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**BP Cherry Point Refinery**  
**4519 Grandview Road**  
**Blaine, WA 98230**

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Subject: Investigation and Response Plan Cherry Point Refinery Oily Water  
Sewer

## ***INTRODUCTION***

The Washington State Department of Ecology (Ecology) has issued a Dangerous Waste Management Permit for Corrective Action (Permit) to the BP Cherry Point Refinery (CHP) for the period 1 August 2020 through 31 July 2030. CHP's corrective action obligations under the Permit are defined in Agreed Order Docket No. 16296 (attached to the Permit). The Agreed Order requires CHP to conduct an interim action at the Oily Water Sewer (OWS). The interim action includes the following generalized scope of work elements:

- Inspect all main trunk lines of the OWS for evidence of releases or threatened releases.
- Address the cause of an identified release or threatened release.
- Implement interim remedial actions, if necessary, consistent with the requirements of the Model Toxics Control Act (MTCA), RCW 70.105D, and its implementing regulations at Washington Administrative Code (WAC) 173-340.
- Document and report interim action work.

The Investigation and Response Plan presented herein was prepared consistent with the requirements of Agreed Order part VII.A. The plan sets forth CHP's approach to 1) investigating the OWS and 2) responding to any releases discovered during the investigation work.

## ***PROGRAM SCHEDULE***

Figure 1 shows the main trunk lines of the refinery OWS that are subject to corrective action under the Permit. Figure 1 also shows the year during which specific segments of the main trunk lines will be inspected and assessed for potential releases. The schedule addresses 100 percent of the main trunk lines over the course of the 10-year program. Deviations from the schedule may occur if problems arise in other segments of the sewer system.

## ***INSPECTION PROCEDURES, METHODS, AND CORRECTIVE MEASURES***

Sewer inspection and integrity assessment occurs as follows.<sup>1</sup>

- A section of sewer targeted for inspection is isolated.
- The isolated section is cleaned by hydraulic jetting until all surfaces of the pipe are visible for the camera inspection.
- The cleaned section is inspected using an inspection camera in general accordance with NASSCO guidelines. The progression of the camera is monitored and adjusted in real time by the camera operator to assure thorough video documentation of pipe surfaces.
- The camera inspection report is reviewed to identify any irregularities that indicate a potential release.
- A recording of the camera inspection is kept as documentation of the inspection.

Damaged piping is either replaced or relined. A majority of the OWS main trunk lines have been relined using cured-in-place lining technology. Manholes are replaced or epoxy coated if found to be damaged. Repaired or relined sewers are pressure tested to verify integrity. All of these activities are classified as civil work, for which design, construction, and testing must comply with BP Site Technical Practices. The Site Technical Practices are BP's technical/engineering guidelines that draw on accepted industry standards as appropriate (e.g., ASTM, ANSI, AWWA) and are used to specify proper components, construction and testing regimens.

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<sup>1</sup> Health, safety, waste management, and logistical coordination with CHP operations for the OWS corrective action work required by the Agreed Order are captured in project-specific work orders and permits.

Each situation is case-specific often requiring a unique engineered solution. The design engineering for each project is subject to approval by a structural engineer. Engineering drawings, work packages/orders, permits, and any associated project close-out documentation are stored in the Engineering Department's project files.

### ***PROCEDURES FOR DETERMINING WHETHER A RELEASE HAS OCCURRED***

Where inspection identifies a potential release from the OWS, CHP will undertake a screening-level soil investigation for evidence of a release.<sup>2</sup> The following investigation approach will be implemented consistent with Ecology's Guidance for Remediation of Petroleum Contaminated Sites (Publication No. 10-09-057; hereafter referred to as the "Guidance") and standard industry practice.

The screening-level soil investigation may include, but is not limited to, the following:

- Collect one or more samples of soil proximate to and below the elevation of the potential release location using one of the following methods as appropriate for the case-specific circumstances:<sup>3</sup>
  - Test pit - backhoe
  - Boring - direct-push, hand auger, power auger
- Screen soil sample(s) for presence of petroleum hydrocarbons:
  - Visual and olfactory evidence

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<sup>2</sup> A release may also be indicated or detected during routine operations, maintenance, or construction work at the refinery. CHP staff and contractors are required to contact the CHP Environmental Department if indications of contamination are observed. Under such circumstances, a CHP Environmental Department representative or qualified contractor will determine whether investigation, assessment, release reporting, and corrective action is required consistent with the methods and procedures described in this plan.

<sup>3</sup> Access limitations may influence the sample location.

- Photoionization detector (PID), organic vapor analyzer (OVA), or similar technology
- Sheen test
- Field fluorescence or similar technology

If field screening suggests that a release has occurred, then a sample of soil will be collected from the most concentrated area for laboratory analysis to verify the field screening results. Testing will be based on Tables 7.2 and 7.3 of the Guidance. If the analytical results from the screening sample exceed MTCA Method A clean-up levels for one or more contaminants, then additional soil sampling will be conducted to evaluate nature and extent as discussed below.

### ***RELEASE REPORTING***

CHP will provide written notification to Ecology within 90 days of discovering the release of a hazardous substance that may threaten human health or the environment. The report will be prepared consistent with the requirements of WAC 173-340-300(2)(a), which requires the following information:

- Identification and location of the hazardous substance release;
- Circumstances of the release and the discovery;
- Any remedial actions planned if known at the time a release is reported and consistent with interim action work plan preparation and submittal provisions (Section VII.B of the Agreed Order).

### ***PROCEDURES FOR EVALUATING THE NATURE AND EXTENT OF SOIL CONTAMINATION***

A site characterization to evaluate the nature and extent of soil contamination will be initiated if the screening-level investigation suggests a release from the OWS. The primary objective of the characterization will be to gain information of sufficient abundance and quality to inform interim action decision-making.

The technical approach and procedures for the soil characterization are common to all MTCA investigations and have been practiced at CHP for many years. To the extent practicable from health, safety and access perspectives, samples of soil will be collected from test pits or borings (as

previously described) consistent with the conceptual site model and sampling and analysis considerations described in the Guidance. CHP will prepare an abbreviated sampling and analysis plan for each soil characterization consistent with the Guidance.<sup>4</sup> The plan will project numbers and approximate locations of samples horizontally and vertically, sample collection methods, contaminants of concern to be analyzed, analytical methods, and QA/QC requirements. The plan will include testing for contaminants of concern that could have been in the wastewater conveyed by the particular section of piping covered by the plan (for example, PFAS chemicals). The plan (and any adjustments to the plan made in the field) will be retained as part of the characterization project record.

Depending on release-specific circumstances, CHP will endeavor to complete the soil characterization within 90 days of release discovery and report the findings in the initial release report to Ecology (see previous section). Otherwise, CHP will seek to complete the soil characterization work within 180 days of release discovery. CHP will keep Ecology informed of any potential schedule changes.<sup>5</sup>

### ***METHODS FOR ASSESSING WHETHER GROUNDWATER HAS BEEN IMPACTED***

Evidence of groundwater contamination may be obtained during the soil characterization or during a separate investigation specific to groundwater.

An opportunity may arise during the soil characterization work (described previously) to assess whether groundwater has been impacted by a release from the OWS. Where feasible, for example, a groundwater sample may be collected directly from an open test pit or soil boring using a bailer, peristaltic pump, or other [U.S. Environmental Protection Agency-approved sampling methodology](#).

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<sup>4</sup> The sampling and analysis plan does not need to be submitted to Ecology for review and approval.

<sup>5</sup> The Agreed Order allows Ecology to approve requested schedule changes for individual releases.

If groundwater cannot be sampled during the soil characterization work, one or more temporary or permanent monitoring wells will be constructed, developed, and sampled in accordance with WAC Chapter 173-160. New wells will be located within or slightly downgradient of the release site considering access restrictions and proximity to refinery process structures/equipment. Monitoring wells will be constructed with screen in the upper-most water bearing unit. Groundwater samples will be analyzed at a state-certified laboratory for contaminants of concern discovered during the soil characterization work.

CHP will prepare an abbreviated groundwater sampling and analysis plan for each groundwater investigation consistent with the Guidance.<sup>6</sup> Plans will specify sample locations, sampling method(s), contaminants of concern to be analyzed, analytical methods and QA/QC requirements. The plan will include testing for contaminants of concern that could have been in the wastewater conveyed by the particular section of piping covered by the plan (for example, PFAS chemicals). Samples will not be filtered following collection in the field and before analytical testing. The sampling and analysis plan (and any adjustments to the plan made in the field) will be retained as part of the characterization project record.

## ***PROCEDURES FOR DETERMINING THE NATURE AND EXTENT OF GROUNDWATER CONTAMINATION***

### ***Site Geology and Hydrogeology***

The geology and hydrogeology at and proximate to the refinery are summarized here as context for the groundwater investigation discussion. Detailed documentation on facility geology and hydrogeology is located in Ecology's administrative records.

The refinery is built primarily on Bellingham Drift, a massive, brown to blue-gray, unsorted sandy to silty clay with scattered pebbles and occasional boulders and is up to 80 feet thick. The Bellingham Drift is subdivided into the upper weathered unit and the lower unweathered unit and is underlain by

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<sup>6</sup> The sampling and analysis plan does not need to be submitted to Ecology for review and approval.

Deming Sand. Deming Sand is a brown to gray, stratified, well sorted, medium to coarse sand with layers of clay, silt, and gravel. The contact between the Bellingham Drift and the Deming Sand is irregular and the Deming Sand thickness is not well defined. A thin and variable silty to sandy unit overlies the Bellingham Drift at many locations in the refinery.

The unweathered Bellingham Drift is a low permeability aquitard. The variable unit and weathered Bellingham Drift, which together comprise the upper aquifer, have limited permeability. Groundwater elevations across the refinery decrease from approximately 110 feet above mean sea level (MSL) in the southeast corner to 30 feet above MSL in the northwest corner. The potentiometric surface generally parallels the topography. Groundwater in the upper Bellingham Drift flows to the northwest across most of the refinery. On the southern border of the refinery, groundwater flows west to southwest. Groundwater levels are generally highest between January and April and lowest between September and October. Depth to groundwater generally ranges from 3 to 15 feet below ground surface.

The presence of low permeability soil beneath the refinery acts as a natural barrier that retards the movement of contaminant releases from the OWS. The estimated velocity of groundwater in the Bellingham Drift is less than 5 feet per year. This beneficial condition reduces the potential for significant contaminant migration in the event of a release.

### *Existing Monitoring Well Network*

CHP has a groundwater well network (Figure 2), the purpose of which is to monitor shallow groundwater conditions near the facility perimeter and at interior release (MTCA) sites. Wells in this network may be useful for monitoring any impacts to groundwater that may be identified during the OWS corrective action program.

### *Construction and Use of New Monitoring Wells*

If an impact to groundwater from the OWS is confirmed, then groundwater proximate to and downgradient of the release site may be monitored depending on release-specific conditions. A minimum of three new or existing wells will be used for this purpose: one located in the source area, one downgradient of the source area, and one well upgradient or sidegradient to

the source area.<sup>7</sup> Well screens will be set to the target depth of the shallow aquifer identified in the investigation. The screen will be set to capture the anticipated seasonal fluctuations observed during several decades of groundwater monitoring at the refinery.

Monitoring will be initiated at a frequency of quarterly for at least one year. Samples will be analyzed at a state-certified laboratory. Sample analyses will be for contaminants that were detected above MTCA Method A cleanup levels during the soil characterization.

If no contaminants are detected above MTCA Method A clean-up levels for four consecutive sample periods and concentrations are stable or decreasing, CHP will request that Ecology approve discontinuing the monitoring. If longer-term monitoring is necessary (e.g., low or declining concentrations that exceed cleanup levels), then the sampling frequency may be reduced until concentrations decline below cleanup standards (i.e., by natural attenuation) and are stable or decreasing for four consecutive sample events.

### ***INTERIM ACTION WORK PLAN***

Provisions for submittal of interim action work plans are described herein. In accordance with the Agreed Order, the following timeframes apply for work plan submittals to Ecology:

- Within 60 days of completing the site characterization and before initiating a presumptive interim action;<sup>8</sup>
- Within 120 days of completing the site characterization and before initiating a non-presumptive interim action.

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<sup>7</sup> Information on such monitoring will be provided in 1) the groundwater sampling and analysis plan described above in the section “METHODS FOR ASSESSING WHETHER GROUNDWATER HAS BEEN IMPACTED” or 2) the INTERIM ACTION WORKPLAN (i.e., the next section below).

<sup>8</sup> Presumptive actions are described in Exhibits C and D of the Agreed Order.



The work plan for a presumptive interim action will include the following information:

- Results of the site characterization;
- A site-specific description of the presumptive interim action CHP intends to implement;
- Procedures for remediation of contaminated soil and contaminated groundwater; and
- The schedule for implementing the presumptive interim action.

Ecology pre-approval of the work plan and interim action is not necessary for a presumptive interim action.

If CHP chooses to implement a non-presumptive interim action, the work plan will provide the following information as required by WAC 173-340-430(7):

- Details regarding the interim action that will be implemented, such as site description, conceptual site model, and site characterization results;
- Sampling and analysis plan;
- Evaluation of cleanup standards;
- Description of interim action;
- Proposed schedule for implementing the interim action;
- Compliance monitoring; and
- Description of the reporting and documentation required during the interim action.

### ***MEASURES FOR MANAGING SOIL AND GROUNDWATER CONTAMINATION IN INACCESSIBLE AREAS***

CHP will maintain records (including figures or maps, as appropriate) showing the estimated extent of contamination exceeding cleanup levels where remedial actions are incomplete because of inaccessibility. If refinery capital projects enable inaccessible contamination to be accessed, then CHP will complete remedial actions to the extent feasible and consistent with the interim action work plan prepared for the specific release. Such supplemental actions will be documented and reported to Ecology in the annual report. Longer term (e.g., if and when the refinery closes), any remaining contamination from OWS releases will be addressed similarly.

Tools for managing the risk of contaminant migration are described in previous sections. In particular, the interim action workplans will identify and discuss the occurrence and potential risks posed by residual/inaccessible contamination. Depending on the circumstances groundwater monitoring may or may not be necessary. Any actions necessary and undertaken to prevent contaminant migration would be documented as described in the next section. If necessary, an environmental covenant may be instituted as an institutional control measure where additional cleanup actions are deemed impracticable.

### ***DOCUMENTATION PROCEDURES***

CHP follows standard industry practices to document inspection dates, findings, the location of a release, the cause of a release or threatened release, corrective actions or interim measures taken or planned, and areas where soil or groundwater contamination is left in place. The requirements of the Agreed Order are consistent with the requirements for documenting information for releases regulated and managed under MTCA. Documentation tools include field notebooks/logs, geographic information systems, databases, and internal CHP operations and maintenance recordkeeping. Environmental data collected under the Agreed Order will be submitted to Ecology in both printed and electronic forms consistent with Section VIII.E. of the Agreed Order.

### ***FINANCIAL***

Due to the unknown costs of current or future cleanup corrective actions, CHP is not required to obtain, nor has it obtained, financial assurance for the operation of the OWS or related releases. If in the future financial assurance becomes necessary, CHP will finance corrective actions in amounts equal to or greater than the amount of the probable corrective action cost estimates. Financial assurance is provided through one or a combination of financial instruments, in accordance with state regulatory requirements. CHP currently uses an irrevocable letter of credit to satisfy most financial assurance requirements. In addition to the letter of credit, CHP may also establish a standby trust fund. These trust funds have been implemented at similar refineries owned by BP. The letter of credit is typically issued for a period of at least 1 year and automatically renews. If the corrective action cost estimate

increases to an amount greater than the amount of the letter of credit, CHP will increase the letter of credit to meet or exceed the revised cost estimate and submit evidence of this increase to the regulatory agency.

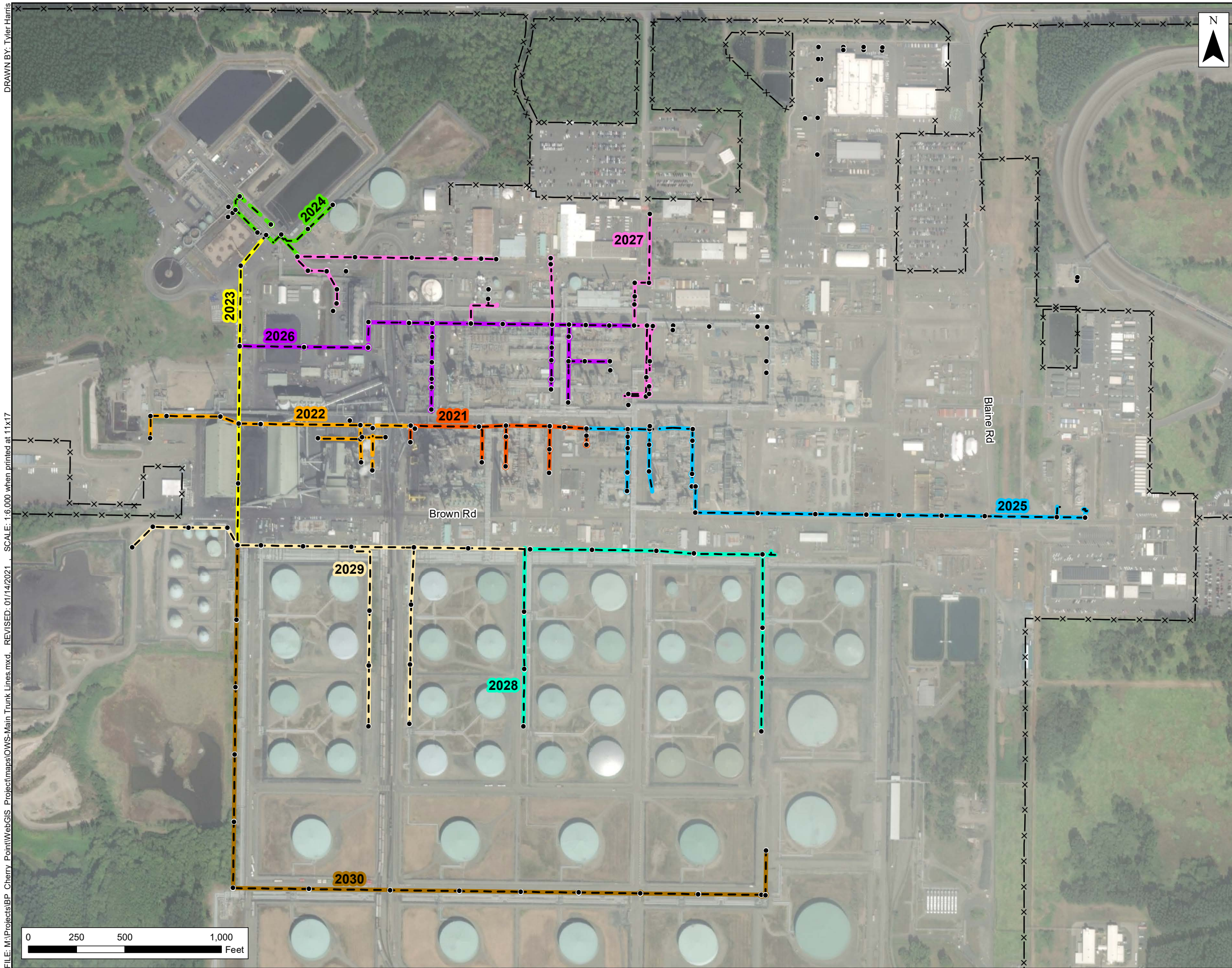
Sincerely,

A handwritten signature in black ink, appearing to read "Ken Taylor". The signature is stylized and includes a large, sweeping flourish at the end.

Ken Taylor  
Environmental Superintendent  
BP Cherry Point Refinery

DRAWN BY: Tyler Harris

FILE: M:\Projects\BP\_Cherry\_Point\WebGIS\_Project\maps\OWS-Main Trunk Lines.mxd . . . SCALE: 1:9,000 when printed at 11x17

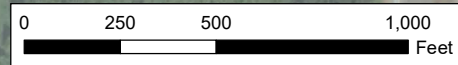


**Legend**

- Oily Water Sewer Manholes
- - - Oily Water Sewer Piping (Main Trunk Lines)
- x-x-x Fenceline

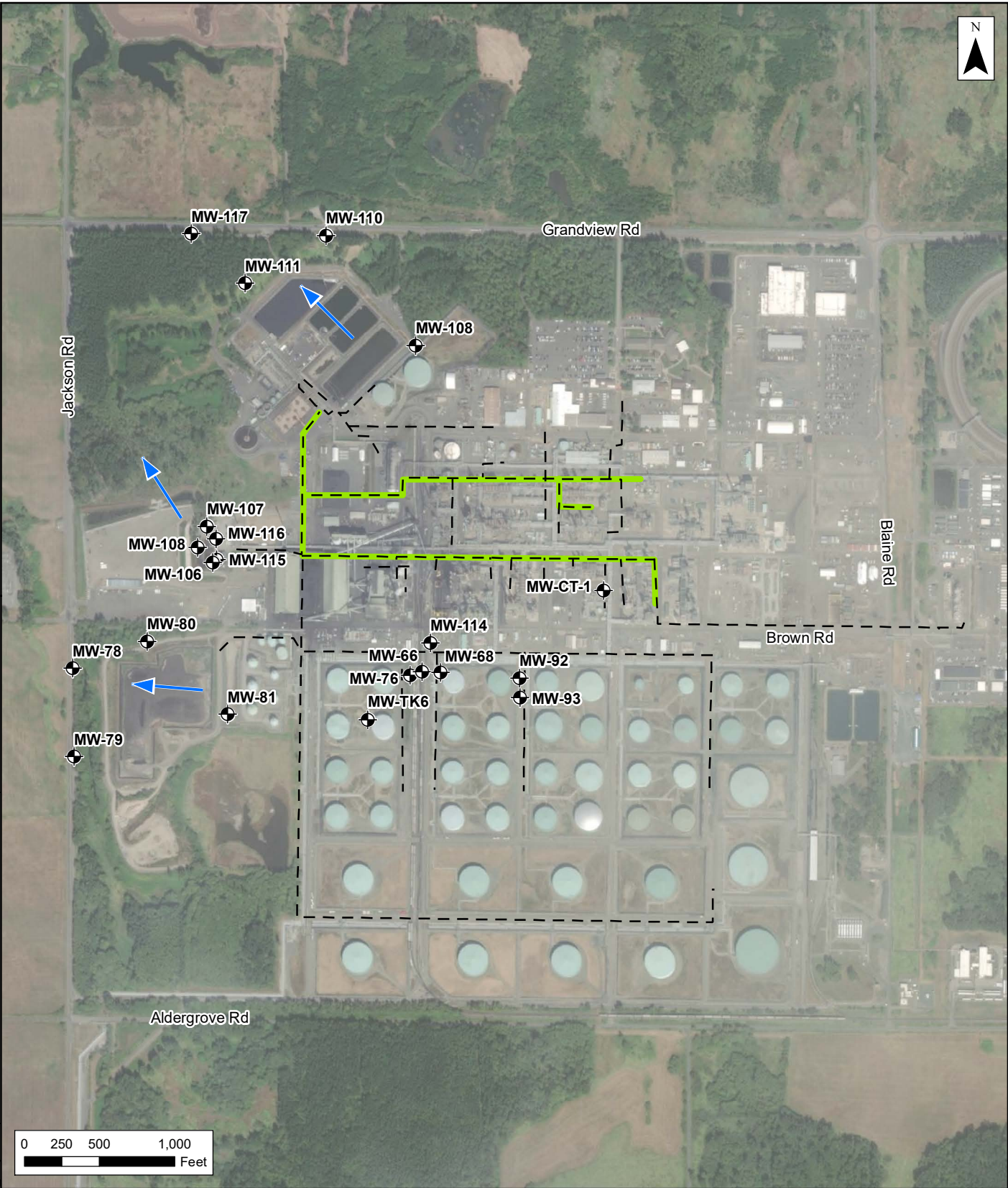
**Main Trunk Line Segments Inspection and Assessment Year**

- 2021
- 2022
- 2023
- 2024
- 2025
- 2026
- 2027
- 2028
- 2029
- 2030



**Figure 1**  
**Oily Water Sewer - Main Trunk Lines**  
 BP Cherry Point  
 Ferndale, Washington

Source: Esri - World Topographic Map; NAD 1983 UTM Zone 10N



**Legend**

- Monitoring Well Location
- Groundwater Flow Direction
- Oily Water Sewer Piping
- Lined Oily Water Sewer Piping

Note:  
 All Oily Water Sewer Piping marked on the drawing was inspected and repaired, as needed, as part of the BP Cherry Point Sewer Integrity Program established in 2006.

**Figure 2**  
**Oily Water Sewer Piping and**  
**Monitoring Well Network**  
 BP Cherry Point  
 Ferndale, Washington