Ocean Wind
An Ørsted & PSEG project

Appendix P – Inadvertent Returns Contingency Plans

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Offshore Horizontal Directional Drilling Inadvertent Return Contingency Plan- BL England

Inadvertent Returns Contingency Plan

Prepared for Ørsted

Ørsted Ocean Wind Project

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Project Introduction

Ørsted (Ørsted or Company) proposes to install 32-inch outside diameter (OD) HDPE conduits for encasing a subsequent cable installation that will ultimately transfer electricity generated by an offshore wind farm to the intended onshore locations for distribution. Ørsted has determined the horizontal directional drill (HDD) construction method is currently preferred for the HDPE pipeline shore approach installations at each of the locations identified herein. HDD crossings ranging from approximately 356 meters to 762 meters in horizontal length are currently planned for a total of five locations to install the utility beneath the shoreline and seabed.

Inadvertent Returns Contingency Plan Purpose

The goal of this Inadvertent Returns (IR) Contingency Plan is to identify measures that will be taken prior to or during construction to control, contain, and collect any inadvertent drilling fluid returns and minimize impacts to environmentally sensitive areas. This IR Contingency Plan also summarizes the steps taken on the front end to determine feasibility for the HDD construction method, assess IR potential, and account for the identified subsurface conditions in design and planning of the proposed HDD crossings. In addition, this Plan outlines preventative measures and protocols established for reducing the probability, frequency, and severity of IRs. Project drawings and specifications also provide details of the HDD portion of the project. If required by the Contract Documents for specific HDD crossings, the selected HDD contractor also should generate site-specific contingency plans to augment these minimum requirements and address site-specific items based on its planned means and methods. The contractor(s) responsible for the work must adhere to this Plan and the approved, site-specific contingency plan during the entire HDD construction process.

The specific objectives of this Plan are to:

1. Minimize the potential for a drilling fluid release associated with HDD activities.
2. Protect environmentally sensitive areas.
3. Provide for the timely detection of indicators for drilling fluid loss and/or detection of IRs to the surface.
4. Establish proper protocols for monitoring, reporting, containing, cleaning, and reporting IR events.
5. Establish ground rules for contractor reactions to IR events, including resuming of work.
6. Ensure an organized, timely, accurate, and efficient response in the event of a release of drilling fluid; and
7. Ensure appropriate notifications are made immediately to designated Company project and environmental field support. Company will be responsible for notifications to appropriate regulatory agencies.

Drilling Fluids for HDD

HDD is a common method used to install underground utilities through heavily developed areas, roadways, waterways, steep slopes, shore approaches, and environmentally sensitive areas to minimize the surface disturbance that traditional open-cut trenching methods typically require. HDD construction generally limits disturbances along project corridors with intent to achieve a reduced workspace footprint in comparison to open-cut installations. HDD construction methods typically involve three phases:

1. The first phase involves a smaller diameter pilot hole drilled or jetted along a designed drill path.
2. After completion of the pilot hole, the hole is enlarged (or reamed) to a diameter that will accommodate the HDD carrier pipe and then prepared for pullback.
3. Finally, the HDD carrier pipe is pulled back into the reamed hole.

Drilling fluid is an essential component for all phases of HDD operations, and typically consists of 4 to 8 percent bentonite in solution with 92 to 96 percent fresh water. All three phases of HDD construction involve the utilization of a circulating drilling fluid that provides the following functions:

- **Hydraulic Excavation:** Excavates softer soils along the drill path by high velocity fluid streams dispensed through jet nozzles installed in bits or hole opening tools.
- **Hydraulic to Mechanical Power Transfer:** Provides the power required to turn a bit and mechanically drill a hole in dense soils and rock via a positive displacement mud motor.
- **Transportation of Solids:** Suspends excavated solids, consisting of soil or rock cuttings, and carries them to returns pits at HDD endpoints as the drilling fluid returns circulate through the hole annulus.
- **Hole Stabilization:** Creates a thin “wall cake” that stabilizes and provides a seal to the surrounding formation of the drilled hole. This is critical for HDD pipeline installation as holes are often drilled through formations highly susceptible to extracting the free, available water from the drilling fluid.
- **Cooling and Cleaning of Downhole Tooling:** Cools drill bits, hole-opening tools, and other downhole tooling. Pre-approved additives can provide support for optimizing the hole cleaning process and helping keep the bit and/or tooling clean.
- **Friction Reduction:** Reduces friction between the downhole drill string and wall of the drilled hole using the lubricating properties of drilling fluid.
- **Modification of Soil Properties:** In applicable soils, mixing of drilling fluid with the native soils along the drilled path facilitates pipeline installation by reducing the soil’s shear strength to a near fluid condition or state. The resulting soil and drilling fluid mixture can then be displaced as a pipeline is pulled through it.

Because of drilling fluid’s required use, HDD operations have the potential to inadvertently migrate to the surface (e.g. IR). These IRs happen when the drilling fluid exits the ground surface at locations other than the intended entry and/or exit. In practice, IRs typically occur in proximity to entry and exit points where near surface soils generally have lower shear strengths and soil cover is thin. IRs can also occur at locations along a drill path where there are low shear strength soils, where the depth of soil cover is reduced, or along pre-existing fractures or voids. Other locations where IRs can occur include exploratory boring locations or along the edges of existing subsurface structures, such as piles or utility poles. For an IR to occur, the drilling fluid must first migrate out of the drilled hole by means of hydraulic fracture or formational drilling fluid loss.

Formational drilling fluid losses typically occur when drilling fluid flows through pore spaces in the surrounding formation. Thus, a formation with a higher porosity, or permeability, can potentially absorb a larger volume of drilling fluid than a formation with a lower porosity/permeability. Silty sands/clays, silts, and clays typically have a low susceptibility to formational drilling fluid losses. Coarse sand and gravel units with low percentages of silt and clay have a moderate to high susceptibility for formational drilling fluid loss.

The term “hydraulic fracture” describes a situation where downhole drilling fluid pressures exceed the confining overburden pressure and shear strength of surrounding soil along the drill path. Soils most

vulnerable to hydraulic fracture include relatively weak cohesive soils (soft clays) or loose granular soils with low shear strength. Medium dense to very dense sands and very stiff to hard silts and clays typically have a low to moderate hydraulic fracture potential. HDD installations with greater depths of cover or where the drill path is situated in formations with higher shear strength may have reduced potential for hydraulic fracture and IR.

Proper management of drilling fluid properties can reduce the potential and/or severity of drilling fluid loss. In some cases, the use of drilling fluid additives is warranted to improve drilling fluid properties and overcome challenging or problematic subsurface conditions. Prior to construction, the HDD contractor will develop a drilling fluid management plan, including planned drilling fluid composition and any proposed additives to account for subsurface conditions anticipated at the crossing location. The Company will review and approve additives proposed by contractors, associated Safety Data Sheets (SDSs), and the plans for implementation prior to use. No additives shall be approved for use if they are not also approved by local, state, federal, or any other regulating bodies having jurisdiction at an HDD crossing location.

Pre-Construction Measures

The primary objectives of this section are to:

- Assess the probability of inadvertent returns occurring as it relates to proposed geometrical design.
- Establish measures for reducing the probability of IRs to occur, and
- Identify procedures intended to minimize severity of IRs.

The following subsections outline the steps that have been and will be taken prior to construction to achieve these objectives.

Feasibility Assessment

HDD crossings can only be considered feasible if the installations can achieve success with a presumptive level of risk acceptable by all parties. In addition, the geometric and geological conditions must be conducive to the current technology's capabilities. Front-end engineering and design (FEED) has been completed to support the presumed feasibility for pursuing HDD construction at the relevant crossing locations. In addition to evaluating subsurface conditions for conduciveness to the HDD construction method, the FEED initiatives consider IR risk due to subsurface conditions, assuming responsible construction practices and suitable equipment are utilized. FEED completed for these crossings was intended to evaluate the site-specific conditions and included:

- Site reconnaissance by conducting a site visit to the crossing locations in order to evaluate the suitability and feasibility for design and construction using the HDD construction method.
- Site surveys for existing utilities and surface features that may impact HDD construction activities and delineated wetlands in the vicinity of the alignment.
- A site-specific geotechnical investigation with geotechnical borings along the alignment, extending to depths below the planned profile elevation. Subsequent lab testing was completed on select samples and a geotechnical data report generated for the borings.
- A constructability evaluation accounting for the surface and subsurface conditions identified at the proposed crossing location. The findings from the constructability assessment have been incorporated to the extent practical given all other project constraints and requirements to develop an HDD design for the HDD crossings.

Design

An HDD design has been completed for each of the crossings that accounts for the site-specific conditions and constraints identified through FEED. The HDD designs are considered geometrically feasible and aligned with criteria established for acceptable resulting pipe stresses during installation and operation. As well, the mindset of reducing frequency and severity of inadvertent returns (with elevated focus on environmentally sensitive areas) has been incorporated in the design process. The current designs range in horizontal length between 356 meters and 762 meters, extending to depths beneath the shoreline and/or seabed as identified on the drawings.

Hydraulic Fracture and Inadvertent Returns Analyses (HFIA)

Hydraulic fracture and inadvertent returns analyses (HFIAs) have been completed, based on the final approved design, and identified subsurface conditions at each of the crossing locations, to estimate anticipated annular pressures and formation limit pressures and determine the probability for inadvertent returns to occur along the planned alignment. Estimated annular pressures, formation limit pressures and corresponding factors of safety calculated at regular intervals along the alignment can be referenced in the HFIA Report (Appendix 1) and used by the contractor during construction to compare against annular pressures collected during the pilot hole operations. As such, areas of elevated risk can be pre-identified before construction and indicators of potential fluid loss from the hole and/or subsequent IRs can be identified and addressed during construction.

Note: The geotechnical data report is appended to the HFIA Report for reference of subsurface conditions.

Execution Plans

The Company will verify the design documentation (inclusive of geotechnical data collected in the design phase) has been received by the HDD contractor and reviewed for evaluation and understanding of the site conditions expected to be encountered. The HDD contractor will utilize this information to provide a detailed and site-specific Drill Plan to the Company for review and approval prior to construction. The Company will review the plan for consistency with appropriate methods aligned with reducing potential for IRs and adherence to any site-specific agency requirements having jurisdiction at the crossing location. Construction methodologies that must be outlined in the contractor's plans include, but are not limited to:

- Anticipated pump rates and pressures
- Anticipated penetration rates
- Planned trips and/or hole sizing initiatives to relieve annular pressure
- Any preemptive containment/pressure relief measures (if applicable)
- Equipment and tooling
- Pilot hole plan
    - Bottom hole assembly (BHA) components (including an annular pressure tool)
    - Pilot hole dimensions for bit, BHA, drill pipe, and any other tools that will be inserted downhole
- Reaming plan, including stages and final hole size
- Pullback plan, including pullback assembly components
- Drilling fluid composition and properties, including safety data sheets (SDSs)
    - All drilling fluid additives proposed for use must be reviewed and approved prior to construction

- Disposal Plan, including reporting and documentation procedures.

Worksite Preparation

The following preparation measures will be taken by the HDD contractor prior to and maintained throughout the HDD construction process:

- Prior to construction, the work areas and the delineated sensitive area limits identified (wetland boundaries, setbacks, etc.) will be marked with stakes or flags. The HDD contractor will place erosion and sediment controls on down-sloping sides of the work pads and around the drilling fluid returns pits as a preventative measure against drilling fluids leaving the work sites.
- A list of any pre-identified sensitive areas near each of the alignments where access and/or methods for containment and cleanup may be limited will be generated by the HDD contractor. Pre-approved means and methods for overcoming the pre-identified challenges will be outlined in the Drill Plan described above.
- Staging areas for containment, cleanup materials and equipment will be placed within available workspaces and located strategically (and between entry and shoreline if needed) by the HDD contractor for timely use if necessary. The materials staged on site may include, but are not limited to those items listed in Appendix 2.
- Secondary spill containment will be installed beneath the HDD rig(s) and power unit(s) such that any hydrocarbon leaks can be contained and cleaned.
- Drilling fluid return pits will be in place at the HDD endpoints to prevent drilling fluid from leaving the workspaces at the entry and exit points. The HDD contractor will place silt fences, wattles, or other appropriate measures along the downgradient boundaries of the pits and workspaces onshore. Offshore pits will be constructed to capture all drilling fluids released at the exit end of the crossings over the course of construction. It is noted that excavations shall not be made until approval to proceed with construction is granted by the Company and any applicable agencies.
- The SDSs for all anticipated, and pre-approved, drilling fluid products will be kept on site.
- This IR Contingency Plan will be staged on site during construction and will be readily available for review by the project team and applicable agencies if requested.

Pre-Construction Meetings

Before HDD construction commences, an environmental safety meeting or pre-construction meeting will take place to establish, for all parties (Company, inspection team, contractor, etc.), familiarity and understanding of the requirements set forth by this Plan as well as any additional agency requirements having jurisdiction. For any conflicting requirements between this Plan and any similar plans that apply to the project, the more stringent shall govern the work. The HDD contractor's site supervisor shall verify a copy of the contingency plans are available (on site) and accessible to all construction personnel and Company representatives. The site supervisor shall also verify all contractor employees are properly trained and familiar with the necessary procedures for response to a drilling fluid release prior to commencement of drilling operations.

Before approval is granted to proceed with construction activities, a Company representative will verify the following and document on the pre-HDD checklist:

- The construction limits are clearly marked.
- The sensitive resources within and adjacent to the construction workspace are flagged.
- All required clearances and setbacks related to sensitive features have been obtained.
- Any required coordination with jurisdictional regulatory agencies has occurred.

- The erosion and sediment controls are appropriate for the current and expected conditions, are installed, and are functioning properly.
- The spill response kit is at the drill site and properly stocked.
- The appropriate response equipment is on site and in good working order (minimum required equipment is listed in Appendix 2); and
- The on-site briefing described above with the HDD contractor and HDD inspector has been conducted.

Prevention Measures

The primary objectives of this section are to:

- Establish proper protocols for drilling fluid and equipment monitoring, recording, and reporting.
- Establish on-site inspection responsibilities and ensure competent personnel are assigned.
- Mandate construction means and methods that will be used to reduce probability for IRs to occur; and
- Provide for the timely detection of indicators for drilling fluid loss and/or detection of IRs to the surface to minimize environmental impacts.

Monitoring Protocols

The HDD contractor shall make every effort to maintain annular circulation of drilling fluid to the endpoints of the HDD crossing and reduce the potential for IRs throughout the entirety of construction. In addition, the contractor shall take the following monitoring procedures to reduce the likelihood for an inadvertent return to occur during construction and reduce the severity of impacts from an inadvertent return event.

- Incorporate a working annular pressure tool as a primary component of the BHA during pilot hole operations. Consistently monitor annular pressures observed while drilling and record the maximum and average annular pressures observed for each joint drilled or jetted. Compare the annular pressures observed to anticipated pressures along the drill path, and when annular pressure(s) are observed that may compromise and/or exceed estimated formation limit pressures, make every effort to reduce downhole annular pressures and maintain full annular circulation without inducing a hydraulic fracture and/or inadvertent returns. Refer to the HFIA completed for these HDD crossings in Appendix 1 for details regarding anticipated annular pressures and formation limit pressures.
- Monitor circulation of drilling fluid visually and through assessment of fluid volumes circulating through the drilling fluid system. The drill rig operators shall halt drilling operations and take corrective action(s) immediately upon detection of a loss of circulation, a drop in annular pressure, or any other indicator of fluid loss. If circulation cannot be regained, the contractor will develop a plan of action for Company review and approval prior to progressing forward.
- Monitor facilities and other sensitive areas within 300 feet of the drill path, or as specified by Company, for drilling fluid migration and release at least three times per shift or more often if any fluid migration is detected and/or slowed or loss of circulation is observed.
- Monitor and manipulate drilling fluid composition and volumes to maintain favorable properties and parameters throughout all phases of construction.

Company Inspection

Ørsted will assign a competent HDD inspector who will remain on site during the duration of HDD construction activities. The Company HDD inspector will be responsible for monitoring, documenting,

reporting, and notifying applicable parties as outlined in this Plan. The Company HDD inspector will monitor operational parameters and characteristics in real-time and record detailed documentation regarding the drilling operations and the observed materials being removed from the hole so field conditions can be compared to what is expected based on the geotechnical investigation completed in the design phase of the project. The operational details that the Company HDD inspector will record, include but are not limited to penetration rates, pump volumes, rotary torque, thrust/pull, water acquisition volumes, disposal volumes, and any problematic conditions encountered throughout the drilling process. The HDD contractor shall provide the HDD inspector access to view/monitor the equipment and instruments at all times during construction.

The HDD contractor will coordinate with the on-site HDD inspector and communicate any indicators of problematic conditions, specifically IRs, in a timely manner so the HDD inspector can assist with monitoring and notification efforts. The Company HDD inspector will document monitoring and preventative measures taken and drilling fluid flow characteristics and report to the project team any events that require notification to the agencies per this Plan. In the event of an IR, the Company HDD inspector, with the assistance of the HDD contractor, will complete the IR Incident Summary attached in Appendix 3 per the notification protocols described herein **(NOTE: There shall be concurrence from all parties including HDD contractor for all information collected and documented in the IR Incident Summary and corresponding notifications).**

Drilling Fluid Management

Proper drilling fluid management is essential for successfully completing HDD installations as well as reducing frequency and severity of IRs. The HDD contractor shall maintain favorable drilling fluid properties to reduce downhole annular pressures, to the extent practical, while successfully excavating and maintaining a stable hole. A qualified drilling fluid engineer shall remain on site for each crossing during all phases of construction to manage the drilling fluid properties and pump volumes. The drilling fluid management program shall account for and consider modifying drilling fluid density, suspension, and rheological properties as necessary to address subsurface conditions encountered. Only additives, pre-approved by the Company, may be used to manipulate the drilling fluid composition and parameters. If any new additives are proposed during construction, they will be reviewed prior to use to verify compliance with local, state, and federal agencies. SDSs for all drilling fluid additives in use will remain on site at all times.

Addressing IR Indicators

If indicators of potential IRs are observed, such as slowed/lost circulation or spikes/drops in annular pressure, the HDD contractor shall take immediate and responsible reactive measures to address the indicators. **If circulation is lost or slowed, the HDD contractor shall temporarily stop drilling activities and notify the Company HDD inspector or designee, who will make follow up notifications as required. The HDD contractor shall evaluate the drilling and site conditions to determine the most appropriate remedial actions, but must make every effort to regain full circulation to the returns pit(s) prior to advancing the construction process.** As well, the monitoring procedures shall be enhanced by performing more frequent observations, or centerline walks, and expanding the footprint of the area being observed to outside the limits of disturbance (LOD), where authorized, in the surrounding area. The HDD contractor shall increase focus on monitoring initiatives for environmentally sensitive areas. Depending on the operational conditions observed, one or more of the following construction practices may be administered as applicable or necessary:

- Retract (trip out) the downhole drill pipe string and tooling to inspect equipment and clean the hole behind the bit or hole opening tools.

- Swab a specific portion of the hole to clean and/or size the hole to clean and relieve annular pressure.
- Modify penetration rates and drilling fluid pump rates to reduce annular pressure to the extent practical so the hole can be cleaned and maintained as stable.
- Circulate drilling fluid, potentially achieving “bottoms up,” without progressing the downhole tooling forward.
- Modify drilling fluid density and/or rheological properties to perceived favorable parameters for the materials encountered.
    - Only pre-approved drilling fluid additives will be used.
    - SDS sheets for all additives and bentonite in use will be maintained on site.
- Pump approved lost circulation material (LCM) downhole to attempt to plug off location(s) where drilling fluid is escaping the hole into the formation.
    - HDD operations will be suspended to allow LCM plugs or grout to set-up as necessary.
- Install large or small diameter casing to depths required to combat poor subsurface conditions.
- Excavate pressure relief hole(s) at strategic and pre-approved (and permitted) location(s) if necessary. Note that containment and proper protocols for managing drilling fluid shall be in place at any pre-excavated pit/hole intended for directing fluid flow or relieving annular pressures.
- Increase monitoring intervals/areas.
    - Perform constant monitoring of specific area(s) along the alignment if necessary.

The Company HDD inspector will record any corrective measures taken by the HDD contractor and monitor the resulting effectiveness.

Response Measures

The primary objectives of this section are to:

- Establish protocols for contractor reactions to IR events including reporting, containing, cleaning, and resuming work.
- Execute a team-based (HDD contractor and Company), organized, timely, accurate, and efficient response in the event of a drilling fluid release; and
- Make appropriate and timely notifications to applicable contacts and regulatory agencies.

Notifications

If there is an IR or any other environmental or safety incident, the HDD contractor and HDD inspector must jointly report the incident to the designated Company representative immediately. If the designated Company representative is not immediately available, the HDD contractor and HDD inspector must report the incident to the Ørsted Project Owner.

Company Notifications

The table below provides the contact information for the Company representatives who will be notified for each IR.

Table 1: Ørsted Contacts for HDD-Related Notifications

Company	Name	Title	Phone	Email
Ørsted		Engineer/ Project Owner		
Ørsted		Construction Inspector		
Ørsted		Environmental Compliance Coordinator		
Ørsted		Environmental Lead		

[1]Requires submittal of IR Incident Summary (Appendix 3) with notification.

Agency Notifications

Notifications to applicable agencies will be executed by Ørsted.

General Response

There are multiple understood scenarios which require different levels of reactionary measures for IRs, depending on the quantities released, the IR location, and the accessibility to contain and clean up the IR. The general response procedures for any IR will be as follows:

- Drilling operations shall be temporarily ceased upon identification of drilling fluid on the surface or in waterbodies to evaluate the nature and magnitude of the IR. The estimated drilling fluid quantities released to the surface shall be evaluated with concurrence from the HDD contractor and Company HDD inspector and recorded.
- The IR shall be contained and cleaned up as required.
- If necessary, the Company will deploy a qualified professional to evaluate and report on the incident.
- In the IR Incident Summary attached in Appendix 3, the Company HDD inspector will document the details regarding the IR event and drilling operations at the time of the incident.
    - All applicable parties, including HDD contractor, shall concur with the details in the IR Incident Summary.
- The HDD contractor will prepare and transmit to Company any mitigation measures for modifications to drilling procedures, monitoring protocols, and addressing any recurring IR events.
- The appropriate verbal and/or written notifications to the Company and applicable agencies will be made.
- Drilling will resume with the necessary authorizations from the Company and applicable agencies with appropriate preventative measures in place for altering drilling practices and containing any remaining surfacing fluids (as applicable).
- Upon re-starting HDD operations, the Company HDD inspector will monitor and document any corrective drilling procedures, including modifications to drilling fluid parameters, equipment, or tooling.
- After construction is complete the HDD contractor will remove or clean up any remaining containment structures or drilling fluid in containment areas and restore the area as close to its pre-disturbed condition as possible.

Monitoring Adjustments

The monitoring protocols as required by this Plan may be adjusted if a loss of circulation or IR occurs. Within the notifications and corresponding reporting to applicable agencies, the corrective actions taken shall be documented and the revised plan for enhanced monitoring shall be described.

Containment and Cleanup

Immediately following detection of an IR at an onshore location, the IR shall be contained. The HDD contractor shall use straw bales, silt fences, sandbags, and earth berms to prevent fluid from migrating or flowing from the IR location, with focus on preventing flow towards any surface waters, environmentally sensitive areas, or outside the approved workspace. If the IR occurs within surface waters, appropriate containment measures/equipment (turbidity curtains, silt fence, sandbags, etc.), approved by the Company, shall be used to address the location, flow characteristics and depth of water. The HDD contractor shall position hoses and pumps, or a vacuum truck, near the containment structure(s) to redirect the fluid that surfaced during the IR (and any fluid continuing to migrate out of the hole) to the returns pit(s) and/or storage containers, such as vacuum trucks. Cleanup shall commence after the release is contained. Cleanup shall include removal of all visible drilling fluids located in the accessible area. Removal methods will vary based on the volume of the release, site conditions, and access. Removal equipment may include vacuum trucks, loader and track hoe buckets, small pumps, shovels, and buckets.

Containment and/or cleanup activities that would require the installation of construction matting, placement of materials in the wetland or waterway, or access of construction vehicles outside the approved workspace require approval prior to implementation except in an emergency where inaction would pose an imminent threat to human health, sensitive environment, or property. The Company will obtain landowner and/or agency permission prior to accessing locations outside of the approved workspace for fluids containment and cleanup operations. If the release occurs in an environmentally sensitive area where the containment and/or cleanup initiatives may cause additional damage, the HDD contractor and the Company shall collaborate to determine the proposed method of removal and provide corresponding plans to applicable agencies/landowners for review and approval prior to implementation. Only approved measures may be implemented.

Potential for secondary impacts from the cleanup activities shall be evaluated. The following containment/cleanup measures are considered appropriate at this time:

- By hand using shovels, buckets, and soft bristled brooms to minimize damage to existing vegetation.
- Turbidity curtains.
- Small collection pumps may be necessary to remove released fluids; and
- Vacuum (vac)-trucks to collect and remove drilling fluids as needed.

Response Close-out Procedures

After the IR has been contained and cleaned up, the following actions will be taken:

- The recovered drilling fluid will either be recycled or hauled to an approved facility for disposal. The HDD contractor shall provide Company with documented proof of disposal. No recovered drilling fluids or materials will be discharged into streams, wetlands, storm drains, or any other environmentally sensitive areas.
- Any material coming into contact with drilling fluids shall be removed to a depth where there are no visible signs of the drilling fluid material, contained and properly disposed of.

- The HDD contractor will return all containment excavations and cleanup of high ground sites to pre-project contours using clean fill and appropriate seeding activities as necessary. Cleanup procedures for areas within wetlands, streams, or other sensitive environmental areas will be on a site-specific basis in consultation with Company and regulatory agencies, if appropriate.
- All containment measures (wattles, straw bales, silt fences, etc.) will not be removed until the site is properly stabilized, and such removal is authorized by Company. Upon Company approval, the HDD Contractor will remove all containment structures/devices and recovery equipment, tools, supplies, materials, wastes, and debris.

In addition to the HDD IR Incident Summary (see Appendix 3), the HDD contractor's site supervisor and Company shall record details of drilling fluid losses or IRs in their daily log. The logs shall include any notes or details regarding containment, characterization, cleanup, or stabilization activities not otherwise captured from the HDD IR incident form attached in Appendix 3.

Construction Re-Start

The Company will be part of the re-start process in all cases. For small releases that do not reach surface waters, wetlands, or other environmentally sensitive areas, drilling may continue if the release is promptly contained and cleaned up, and the location of the IR is monitored regularly throughout the remainder of the HDD construction process.

For all other releases that are within environmentally sensitive areas or a threat to public safety, construction activities will not re-start without prior approval from Company and appropriate agency approval. IRs into environmentally sensitive areas will require at least one member of the contractor's crew to remain at the IR location throughout the remainder of the HDD construction process. In addition, the contractor will provide a plan to prevent fluid loss for the remainder of the project.

Unless the IR poses imminent danger to the environment or public safety, if the IR occurs during pullback, the installation may resume at the discretion of the Company while appropriate and pre-approved containment/cleanup measures are executed in parallel with pullback operations.

Onshore IRs

In all upland IR cases, HDD operations will be temporarily ceased while the IR is contained, and the cause and nature of the IR evaluated. The proper notifications shall be made by the HDD contractor and the Company in accordance with this document. The Company HDD inspector, with the concurrence of the HDD contractor, shall generate and submit the IR Incident Summary (Appendix 3) to the contacts identified for receiving it in Table 1. Re-start will not occur until described in this Plan.

For IRs that occur within the permitted workspace and can be easily contained and redirected to a secondary workspace containment or returns pit, the contractor shall immediately isolate the area with silt fence, wattles, or similar measures to contain drilling fluid. Containment structures or pits shall be located on high ground to keep drilling fluid from reaching environmentally sensitive areas and removal will begin by vac-truck, pumps, or hand tools. In areas that cannot be reached by a vac-truck for drilling fluid removal, a tiered system of contained areas and portable pumps will relay drilling fluid to a location accessible by a vac-truck for removal.

When upland IRs occur, the Company HDD inspector or designee will collaborate with the HDD contractor to develop an IR Response Report (inclusive of the IR Incident Summary appended to this Plan) identifying the containment, cleanup, and reactionary measures for HDD construction activities and monitoring initiatives moving forward. The Company must review and approve the IR Response Report

prior to re-start drilling activities. Additional approvals may be required by regulatory agencies having jurisdiction.

The HFIA for these crossings, which is included in Appendix 1, indicates the areas where higher risk for inadvertent returns may occur along each of the alignments. For instance, the drill paths near entry and exit are areas where the probability for IRs is increased. Temporary workspace has been extended beyond the entry and exit points above that portion of the drill paths. With this in mind, to allow for preemptive work to be employed to either reduce the potential for IR to occur or set up mechanisms such that response to and managing any potential IR can be pre-planned, expedited and organized to reduce severity of a potential incident. The HDD contractor shall be aware of these considerations and have addressed any plans in its drilling plan and/or at the pre-construction meeting.

Wetland and Surface Water IRs

The reactionary measures taken associated with IR events in wetlands or surface waters depend on the quantity of fluid released, permit requirements and the recurring nature of the IR. Because of site and project-specific variables such as distance from open water, surface hydrologic conditions, and vegetation cover, the selection of the most appropriate response methods will be made on a case-by-case basis. However, in the case of any IR in wetlands or surface waters, the Company HDD inspector or designee will collaborate with the HDD contractor to develop an IR Response Report identifying the containment, cleanup, and reactionary measures for HDD construction activities and monitoring initiatives moving forward, all of which must be aligned with permitted and approved procedures. The appropriate Company representative will complete the IR Response Report, which will contain, at a minimum:

- The completed IR Incident Summary attached in Appendix 3.
- An overview of the HDD activities at the time of the IR event.
- The designated representative's assessment of the subsurface material present where the IR occurred.
- Depth and alignment (X, Y, Z location) of the downhole tool at time of the IR.
- As-built drill path overlaid on the designed and permitted drill path.
- Proposed mitigation measures to address the IR moving forward, including, but not limited to:
    - Consideration of the use of alternative entry and/or exit points and angles,
    - Alternative depth profiles,
    - Reducing drilling fluid pressures,
    - Modifying drilling fluid composition and parameters,
    - Use of casing, or
    - Excavating pressure relief wells (where and/or if permitted).
- An analysis of the risk for continued IR(s) to occur.
- A list of notified parties.

The Company (and any applicable agencies) must review and approve the IR Response Report prior to re-start of drilling activities.

In preparation for drilling fluid reaching the surface in wetlands or surface waters that do not extend offshore, response materials shall be staged within the approved workspace and where accessible near the sensitive areas. Deployment of materials and installation will only occur when an IR event is identified, and the uses are determined appropriate by Company. If an IR occurs, drilling fluid shall be contained (if possible) and cleaned up as soon as possible. The Company HDD inspector or designee will complete

the IR Incident Summary and an IR Response Report identifying the containment, cleanup, and reactionary measures for HDD construction activities and monitoring. In doing so, the following requirements should be considered:

- The area directly affected by the released drilling fluids shall be measured or estimated. The area affected may be estimated from a distance, if access to the affected area for measurement would result in additional impacts, or if the IR location is outside the approved workspace.
- The type of impact caused by the released drilling fluids (e.g., temporary, vegetation only, permanent, change in surface hydrology) shall be characterized and documented. The Company will seek regulatory agency concurrence if required.
- The HDD contractor and Company HDD inspector shall collaborate to estimate and define the additional impacts to wetlands and/or surface waters likely to occur as a result of accessing the affected area for containment and removal of the drilling fluids. The anticipated additional impacts likely to occur if the drilling fluid were contained and cleaned per the approved plans versus a scenario where drilling operations are allowed to continue with some other mitigation strategy to reduce impacts (LCM, modifying drilling fluid parameters, etc.) in place should be compared.
- If it is determined that the released drilling fluid is to be contained and recovered, removal/cleanup plans for the contained drilling fluid shall be provided by the HDD contractor for Company (and applicable agency) review and approval prior to implementation.
- All access to the wetlands will be done in such a manner as to cause the least impacts to the vegetation and surface hydrology, and only with prior agency approval (as required). Adequate quantities of personnel and equipment necessary to successfully accomplish the task safely and in a timely manner shall be deployed.
- The HDD contractor will stage personnel to continuously monitor the IR location for timely observation and notification of changed conditions from what was initially evaluated.

In cases where the inadvertent release is within surface waters or wetlands, it may be impractical or impossible to contain and remove the release. Initially, the HDD contractor shall attempt to remove the surface release using a wand (i.e., a perforated plastic pipe attached to a suction hose). Proposed alternative methods and measures taken in these instances shall be provided by the HDD contractor to the Company for review and approval prior to implementation. The Company will coordinate with applicable agencies that may require additional approval.

If the decision is made and approved by applicable parties to forgo containment and proceed with HDD operations because a lesser impact is perceived to occur, the Company will provide personnel to continuously monitor the IR location throughout the duration of construction. The monitor(s) will observe operations, record volumes and characteristics of the IR, and periodically reevaluate the determination to continue the HDD operations until containment and removal are justified, or the HDD is complete.

Known Surface Waters and Wetlands

Where surface waters and/or wetlands exist along the HDD crossing alignments, the HDD contractor shall take the necessary steps to prepare the workspace for operations such that impacts to the wetland(s) are minimized and so that drilling fluids are contained within approved designated areas, preventing runoff or migration into additional waters and/or wetlands.

As described, above the response measures will be dictated by the characteristics of the IR if drilling fluid surfaces within surface waters. The HDD contractor should include planned methodologies for accessing, containing, and cleaning any potential IRs within surface waters and/or wetlands. However, it is understood that not all scenarios can be planned for. Assuming the IR location is accessible, the following

procedures are considered appropriate at this time and the HDD contractor shall account for them at a minimum:

- HDD contractor shall immediately cease drilling operations for investigation and impact evaluation.
- HDD contractor shall install a pre-approved (based on drill plan submittal) coffer dam (or equivalent) downstream of the IR location to contain the fluid if an IR occurs in a watercourse.
- If the flow of water within the waterbodies is too rapid for containment with one coffer dam (or equal) downstream, the HDD contractor should consider installing one or more similar structures upstream to reduce the flow and pump clean water around the affected location to maintain the water flow.
- If in a wetland, focus should be on determining estimated quantity released and footprint, plans for access, containment and cleanup and anticipated surface impacts for addressing the IR as well as concurrence from relevant regulatory agencies prior to implementation of any response.
- The Company will designate a representative to visit the site that will evaluate and report on the IR event. The designated representative will collect photographs, details of the release, location, volume released, receiving stream characteristics, and other important information and submit an IR Response Report to the appropriate Company contacts.
- The Company HDD inspector onsite and HDD contractor's site supervisor shall already have started the documentation process and the filling out of the IR Incident Summary, which is to be appended to the IR Response Report. The comprehensive team will collaborate to verify all necessary documentation is collected.
- Initial notifications shall be made per Table 1 as appropriate for the IR. Follow up reports will be submitted when complete. As noted, the Company will be responsible for agency notifications and follow-up communications.
- Removal/cleanup plans for the contained drilling fluid shall be provided by the HDD contractor and these should include the perceived most nonintrusive means to remove and clean up the drilling fluid. It is noted that plans included in the drill plan that have been pre-approved may be employed if appropriate for the conditions.
- Upon Company (and potentially agency) approval of the proposed removal plan, the HDD contractor shall initiate the approved removal/cleanup procedure(s) and transport the drilling fluid (if practical) to containment structures on high ground by hand, pumps, vac-truck, or other approved mechanism as necessary.
- Upon completion of the project, the HDD contractor will remove all containment and recovery equipment, tools, supplies, materials, wastes, and debris from in and around the surface waters or wetlands.

Offshore IRs

The reactionary measures taken associated with IR events in the offshore environment again depend on the quantity of fluid released, the recurring nature of the IR, and permit requirements. Because of site-specific variables such as depth of water, currents, etc., the selection of the most appropriate response methods will be made on a case-by-case basis. In some cases, the best action it to leave the IR as found and make operational attempts at restoring circulation through the drilled hole. For any offshore IR, the following procedures should be considered, and the HDD contractor shall account for them at a minimum:

- HDD contractor shall immediately cease drilling operations for investigation and impact evaluation.

- HDD contractor and HDD Inspector will determine estimated quantity released and footprint. If possible, plans for access, containment and cleanup should be reviewed and identifying anticipated impacts for addressing the IR. Prior to implementation of any responses, concurrence from relevant regulatory agencies must be secured.
- The Company will designate a representative to visit the site that will evaluate and report on the IR event. The designated representative will collect photographs (if applicable), details of the release, location, volume released, and other important information and submit an IR Response Report to the appropriate Company contacts.
- The Company HDD inspector onsite and HDD contractor's site supervisor shall already have started the documentation process and the filling out of the IR Incident Summary, which is to be appended to the IR Response Report. The comprehensive team will collaborate to verify all necessary documentation is collected.
- Initial notifications shall be made per Table 1 as appropriate for the IR. Follow up reports will be submitted when complete. As noted, the Company will be responsible for agency notifications and follow-up communications.
- Removal/cleanup plans (if any) for the released drilling fluid shall be provided by the HDD contractor and these should include the perceived most nonintrusive means to remove and clean up the drilling fluid. It is noted that plans included in the drill plan that have been pre-approved may be employed if appropriate for the conditions.
- Upon Company (and potentially agency) approval of the proposed plan, the HDD contractor shall initiate the approved removal/cleanup procedure(s) and transport the drilling fluid (if practical) to containment structures onshore by approved vessels, mechanisms, etc., as necessary.
- Upon completion of the project, the HDD contractor will remove all structures and recovery equipment, tools, supplies, materials, wastes, and debris from the offshore location(s).

Water Wells

Although it is anticipated that none exist in or around the proposed HDD alignments, Ørsted may wish to engage any well owner that is discovered prior to construction and establish an agreement for water testing before and after construction to verify that impacts have not occurred from the construction activities. Ørsted will handle all correspondence with the water well owner(s).

Hole Abandonment

Abandonment of a drill path will only be considered when all efforts to control the drilling fluid loss have failed or hole conditions have deteriorated to the extent that completing the HDD is infeasible. Any hole abandonment locations will be documented and shown on any as-built documents.

The following steps will be taken during abandonment of the hole:

- A new drill path for the HDD crossing will be determined (if feasible).
- A thick grout plug will be pumped into the hole to securely seal the abandoned hole.
- All downhole equipment and tooling will be removed from the abandoned hole.

Communication during an HDD Project

Communication for routine aspects of an HDD should be between the HDD contractor's site supervisor and Company assigned HDD inspector or designee. During IRs, additional Company policies, permit requirements, or agreements into such dialogs for guidance and concurrence on IR response actions may be incorporated.

Post Construction Monitoring

In the event of a drilling fluid release in a sensitive area as determined by the Company, a site-specific, post-remediation protocol will be submitted to the applicable regulatory agencies by the Company. This protocol will be based on the specific parameters of the release, including volume, location, and extent. The goal of the plan will be to determine what adverse effects may have occurred in the impacted area of release. Efforts may include random sampling of each present habitat and comparison of impacted habitats to non-impacted habitats. Pre-drilling data for this project will be used for comparative purposes.

At a minimum, an inspection of the entire drill path will occur within 48 hours of completion of drilling activities. A letter report will be prepared to summarize any fluid deposits that are identified. In the event that there is a drilling fluid release, post drilling monitoring may consist of an in-water investigation to be performed within 30 days after completion of drilling activities, if required by Company and/or applicable regulatory agency. All drilling fluid releases that persist beyond completion of drilling activities will be removed within 30 days of completion of drilling, if requested by the federal or state regulatory agencies having jurisdiction.

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Appendix 1: Hydraulic Fracture and Inadvertent Returns Analyses

TO BE INSRERTED AS PART OF FINAL DESIGN

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Appendix 2: HDD Inadvertent Drilling Fluid Return Response Items

Containment, response, and cleanup equipment will be provided by the contractor(s) and readily available at the HDD site to assure a timely response to IRs. Equipment may include, but is not limited to:

- Shovels, push brooms, squeegees, trowels, pails, and/or other appropriate hand tools
- Hay or straw bales, wattles, and wooden stakes
- Silt fence, T-bar posts, post pounders
- Plastic sheeting or geotextile fabric
- Sediment/silt curtains, sandbags, absorbent booms, or pads
- Turbidity curtains
- Pumps with sufficient suction and lifting heads, control and check valves, and leak-free hoses
- Tanks for non-potable water and/or waste mixture storage
- Earth moving equipment (backhoes, dozers, skid-steers, as appropriate)
- Secondary containment for all on-site mobile equipment, fuel, lube, or other chemical storage containers
- Vacuum truck (or on 24-hour call)
- SDS sheets for all pre-approved, on-site, materials
- This IR Contingency Plan with appended IR Incident Summary template

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Appendix 3: HDD Inadvertent Return Incident Summary

HDD Inadvertent Return Incident Summary		
Project Name/Number/Location:	**Date:**	**Data Collected By:**
General Information Required	**Collected Information**	
1. Person(s) reporting incident with contact information		
2. Release date and time		
3. Responsible parties / Contractor(s) involved		
4. Location (county and coordinates) / Address / Station Number		
5. Environmental impact (Wetland, Stream, etc.)		
6. Estimated release volume (gallons) and surface impact area		
7. Contingency Plan implemented? (Yes/No) If yes, attach plan.		
8. Photo documentation (provide pre-cleanup photos of IR, upgradient and downgradient view, impact areas).		
9. Contained to permitted workspace or ROW? (Yes/No)		
10. Accessibility requirements (4x4, equipment or worker access mats, hose length, etc.).		
11. Proposed method of drilling fluid/waste recovery.		
12. Proposed waste material storage or disposal plan.		
13. Proposed disposal site for waste material.		
14. Planned/intended final hole diameter and crossing's carrier pipe diameter for installation.		

HDD Inadvertent Return Incident Summary		
Project Name/Number/Location:	**Date:**	**Data Collected By:**
15. Phase of HDD operation in process at time of inadvertent release.		
16. General description of subsurface materials identified for the tool's downhole location at time of release event.		
17. Diameter and type of downhole tool at time of release (i.e. – pilot hole bit diameter, reamer diameter, type of bit or reamer, etc.).		
18. Diameter of drill pipe used, and specifically the tube and tool joint diameter(s).		
19. Distance downhole from identified end of crossing (i.e. – entry or exit) where drilling fluid returns were surfacing just prior to release event occurring.		
20. Distance from Environmentally Sensitive Area		
21. X, Y, Z location of release, with correlating delta between entry/exit elevations, ground surface elevation at release point, and the as-drilled profile depth at the release point.		
22. Any/all casings installed and distance downhole for each.		
23. Drilling fluid materials (i.e. – bentonite, additives, etc.) used, leading up to and at the time of the release event. Include SDS sheets of materials in use.		
24. Drilling fluid properties (i.e. – drilling fluid density, viscosity, sand content, rheology, fluid loss, pH of make-up water, etc.) leading up to and at the time of release.		
25. Penetration rates and drilling fluid pump volumes, leading up to and at the time of the release event.		
26. Downhole annular pressures, leading up to and at the time of the release event.		

HDD Inadvertent Return Incident Summary		
Project Name/Number/Location:	**Date:**	**Data Collected By:**
27. Any Lost Circulation Materials (LCMs) introduced to the drilling fluid program once the release event occurred.		
28. Any other mitigation measures taken to prevent, or contingency plans implemented once the release event occurred.		
29. All steps taken to regain circulation after the release event occurred.		
Additional Comments:		

Ocean Wind
An Ørsted & PSEG project

Onshore Horizontal Directional Drilling Inadvertent Returns Contingency Plan

Horizontal Directional Drilling (HDD) Inadvertent Return Contingency Plan for the Ocean Wind Project – BL England

Prepared For:
Ocean Wind LLC

Prepared By:
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700 East Gate Drive #201
Mt. Laurel, NJ 08854

January 2022

Contacts:

Licensee: *Ocean Wind LLC (Ocean Wind), a Joint Venture between Ørsted Wind Power North America LLC (Ørsted) and PSEG Renewables LLC (PSEG)*
Design Engineer: *TBD*
Environmental Inspector: *TBD*
HDD Contractor: *TBD*

Please see below for a list of personnel contacts:

Name	Company	Role	Phone	Email
TBD	***Ocean Wind LLC***	**Licensee**	*TBD*	*TBD*
TBD	*TBD*	**Licensee Environmental Representative**	*TBD*	*TBD*
TBD	*TBD*	**Environmental Inspector**	*TBD*	*TBD*
TBD	*TBD*	**Design Engineer**	*TBD*	*TBD*
TBD	*TBD*	**HDD Contractor**	*TBD*	*TBD*

Table of Contents

1.0 Introduction

This Horizontal Directional Drill (HDD) Inadvertent Return (IR) Contingency Plan is to provide assurance of adequate monitoring, detection, containment, and cleanup for potential discharge of drilling fluid or other materials (referred to as an "inadvertent return") resulting from the horizontal directional drilling (HDD) crossing of Peck Bay in Cape May County, New Jersey. The HDD crossing will be authorized by the New Jersey Department of Environmental Protection *(Permit # not yet issued*) and the U.S. Army Corps of Engineers, Philadelphia District (*Permit # not yet issued*). See Figure 1: Project Location Map. The Licensee/Owner for this project is Ørsted Wind Power North America LLC (Ørsted) and PSEG Renewables LLC (PSEG)**.**

2.0 Best Practices

The Licensee and their HDD Contractor, under observation of the Environmental Inspector, shall follow industry best management practices such as those contained in the *Horizontal Directional Drilling (HDD) Good Practices Guidelines* by HDD Consortium, David Bennett, PhD & Samuel Ariaratnam, PhD (2017, Fourth Edition) or other similar sources combined with in-house best practices developed from previous projects.

3.0 Pre-Construction Preparations

Before construction begins:

All employees shall attend project specific environmental and safety training before starting work on the project.

The Licensee shall conduct a pre-construction meeting to review the project and HDD IR Contingency Plan and include the following representatives:

- HDD Contractor
- Design Engineer
- Environmental Inspector
- Licensee's Environmental Representative
- Pending future permit conditions, NJDEP/USACE Representatives may participate as well.

Coordination is recommended with adjacent/nearby property owners prior to the start of drilling activities to inform them of the HDD activity and request permission to enter affected properties to clean up in the unlikely event that inadvertent drill fluid releases on their property. Contact information should be maintained for the adjacent property owners should the contractor need to contact them due to fluid release outside the limits of disturbance.

Adequate quantities of containment materials should be available at the HDD crossing location and be adequately designed for the specific project; including but not limited to:

- ☐ Hay bales (certified weed free), stakes to secure
- ☐ Silt fence
- ☐ Plastic Sheeting
- ☐ Turbidity barriers
- ☐ Shovels, Pails
- ☐ Push Brooms
- ☐ Squeegees
- ☐ Pumps and hoses
- ☐ Boat(s): on call with a required response time of less than 45 minutes, contact___*TBD*_____, phone_____*TBD*_____
- ☐ Vacuum truck on 24-hour call, contact____*TBD*_____, phone___*TBD*_____

- ☐ Generator with light tower
- ☐ Sandbags/Weighted filter socks
- ☐ Designated areas for storage of inadvertent release materials
- ☐ Other

4.0 Construction

The HDD process typically utilizes a drilling fluid that consists primarily of water and a naturally occurring clay mineral (bentonite). The drilling fluid helps to provide lubrication, cools the drill bit, and stabilizes the wall of the borehole.

During construction:

The HDD Contractor shall perform visual monitoring of the drilling route and surrounding area during all HDD operations and shall make and retain daily inspection notes. The notes will be kept onsite and available for review for the duration of the project and shall include:

- Volume of drilling material used and recovered
- Method of material disposal
- Depth of bore below the regulated water body or wetland bottom
- Daily average drilling pressures and any notable spikes or deviations
- Daily bore or ream size and distance of progression

HDD activities will be monitored, either by the HDD contractor, Environmental Inspector, or both. Monitoring procedures will include:

- Inspection along the drill path and nearby waterbodies.
- Continuous examination of drill mud pressure gauges and return flows to the surface pits.
- Monitoring of the drill status information regarding drilling conditions and alignments of the drilling profile during drilling activities.
- Should a release occur in an upland, a waterbody or wetland (including wetland transition area), containment of the returns that may contain drilling fluids will be established and monitoring of the effectiveness of the containment method to determine whether any further potential movement of released drilling mud is occurring will continue until there are no further signs of a release.
- Inspect any roads or buildings the HDD may cross under for subsidence. If subsidence is observed, cease drilling operations and contact the Design Engineer.

5.0 Response to Inadvertent Return

An inadvertent return (IR) is a discharge of drilling fluid or other materials. If an IR is observed and has impacted, or has the potential to impact, federally or state regulated waters or wetlands, or uplands, the Licensee and its contractor is responsible for following this HDD Inadvertent Return Contingency Plan. Specifically, the Licensee and its contractor will:

Assess the IR to determine the amount of drilling fluid released and the potential for the IR to reach regulated waters or wetlands.

If IR is at an **Upland location**, the contractor's HDD crew shall:

- Promptly notify HDD Contractor's on-site supervisor, who will contact the Licensee. The Licensee will be responsible for notifying the appropriate representatives.
- Immediately suspend drilling operation.
- Evaluate the IR to determine the most appropriate cleanup measures, including if containment structures are needed.

- Implement appropriate cleanup measures to contain and remove IR drilling fluid to the extent practicable.
- Depending on volume of drilling fluid lost, remove the fluid by vacuum truck and/or shovel.
- Remove drilling fluids at a rate sufficient to maintain containment of the IR during all drilling operations.
- Drilling to resume after consultation with the Environmental Inspector and the Licensee's Environmental Representative.

If the IR is in a **Wetland location** (including wetland transition areas), the Licensee and its contractor shall:

- Suspend drilling and promptly notify the HDD Contractor's on-site supervisor, who will contact the Licensee. The Licensee will be responsible for notifying the appropriate representatives.
- Evaluate IR to determine the immediate containment and cleanup measures. The Licensee shall consult with the USACE and NJDEP after the IR is contained concerning further evaluation and additional proposed cleanup measures, and take appropriate immediate action to stop and contain the IR.
- Implement appropriate cleanup measures to contain and remove IR drilling fluid to the extent practicable. Appropriate cleanup measures are determined by the specific circumstances of the IR and may include, but are not limited to:
    - Removing the drilling fluid with manual tools if efforts to contain and remove the drilling fluid with equipment will result in further disturbance by equipment and personnel.
    - Diluting the drilling fluid with fresh water, allowing the fluid to dry and dissipate naturally, or a combination of both, if hand removal is not possible.
    - Using small collection sump pumps (diaphragm) to remove the fluid, if the amount of the released drilling fluid exceeds that which can be contained with hand-placed barriers.
    - If the amount of the slurry exceeds that which can be contained and collected using small sumps, drilling operations will be suspended until the IR can be brought under control.
- Store removed drilling fluid in a temporary holding tank or other suitable structure, out of the wetland area and wetland transition area pending reuse or disposal.
- Evaluate current drill profile (e.g., drill pressures, pump volume rates, drilling mud consistency) to identify methods to prevent further IR events.
- Resume drilling *only* when evaluation, regulatory agency coordination, and adequate containment measures are complete and prevention measures are in place.

If IR is at an **In-Waterbody location**, the Licensee shall:

- Suspend forward drilling and promptly notify the HDD Contractor's on-site supervisor, who will contact the Licensee. The Licensee will be responsible for notifying the appropriate representatives.
- Evaluate IR to determine the most appropriate cleanup measures, including if structures are needed to contain the plume. The Licensee shall consult with USACE and NJDEP concerning the evaluation and proposed cleanup measures, and take appropriate, immediate action to stop and contain the IR.
- Implement appropriate cleanup measures to contain and remove IR drilling fluid to the extent practicable. Appropriate cleanup measures are determined by the specific circumstances of the IR and may include, but are not limited to:
    - Pump or vacuum truck,
    - Hand-placed containment recovery,
    - Silt curtains, turbidity barriers, and similar measures.
- Store removed drilling fluid in a temporary holding tank or other suitable structure, out of any wetland and wetland transition area pending reuse or disposal.
- Evaluate current drill profile (e.g., drill pressures, pump volume rates, drilling mud consistency) to identify methods to prevent further IR events.

- Resume drilling *only* when evaluation, regulatory agency coordination, and adequate containment measures are complete and prevention measures are in place.

Internal Reporting Chain

In the case of an IR, the HDD Contractor will immediately notify the HDD Contractor's on-site supervisor, Environmental Inspector, Design Engineer, and the Licensee's Environmental Representative.

Agency Reporting of Inadvertent return (IR)

If the IR occurred within federally or state regulated waters or wetlands, the Licensee/Owner will be responsible for notifying the New Jersey Department of Environmental Protection via DEP's Spill Hotline: 1-877-WARNDEP (1-877-927-6337); as well as U.S. Army Corps of Engineers.

6.0 Cleanup Guidelines

In the case of an IR in upland areas or federally/state regulated waters or wetlands, IR drilling mud/fluids should be removed by hand or vacuum truck.

Hand-cleaning means using shovels, buckets, soft-bristled brooms or other hand items included in the material list, without causing damage to vegetation. Fresh water washes will be employed if deemed beneficial and feasible.

Containment structures (turbidity curtains, booms, or other) must be pumped out and the ground surface scraped to bare topsoil/existing vegetation without causing undue loss of topsoil or ancillary damage to existing and adjacent vegetation.

Material will be collected in containers for temporary storage prior to removal from the site.

Potential for a secondary impact from the clean-up process is to be evaluated and clean-up activities terminated if physical damage to the site may exceed the benefits of clean-up activities.

The need to restore disturbances to upland areas, freshwater and tidal wetlands or waters will be determined in consultation with the Licensee's Environmental Representative, USACE, and NJDEP.

7.0 Close-Out Procedures

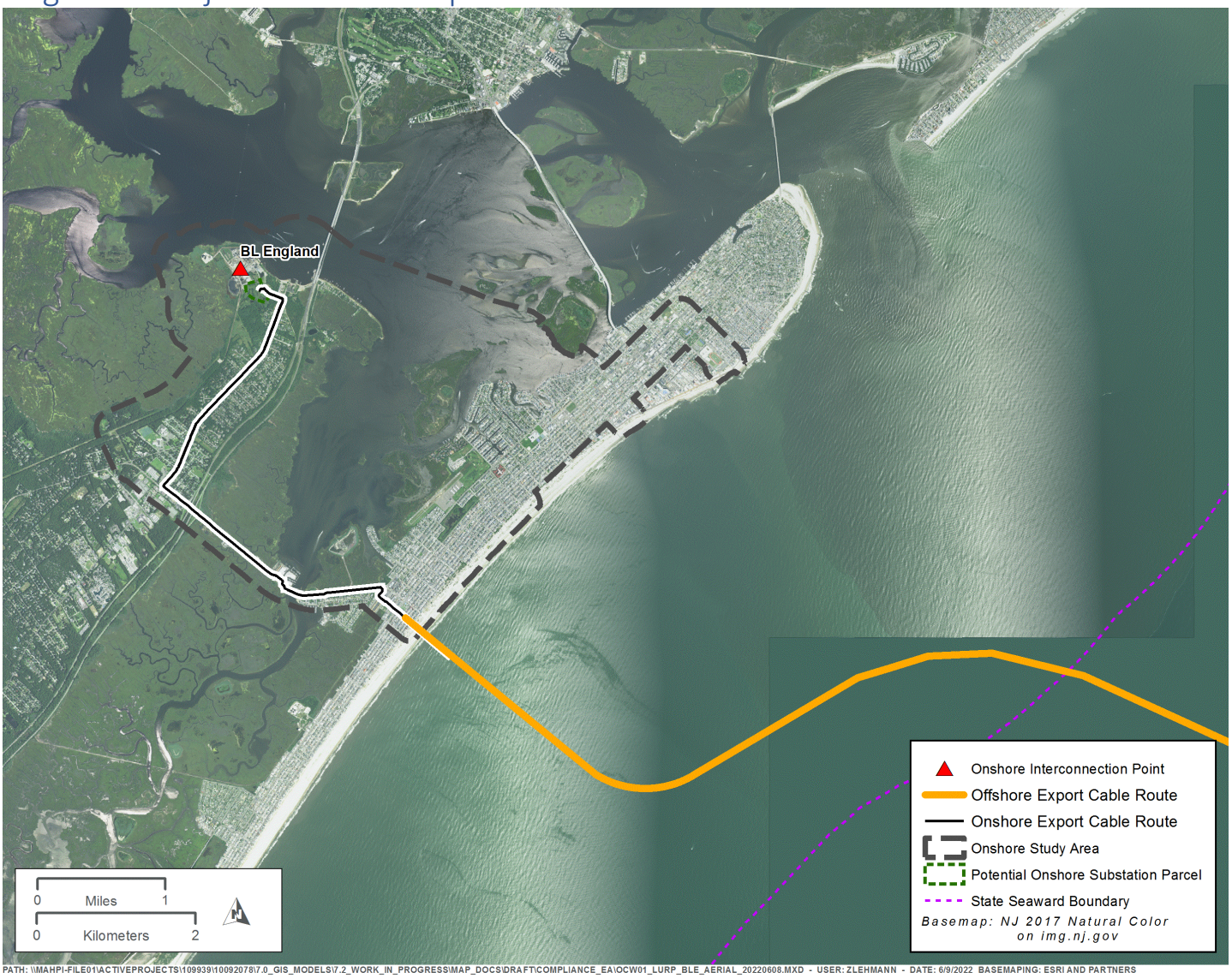
After the drilling fluid has been contained and removed, the Licensee and its contractor shall:

- Recycle or dispose of the removed drilling fluid at an authorized upland location or commercial disposal facility.

Note: Recovered drilling mud may not be deposited in waters of the State, streams, water bodies, or storm drains.

- Remove all containment structures and materials unless otherwise specified by the Design Engineer with approval from the appropriate regulatory agencies.
- Consult with the Licensee's Environmental Representative, USACE and NJDEP concerning restoration.

Figure 1: Project Location Map



Ocean Wind
An Ørsted & PSEG project

Offshore Horizontal Directional Drilling Inadvertent Return Contingency Plan- Oyster Creek

Inadvertent Returns Contingency Plan

Prepared for Ørsted

Ørsted Ocean Wind Project

New Jersey
November 8, 2021

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Project Introduction

Ørsted (Ørsted or Company) proposes to install 32-inch outside diameter (OD) HDPE conduits for encasing a subsequent cable installation that will ultimately transfer electricity generated by an offshore wind farm to the intended onshore locations for distribution. Ørsted has determined the horizontal directional drill (HDD) construction method is currently preferred for the HDPE pipeline shore approach installations at each of the locations identified herein. HDD crossings ranging from approximately 356 meters to 762 meters in horizontal length are currently planned for a total of five locations to install the utility beneath the shoreline and seabed.

Inadvertent Returns Contingency Plan Purpose

The goal of this Inadvertent Returns (IR) Contingency Plan is to identify measures that will be taken prior to or during construction to control, contain, and collect any inadvertent drilling fluid returns and minimize impacts to environmentally sensitive areas. This IR Contingency Plan also summarizes the steps taken on the front end to determine feasibility for the HDD construction method, assess IR potential, and account for the identified subsurface conditions in design and planning of the proposed HDD crossings. In addition, this Plan outlines preventative measures and protocols established for reducing the probability, frequency, and severity of IRs. Project drawings and specifications also provide details of the HDD portion of the project. If required by the Contract Documents for specific HDD crossings, the selected HDD contractor also should generate site-specific contingency plans to augment these minimum requirements and address site-specific items based on its planned means and methods. The contractor(s) responsible for the work must adhere to this Plan and the approved, site-specific contingency plan during the entire HDD construction process.

The specific objectives of this Plan are to:

1. Minimize the potential for a drilling fluid release associated with HDD activities.
2. Protect environmentally sensitive areas.
3. Provide for the timely detection of indicators for drilling fluid loss and/or detection of IRs to the surface.
4. Establish proper protocols for monitoring, reporting, containing, cleaning, and reporting IR events.
5. Establish ground rules for contractor reactions to IR events, including resuming of work.
6. Ensure an organized, timely, accurate, and efficient response in the event of a release of drilling fluid; and
7. Ensure appropriate notifications are made immediately to designated Company project and environmental field support. Company will be responsible for notifications to appropriate regulatory agencies.

Drilling Fluids for HDD

HDD is a common method used to install underground utilities through heavily developed areas, roadways, waterways, steep slopes, shore approaches, and environmentally sensitive areas to minimize the surface disturbance that traditional open-cut trenching methods typically require. HDD construction generally limits disturbances along project corridors with intent to achieve a reduced workspace footprint in comparison to open-cut installations. HDD construction methods typically involve three phases:

1. The first phase involves a smaller diameter pilot hole drilled or jetted along a designed drill path.
2. After completion of the pilot hole, the hole is enlarged (or reamed) to a diameter that will accommodate the HDD carrier pipe and then prepared for pullback.
3. Finally, the HDD carrier pipe is pulled back into the reamed hole.

Drilling fluid is an essential component for all phases of HDD operations, and typically consists of 4 to 8 percent bentonite in solution with 92 to 96 percent fresh water. All three phases of HDD construction involve the utilization of a circulating drilling fluid that provides the following functions:

- **Hydraulic Excavation:** Excavates softer soils along the drill path by high velocity fluid streams dispensed through jet nozzles installed in bits or hole opening tools.
- **Hydraulic to Mechanical Power Transfer:** Provides the power required to turn a bit and mechanically drill a hole in dense soils and rock via a positive displacement mud motor.
- **Transportation of Solids:** Suspends excavated solids, consisting of soil or rock cuttings, and carries them to returns pits at HDD endpoints as the drilling fluid returns circulate through the hole annulus.
- **Hole Stabilization:** Creates a thin “wall cake” that stabilizes and provides a seal to the surrounding formation of the drilled hole. This is critical for HDD pipeline installation as holes are often drilled through formations highly susceptible to extracting the free, available water from the drilling fluid.
- **Cooling and Cleaning of Downhole Tooling:** Cools drill bits, hole-opening tools, and other downhole tooling. Pre-approved additives can provide support for optimizing the hole cleaning process and helping keep the bit and/or tooling clean.
- **Friction Reduction:** Reduces friction between the downhole drill string and wall of the drilled hole using the lubricating properties of drilling fluid.
- **Modification of Soil Properties:** In applicable soils, mixing of drilling fluid with the native soils along the drilled path facilitates pipeline installation by reducing the soil’s shear strength to a near fluid condition or state. The resulting soil and drilling fluid mixture can then be displaced as a pipeline is pulled through it.

Because of drilling fluid’s required use, HDD operations have the potential to inadvertently migrate to the surface (e.g. IR). These IRs happen when the drilling fluid exits the ground surface at locations other than the intended entry and/or exit. In practice, IRs typically occur in proximity to entry and exit points where near surface soils generally have lower shear strengths and soil cover is thin. IRs can also occur at locations along a drill path where there are low shear strength soils, where the depth of soil cover is reduced, or along pre-existing fractures or voids. Other locations where IRs can occur include exploratory boring locations or along the edges of existing subsurface structures, such as piles or utility poles. For an IR to occur, the drilling fluid must first migrate out of the drilled hole by means of hydraulic fracture or formational drilling fluid loss.

Formational drilling fluid losses typically occur when drilling fluid flows through pore spaces in the surrounding formation. Thus, a formation with a higher porosity, or permeability, can potentially absorb a larger volume of drilling fluid than a formation with a lower porosity/permeability. Silty sands/clays, silts, and clays typically have a low susceptibility to formational drilling fluid losses. Coarse sand and gravel units with low percentages of silt and clay have a moderate to high susceptibility for formational drilling fluid loss.

The term “hydraulic fracture” describes a situation where downhole drilling fluid pressures exceed the confining overburden pressure and shear strength of surrounding soil along the drill path. Soils most

vulnerable to hydraulic fracture include relatively weak cohesive soils (soft clays) or loose granular soils with low shear strength. Medium dense to very dense sands and very stiff to hard silts and clays typically have a low to moderate hydraulic fracture potential. HDD installations with greater depths of cover or where the drill path is situated in formations with higher shear strength may have reduced potential for hydraulic fracture and IR.

Proper management of drilling fluid properties can reduce the potential and/or severity of drilling fluid loss. In some cases, the use of drilling fluid additives is warranted to improve drilling fluid properties and overcome challenging or problematic subsurface conditions. Prior to construction, the HDD contractor will develop a drilling fluid management plan, including planned drilling fluid composition and any proposed additives to account for subsurface conditions anticipated at the crossing location. The Company will review and approve additives proposed by contractors, associated Safety Data Sheets (SDSs), and the plans for implementation prior to use. No additives shall be approved for use if they are not also approved by local, state, federal, or any other regulating bodies having jurisdiction at an HDD crossing location.

Pre-Construction Measures

The primary objectives of this section are to:

- Assess the probability of inadvertent returns occurring as it relates to proposed geometrical design.
- Establish measures for reducing the probability of IRs to occur, and
- Identify procedures intended to minimize severity of IRs.

The following subsections outline the steps that have been and will be taken prior to construction to achieve these objectives.

Feasibility Assessment

HDD crossings can only be considered feasible if the installations can achieve success with a presumptive level of risk acceptable by all parties. In addition, the geometric and geological conditions must be conducive to the current technology's capabilities. Front-end engineering and design (FEED) has been completed to support the presumed feasibility for pursuing HDD construction at the relevant crossing locations. In addition to evaluating subsurface conditions for conduciveness to the HDD construction method, the FEED initiatives consider IR risk due to subsurface conditions, assuming responsible construction practices and suitable equipment are utilized. FEED completed for these crossings was intended to evaluate the site-specific conditions and included:

- Site reconnaissance by conducting a site visit to the crossing locations in order to evaluate the suitability and feasibility for design and construction using the HDD construction method.
- Site surveys for existing utilities and surface features that may impact HDD construction activities and delineated wetlands in the vicinity of the alignment.
- A site-specific geotechnical investigation with geotechnical borings along the alignment, extending to depths below the planned profile elevation. Subsequent lab testing was completed on select samples and a geotechnical data report generated for the borings.
- A constructability evaluation accounting for the surface and subsurface conditions identified at the proposed crossing location. The findings from the constructability assessment have been incorporated to the extent practical given all other project constraints and requirements to develop an HDD design for the HDD crossings.

Design

An HDD design has been completed for each of the crossings that accounts for the site-specific conditions and constraints identified through FEED. The HDD designs are considered geometrically feasible and aligned with criteria established for acceptable resulting pipe stresses during installation and operation. As well, the mindset of reducing frequency and severity of inadvertent returns (with elevated focus on environmentally sensitive areas) has been incorporated in the design process. The current designs range in horizontal length between 356 meters and 762 meters, extending to depths beneath the shoreline and/or seabed as identified on the drawings.

Hydraulic Fracture and Inadvertent Returns Analyses (HFIA)

Hydraulic fracture and inadvertent returns analyses (HFIAs) have been completed, based on the final approved design, and identified subsurface conditions at each of the crossing locations, to estimate anticipated annular pressures and formation limit pressures and determine the probability for inadvertent returns to occur along the planned alignment. Estimated annular pressures, formation limit pressures and corresponding factors of safety calculated at regular intervals along the alignment can be referenced in the HFIA Report (Appendix 1) and used by the contractor during construction to compare against annular pressures collected during the pilot hole operations. As such, areas of elevated risk can be pre-identified before construction and indicators of potential fluid loss from the hole and/or subsequent IRs can be identified and addressed during construction.

Note: The geotechnical data report is appended to the HFIA Report for reference of subsurface conditions.

Execution Plans

The Company will verify the design documentation (inclusive of geotechnical data collected in the design phase) has been received by the HDD contractor and reviewed for evaluation and understanding of the site conditions expected to be encountered. The HDD contractor will utilize this information to provide a detailed and site-specific Drill Plan to the Company for review and approval prior to construction. The Company will review the plan for consistency with appropriate methods aligned with reducing potential for IRs and adherence to any site-specific agency requirements having jurisdiction at the crossing location. Construction methodologies that must be outlined in the contractor's plans include, but are not limited to:

- Anticipated pump rates and pressures
- Anticipated penetration rates
- Planned trips and/or hole sizing initiatives to relieve annular pressure
- Any preemptive containment/pressure relief measures (if applicable)
- Equipment and tooling
- Pilot hole plan
    - Bottom hole assembly (BHA) components (including an annular pressure tool)
    - Pilot hole dimensions for bit, BHA, drill pipe, and any other tools that will be inserted downhole
- Reaming plan, including stages and final hole size
- Pullback plan, including pullback assembly components
- Drilling fluid composition and properties, including safety data sheets (SDSs)
    - All drilling fluid additives proposed for use must be reviewed and approved prior to construction

- Disposal Plan, including reporting and documentation procedures.

Worksite Preparation

The following preparation measures will be taken by the HDD contractor prior to and maintained throughout the HDD construction process:

- Prior to construction, the work areas and the delineated sensitive area limits identified (wetland boundaries, setbacks, etc.) will be marked with stakes or flags. The HDD contractor will place erosion and sediment controls on down-sloping sides of the work pads and around the drilling fluid returns pits as a preventative measure against drilling fluids leaving the work sites.
- A list of any pre-identified sensitive areas near each of the alignments where access and/or methods for containment and cleanup may be limited will be generated by the HDD contractor. Pre-approved means and methods for overcoming the pre-identified challenges will be outlined in the Drill Plan described above.
- Staging areas for containment, cleanup materials and equipment will be placed within available workspaces and located strategically (and between entry and shoreline if needed) by the HDD contractor for timely use if necessary. The materials staged on site may include, but are not limited to those items listed in Appendix 2.
- Secondary spill containment will be installed beneath the HDD rig(s) and power unit(s) such that any hydrocarbon leaks can be contained and cleaned.
- Drilling fluid return pits will be in place at the HDD endpoints to prevent drilling fluid from leaving the workspaces at the entry and exit points. The HDD contractor will place silt fences, wattles, or other appropriate measures along the downgradient boundaries of the pits and workspaces onshore. Offshore pits will be constructed to capture all drilling fluids released at the exit end of the crossings over the course of construction. It is noted that excavations shall not be made until approval to proceed with construction is granted by the Company and any applicable agencies.
- The SDSs for all anticipated, and pre-approved, drilling fluid products will be kept on site.
- This IR Contingency Plan will be staged on site during construction and will be readily available for review by the project team and applicable agencies if requested.

Pre-Construction Meetings

Before HDD construction commences, an environmental safety meeting or pre-construction meeting will take place to establish, for all parties (Company, inspection team, contractor, etc.), familiarity and understanding of the requirements set forth by this Plan as well as any additional agency requirements having jurisdiction. For any conflicting requirements between this Plan and any similar plans that apply to the project, the more stringent shall govern the work. The HDD contractor's site supervisor shall verify a copy of the contingency plans are available (on site) and accessible to all construction personnel and Company representatives. The site supervisor shall also verify all contractor employees are properly trained and familiar with the necessary procedures for response to a drilling fluid release prior to commencement of drilling operations.

Before approval is granted to proceed with construction activities, a Company representative will verify the following and document on the pre-HDD checklist:

- The construction limits are clearly marked.
- The sensitive resources within and adjacent to the construction workspace are flagged.
- All required clearances and setbacks related to sensitive features have been obtained.
- Any required coordination with jurisdictional regulatory agencies has occurred.

- The erosion and sediment controls are appropriate for the current and expected conditions, are installed, and are functioning properly.
- The spill response kit is at the drill site and properly stocked.
- The appropriate response equipment is on site and in good working order (minimum required equipment is listed in Appendix 2); and
- The on-site briefing described above with the HDD contractor and HDD inspector has been conducted.

Prevention Measures

The primary objectives of this section are to:

- Establish proper protocols for drilling fluid and equipment monitoring, recording, and reporting.
- Establish on-site inspection responsibilities and ensure competent personnel are assigned.
- Mandate construction means and methods that will be used to reduce probability for IRs to occur; and
- Provide for the timely detection of indicators for drilling fluid loss and/or detection of IRs to the surface to minimize environmental impacts.

Monitoring Protocols

The HDD contractor shall make every effort to maintain annular circulation of drilling fluid to the endpoints of the HDD crossing and reduce the potential for IRs throughout the entirety of construction. In addition, the contractor shall take the following monitoring procedures to reduce the likelihood for an inadvertent return to occur during construction and reduce the severity of impacts from an inadvertent return event.

- Incorporate a working annular pressure tool as a primary component of the BHA during pilot hole operations. Consistently monitor annular pressures observed while drilling and record the maximum and average annular pressures observed for each joint drilled or jetted. Compare the annular pressures observed to anticipated pressures along the drill path, and when annular pressure(s) are observed that may compromise and/or exceed estimated formation limit pressures, make every effort to reduce downhole annular pressures and maintain full annular circulation without inducing a hydraulic fracture and/or inadvertent returns. Refer to the HFIA completed for these HDD crossings in Appendix 1 for details regarding anticipated annular pressures and formation limit pressures.
- Monitor circulation of drilling fluid visually and through assessment of fluid volumes circulating through the drilling fluid system. The drill rig operators shall halt drilling operations and take corrective action(s) immediately upon detection of a loss of circulation, a drop in annular pressure, or any other indicator of fluid loss. If circulation cannot be regained, the contractor will develop a plan of action for Company review and approval prior to progressing forward.
- Monitor facilities and other sensitive areas within 300 feet of the drill path, or as specified by Company, for drilling fluid migration and release at least three times per shift or more often if any fluid migration is detected and/or slowed or loss of circulation is observed.
- Monitor and manipulate drilling fluid composition and volumes to maintain favorable properties and parameters throughout all phases of construction.

Company Inspection

Ørsted will assign a competent HDD inspector who will remain on site during the duration of HDD construction activities. The Company HDD inspector will be responsible for monitoring, documenting,

reporting, and notifying applicable parties as outlined in this Plan. The Company HDD inspector will monitor operational parameters and characteristics in real-time and record detailed documentation regarding the drilling operations and the observed materials being removed from the hole so field conditions can be compared to what is expected based on the geotechnical investigation completed in the design phase of the project. The operational details that the Company HDD inspector will record, include but are not limited to penetration rates, pump volumes, rotary torque, thrust/pull, water acquisition volumes, disposal volumes, and any problematic conditions encountered throughout the drilling process. The HDD contractor shall provide the HDD inspector access to view/monitor the equipment and instruments at all times during construction.

The HDD contractor will coordinate with the on-site HDD inspector and communicate any indicators of problematic conditions, specifically IRs, in a timely manner so the HDD inspector can assist with monitoring and notification efforts. The Company HDD inspector will document monitoring and preventative measures taken and drilling fluid flow characteristics and report to the project team any events that require notification to the agencies per this Plan. In the event of an IR, the Company HDD inspector, with the assistance of the HDD contractor, will complete the IR Incident Summary attached in Appendix 3 per the notification protocols described herein **(NOTE: There shall be concurrence from all parties including HDD contractor for all information collected and documented in the IR Incident Summary and corresponding notifications).**

Drilling Fluid Management

Proper drilling fluid management is essential for successfully completing HDD installations as well as reducing frequency and severity of IRs. The HDD contractor shall maintain favorable drilling fluid properties to reduce downhole annular pressures, to the extent practical, while successfully excavating and maintaining a stable hole. A qualified drilling fluid engineer shall remain on site for each crossing during all phases of construction to manage the drilling fluid properties and pump volumes. The drilling fluid management program shall account for and consider modifying drilling fluid density, suspension, and rheological properties as necessary to address subsurface conditions encountered. Only additives, pre-approved by the Company, may be used to manipulate the drilling fluid composition and parameters. If any new additives are proposed during construction, they will be reviewed prior to use to verify compliance with local, state, and federal agencies. SDSs for all drilling fluid additives in use will remain on site at all times.

Addressing IR Indicators

If indicators of potential IRs are observed, such as slowed/lost circulation or spikes/drops in annular pressure, the HDD contractor shall take immediate and responsible reactive measures to address the indicators. **If circulation is lost or slowed, the HDD contractor shall temporarily stop drilling activities and notify the Company HDD inspector or designee, who will make follow up notifications as required. The HDD contractor shall evaluate the drilling and site conditions to determine the most appropriate remedial actions, but must make every effort to regain full circulation to the returns pit(s) prior to advancing the construction process.** As well, the monitoring procedures shall be enhanced by performing more frequent observations, or centerline walks, and expanding the footprint of the area being observed to outside the limits of disturbance (LOD), where authorized, in the surrounding area. The HDD contractor shall increase focus on monitoring initiatives for environmentally sensitive areas. Depending on the operational conditions observed, one or more of the following construction practices may be administered as applicable or necessary:

- Retract (trip out) the downhole drill pipe string and tooling to inspect equipment and clean the hole behind the bit or hole opening tools.

- Swab a specific portion of the hole to clean and/or size the hole to clean and relieve annular pressure.
- Modify penetration rates and drilling fluid pump rates to reduce annular pressure to the extent practical so the hole can be cleaned and maintained as stable.
- Circulate drilling fluid, potentially achieving “bottoms up,” without progressing the downhole tooling forward.
- Modify drilling fluid density and/or rheological properties to perceived favorable parameters for the materials encountered.
    - Only pre-approved drilling fluid additives will be used.
    - SDS sheets for all additives and bentonite in use will be maintained on site.
- Pump approved lost circulation material (LCM) downhole to attempt to plug off location(s) where drilling fluid is escaping the hole into the formation.
    - HDD operations will be suspended to allow LCM plugs or grout to set-up as necessary.
- Install large or small diameter casing to depths required to combat poor subsurface conditions.
- Excavate pressure relief hole(s) at strategic and pre-approved (and permitted) location(s) if necessary. Note that containment and proper protocols for managing drilling fluid shall be in place at any pre-excavated pit/hole intended for directing fluid flow or relieving annular pressures.
- Increase monitoring intervals/areas.
    - Perform constant monitoring of specific area(s) along the alignment if necessary.

The Company HDD inspector will record any corrective measures taken by the HDD contractor and monitor the resulting effectiveness.

Response Measures

The primary objectives of this section are to:

- Establish protocols for contractor reactions to IR events including reporting, containing, cleaning, and resuming work.
- Execute a team-based (HDD contractor and Company), organized, timely, accurate, and efficient response in the event of a drilling fluid release; and
- Make appropriate and timely notifications to applicable contacts and regulatory agencies.

Notifications

If there is an IR or any other environmental or safety incident, the HDD contractor and HDD inspector must jointly report the incident to the designated Company representative immediately. If the designated Company representative is not immediately available, the HDD contractor and HDD inspector must report the incident to the Ørsted Project Owner.

Company Notifications

The table below provides the contact information for the Company representatives who will be notified for each IR.

Table 1: Ørsted Contacts for HDD-Related Notifications

Company	Name	Title	Phone	Email
Ørsted		Engineer/ Project Owner		
Ørsted		Construction Inspector		
Ørsted		Environmental Compliance Coordinator		
Ørsted		Environmental Lead		

[1]Requires submittal of IR Incident Summary (Appendix 3) with notification.

Agency Notifications

Notifications to applicable agencies will be executed by Ørsted.

General Response

There are multiple understood scenarios which require different levels of reactionary measures for IRs, depending on the quantities released, the IR location, and the accessibility to contain and clean up the IR. The general response procedures for any IR will be as follows:

- Drilling operations shall be temporarily ceased upon identification of drilling fluid on the surface or in waterbodies to evaluate the nature and magnitude of the IR. The estimated drilling fluid quantities released to the surface shall be evaluated with concurrence from the HDD contractor and Company HDD inspector and recorded.
- The IR shall be contained and cleaned up as required.
- If necessary, the Company will deploy a qualified professional to evaluate and report on the incident.
- In the IR Incident Summary attached in Appendix 3, the Company HDD inspector will document the details regarding the IR event and drilling operations at the time of the incident.
    - All applicable parties, including HDD contractor, shall concur with the details in the IR Incident Summary.
- The HDD contractor will prepare and transmit to Company any mitigation measures for modifications to drilling procedures, monitoring protocols, and addressing any recurring IR events.
- The appropriate verbal and/or written notifications to the Company and applicable agencies will be made.
- Drilling will resume with the necessary authorizations from the Company and applicable agencies with appropriate preventative measures in place for altering drilling practices and containing any remaining surfacing fluids (as applicable).
- Upon re-starting HDD operations, the Company HDD inspector will monitor and document any corrective drilling procedures, including modifications to drilling fluid parameters, equipment, or tooling.
- After construction is complete the HDD contractor will remove or clean up any remaining containment structures or drilling fluid in containment areas and restore the area as close to its pre-disturbed condition as possible.

Monitoring Adjustments

The monitoring protocols as required by this Plan may be adjusted if a loss of circulation or IR occurs. Within the notifications and corresponding reporting to applicable agencies, the corrective actions taken shall be documented and the revised plan for enhanced monitoring shall be described.

Containment and Cleanup

Immediately following detection of an IR at an onshore location, the IR shall be contained. The HDD contractor shall use straw bales, silt fences, sandbags, and earth berms to prevent fluid from migrating or flowing from the IR location, with focus on preventing flow towards any surface waters, environmentally sensitive areas, or outside the approved workspace. If the IR occurs within surface waters, appropriate containment measures/equipment (turbidity curtains, silt fence, sandbags, etc.), approved by the Company, shall be used to address the location, flow characteristics and depth of water. The HDD contractor shall position hoses and pumps, or a vacuum truck, near the containment structure(s) to redirect the fluid that surfaced during the IR (and any fluid continuing to migrate out of the hole) to the returns pit(s) and/or storage containers, such as vacuum trucks. Cleanup shall commence after the release is contained. Cleanup shall include removal of all visible drilling fluids located in the accessible area. Removal methods will vary based on the volume of the release, site conditions, and access. Removal equipment may include vacuum trucks, loader and track hoe buckets, small pumps, shovels, and buckets.

Containment and/or cleanup activities that would require the installation of construction matting, placement of materials in the wetland or waterway, or access of construction vehicles outside the approved workspace require approval prior to implementation except in an emergency where inaction would pose an imminent threat to human health, sensitive environment, or property. The Company will obtain landowner and/or agency permission prior to accessing locations outside of the approved workspace for fluids containment and cleanup operations. If the release occurs in an environmentally sensitive area where the containment and/or cleanup initiatives may cause additional damage, the HDD contractor and the Company shall collaborate to determine the proposed method of removal and provide corresponding plans to applicable agencies/landowners for review and approval prior to implementation. Only approved measures may be implemented.

Potential for secondary impacts from the cleanup activities shall be evaluated. The following containment/cleanup measures are considered appropriate at this time:

- By hand using shovels, buckets, and soft bristled brooms to minimize damage to existing vegetation.
- Turbidity curtains.
- Small collection pumps may be necessary to remove released fluids; and
- Vacuum (vac)-trucks to collect and remove drilling fluids as needed.

Response Close-out Procedures

After the IR has been contained and cleaned up, the following actions will be taken:

- The recovered drilling fluid will either be recycled or hauled to an approved facility for disposal. The HDD contractor shall provide Company with documented proof of disposal. No recovered drilling fluids or materials will be discharged into streams, wetlands, storm drains, or any other environmentally sensitive areas.
- Any material coming into contact with drilling fluids shall be removed to a depth where there are no visible signs of the drilling fluid material, contained and properly disposed of.

- The HDD contractor will return all containment excavations and cleanup of high ground sites to pre-project contours using clean fill and appropriate seeding activities as necessary. Cleanup procedures for areas within wetlands, streams, or other sensitive environmental areas will be on a site-specific basis in consultation with Company and regulatory agencies, if appropriate.
- All containment measures (wattles, straw bales, silt fences, etc.) will not be removed until the site is properly stabilized, and such removal is authorized by Company. Upon Company approval, the HDD Contractor will remove all containment structures/devices and recovery equipment, tools, supplies, materials, wastes, and debris.

In addition to the HDD IR Incident Summary (see Appendix 3), the HDD contractor's site supervisor and Company shall record details of drilling fluid losses or IRs in their daily log. The logs shall include any notes or details regarding containment, characterization, cleanup, or stabilization activities not otherwise captured from the HDD IR incident form attached in Appendix 3.

Construction Re-Start

The Company will be part of the re-start process in all cases. For small releases that do not reach surface waters, wetlands, or other environmentally sensitive areas, drilling may continue if the release is promptly contained and cleaned up, and the location of the IR is monitored regularly throughout the remainder of the HDD construction process.

For all other releases that are within environmentally sensitive areas or a threat to public safety, construction activities will not re-start without prior approval from Company and appropriate agency approval. IRs into environmentally sensitive areas will require at least one member of the contractor's crew to remain at the IR location throughout the remainder of the HDD construction process. In addition, the contractor will provide a plan to prevent fluid loss for the remainder of the project.

Unless the IR poses imminent danger to the environment or public safety, if the IR occurs during pullback, the installation may resume at the discretion of the Company while appropriate and pre-approved containment/cleanup measures are executed in parallel with pullback operations.

Onshore IRs

In all upland IR cases, HDD operations will be temporarily ceased while the IR is contained, and the cause and nature of the IR evaluated. The proper notifications shall be made by the HDD contractor and the Company in accordance with this document. The Company HDD inspector, with the concurrence of the HDD contractor, shall generate and submit the IR Incident Summary (Appendix 3) to the contacts identified for receiving it in Table 1. Re-start will not occur until described in this Plan.

For IRs that occur within the permitted workspace and can be easily contained and redirected to a secondary workspace containment or returns pit, the contractor shall immediately isolate the area with silt fence, wattles, or similar measures to contain drilling fluid. Containment structures or pits shall be located on high ground to keep drilling fluid from reaching environmentally sensitive areas and removal will begin by vac-truck, pumps, or hand tools. In areas that cannot be reached by a vac-truck for drilling fluid removal, a tiered system of contained areas and portable pumps will relay drilling fluid to a location accessible by a vac-truck for removal.

When upland IRs occur, the Company HDD inspector or designee will collaborate with the HDD contractor to develop an IR Response Report (inclusive of the IR Incident Summary appended to this Plan) identifying the containment, cleanup, and reactionary measures for HDD construction activities and monitoring initiatives moving forward. The Company must review and approve the IR Response Report

prior to re-start drilling activities. Additional approvals may be required by regulatory agencies having jurisdiction.

The HFIA for these crossings, which is included in Appendix 1, indicates the areas where higher risk for inadvertent returns may occur along each of the alignments. For instance, the drill paths near entry and exit are areas where the probability for IRs is increased. Temporary workspace has been extended beyond the entry and exit points above that portion of the drill paths. With this in mind, to allow for preemptive work to be employed to either reduce the potential for IR to occur or set up mechanisms such that response to and managing any potential IR can be pre-planned, expedited and organized to reduce severity of a potential incident. The HDD contractor shall be aware of these considerations and have addressed any plans in its drilling plan and/or at the pre-construction meeting.

Wetland and Surface Water IRs

The reactionary measures taken associated with IR events in wetlands or surface waters depend on the quantity of fluid released, permit requirements and the recurring nature of the IR. Because of site and project-specific variables such as distance from open water, surface hydrologic conditions, and vegetation cover, the selection of the most appropriate response methods will be made on a case-by-case basis. However, in the case of any IR in wetlands or surface waters, the Company HDD inspector or designee will collaborate with the HDD contractor to develop an IR Response Report identifying the containment, cleanup, and reactionary measures for HDD construction activities and monitoring initiatives moving forward, all of which must be aligned with permitted and approved procedures. The appropriate Company representative will complete the IR Response Report, which will contain, at a minimum:

- The completed IR Incident Summary attached in Appendix 3.
- An overview of the HDD activities at the time of the IR event.
- The designated representative's assessment of the subsurface material present where the IR occurred.
- Depth and alignment (X, Y, Z location) of the downhole tool at time of the IR.
- As-built drill path overlaid on the designed and permitted drill path.
- Proposed mitigation measures to address the IR moving forward, including, but not limited to:
    - Consideration of the use of alternative entry and/or exit points and angles,
    - Alternative depth profiles,
    - Reducing drilling fluid pressures,
    - Modifying drilling fluid composition and parameters,
    - Use of casing, or
    - Excavating pressure relief wells (where and/or if permitted).
- An analysis of the risk for continued IR(s) to occur.
- A list of notified parties.

The Company (and any applicable agencies) must review and approve the IR Response Report prior to re-start of drilling activities.

In preparation for drilling fluid reaching the surface in wetlands or surface waters that do not extend offshore, response materials shall be staged within the approved workspace and where accessible near the sensitive areas. Deployment of materials and installation will only occur when an IR event is identified, and the uses are determined appropriate by Company. If an IR occurs, drilling fluid shall be contained (if possible) and cleaned up as soon as possible. The Company HDD inspector or designee will complete

the IR Incident Summary and an IR Response Report identifying the containment, cleanup, and reactionary measures for HDD construction activities and monitoring. In doing so, the following requirements should be considered:

- The area directly affected by the released drilling fluids shall be measured or estimated. The area affected may be estimated from a distance, if access to the affected area for measurement would result in additional impacts, or if the IR location is outside the approved workspace.
- The type of impact caused by the released drilling fluids (e.g., temporary, vegetation only, permanent, change in surface hydrology) shall be characterized and documented. The Company will seek regulatory agency concurrence if required.
- The HDD contractor and Company HDD inspector shall collaborate to estimate and define the additional impacts to wetlands and/or surface waters likely to occur as a result of accessing the affected area for containment and removal of the drilling fluids. The anticipated additional impacts likely to occur if the drilling fluid were contained and cleaned per the approved plans versus a scenario where drilling operations are allowed to continue with some other mitigation strategy to reduce impacts (LCM, modifying drilling fluid parameters, etc.) in place should be compared.
- If it is determined that the released drilling fluid is to be contained and recovered, removal/cleanup plans for the contained drilling fluid shall be provided by the HDD contractor for Company (and applicable agency) review and approval prior to implementation.
- All access to the wetlands will be done in such a manner as to cause the least impacts to the vegetation and surface hydrology, and only with prior agency approval (as required). Adequate quantities of personnel and equipment necessary to successfully accomplish the task safely and in a timely manner shall be deployed.
- The HDD contractor will stage personnel to continuously monitor the IR location for timely observation and notification of changed conditions from what was initially evaluated.

In cases where the inadvertent release is within surface waters or wetlands, it may be impractical or impossible to contain and remove the release. Initially, the HDD contractor shall attempt to remove the surface release using a wand (i.e., a perforated plastic pipe attached to a suction hose). Proposed alternative methods and measures taken in these instances shall be provided by the HDD contractor to the Company for review and approval prior to implementation. The Company will coordinate with applicable agencies that may require additional approval.

If the decision is made and approved by applicable parties to forgo containment and proceed with HDD operations because a lesser impact is perceived to occur, the Company will provide personnel to continuously monitor the IR location throughout the duration of construction. The monitor(s) will observe operations, record volumes and characteristics of the IR, and periodically reevaluate the determination to continue the HDD operations until containment and removal are justified, or the HDD is complete.

Known Surface Waters and Wetlands

Where surface waters and/or wetlands exist along the HDD crossing alignments, the HDD contractor shall take the necessary steps to prepare the workspace for operations such that impacts to the wetland(s) are minimized and so that drilling fluids are contained within approved designated areas, preventing runoff or migration into additional waters and/or wetlands.

As described, above the response measures will be dictated by the characteristics of the IR if drilling fluid surfaces within surface waters. The HDD contractor should include planned methodologies for accessing, containing, and cleaning any potential IRs within surface waters and/or wetlands. However, it is understood that not all scenarios can be planned for. Assuming the IR location is accessible, the following

procedures are considered appropriate at this time and the HDD contractor shall account for them at a minimum:

- HDD contractor shall immediately cease drilling operations for investigation and impact evaluation.
- HDD contractor shall install a pre-approved (based on drill plan submittal) coffer dam (or equivalent) downstream of the IR location to contain the fluid if an IR occurs in a watercourse.
- If the flow of water within the waterbodies is too rapid for containment with one coffer dam (or equal) downstream, the HDD contractor should consider installing one or more similar structures upstream to reduce the flow and pump clean water around the affected location to maintain the water flow.
- If in a wetland, focus should be on determining estimated quantity released and footprint, plans for access, containment and cleanup and anticipated surface impacts for addressing the IR as well as concurrence from relevant regulatory agencies prior to implementation of any response.
- The Company will designate a representative to visit the site that will evaluate and report on the IR event. The designated representative will collect photographs, details of the release, location, volume released, receiving stream characteristics, and other important information and submit an IR Response Report to the appropriate Company contacts.
- The Company HDD inspector onsite and HDD contractor's site supervisor shall already have started the documentation process and the filling out of the IR Incident Summary, which is to be appended to the IR Response Report. The comprehensive team will collaborate to verify all necessary documentation is collected.
- Initial notifications shall be made per Table 1 as appropriate for the IR. Follow up reports will be submitted when complete. As noted, the Company will be responsible for agency notifications and follow-up communications.
- Removal/cleanup plans for the contained drilling fluid shall be provided by the HDD contractor and these should include the perceived most nonintrusive means to remove and clean up the drilling fluid. It is noted that plans included in the drill plan that have been pre-approved may be employed if appropriate for the conditions.
- Upon Company (and potentially agency) approval of the proposed removal plan, the HDD contractor shall initiate the approved removal/cleanup procedure(s) and transport the drilling fluid (if practical) to containment structures on high ground by hand, pumps, vac-truck, or other approved mechanism as necessary.
- Upon completion of the project, the HDD contractor will remove all containment and recovery equipment, tools, supplies, materials, wastes, and debris from in and around the surface waters or wetlands.

Offshore IRs

The reactionary measures taken associated with IR events in the offshore environment again depend on the quantity of fluid released, the recurring nature of the IR, and permit requirements. Because of site-specific variables such as depth of water, currents, etc., the selection of the most appropriate response methods will be made on a case-by-case basis. In some cases, the best action it to leave the IR as found and make operational attempts at restoring circulation through the drilled hole. For any offshore IR, the following procedures should be considered, and the HDD contractor shall account for them at a minimum:

- HDD contractor shall immediately cease drilling operations for investigation and impact evaluation.

- HDD contractor and HDD Inspector will determine estimated quantity released and footprint. If possible, plans for access, containment and cleanup should be reviewed and identifying anticipated impacts for addressing the IR. Prior to implementation of any responses, concurrence from relevant regulatory agencies must be secured.
- The Company will designate a representative to visit the site that will evaluate and report on the IR event. The designated representative will collect photographs (if applicable), details of the release, location, volume released, and other important information and submit an IR Response Report to the appropriate Company contacts.
- The Company HDD inspector onsite and HDD contractor's site supervisor shall already have started the documentation process and the filling out of the IR Incident Summary, which is to be appended to the IR Response Report. The comprehensive team will collaborate to verify all necessary documentation is collected.
- Initial notifications shall be made per Table 1 as appropriate for the IR. Follow up reports will be submitted when complete. As noted, the Company will be responsible for agency notifications and follow-up communications.
- Removal/cleanup plans (if any) for the released drilling fluid shall be provided by the HDD contractor and these should include the perceived most nonintrusive means to remove and clean up the drilling fluid. It is noted that plans included in the drill plan that have been pre-approved may be employed if appropriate for the conditions.
- Upon Company (and potentially agency) approval of the proposed plan, the HDD contractor shall initiate the approved removal/cleanup procedure(s) and transport the drilling fluid (if practical) to containment structures onshore by approved vessels, mechanisms, etc., as necessary.
- Upon completion of the project, the HDD contractor will remove all structures and recovery equipment, tools, supplies, materials, wastes, and debris from the offshore location(s).

Water Wells

Although it is anticipated that none exist in or around the proposed HDD alignments, Ørsted may wish to engage any well owner that is discovered prior to construction and establish an agreement for water testing before and after construction to verify that impacts have not occurred from the construction activities. Ørsted will handle all correspondence with the water well owner(s).

Hole Abandonment

Abandonment of a drill path will only be considered when all efforts to control the drilling fluid loss have failed or hole conditions have deteriorated to the extent that completing the HDD is infeasible. Any hole abandonment locations will be documented and shown on any as-built documents.

The following steps will be taken during abandonment of the hole:

- A new drill path for the HDD crossing will be determined (if feasible).
- A thick grout plug will be pumped into the hole to securely seal the abandoned hole.
- All downhole equipment and tooling will be removed from the abandoned hole.

Communication during an HDD Project

Communication for routine aspects of an HDD should be between the HDD contractor's site supervisor and Company assigned HDD inspector or designee. During IRs, additional Company policies, permit requirements, or agreements into such dialogs for guidance and concurrence on IR response actions may be incorporated.

Post Construction Monitoring

In the event of a drilling fluid release in a sensitive area as determined by the Company, a site-specific, post-remediation protocol will be submitted to the applicable regulatory agencies by the Company. This protocol will be based on the specific parameters of the release, including volume, location, and extent. The goal of the plan will be to determine what adverse effects may have occurred in the impacted area of release. Efforts may include random sampling of each present habitat and comparison of impacted habitats to non-impacted habitats. Pre-drilling data for this project will be used for comparative purposes.

At a minimum, an inspection of the entire drill path will occur within 48 hours of completion of drilling activities. A letter report will be prepared to summarize any fluid deposits that are identified. In the event that there is a drilling fluid release, post drilling monitoring may consist of an in-water investigation to be performed within 30 days after completion of drilling activities, if required by Company and/or applicable regulatory agency. All drilling fluid releases that persist beyond completion of drilling activities will be removed within 30 days of completion of drilling, if requested by the federal or state regulatory agencies having jurisdiction.

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Appendix 1: Hydraulic Fracture and Inadvertent Returns Analyses

TO BE INSRERTED AS PART OF FINAL DESIGN

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Appendix 2: HDD Inadvertent Drilling Fluid Return Response Items

Containment, response, and cleanup equipment will be provided by the contractor(s) and readily available at the HDD site to assure a timely response to IRs. Equipment may include, but is not limited to:

- Shovels, push brooms, squeegees, trowels, pails, and/or other appropriate hand tools
- Hay or straw bales, wattles, and wooden stakes
- Silt fence, T-bar posts, post pounders
- Plastic sheeting or geotextile fabric
- Sediment/silt curtains, sandbags, absorbent booms, or pads
- Turbidity curtains
- Pumps with sufficient suction and lifting heads, control and check valves, and leak-free hoses
- Tanks for non-potable water and/or waste mixture storage
- Earth moving equipment (backhoes, dozers, skid-steers, as appropriate)
- Secondary containment for all on-site mobile equipment, fuel, lube, or other chemical storage containers
- Vacuum truck (or on 24-hour call)
- SDS sheets for all pre-approved, on-site, materials
- This IR Contingency Plan with appended IR Incident Summary template

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Appendix 3: HDD Inadvertent Return Incident Summary

HDD Inadvertent Return Incident Summary		
Project Name/Number/Location:	**Date:**	**Data Collected By:**
General Information Required	**Collected Information**	
1. Person(s) reporting incident with contact information		
2. Release date and time		
3. Responsible parties / Contractor(s) involved		
4. Location (county and coordinates) / Address / Station Number		
5. Environmental impact (Wetland, Stream, etc.)		
6. Estimated release volume (gallons) and surface impact area		
7. Contingency Plan implemented? (Yes/No) If yes, attach plan.		
8. Photo documentation (provide pre-cleanup photos of IR, upgradient and downgradient view, impact areas).		
9. Contained to permitted workspace or ROW? (Yes/No)		
10. Accessibility requirements (4x4, equipment or worker access mats, hose length, etc.).		
11. Proposed method of drilling fluid/waste recovery.		
12. Proposed waste material storage or disposal plan.		
13. Proposed disposal site for waste material.		
14. Planned/intended final hole diameter and crossing's carrier pipe diameter for installation.		

HDD Inadvertent Return Incident Summary		
Project Name/Number/Location:	**Date:**	**Data Collected By:**
15. Phase of HDD operation in process at time of inadvertent release.		
16. General description of subsurface materials identified for the tool's downhole location at time of release event.		
17. Diameter and type of downhole tool at time of release (i.e. – pilot hole bit diameter, reamer diameter, type of bit or reamer, etc.).		
18. Diameter of drill pipe used, and specifically the tube and tool joint diameter(s).		
19. Distance downhole from identified end of crossing (i.e. – entry or exit) where drilling fluid returns were surfacing just prior to release event occurring.		
20. Distance from Environmentally Sensitive Area		
21. X, Y, Z location of release, with correlating delta between entry/exit elevations, ground surface elevation at release point, and the as-drilled profile depth at the release point.		
22. Any/all casings installed and distance downhole for each.		
23. Drilling fluid materials (i.e. – bentonite, additives, etc.) used, leading up to and at the time of the release event. Include SDS sheets of materials in use.		
24. Drilling fluid properties (i.e. – drilling fluid density, viscosity, sand content, rheology, fluid loss, pH of make-up water, etc.) leading up to and at the time of release.		
25. Penetration rates and drilling fluid pump volumes, leading up to and at the time of the release event.		
26. Downhole annular pressures, leading up to and at the time of the release event.		

HDD Inadvertent Return Incident Summary		
Project Name/Number/Location:	**Date:**	**Data Collected By:**
27. Any Lost Circulation Materials (LCMs) introduced to the drilling fluid program once the release event occurred.		
28. Any other mitigation measures taken to prevent, or contingency plans implemented once the release event occurred.		
29. All steps taken to regain circulation after the release event occurred.		
Additional Comments:		

Ocean Wind
An Ørsted & PSEG project

Onshore Horizontal Directional Drilling Inadvertent Returns Contingency Plan

Horizontal Directional Drilling (HDD) Inadvertent Return Contingency Plan for the Ocean Wind Project – Oyster Creek

Prepared For:
Ocean Wind LLC

Prepared By:
McCormick Taylor
700 East Gate Drive #201
Mt. Laurel, NJ 08854

January 2022

Contacts:

Licensee: *Ocean Wind LLC (Ocean Wind), a Joint Venture between Ørsted Wind Power North America LLC (Ørsted) and PSEG Renewables LLC (PSEG)*
Design Engineer: *TBD*
Environmental Inspector: *TBD*
HDD Contractor: *TBD*

Please see below for a list of personnel contacts:

Name	Company	Role	Phone	Email
TBD	***Ocean Wind LLC***	**Licensee**	*TBD*	*TBD*
TBD	*TBD*	**Licensee Environmental Representative**	*TBD*	*TBD*
TBD	*TBD*	**Environmental Inspector**	*TBD*	*TBD*
TBD	*TBD*	**Design Engineer**	*TBD*	*TBD*
TBD	*TBD*	**HDD Contractor**	*TBD*	*TBD*

Table of Contents

1.0 Introduction

This Horizontal Directional Drill (HDD) Inadvertent Return (IR) Contingency Plan is to provide assurance of adequate monitoring, detection, containment, and cleanup for potential discharge of drilling fluid or other materials (referred to as an "inadvertent return") resulting from the horizontal directional drilling (HDD) crossing of Oyster Creek in Ocean County, New Jersey. The HDD crossing will be authorized by the New Jersey Department of Environmental Protection *(Permit # not yet issued*) and the U.S. Army Corps of Engineers, Philadelphia District (*Permit # not yet issued*). See Figure 1: Project Location Map. The Licensee/Owner for this project is Ørsted Wind Power North America LLC (Ørsted) and PSEG Renewables LLC (PSEG)**.**

2.0 Best Practices

The Licensee and their HDD Contractor, under observation of the Environmental Inspector, shall follow industry best management practices such as those contained in the *Horizontal Directional Drilling (HDD) Good Practices Guidelines* by HDD Consortium, David Bennett, PhD & Samuel Ariaratnam, PhD (2017, Fourth Edition) or other similar sources combined with in-house best practices developed from previous projects.

3.0 Pre-Construction Preparations

Before construction begins:

All employees shall attend project specific environmental and safety training before starting work on the project.

The Licensee shall conduct a pre-construction meeting to review the project and HDD IR Contingency Plan and include the following representatives:

- HDD Contractor
- Design Engineer
- Environmental Inspector
- Licensee's Environmental Representative
- Pending future permit conditions, NJDEP/USACE Representatives may participate as well.

Coordination is recommended with adjacent/nearby property owners prior to the start of drilling activities to inform them of the HDD activity and request permission to enter affected properties to clean up in the unlikely event that inadvertent drill fluid releases on their property. Contact information should be maintained for the adjacent property owners should the contractor need to contact them due to fluid release outside the limits of disturbance.

Adequate quantities of containment materials should be available at the HDD crossing location and be adequately designed for the specific project; including but not limited to:

- ☐ Hay bales (certified weed free), stakes to secure
- ☐ Silt fence
- ☐ Plastic Sheeting
- ☐ Turbidity barriers
- ☐ Shovels, Pails
- ☐ Push Brooms
- ☐ Squeegees
- ☐ Pumps and hoses
- ☐ Boat(s): on call with a required response time of less than 45 minutes, contact_____, phone_____
- ☐ Vacuum truck on 24-hour call, contact_____, phone_____
- ☐ Generator with light tower

- ☐ Sandbags/Weighted filter socks
- ☐ Designated areas for storage of inadvertent release materials
- ☐ Other

4.0 Construction

The HDD process typically utilizes a drilling fluid that consists primarily of water and a naturally occurring clay mineral (bentonite). The drilling fluid helps to provide lubrication, cools the drill bit, and stabilizes the wall of the borehole.

During construction:

The HDD Contractor shall perform visual monitoring of the drilling route and surrounding area during all HDD operations and shall make and retain daily inspection notes. The notes will be kept onsite and available for review for the duration of the project and shall include:

- Volume of drilling material used and recovered
- Method of material disposal
- Depth of bore below the regulated water body or wetland bottom
- Daily average drilling pressures and any notable spikes or deviations
- Daily bore or ream size and distance of progression

HDD activities will be monitored, either by the HDD contractor, Environmental Inspector, or both. Monitoring procedures will include:

- Inspection along the drill path and nearby waterbodies.
- Continuous examination of drill mud pressure gauges and return flows to the surface pits.
- Monitoring of the drill status information regarding drilling conditions and alignments of the drilling profile during drilling activities.
- Should a release occur in an upland, a waterbody or wetland (including wetland transition area), containment of the returns that may contain drilling fluids will be established and monitoring of the effectiveness of the containment method to determine whether any further potential movement of released drilling mud is occurring will continue until there are no further signs of a release.
- Inspect any roads or buildings the HDD may cross under for subsidence. If subsidence is observed, cease drilling operations and contact the Design Engineer.

5.0 Response to Inadvertent Return

An inadvertent return (IR) is a discharge of drilling fluid or other materials. If an IR is observed and has impacted, or has the potential to impact, federally or state regulated waters or wetlands, or uplands, the Licensee and its contractor is responsible for following this HDD Inadvertent Return Contingency Plan. Specifically, the Licensee and its contractor will:

Assess the IR to determine the amount of drilling fluid released and the potential for the IR to reach regulated waters or wetlands.

If IR is at an **Upland location**, the contractor's HDD crew shall:

- Promptly notify HDD Contractor's on-site supervisor, who will contact the Licensee. The Licensee will be responsible for notifying the appropriate representatives.
- Immediately suspend drilling operation.
- Evaluate the IR to determine the most appropriate cleanup measures, including if containment structures are needed.
- Implement appropriate cleanup measures to contain and remove IR drilling fluid to the extent practicable.
- Depending on volume of drilling fluid lost, remove the fluid by vacuum truck and/or shovel.
- Remove drilling fluids at a rate sufficient to maintain containment of the IR during all drilling operations.

- Drilling to resume after consultation with the Environmental Inspector and the Licensee's Environmental Representative.

If the IR is in a **Wetland location** (including wetland transition areas), the Licensee and its contractor shall:

- Suspend drilling and promptly notify the HDD Contractor's on-site supervisor, who will contact the Licensee. The Licensee will be responsible for notifying the appropriate representatives.
- Evaluate IR to determine the immediate containment and cleanup measures. The Licensee shall consult with the USACE and NJDEP after the IR is contained concerning further evaluation and additional proposed cleanup measures, and take appropriate immediate action to stop and contain the IR.
- Implement appropriate cleanup measures to contain and remove IR drilling fluid to the extent practicable. Appropriate cleanup measures are determined by the specific circumstances of the IR and may include, but are not limited to:
    - Removing the drilling fluid with manual tools if efforts to contain and remove the drilling fluid with equipment will result in further disturbance by equipment and personnel.
    - Diluting the drilling fluid with fresh water, allowing the fluid to dry and dissipate naturally, or a combination of both, if hand removal is not possible.
    - Using small collection sump pumps (diaphragm) to remove the fluid, if the amount of the released drilling fluid exceeds that which can be contained with hand-placed barriers.
    - If the amount of the slurry exceeds that which can be contained and collected using small sumps, drilling operations will be suspended until the IR can be brought under control.
- Store removed drilling fluid in a temporary holding tank or other suitable structure, out of the wetland area and wetland transition area pending reuse or disposal.
- Evaluate current drill profile (e.g., drill pressures, pump volume rates, drilling mud consistency) to identify methods to prevent further IR events.
- Resume drilling *only* when evaluation, regulatory agency coordination, and adequate containment measures are complete and prevention measures are in place.

If IR is at an **In-Waterbody location**, the Licensee shall:

- Suspend forward drilling and promptly notify the HDD Contractor's on-site supervisor, who will contact the Licensee. The Licensee will be responsible for notifying the appropriate representatives.
- Evaluate IR to determine the most appropriate cleanup measures, including if structures are needed to contain the plume. The Licensee shall consult with USACE and NJDEP concerning the evaluation and proposed cleanup measures, and take appropriate, immediate action to stop and contain the IR.
- Implement appropriate cleanup measures to contain and remove IR drilling fluid to the extent practicable. Appropriate cleanup measures are determined by the specific circumstances of the IR and may include, but are not limited to:
    - Pump or vacuum truck,
    - Hand-placed containment recovery,
    - Silt curtains, turbidity barriers, and similar measures.
- Store removed drilling fluid in a temporary holding tank or other suitable structure, out of any wetland and wetland transition area pending reuse or disposal.
- Evaluate current drill profile (e.g., drill pressures, pump volume rates, drilling mud consistency) to identify methods to prevent further IR events.
- Resume drilling *only* when evaluation, regulatory agency coordination, and adequate containment measures are complete and prevention measures are in place.

Internal Reporting Chain

In the case of an IR, the HDD Contractor will immediately notify the HDD Contractor's on-site supervisor, Environmental Inspector, Design Engineer, and the Licensee's Environmental Representative.

Agency Reporting of Inadvertent return (IR)

If the IR occurred within federally or state regulated waters or wetlands, the Licensee/Owner will be responsible for notifying the New Jersey Department of Environmental Protection via DEP's Spill Hotline: 1-877-WARNDEP (1-877-927-6337); as well as U.S. Army Corps of Engineers.

6.0 Cleanup Guidelines

In the case of an IR in upland areas or federally/state regulated waters or wetlands, IR drilling mud/fluids should be removed by hand or vacuum truck.

Hand-cleaning means using shovels, buckets, soft-bristled brooms or other hand items included in the material list, without causing damage to vegetation. Fresh water washes will be employed if deemed beneficial and feasible.

Containment structures (turbidity curtains, booms, or other) must be pumped out and the ground surface scraped to bare topsoil/existing vegetation without causing undue loss of topsoil or ancillary damage to existing and adjacent vegetation.

Material will be collected in containers for temporary storage prior to removal from the site.

Potential for a secondary impact from the clean-up process is to be evaluated and clean-up activities terminated if physical damage to the site may exceed the benefits of clean-up activities.

The need to restore disturbances to upland areas, freshwater and tidal wetlands or waters will be determined in consultation with the Licensee's Environmental Representative, USACE, and NJDEP.

7.0 Close-Out Procedures

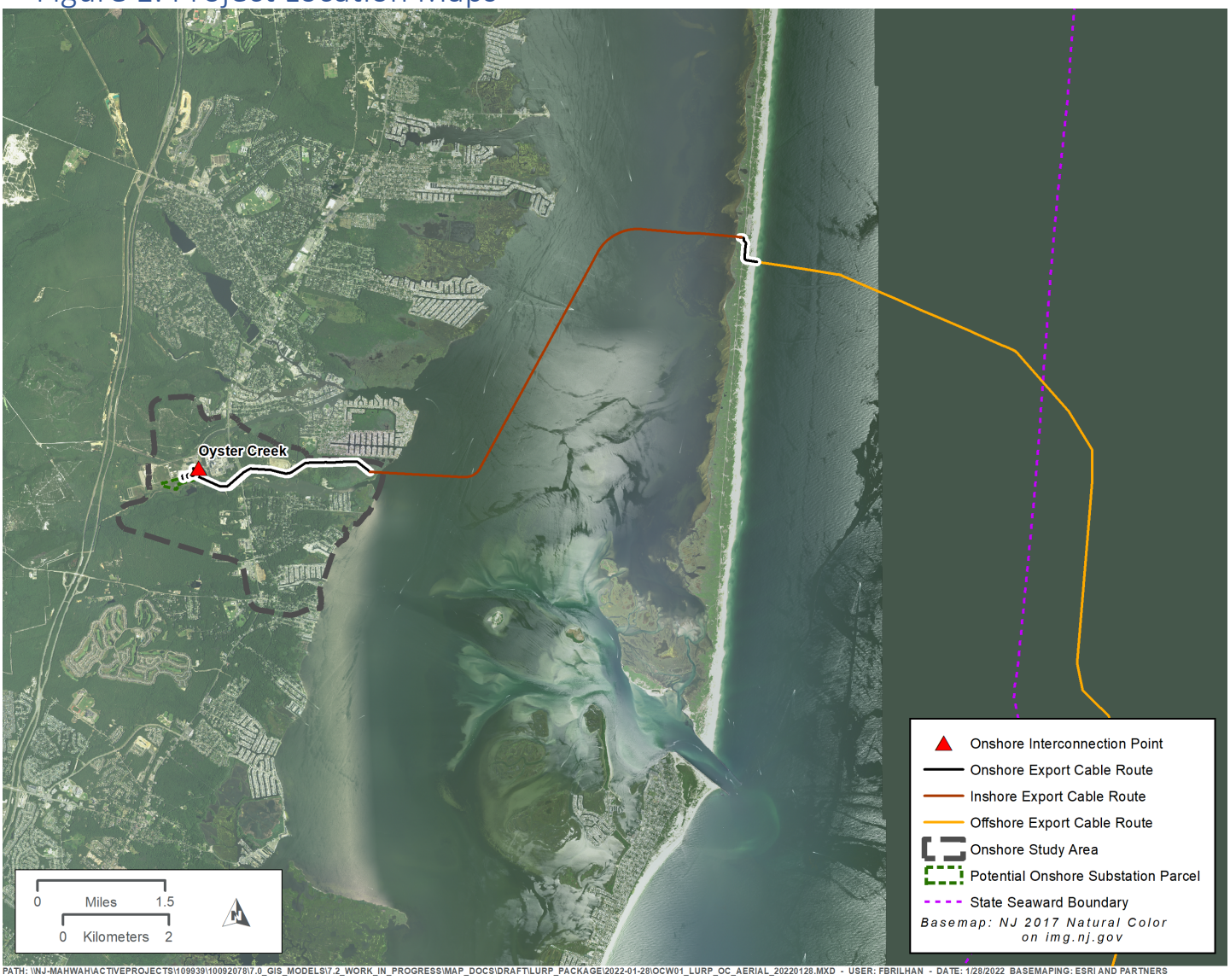
After the drilling fluid has been contained and removed, the Licensee and its contractor shall:

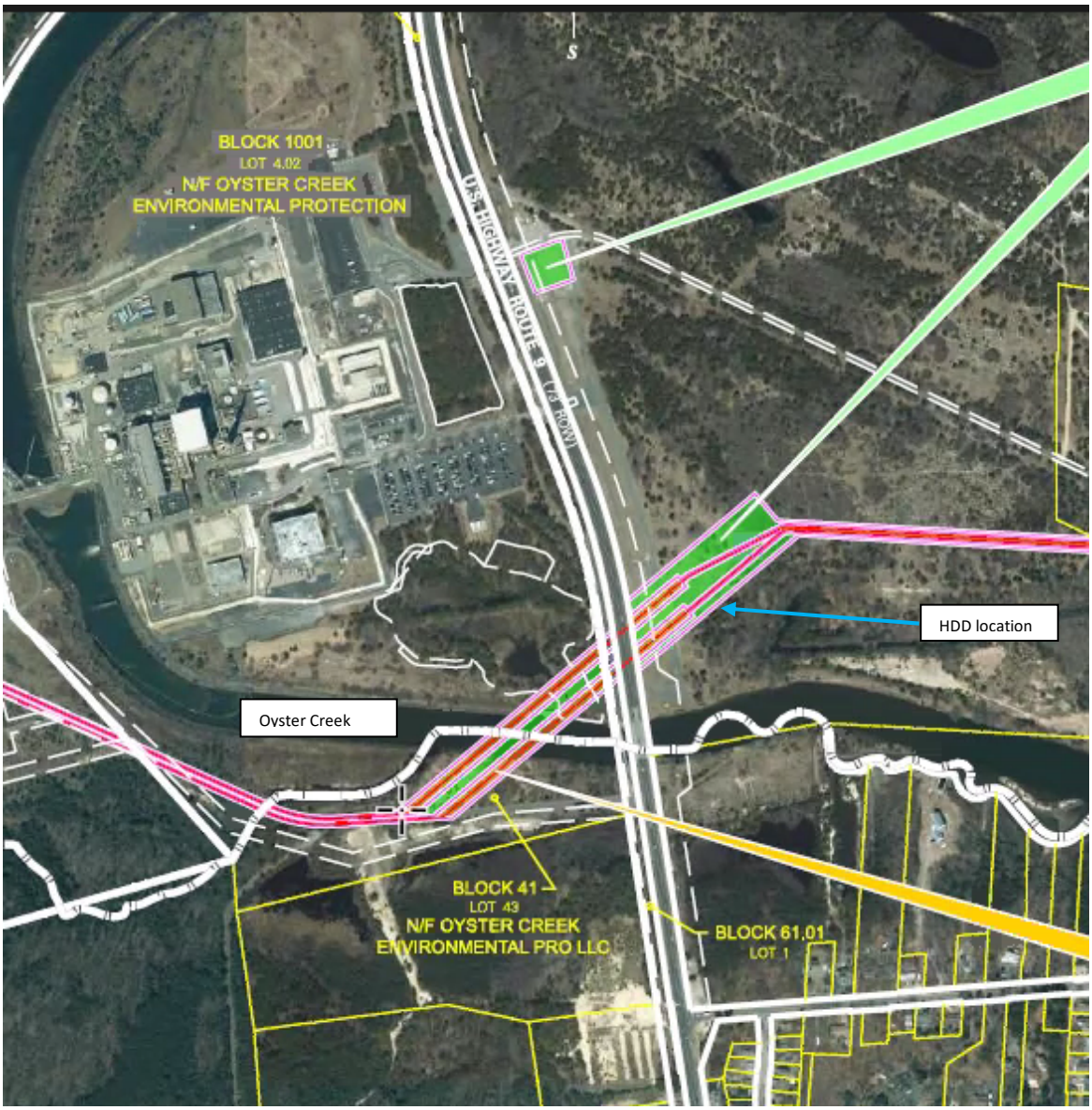
- Recycle or dispose of the removed drilling fluid at an authorized upland location or commercial disposal facility.

Note: Recovered drilling mud may not be deposited in waters of the State, streams, water bodies, or storm drains.

- Remove all containment structures and materials unless otherwise specified by the Design Engineer with approval from the appropriate regulatory agencies.
- Consult with the Licensee's Environmental Representative, USACE and NJDEP concerning restoration.

Figure 1: Project Location Maps




BLOCK 1001
LOT 4.02
N/F OYSTER CREEK
ENVIRONMENTAL PROTECTION
U.S. HIGHWAY ROUTE 9 (3 LANE ROAD)
HDD location
Oyster Creek
BLOCK 41
LOT 43
N/F OYSTER CREEK
ENVIRONMENTAL PRO LLC
BLOCK 61.01
LOT 1