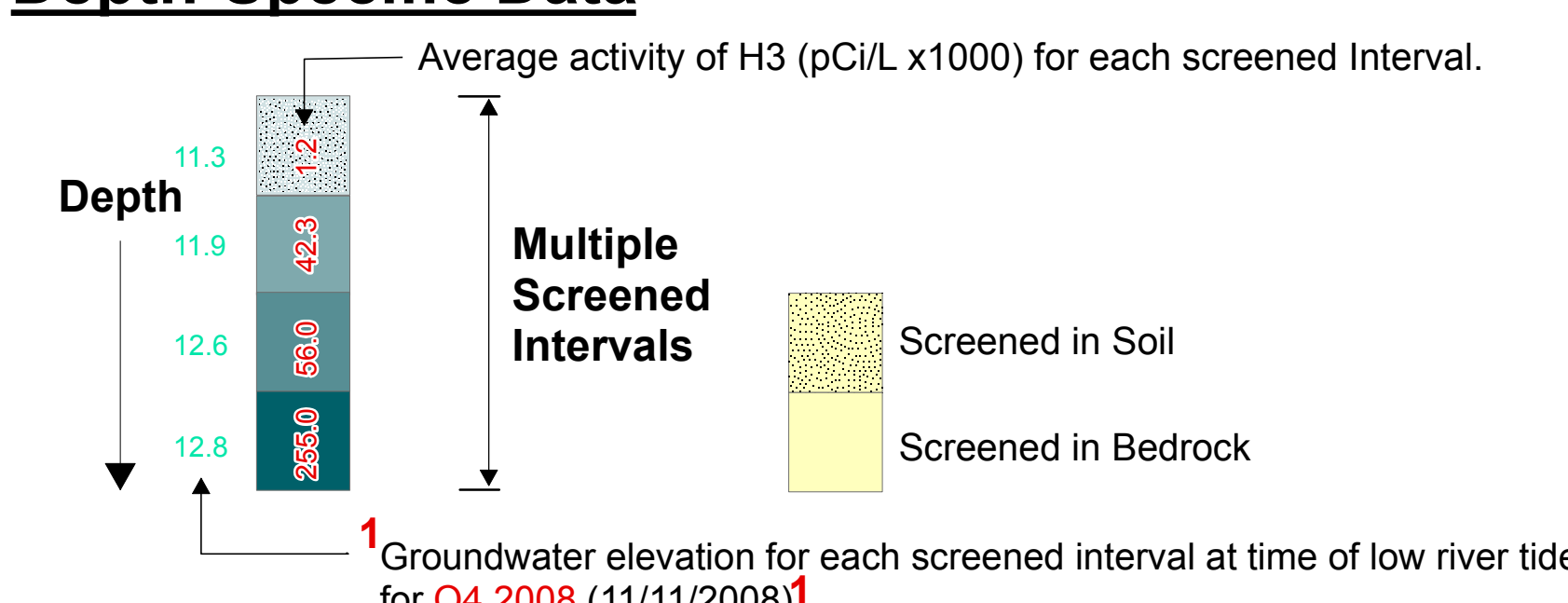
Localized Transient Releases

- ▲⁴ Transient Distillate Tank Valve Leak in Unit 1 Fuel Storage Building - 3/07/2009
- ★⁵ Transient Spill from Temporary R.O. Skid Piping - Entered MW-32 Vault and MH-9 - 11/21/2009
- ◆⁷ Sample Sink Overflow - Unit 1 Chemical Systems Building - Q2 2011
- ⁸ Unit 2 MOB Drain Leak - Q2 2012
- ⊗⁹ Unit 1 Containment Spray Annulus (CSA) Overflow
- ⬠¹⁰ Unit 2 Fan Building 51' Floor Drain Overflow

Probable Legacy Release SSCs

- Unit 2 Fuel Pool
(All identified leaks repaired as of December 2007)
- Unit 1 West Fuel Pool
(All U1-SFPs drained and inactive as of October 2008)
- /// ----- Terminated Connection To Storm Drain
- Drain Exfiltration
- ----- Inter-Structure Joint / Mud Mat
- Containment Spray Sump Trench

Depth-Specific Data



Activity Data^{1,2}

- Bar Graphs; Average H3, pCi/L**

Color/Pattern	Description
White with black cross-hatch	No Depth-Specific Samples
Yellow	Not Detected (ND)
Light Yellow	ND - 1,000
Light Green	1,000 - 5,000
Green	5,000 - 10,000
Dark Green	10,000 - 50,000
Dark Green	50,000 - 100,000
Dark Green	100,000 - 200,000
Dark Green	> 200,000

Isoleths; Average H3, pCi/L

Color	Description
Light Blue	5,000 - 10,000
Blue	10,000 - 50,000
Dark Blue	50,000 - 100,000
Dark Blue	100,000 - 250,000
Dark Blue	>250,000

Note: Illustration of contaminant plume is a schematic representation only. In reality, the geologic bedrock formation is over 99% solid, crystalline rock, with the contaminated water contained only in the remaining (less than 1%) interstitial space (i.e. fractures).

Groundwater Elevation Contours

- 20 ———¹ Ambient "Watertable" Contours for Q4 2008 (11/11/2008)¹
5 - - - - - Contours Other Than 10' Interval
Vadose Zone Contaminant Transport

Notes:
1. Groundwater contours drawn from Q4 2008 groundwater data to show groundwater conditions used for recalibration of the Precipitation Mass Balance Model (see Q2 2009 LTG Report). These contours developed from limited data recorded on 11/11/2008. Actual elevations may vary from conditions shown and the actual distribution of piezometric heads is likely more complex than indicated.

Data Notes:

- 1. Quarterly Tritium isotopes and activity values are yearly rolling arithmetic averages of the current and preceding three quarters' data. Only values greater than the MDC are used in this average, thus adding a degree of conservatism to the subsequent dose computations.
- 2. The release of tritium from the waste tank was estimated by multiplying the total volume of water released from the tank by the average tritium concentration in the water. The geologic bedrock formation is over 90% solid, crystalline rock, with the contaminated water contained only in the remaining (less than 1%) interstitial space (i.e. fractures).
- 3. The release of tritium from the drain was estimated by multiplying the flow rate of the effluent which investigations have determined to be associated with the drain by the average tritium concentration in the effluent.
- 4. Historically elevated Tritium levels in MW-42-49 observed during Q1 2009 were consistent with leakage visually identified on 03/07/2009 (and terminated immediately thereafter) from the waste tank tail valves located within the Unit 1 fuel storage building. Data trends through Q1 2010 indicate that the observed Tritium in MW-42-48 and downgradient wells associated with this release have disappeared through the groundwater flow system.
- 5. Elevated levels of Tritium detected in MH-9 and MH-10a during routine 80-10 Effluents Program sampling on 11/5/2010 appears to have originated from the waste tank tail valve at trench 60B7T. Q1 2011 Tritium levels in MH-9 and MH-10a were similar to those reported in Q4 2010, suggesting that the release had terminated by March 2012, and may have penetrated the well casings and entered the subsurface around the monitoring installation.
- 6. Please refer to Figure 6 for the drawn Unit 1 Tritium plume isotopes. The likely causation of the Q2 2011 Tritium increases in multiple Unit 1 monitoring locations is attributed to tritium release from the waste tank tail valve at trench 60B7T. Q1 2011 Tritium levels in MH-9 and MH-10a rose on the 53 observation day.
- 7. Elevated levels of Tritium initially detected in U1-CSSS, MW-39, MW-46, MW-54, MW-56 and MW-57 during the Q2 2011 sampling event appear to have originated from a Q2 2011 Sample Sink Overflow and subsequent floor flooding in a Unit 1 Chemical Systems Bumping sample room on the 53rd observation day.
- 8. The release of tritium from the waste tank tail valve at trench 60B7T has been traced back to the waste tank tail valve at trench 60A in an existing 12" Maintenance Outage Building (MOB) drain line. This double counted, stainless steel line was used to service the R.O. skid at its new location in the MOB during the 2012 Unit 2 reeling outage.
- 9. The release of tritium from the waste tank tail valve at trench 60B7T in MW-42-49, MW-53-82 and U1-CSSS during the Q4 2013 sampling event appear to have originated from an overflow of the Unit 1 Containment Spray Annulus (CSA).
- 10. The release of tritium from the waste tank tail valve supplemental samples taken from MW-31 and MW-32. Release originated from transient flooding of the Unit 2 Fan Building #1 floor during 2014 refueling outage discharge of RCS drain down to a partially obstructed floor drain.

1. Base map was developed from an untitled electronic file provided by Badley and Watson Surveying and Engineering, P.C., Dated 2/3/06; CAD file name "GZA.dwg".

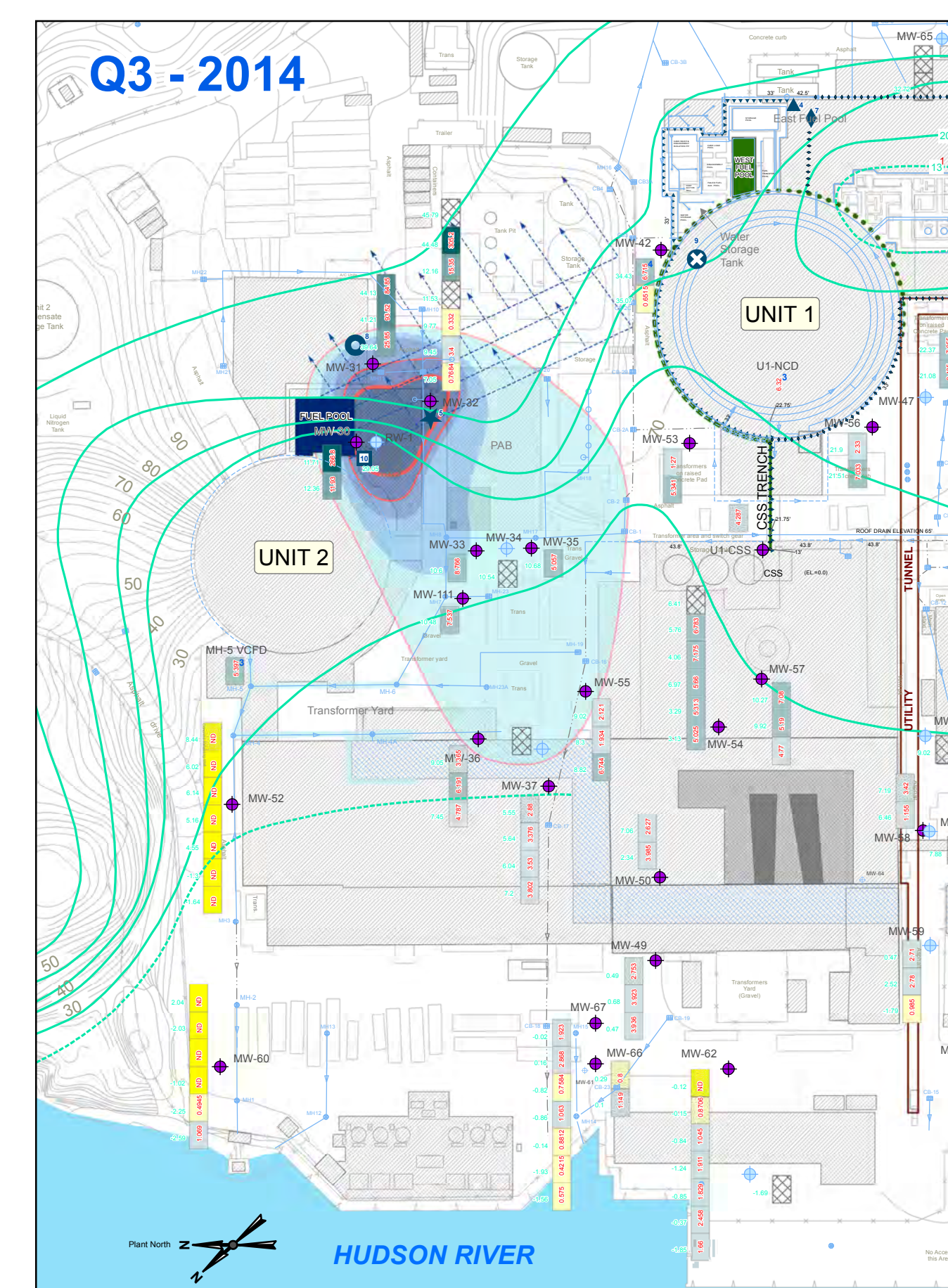
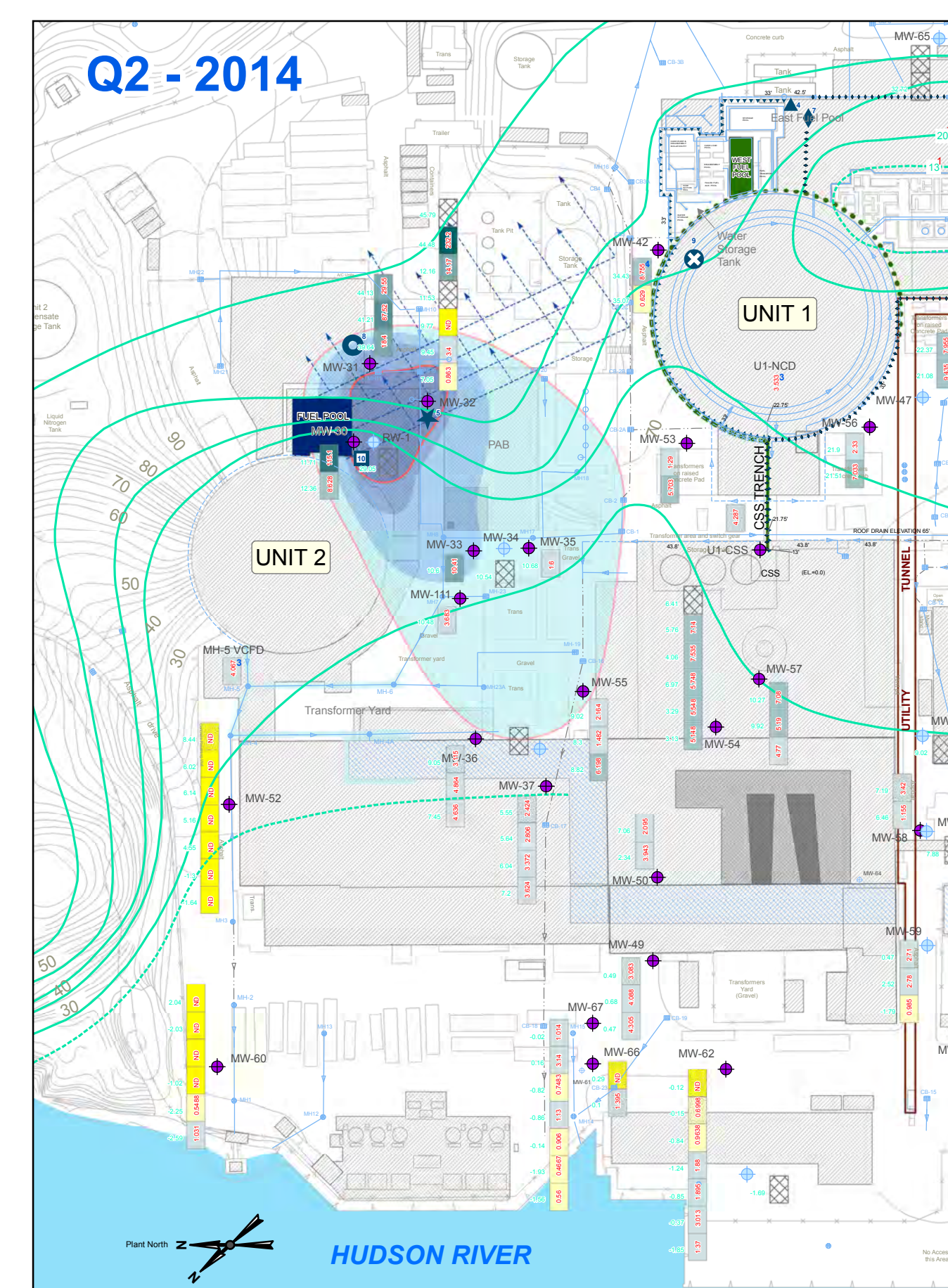
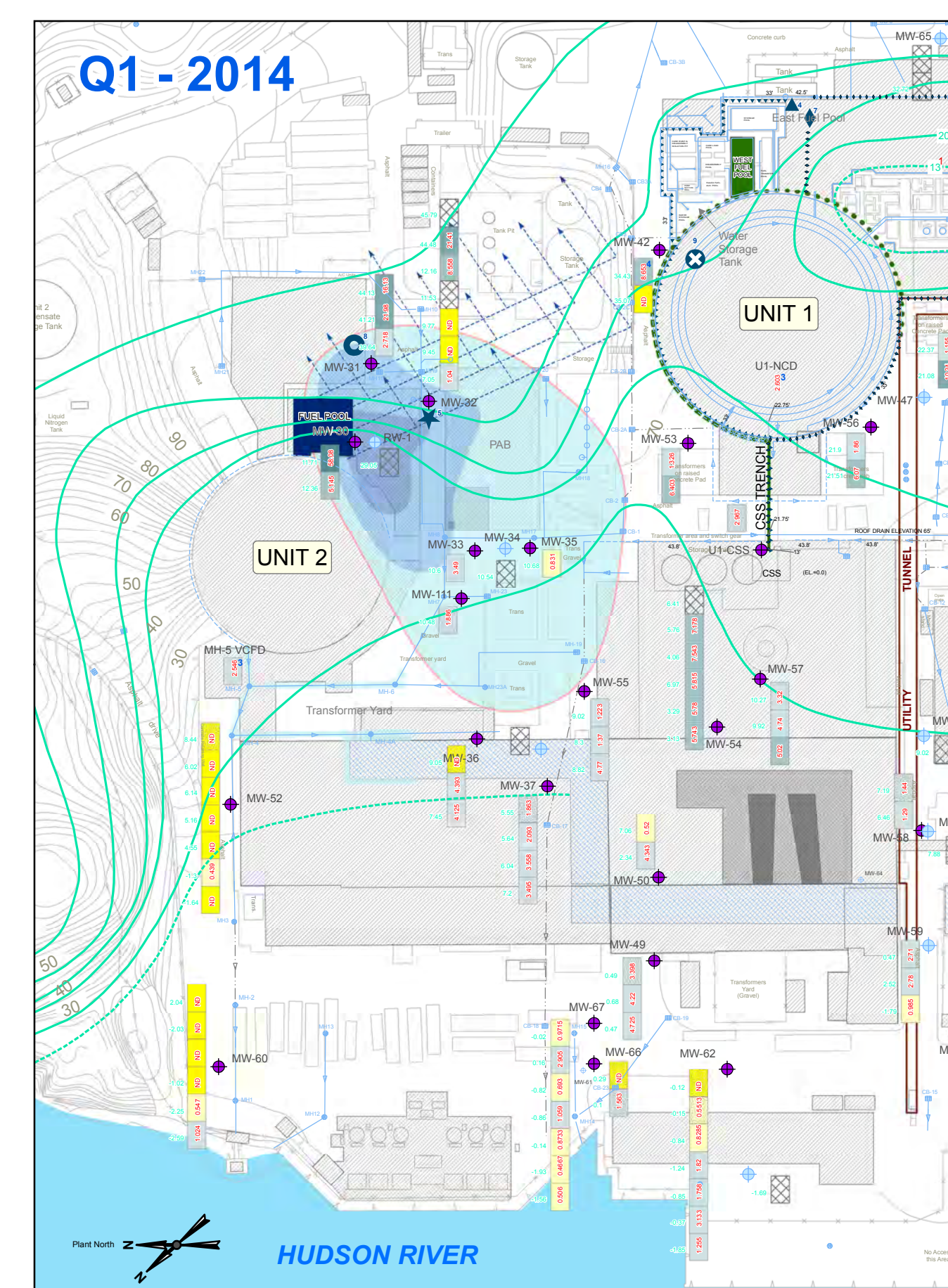
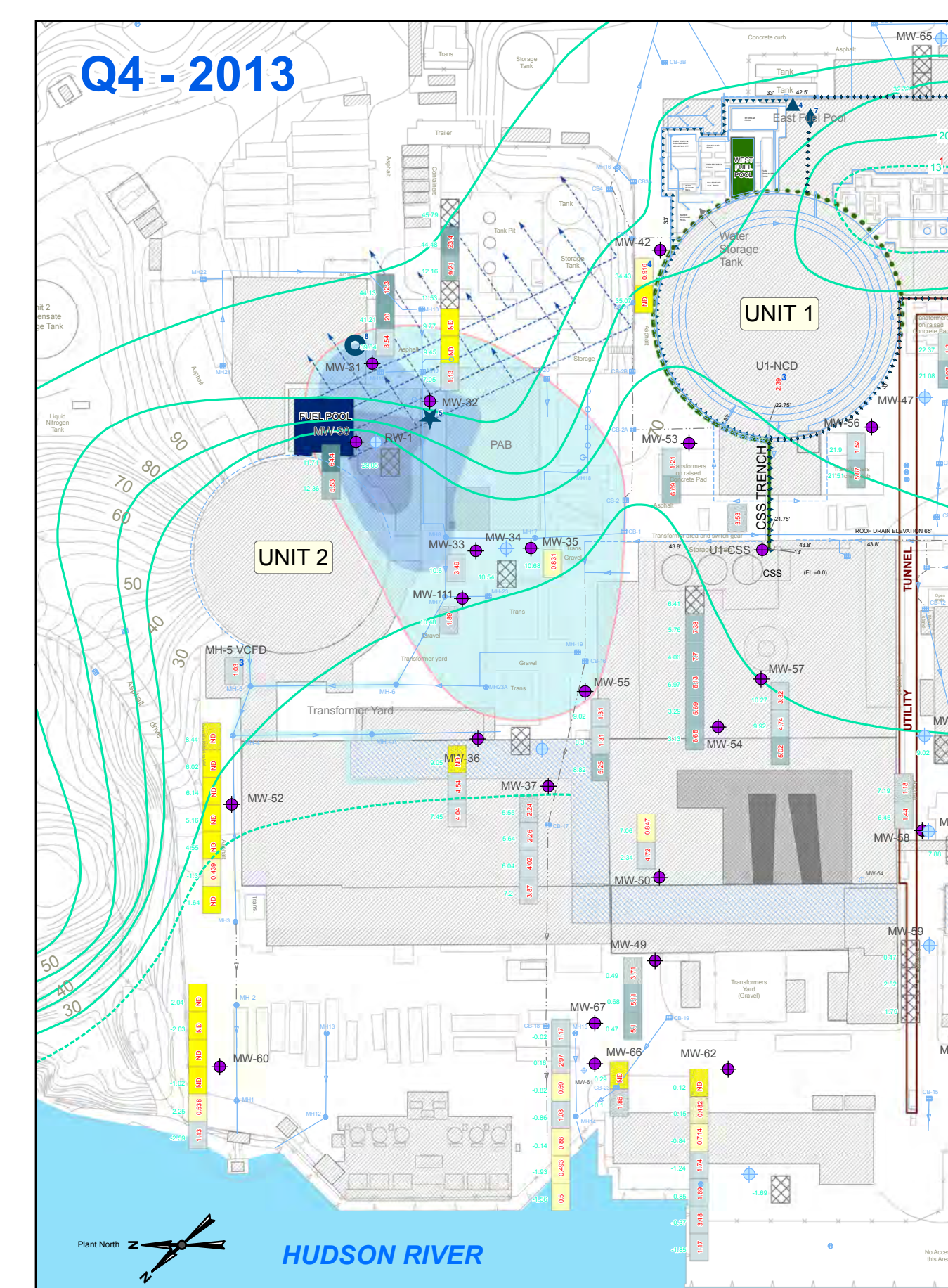
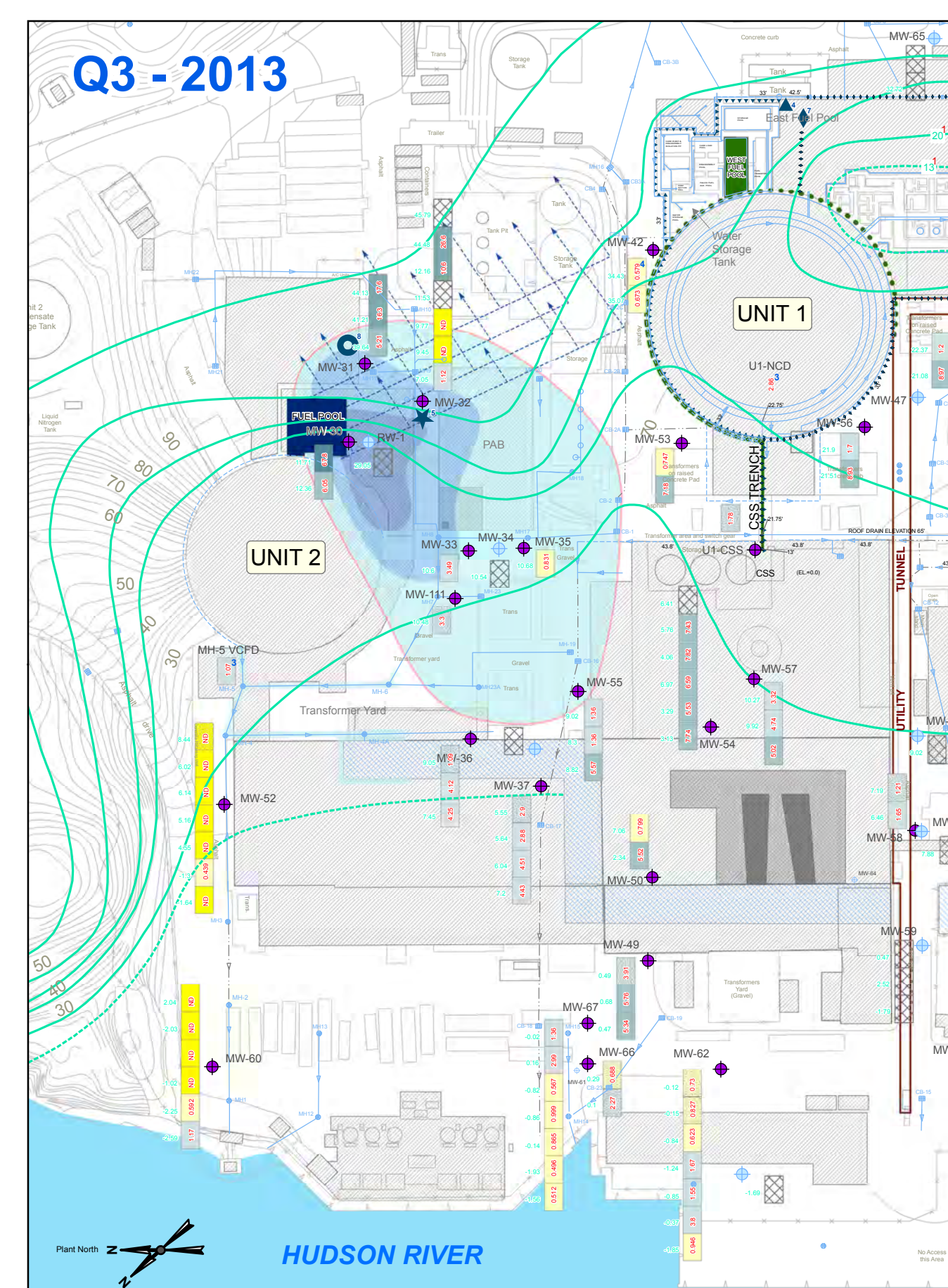
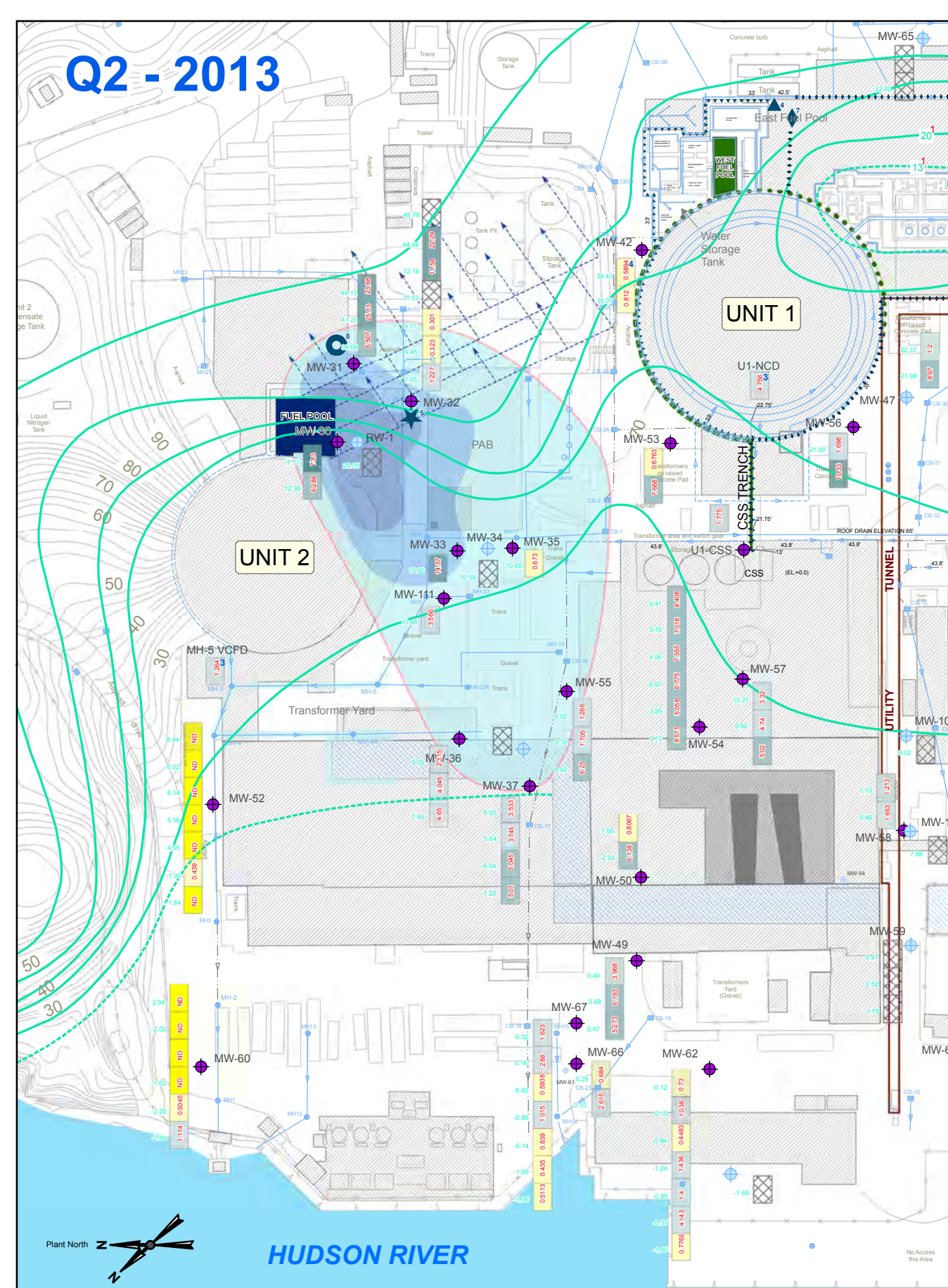
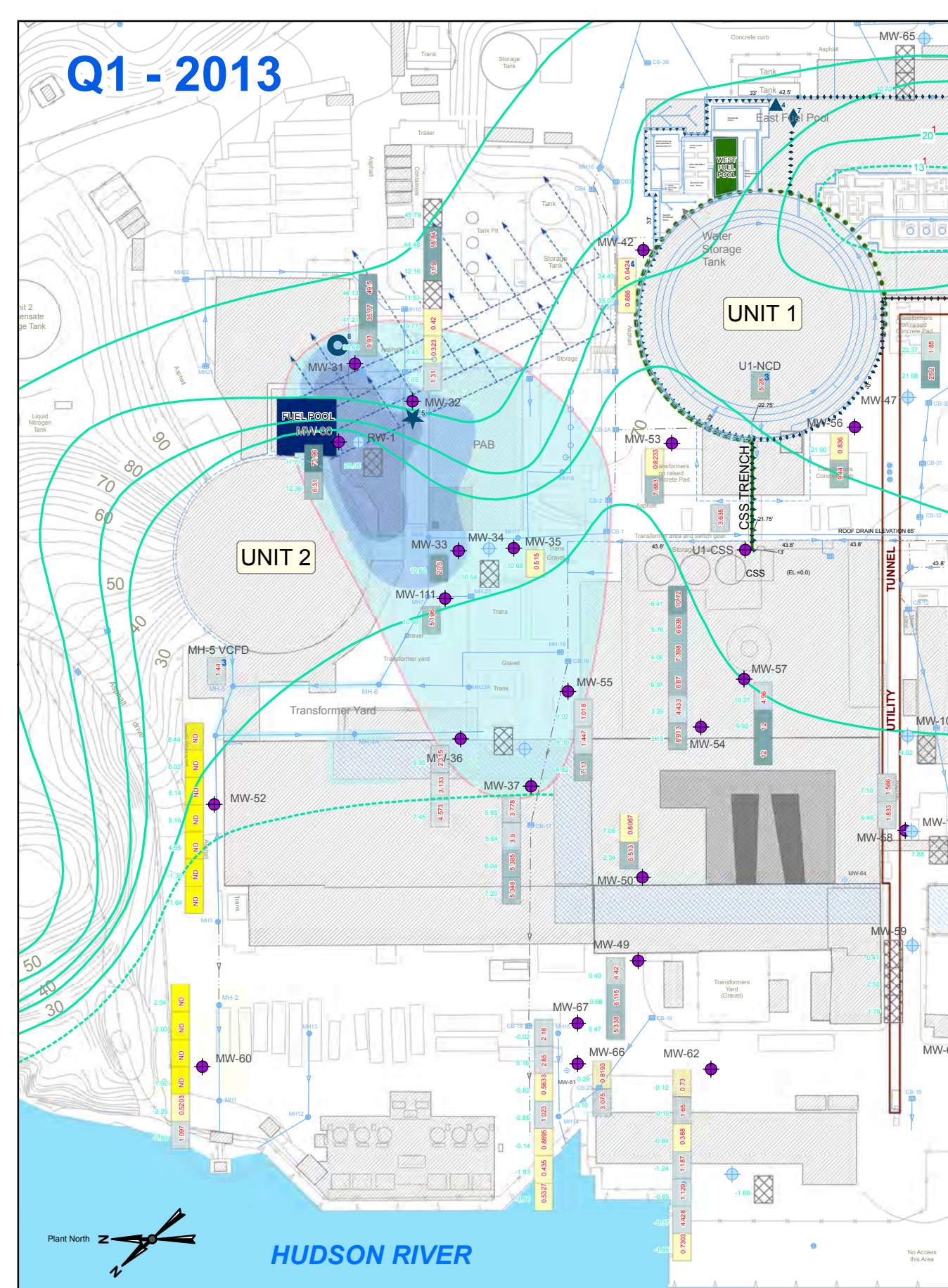
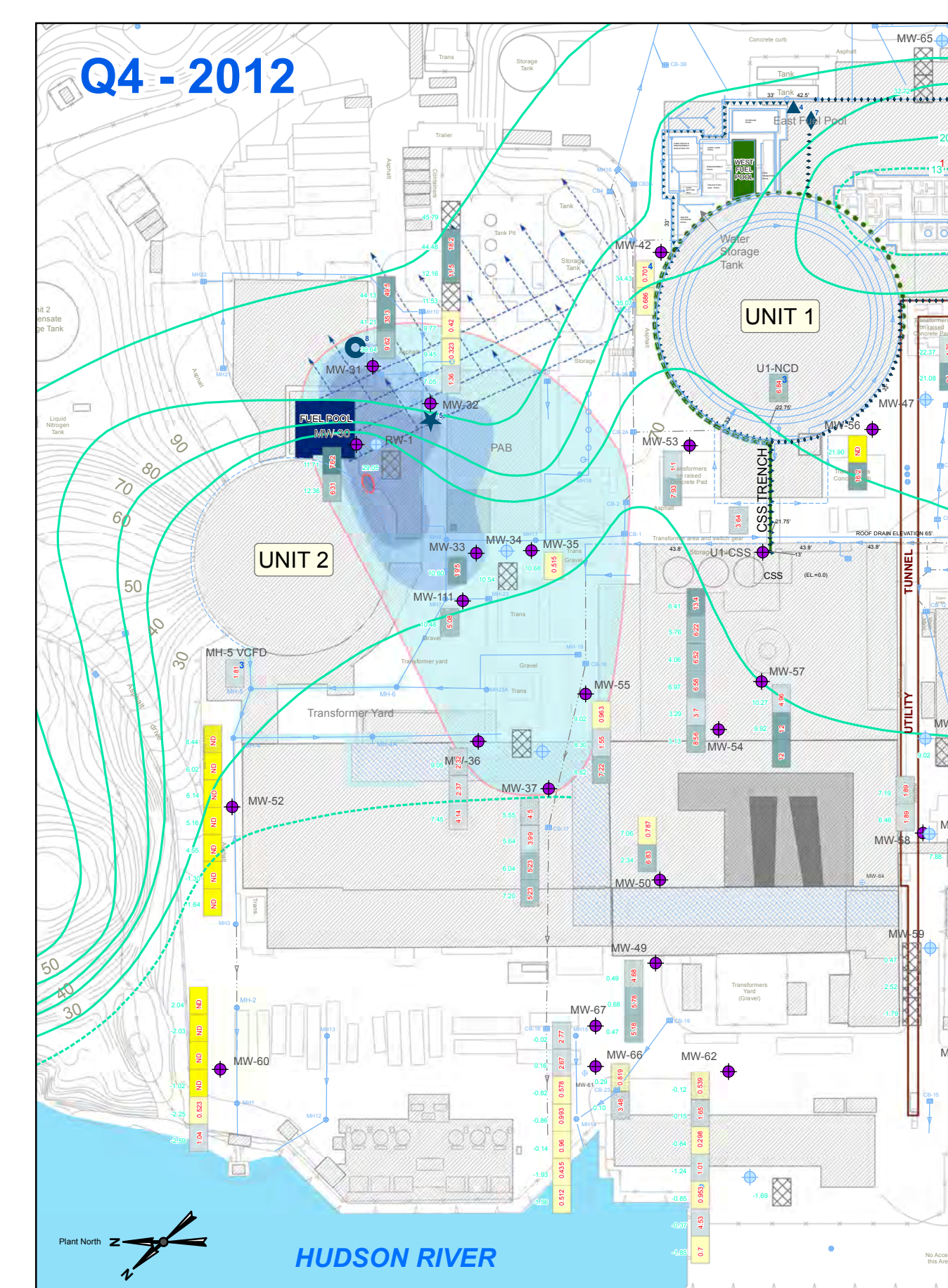
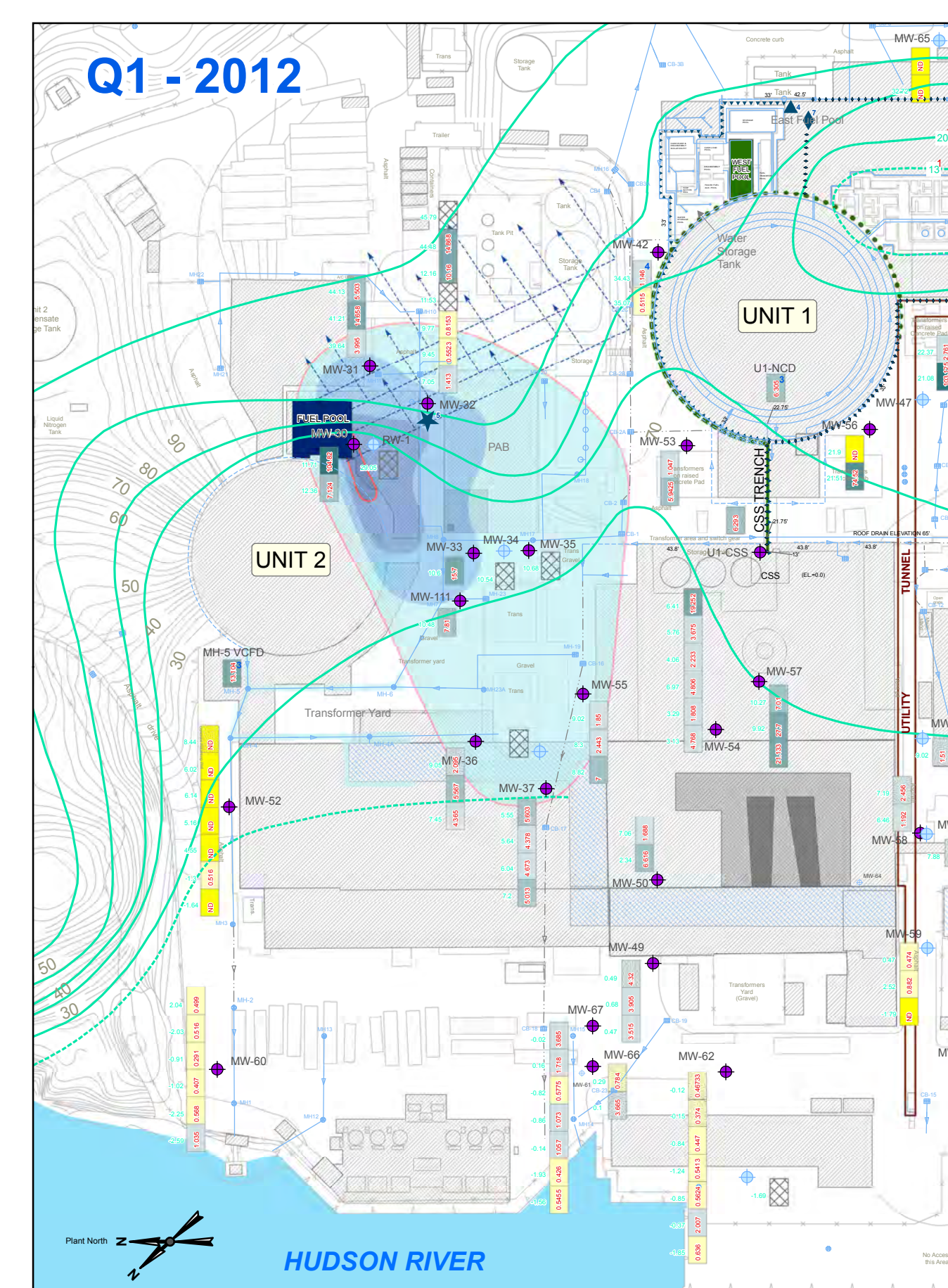
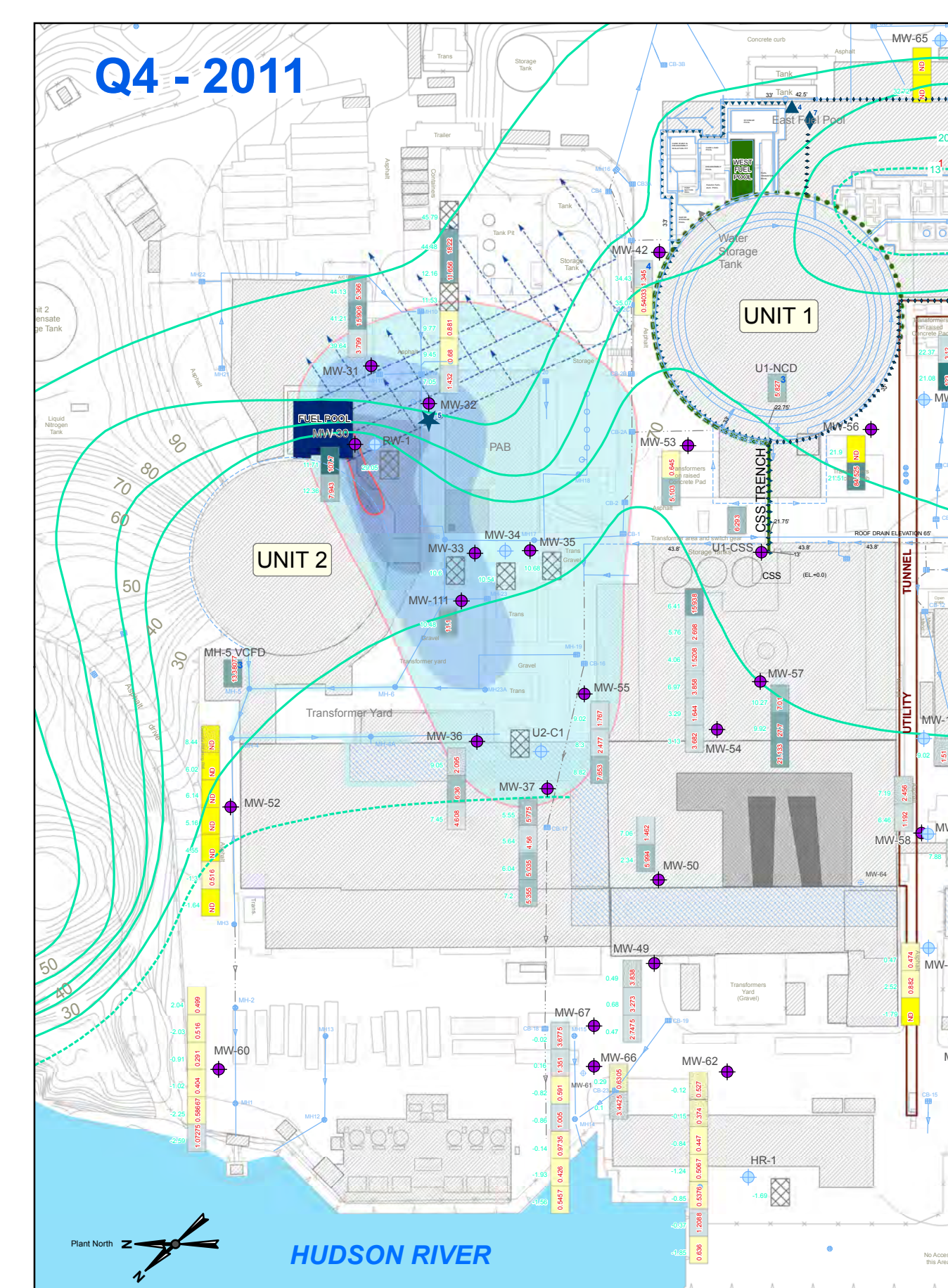
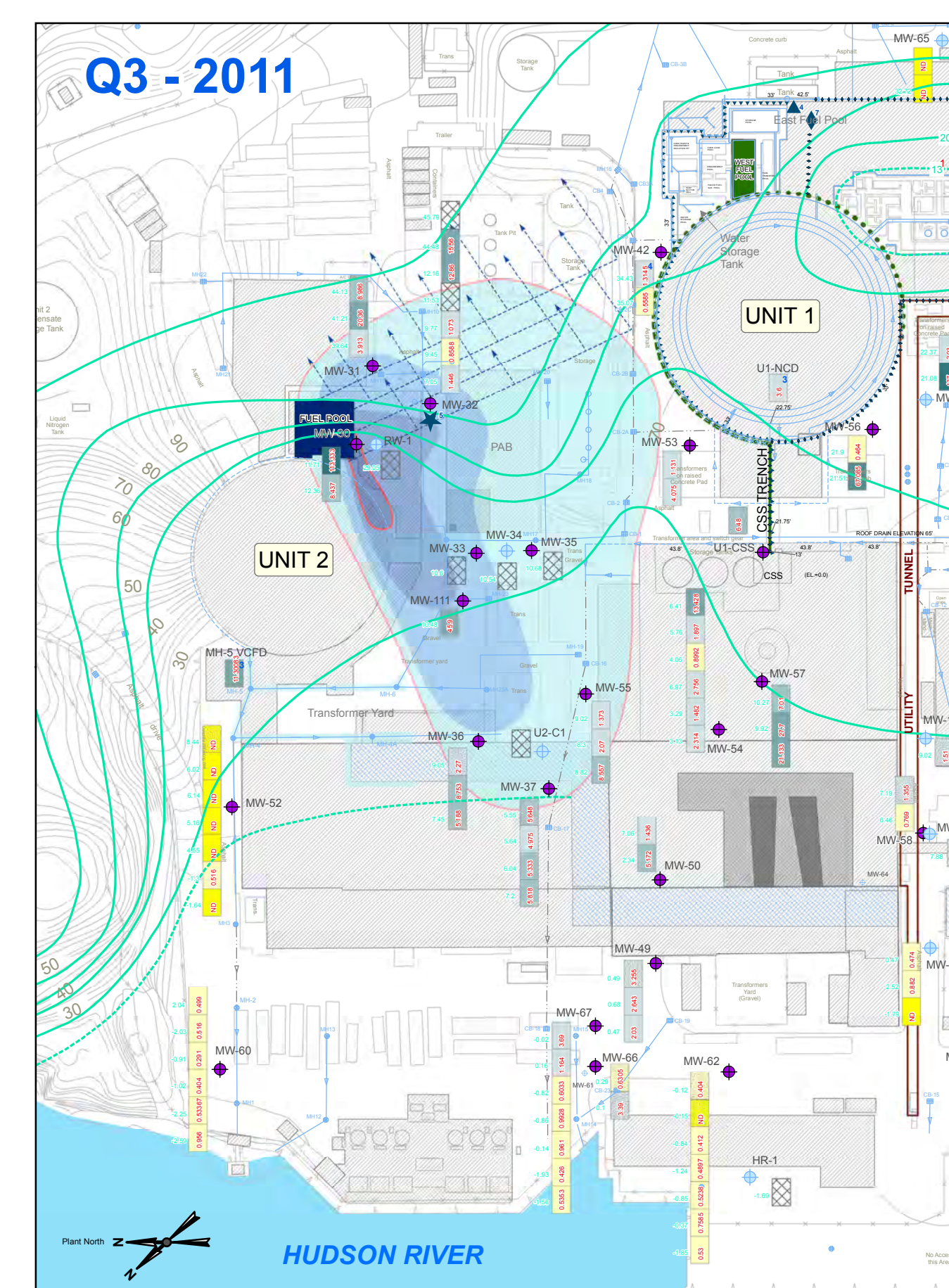
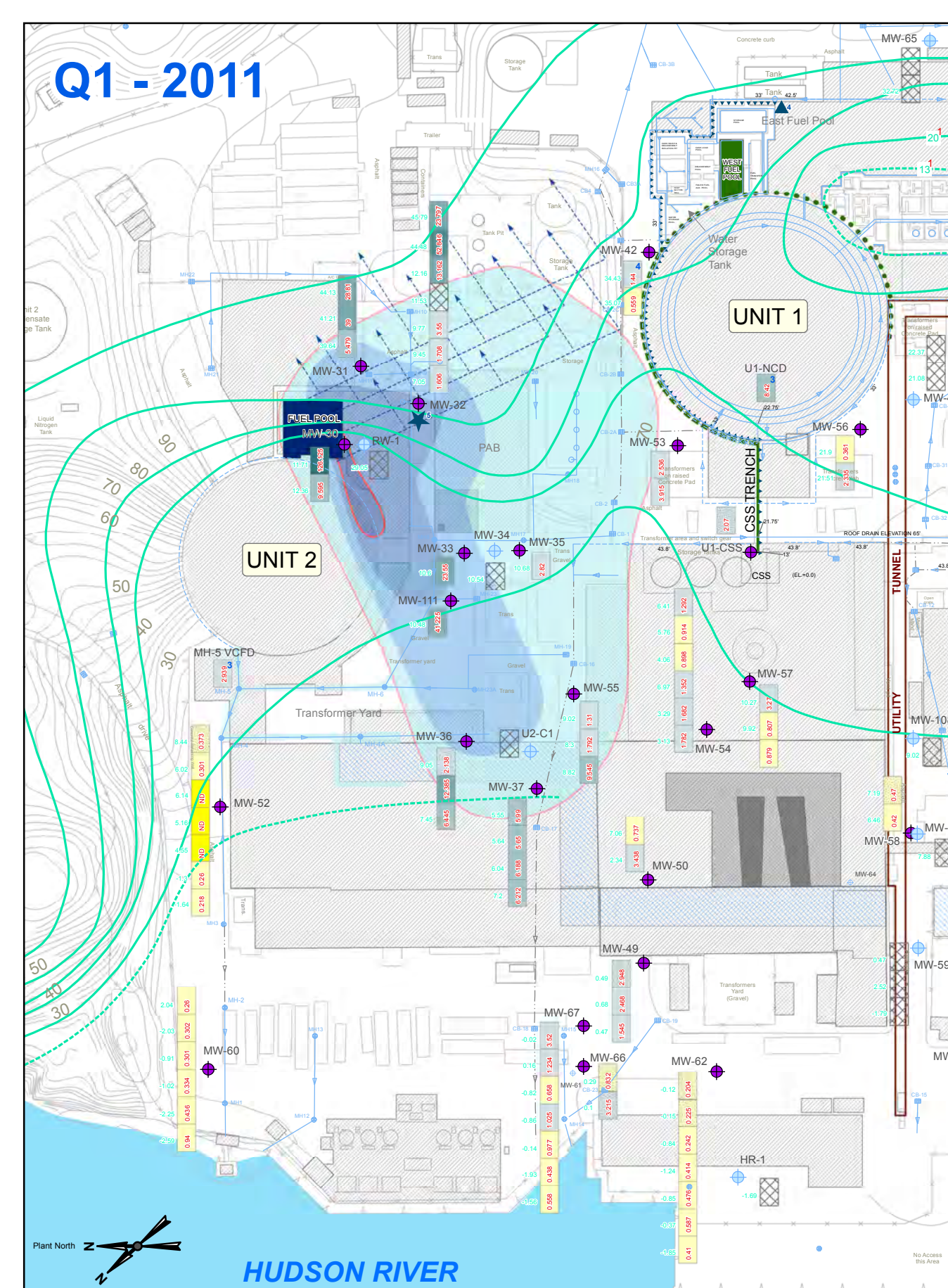
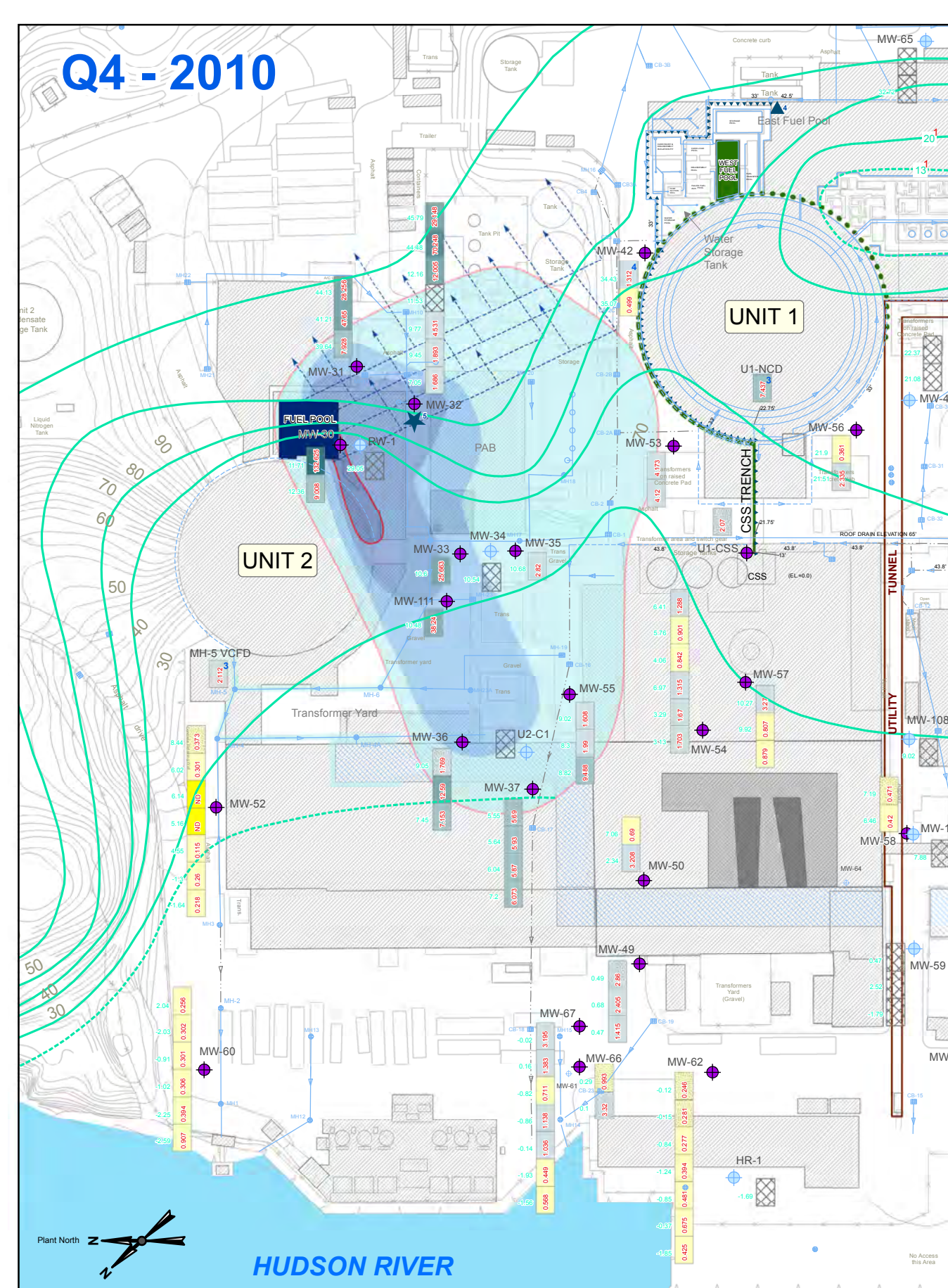
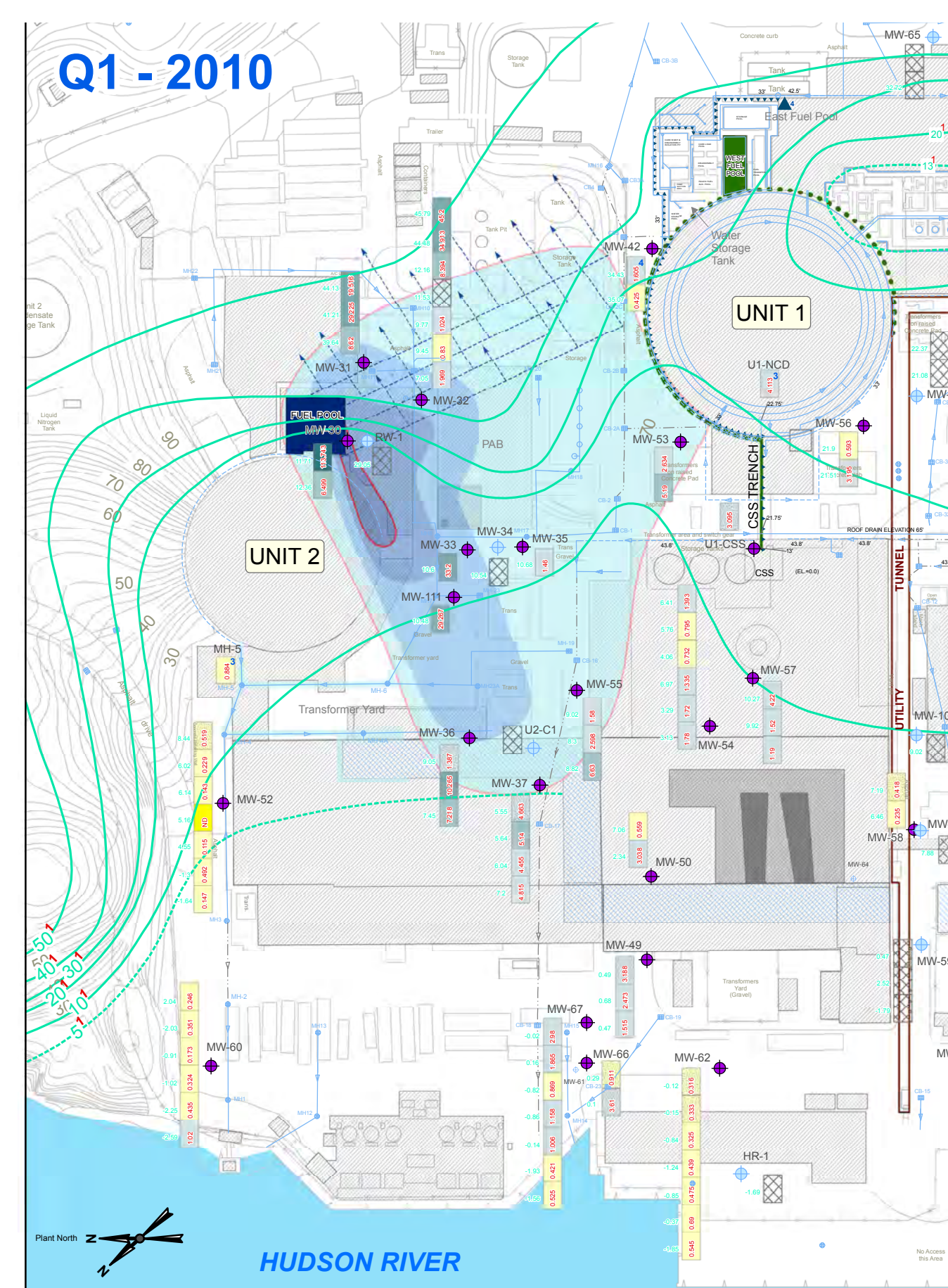
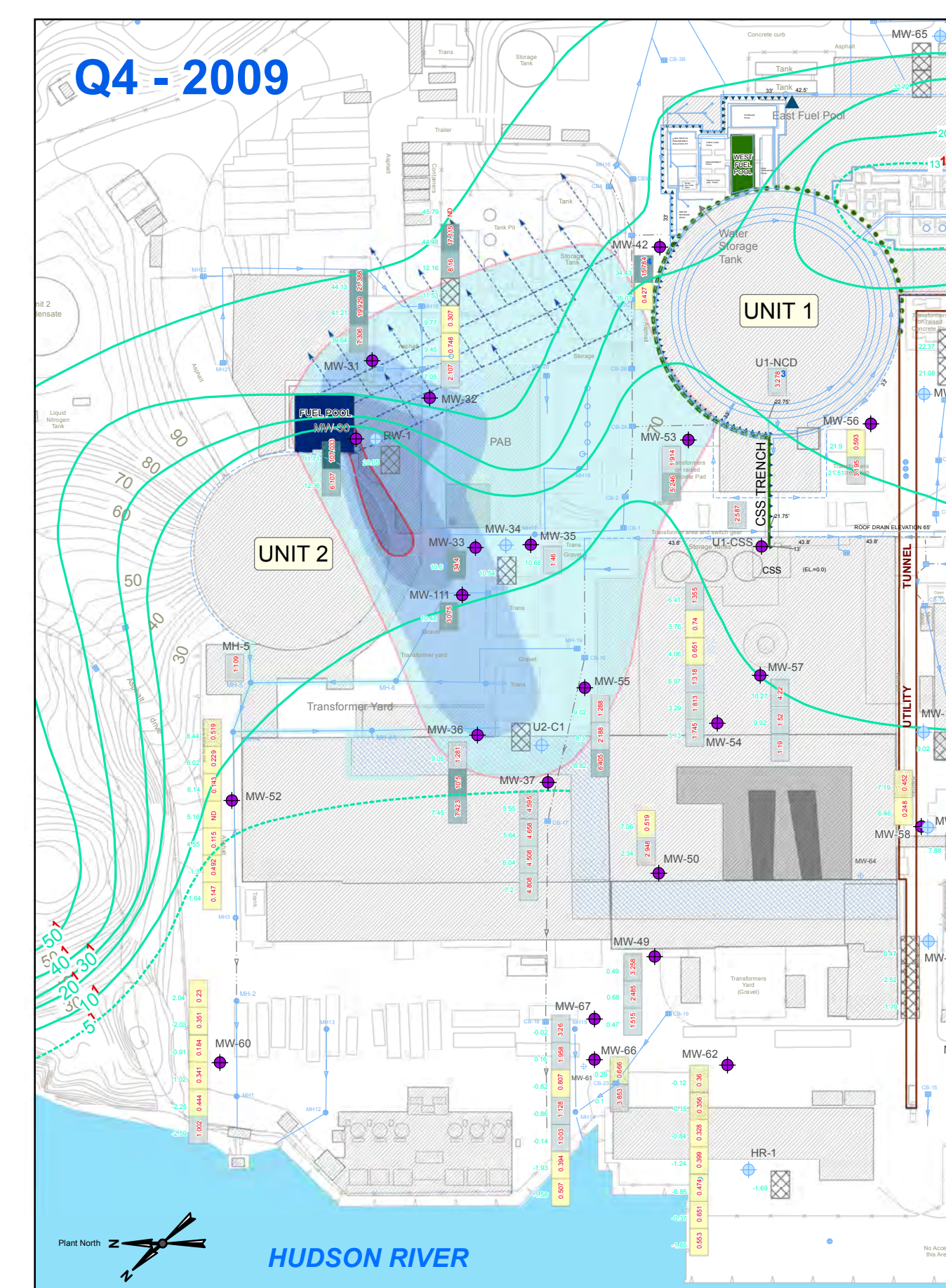
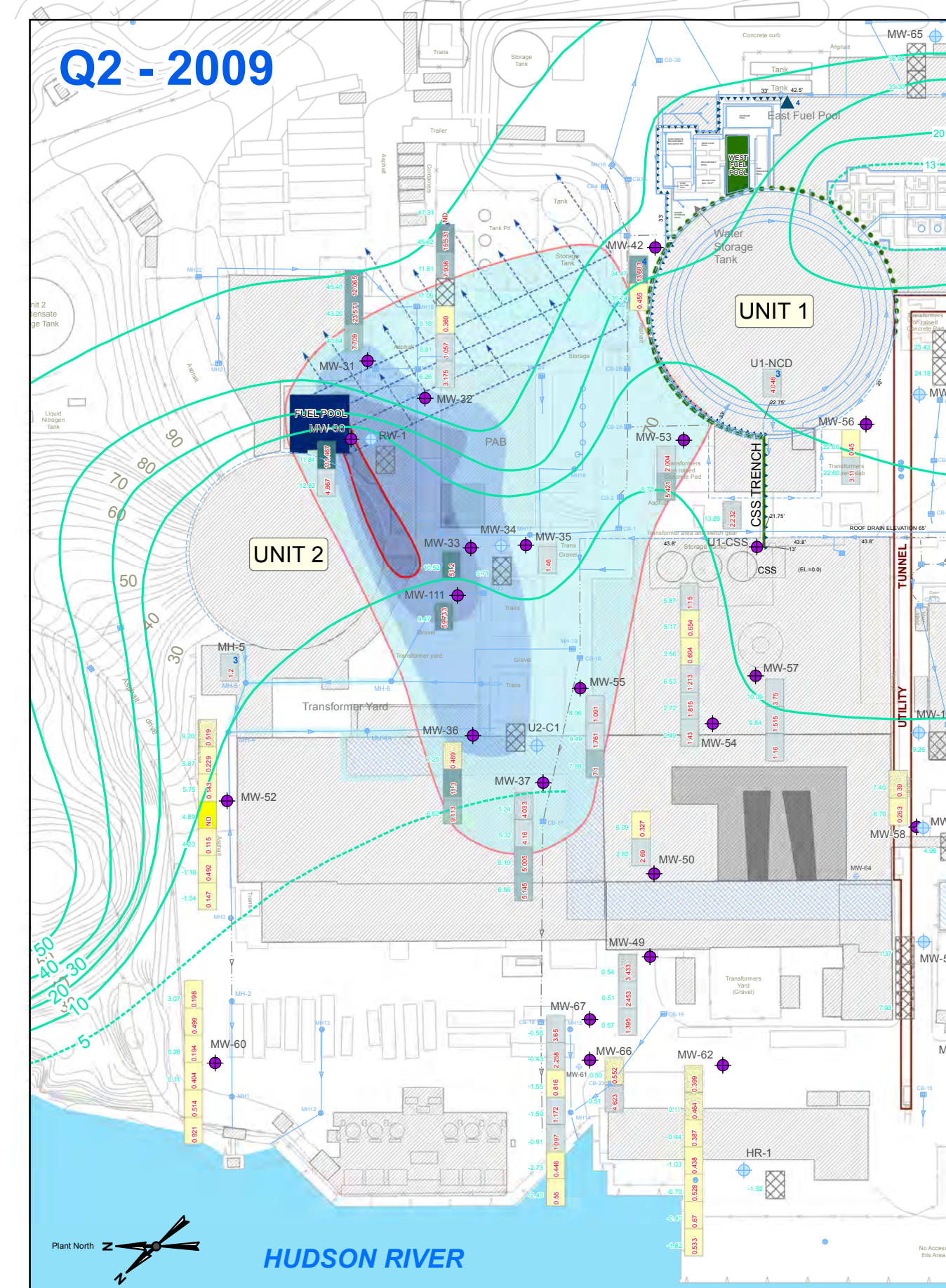
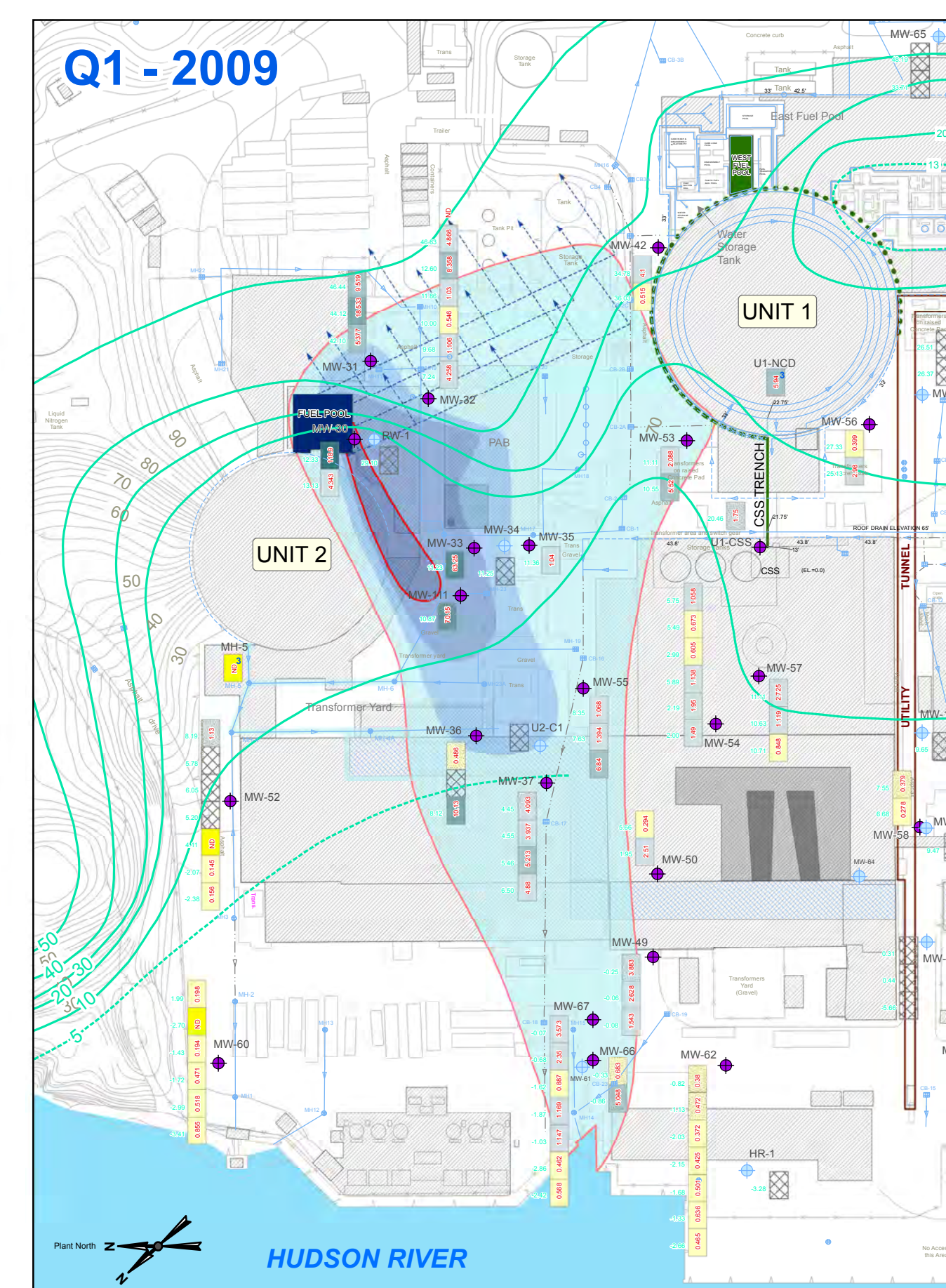
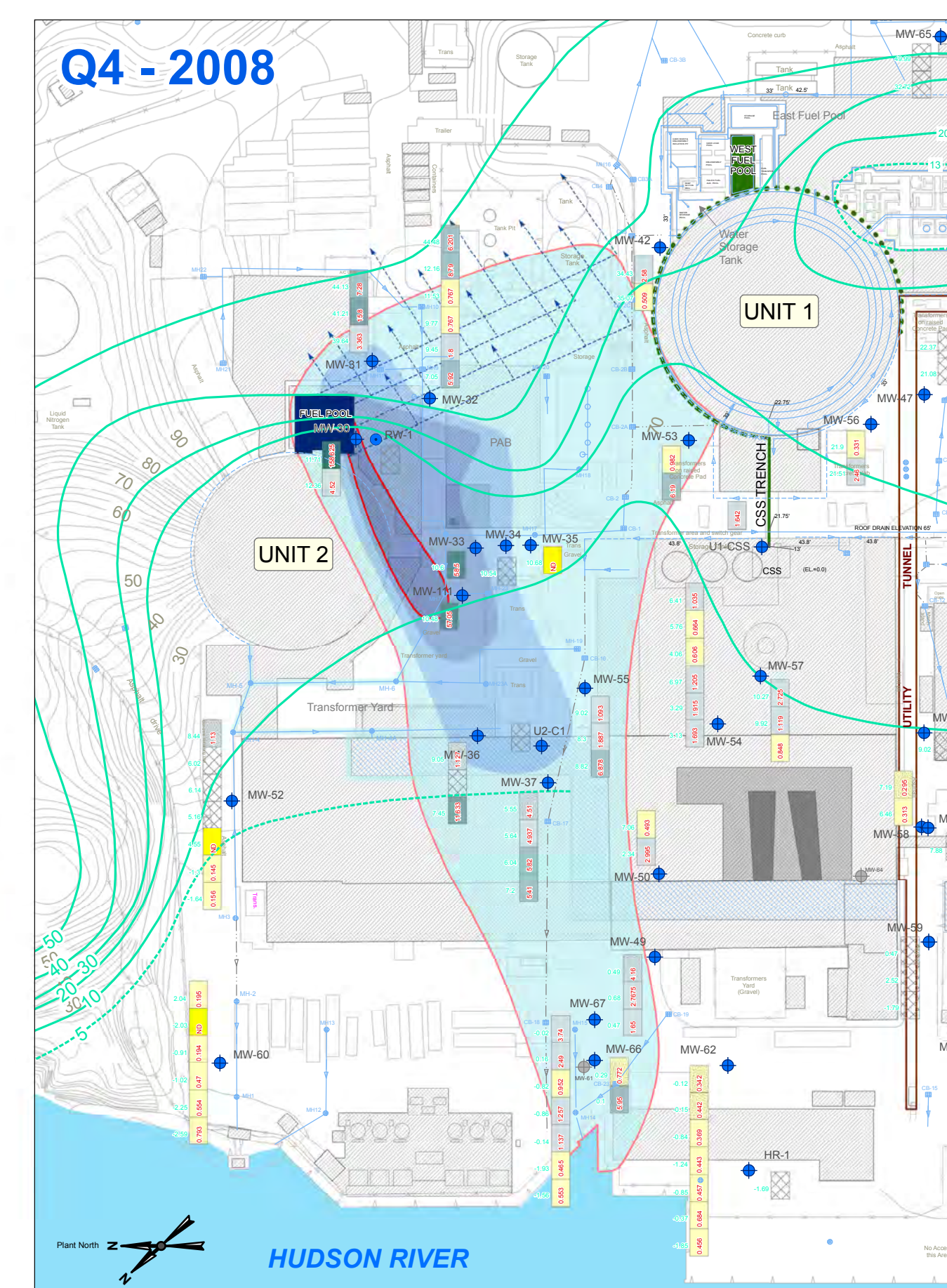
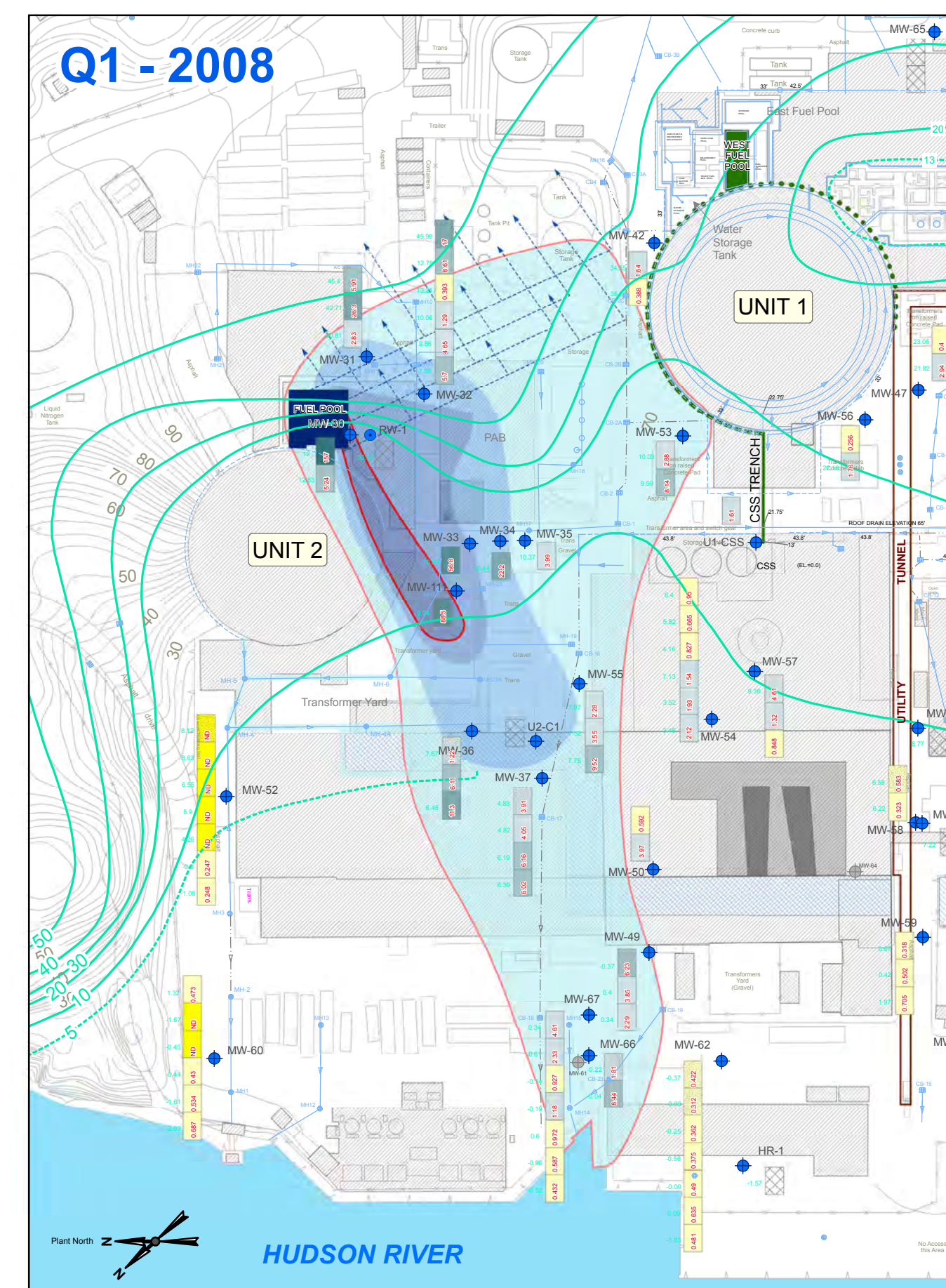
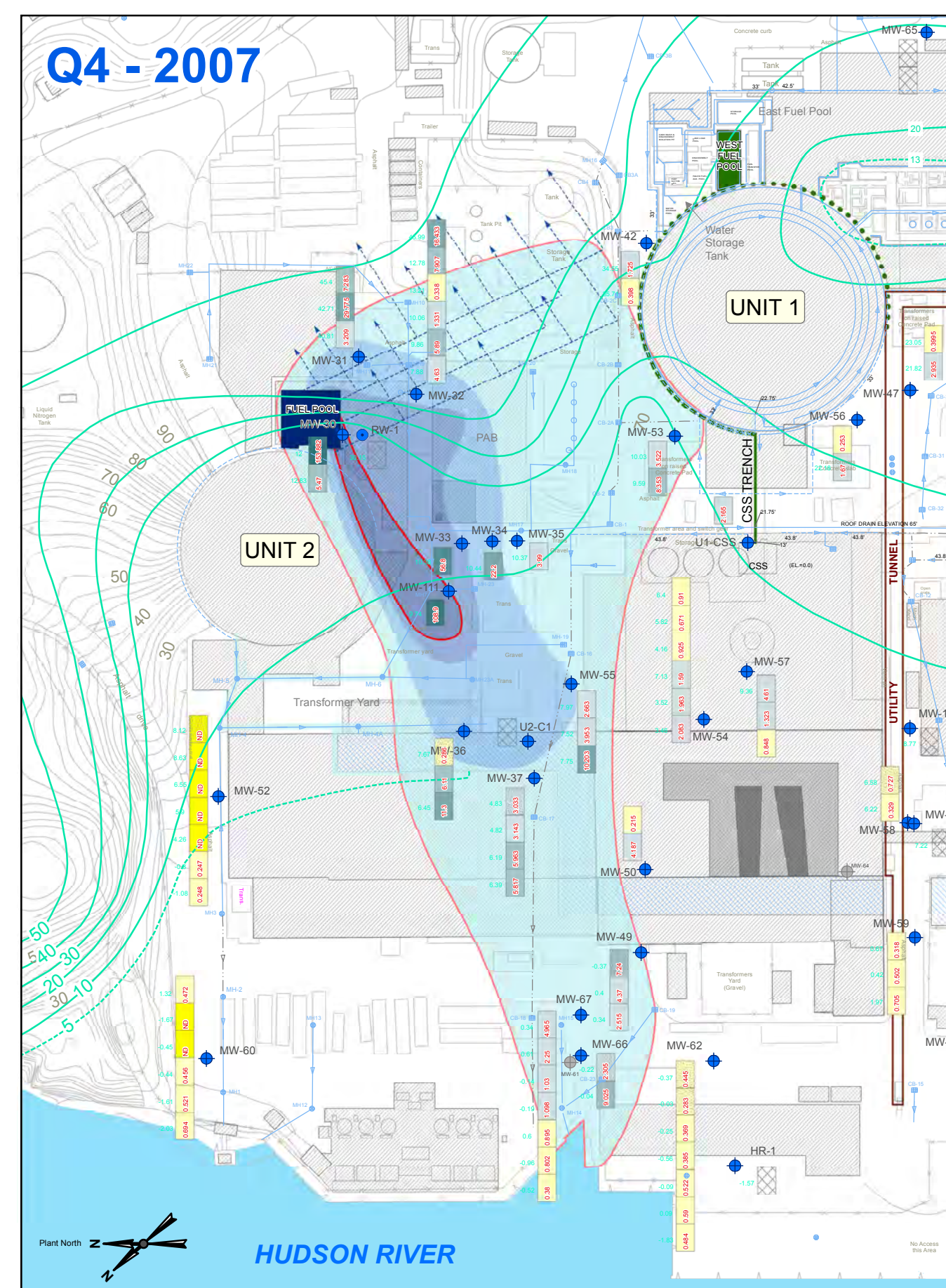
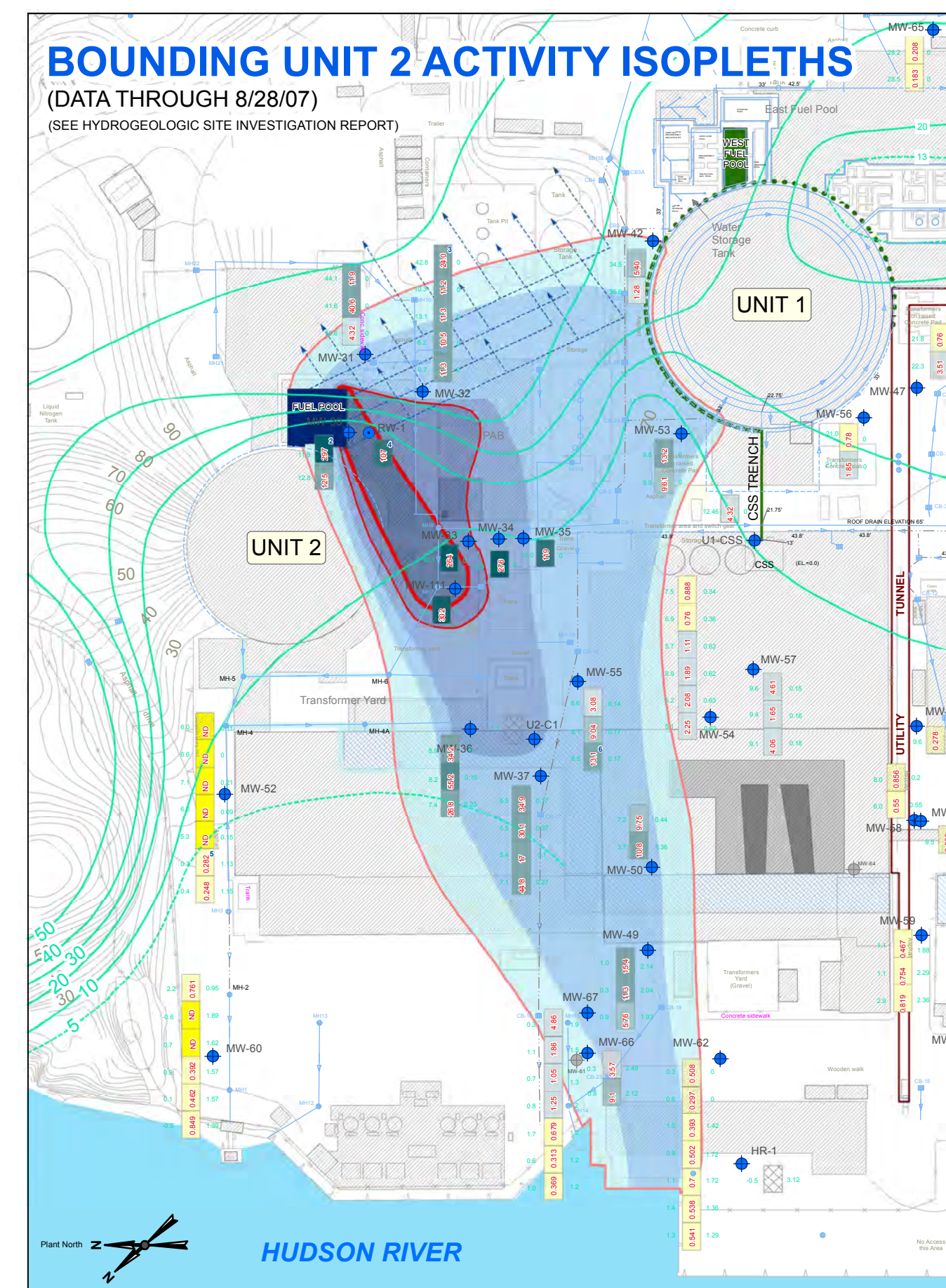
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INDIAN POINT ENERGY CENTER
BUCHANAN, NEW YORK

TEMPORAL TRENDS IN UNIT 2 ROLLIN AVERAGE TRITIUM ACTIVITY MAPS

Proj. Mgr.: MJB Designed By: MJB Reviewed By: MJB Operator: EDC	Dwg. Date: 03-20-2015	Figure No. 6
	Job No.: 01.0017869.92	

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- MW-30 Boring / Monitoring Installation Designation
 - Longterm Radionuclide Monitoring Installation
 - Standby Radionuclide Monitoring Installation
 - Active Storm Drain
 - Abandoned Storm Drain
 - Catch Basin
 - Footing Drain

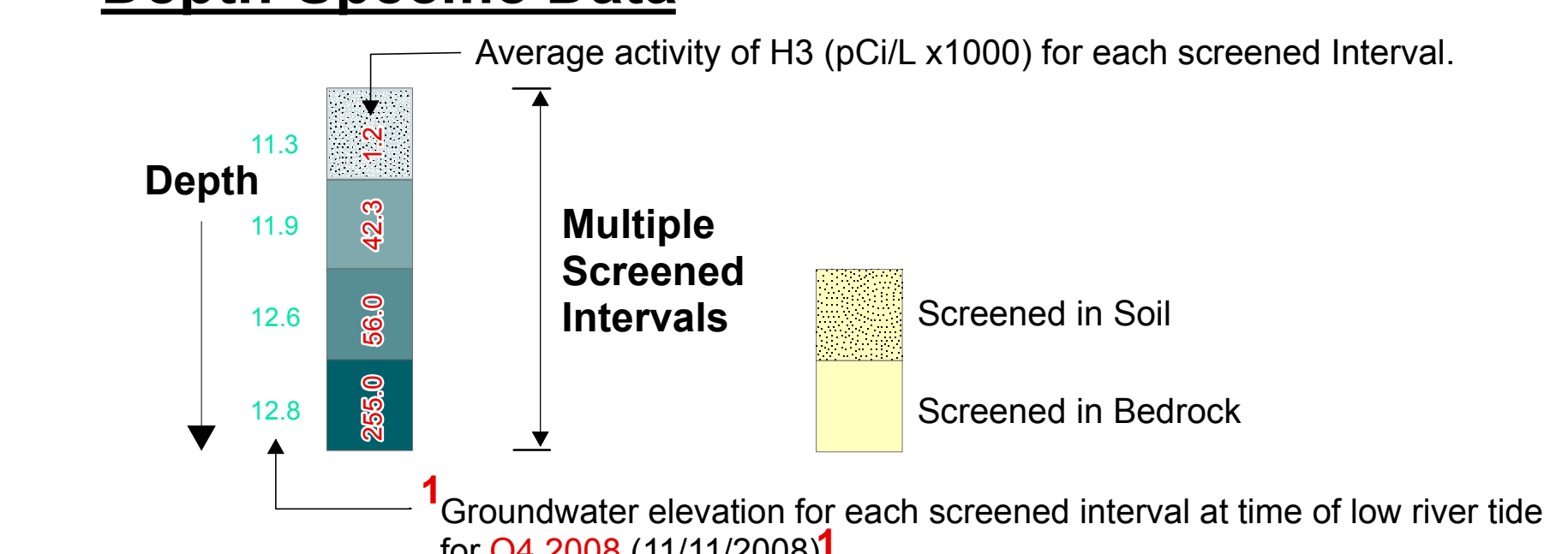
Localized Transient Releases

- ▲ 4 Transient Distillate Tank Valve Leak in Unit 1 Fuel Storage Building - 3/07/2009
- ★ 5 Transient Spill from Temporary R.O. Skid Piping - Entered MW-32 Vault and MH-9 - 11/21/2009
- ◆ 7 Sample Sink Overflow - Unit 1 Chemical Systems Building - Q2 2011
- 8 Unit 2 MOB Drain Leak - Q2 2012
- ⊗ 9 Unit 1 Containment Spray Annulus (CSA) Overflow
- 10 Unit 2 Fan Building 51' Floor Drain Overfill















Probable Legacy Release SSCs

- Unit 2 Fuel Pool
(All identified leaks repaired as of December 2007)
- Unit 1 West Fuel Pool
(All U1-SFPs drained and inactive as of October 2008)
- ///----- Terminated Connection To Storm Drain
- Drain Exfiltration
- Inter-Structure Joint / Mud Mat
- _____ Containment Spray Sump Trench

Depth-Specific Data





Activity Data^{1,2}

- | Bar Graphs; Average H3, pCi/L | | Isoleths; Average H3, pCi/L | |
|---|---------------------------|---|-------------------|
|  | No Depth-Specific Samples |  | 5,000 - 10,000 |
|  | Not Detected (ND) |  | 10,000 - 50,000 |
|  | ND - 1,000 |  | 50,000 - 100,000 |
|  | 1,000 - 5,000 |  | 100,000 - 250,000 |
|  | 5,000 - 10,000 |  | >250,000 |
|  | 10,000 - 50,000 | | |
|  | 50,000 - 100,000 | | |
|  | 100,000 - 200,000 | | |
|  | > 200,000 | | |

Note: Illustration of contaminant plume is a schematic representation only. In reality, the geologic bedrock formation is over 99% solid, crystalline rock, with the contaminated water contained only in the remaining (less than 1%) interstitial space (i.e. fractures).

Groundwater Elevation Contours

- 
 20 — Ambient "Watertable" Contours for Q4 2008 (11/11/2008)
 5 - - - - - Contours Other Than 10' Interval

 Vadose Zone Contaminant Transport

Notes:
1. Groundwater contours drawn from Q4 2008 groundwater data to show groundwater conditions used for recalibration of the Precipitation Mass Balance Model (see Q2 2009 LTM Report). These contours developed from limited data recorded on 11/11/2008. Actual elevations may vary from conditions shown and the actual distribution of piezometric heads is likely more complex than indicated.

4. Data Notes:

- a. Quarterly Tritium isopleths and activity values are yearly rolling arithmetic averages of the current and preceding three quarters' data. Only values greater than the MDC are used in this average, thus adding a degree of conservatism to the subsequent data computations.
- b. The levels of Contaminant Run Rate (CRR) are based on the 1995-2000 period. The CRR is defined as the ratio of the average tritium level, with the contaminated water contained only in the remaining (less than 1%) interstitial space (i.e. fractures).
- c. The levels of drain sample contamination are based on the following:
- d. Historically elevated Tritium levels in MW-42-49 observed during Q2 2009 were consistent with leakage visually identified on 03/07/2009 (and terminated immediately thereafter) from the waste disposal tank valves located within the Unit 1 fuel storage building. Data trends through Q1 2010 indicate that the observed Tritium in MW-42-49 and downgradient wells associated with this release had dissipated through the groundwater flow system.
- e. Elevated levels of Tritium detected in MW-9 and MW-10a during routine 80-100 Fluorim Pump sampling on 11/5/2010 appears to have originated from the same event that caused the release of Tritium from the Unit 1 fuel storage building. This release was not observed on the well used for MW-32, and may have penetrated the well casings and entered the subsurface around the monitoring installation.
- f. Please refer to Figure 6 for the drawn Unit 1 Tritium plume isopleths. The likely causation of the Q2 2011 Tritium increases in multiple Unit 1 monitoring wells is attributed to a transient release of Tritium from the Unit 1 fuel storage building. This release was not observed on the well used for MW-32.
- g. Elevated levels of Tritium initially detected in U1-CSSS, MW-39, MW-54, MW-56 and MW-57 during the Q2-2011 sampling event appear to have originated from a Q2 2011 Sample Siphon Overflow and subsequent floor flooding in a Unit 1 Chemical Storage Building the quarter on the 53 level.
- h. Elevated levels of Tritium detected in U1-CSSS during Q2 2011 may have originated from a release of Tritium from the Unit 1 Fuel Storage Building Maintenance Outbuilding (MBO) drain line. This double ended, stainless steel line was used to service the R.O. skid at its new location in the MBO during the 2012 Unit 2 refueling outage.
- i. Elevated levels of Tritium detected in MW-42-49 and MW-53-62 and U1-CSSS during the Q4 2013 sampling event appear to have originated from an overflow of the Unit 1 Containment Spray Accumulation (CSA).
- j. Elevated levels of Tritium detected in U1-CSSS and supplemental samples from MW-31 and MW-32. Release originated from a 2011 floor flooding of the Unit 2 Fan Building 517 during Q4 2014 refueling outage discharge of RCS drain down to a partially obstructed drain.

1. Base map was developed from an untitled electronic file provided by Badey and Watson Surveying and Engineering, P.C., Dated 2/3/06; CAD file name: "GZA.dwg".

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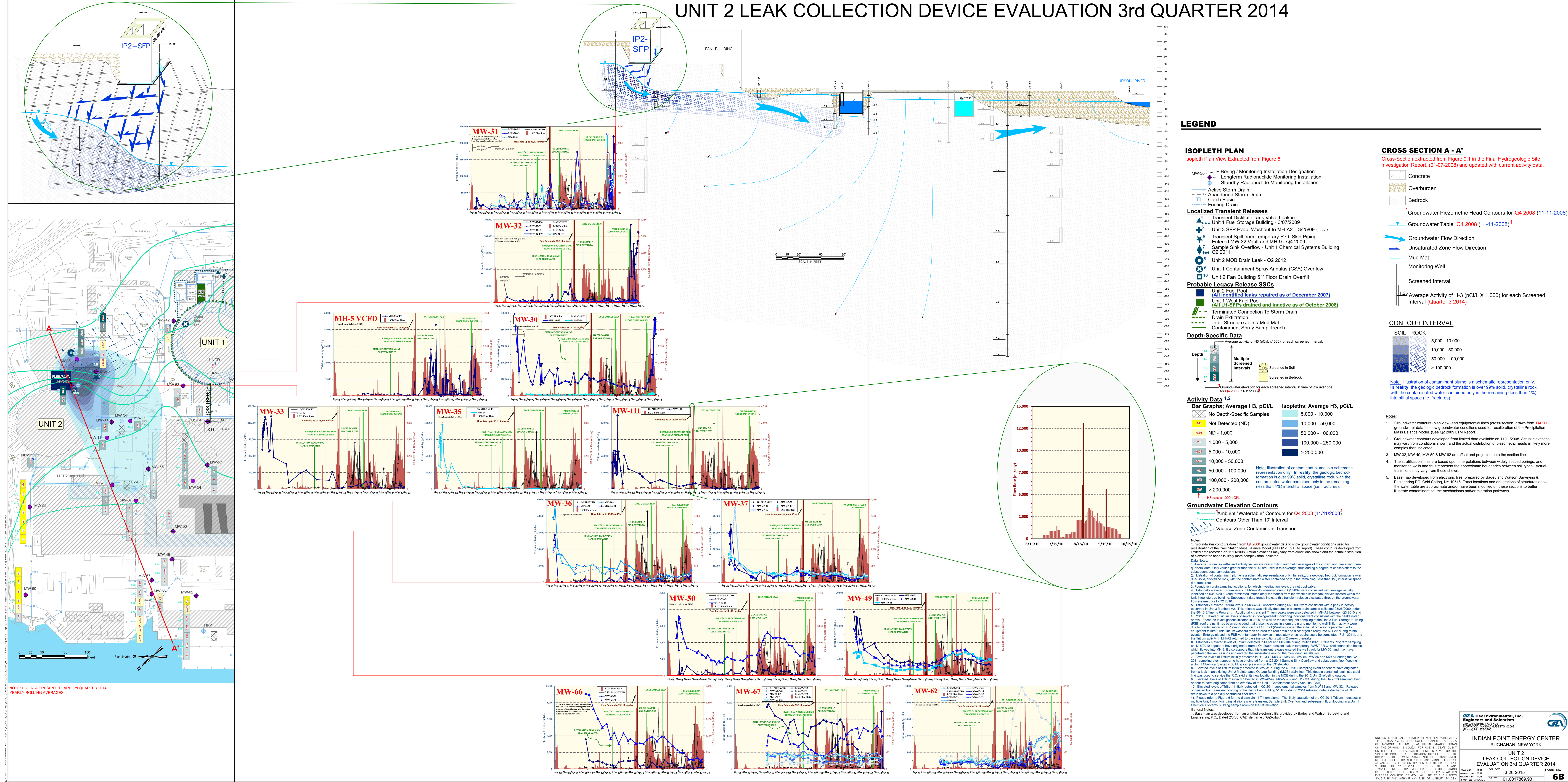
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TEMPORAL TRENDS IN UNIT 2 ROLLING AVERAGE TRITIUM ACTIVITY MAPS

Proj. Mgr.: MJB Designed By: MJB Reviewed By: MJB Operator: EDC	Dwg. Date: 03-20-2015 Job No.: 01.0017869.92	Figure No.: 6A
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UNIT 2 LEAK COLLECTION DEVICE EVALUATION 3rd QUARTER 2014



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