

IMPERIAL OIL LIMITED AND SHELL CANADA PIPELINES RELOCATIONS WORKS

PHASE III - NPS 10 RELOCATION

Engineering Work Package
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1.0 Project Overview

The widening and expansion of Plessis Road in Winnipeg, Manitoba will require several pipelines to be relocated within their existing right of way (ROW). Specifically, pipelines belonging to Imperial Oil will require relocation due to the underpass as-designed for the Canadian National (CN) Rail Redditt Subdivision crossing at Plessis Road.

Approximately 135 Meters of existing Imperial Oil Limited (Owner) NPS 10 Refined Product pipeline will need to be relocated north of Transcona Valve Station.

This engineering work package (EWP) includes the construction of the relocated pipeline and the removal of existing pipeline segment.


The final purging and tie-ins to the original pipeline will be completed by Imperial Oil Limited (Owner), but the design and material is part of this scope. However, the consumables for the purge are not part of this scope.

The proposed pipeline relocation will be protected utilizing the existing IOL cathodic protection system for all buried steel piping.

2.0 Terminology

This section defines the terms used in this Engineering Work Package.

Term	Description
Work	The scope shown on the referenced drawings and described in this Engineering Work Package and C1.1 (ii)
Owner	Imperial Oil Limited (IOL)
Contract Administrator	AECOM/City of Winnipeg
Contractor	General mainline contractor hired to perform the Work described in this Engineering Work Package and C1.1 (ii)
“must”	Signifies a legal or statutory requirement
“shall”	Signifies a requirement made mandatory by this Engineering Work Package
“may”	Signifies a feature which is discretionary in the context in which it is applied


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3.0 Scope of Work

The pipeline Engineering Work Package includes, but is not limited to, the following:

- a. Prepare of the ROW for construction.
- b. Install new pipeline parallel to Plessis Rd utilizing open-cut methodology:
 - a. Install approximately 135 meters (m) of 273.05 mm OD (NPS 10), 6.35 mm WT, SMLS CSA Z245.1, API 5L Grade X42 (42,000 psi), Category II pipe, externally coated with Shaw Yellow Jacket 2K (YJ2K) for carrier pipe.
- c. Hydrovac tie-in locations and pipeline/utility crossings. Testing for disposal suitability and disposal of hydrovac fluid waste.
- d. Wall thickness and grade of original pipe that is to be tied-into shall be verified prior to construction to ensure there is no material mismatch. A spark test shall be conducted on the original pipe, on the same joints where the tie-in welds will be competed, to verify that the carbon equivalency is in accordance with the welding specification being used.
- e. Complete all stringing, bedding, welding, coating of field welds, trench, lowering-in, bedding and padding, and back-filling. Sand shall be used as bedding and for material surround the pipe. The sand bedding shall have a minimum thickness of 150 mm.
- f. Cleaning and running of a sizing and bend plate prior to hydrostatic testing, including locating and repair, of any dents or ovalities concluded unacceptable by the sizing plate. The sizing plate shall be 95% of the nominal internal diameter of the pipe, and the bend shall be 3D.
- g. Hydrostatic testing of the replacement pipe including filling, dewatering, and drying of the pipeline. The pipeline shall be dried to a level of dryness acceptable to the Owner.
- h. Remove and dispose of existing NPS 10 parallel to Plessis Rd. in accordance with regulator and environmental requirements.
- i. Restore ROW to its original condition.
- j. Red-lining of all construction drawings (as well as survey drawings), including collecting weld map of all welds, NDE numbers, clearances from crossed pipelines, bends, facility layout and boundaries.

The Contractor is to perform work in accordance with GP 59-01-12 and the construction drawings.

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4.0 Location

The work described in this work package will take place within the City of Winnipeg, Manitoba.

5.0 Technical Documents

The design and construction of the pipeline system will be in accordance with the Manitoba Innovation, Energy and Mines – Petroleum Division. In complying with the pipeline regulations, the pipeline system will meet or exceed the requirements of the Canadian Standards Association (CSA) standard CSA Z662-11, Oil and Gas Pipeline Systems, and other codes and standards referenced therein.

CSA Z662 invokes a series of industry standards and practices for material, components, and construction. Section 2.1 of CZA Z662 lists reference publications and standards, which are supplemented and/or qualified by CSA Z662. These publications and standards are grouped by organizations including the CSA, the American National Standards Institute (ANSI), the American Society of Mechanical Engineers (ASME), the American Petroleum Institute (API), the American Society for Testing Material (ASTM), the Manufacturer's Standardization Society (MSS) and others. The materials and equipment to be purchased shall meet all required applicable standards, specifications, and codes for the relevant jurisdiction. Codes, rules, standards, and specifications listed or referenced in this section are a minimum and are not intended to represent the full scope of required or applicable standards.

5.1 Design Guidelines, Procedures and Specifications


The following drawings will form part of this work package (Attachment A):

Drawing Title	Drawing Number
WPL NPS 10 Gretna to IOL Pipeline Replacement Plan & Profile – IOL North of Valve Station	U238-2014-3006
Typical Trench Detail	U238-2014-3010

5.2 Regulations, Standards and Specifications

The following specifications will form part of this work package:

No.	Description	Document Number	Effective Date
1	Onshore Pipeline Installation	GP 59-01-12	July 2001
2	Hydrostatic Pressure Testing of Pipeline Facilities	GP 87-87-17	April 2006
3	Pressure Testing of Pipeline Systems	GP 59-01-18	May 2013
4	Manitoba Oil and Gas Act	C.C.SM. c. 034	2013
5	Oil and Gas Pipeline Systems	CSA Z662-11	January 2012

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6.0 Construction Survey

The Contract Administrator will engage and administer a construction survey contractor that will complete the following activities:

- Locate and stake construction ROW boundaries, including the extra temporary work spaces as specified in the drawing or as directed by the Contract Administrator. Boundaries shall be established from existing legal monuments along the ROW.
- Stake all foreign line crossings in areas where clearing is required. The nearest Owner pipeline will also be staked to keep equipment away from existing pipelines.
- Locate environmental, archaeological, and historical sites and identify other items on the lands line list such as trees or shrubs to be saved, tree windbreaks to be bored, and other special concerns to be staked. The Survey contractor is responsible to make arrangements for all utility locates.
- Locate, stake, and flag any pertinent adjacent crossings of third party or Owner lines.
- Stake and reference the centerline of the proposed pipeline on offset measurements from the nearest existing parallel pipeline, legal limit, or proposed legal limit, as defined by the drawings or as directed by field inspection. The proposed ditch line will normally be staked only once by the survey contractor. All points of inflection (PIs) shall be referenced by the contractor for recovery during construction.
- Station the centerline of the proposed pipeline along the work side every 50 m. The mainline Contractor will be responsible for maintaining the proposed or surveyed location of the pipeline centerline while construction activities progress on the ROW.
- Stake and reference the various topsoil stripping widths and erosion protection procedures in accordance with Chief Inspector's instructions, pipeline alignment sheets, or both.


7.0 Welding

The contractor shall be responsible for having developed and qualified welding procedure specifications (WPS) for use during construction. The WPS shall be signed and stamped by a qualified professional engineer (P. Eng.) registered in Manitoba. The qualified WPS shall be supplied to the Owner for review and approval prior to any welding can commence.

8.0 Non-Destructive Testing

The Contract Administrator and Owner shall have the right to inspect and monitor all aspects of production welding to ensure that the welding procedures have been followed, and shall reserve the right to reject any welds not in compliance with the qualified WPS.

The Contractor will engage a third-party Non-Destructive Examination (NDE) Contractor to inspect the mainline welds as well as the repair welds. The NDE Contractor shall supply, at a minimum, a technician with a Level II certification for radiographic interpretation.

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All production wells will be subjected to 100% NDE by an independent third party per CSA Z662-11. The Contractor shall ensure that sufficient inspection units are made available to avoid impeding the progress of the Work. If the Contractor fails to do so, the Contractor will assume any costs associated with the work delay.

A record of all golden welds shall be completed. The bead and hot-pass on tie-in welds shall be inspected using magnetic particle inspection (MPI) prior to completing the weld. The final tie-in welds shall be examined using UT (ultrasonic testing) with a 60 degree probe, followed by X-ray or gamma ray radiography after the weld has been completed, followed by an additional UT and radiography inspection 24 hours later.

9.0 Field Weld Coating

To coat the girth welds, the Contractor shall be use Polyguard RD6 coating, installed and inspected in accordance with the manufacturer's coating application specifications and GP 59-01-01.

10.0 Hydrostatic Test


Contractor is to develop and a detailed pressure test plan of pipeline system for Owner to review and approve prior to performing the work. Hydrostatic pressure test plans and procedures shall be generated in accordance to GP-87-17 and GP 59-01-18.

The below parameters are considered for the hydrostatic test based on the wall thickness, pipe grade, and the elevation profile of the new relocation:

Parameter	Relocation
Pipe OD	NPS 10
Grade	X42 (42,000 psi)
Licensed MOP	9,000 kPa or 1305 psig (NPS 10)
Minimum Wall Thickness (WT) in the New Section	0.25"
Service	Refined Product
100% Specified Minimum Yield Stress (SMYS)	13,470 kPa or 1,953 psig (NPS 10)
Maximum Test Pressure	13,470 kPa or 1,953 psig (NPS 10)
Minimum Test Pressure	9,897 kPa or 1,435 psig (NPS 10)
Test Section Length	135m (NPS 10)

The expected highest pressure value at the low point during the strength test will be limited to below 13,470 kPa or 1,953 psig (NPS 10) which is equivalent to 100% of the pipe SMYS.

Any changes in pipeline parameters shall be reviewed and approved by the Owner prior to hydrostatic testing.

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A pressure-volume plot shall be prepared during the course of the hydrotest to ensure the pipe does not yield during the test. The pressure volume plot shall be signed and stamped by a qualified P.Eng.

If the hydrotest is performed while temperatures are below 0°C, freeze retardants, such as the addition of the methanol, may be used to ensure the test is completed satisfactorily. If a freeze retardant is used, it shall be ensured that the hydrotest medium is disposed of in accordance with local environmental requirements.

Subsequent to the successful hydrostatic test, the pipeline shall be dried using a displacement pig propelled by either pumped nitrogen or dry air with a dewpoint below -45 °C. A second cleaning pig shall be run after the displacement pig to ensure all water and methanol is removed from the line.

At the tie-in locations, the pipe ends, including the heat affected zone, shall be cleaned and buffed to ensure all residue from the water/methanol mixture has been removed prior to performing the tie-in welds.

11.0 Backfilling

11.1 Material Specification for backfill

There are two options for the backfill material, depending on weather conditions:

1. Cold weather specification – utilize Concrete Low Shrink Fill (CLSF) under road way to ensure compaction.
2. Warm weather specification – may use CLSF or sand bedding with hydraulic compaction – Sand bedding could be native material if on site inspector and contractor confirms clean material.


11.2 Backfill procedure

The bedding and backfilling requirements below will be utilized for the pipeline installation using open-cut methodology.

The bedding and surrounding of all pipe work trench backfilling shall be carried out using natural sand, well-graded and free from contamination and deleterious material. A bed of sand backfill material shall be laid and compacted to 150 millimeter (mm) thickness over the full width of the trench. The maximum grain size of the bedding sand shall be 5 mm. Sand shall be clean durable sand.

The sand shall be delivered on a just-in-time basis and stored in a covered location to ensure minimal moisture and ice is present when the bedding and haunch are installed.

The pipe shall be adjusted to line and level to ensure that pipe barrels rest uniformly on the bedding. Where side fill is required, further selected backfill material shall be laid and compacted uniformly by hand halfway up each side of the pipe. Pipes shall not be placed on blocks, bricks, etc.

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Continue filling in lifts of 150 mm to 1.0 m above the pipe. All lifts shall conform to 97% maximum dry density as determined by the dry proctor test. Vibratory compaction shall not be used during the backfilling procedure. All compaction is to be achieved using dead weight.

Once 1.0 m of the engineered fill has been added above the pipe, standard road backfill material will be placed in 150 mm lifts. Compaction standard road building equipment will be utilized for the standard road backfill.

11.3 Quality Control

The Contract Administrator's quality control (QC) Soils Inspector will approve via ITP, and the Contractor will verify the following:

- Trench is free of frozen soils, ice, and snow, and
- Backfill material is free of frozen material, ice, and snow.
- At a minimum, each 150 mm lift should be tested through the pipe zone utilizing compaction test.

In general, QC is the Contractor responsibility, while quality assurance (QA) is the Contract Administrator responsibility.

12.0 Equipment and Materials

The following provides the Bill of Materials (BOM) for the work contained in this EWP. The Contractor is to refer to attachments No.1 and No.2 of this EWP for the detailed BOM. The Contractor shall perform its own material take-off and verify the materials listed. If the Contractor identifies equipment, services, or materials that are not specified in Section 13.1.1 of this EWP below, the Contractor shall notify the Contract Administrator for resolution.


12.1 Contract Administrator Supplied Material

The following material will be supplied by the Contractor and will be made available on-site per design drawings and site conditions:

12.1.1 Contract Administrator Supplied Material

Pipe Descriptions	Coating Description
NPS 8, 0.25" WT, API 5L X42, Cat. II, Cold Bends	YJ2K Coating
NPS 10, 0.25" WT, API 5L X42, Cat. II, Cold Bends	YJ2K Coating
NPS 10, 0.25" WT, API 5L X42, Cat. II, DRL, Mainline Pipe	YJ2K Coating
45° Elbow, 5D, NPS 10, 0.25" WT, API 5L X42, Cat. II	YJ2K Coating

In general, all equipment, materials, and services required to complete the work in accordance with the contract documents, shall be provided by the Contractor.

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Contract Administrator and Owner will not provide any equipment and/or materials for the work performed in this EWP.

13.0 Quality Surveillance Requirements

13.1 Overview

A quality program shall be implemented to provide assurance that all material and services provided by the Contractor are completed in accordance with the Contract, including the Drawings, Contract Administrator specifications, Owner specifications, environmental and permit requirements, and landowner requirements.

13.2 Responsible for Quality

The Contractor is responsible for quality of the Work performed, which includes the systems, and practices to assure that the work on the project comply with the specifications.

In general, QC is the Contractor responsibility, while quality assurance (QA) is the Contract Administrator responsibility.

The Contract Administrator's inspection team will carry out regular inspections and audits of Contractor construction activities. This will help to identify non-compliance items, and will ensure that appropriate corrective action, when required, is taken. The inspection team will audit the Contractor's compiled construction quality records.


The Contractor will be responsible for the quality of the Work performed.

13.3 Quality Control System

The Contractor shall provide its own quality control system that is acceptable by the Contract Administrator to ensure that the Work conforms to the requirements of the Contract prior to submitting any portion of the Work to the Contract Administrator for acceptance. The quality control system shall be approved in advance.

The Contractor's quality management system, usually documented as a Quality Manual, shall be submitted by the Contractor with the Contractor's proposal. The Contractor shall also draft and submit a project-specific Inspection and Test Plan that describes how the Contractor plans to staff, use resources, and control and document evidence of compliance with the Contract requirements. The Inspection and Test Plan shall be submitted at least 2 weeks prior to the kick-off meeting and be approved prior to the start of construction. The Inspection and Test Plan needs to address the following as a minimum:

- Operations or activities to be inspected for compliance.
- The type, extent and frequency of inspection versus criticality of repair or rate of repair.
- The processes in place to monitor and reduce rework.
- Records and forms used to record quality inspections.
- Material receiving and control.

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- Organization for quality control.
- Responsibilities and duties of quality control supervisor.
- Compilation of quality records for turnover to the Contract Administrator at project completion.

If not already detailed in the Contractor's Quality Manual, the Contractor shall describe and include the following in its proposal:

- The processes for identifying, recoding, and obtaining owner approval of non-conforming items, explaining the disposition of non-conforming items, documentation (forms used), authority for disposition, and an example scenario of how non-conformance will be addressed, by a technical corrective action plan.
- Document control, including Drawings and specifications.
- The Contractor's requirements for subcontractors, including inspection and verification.

13.4 Quality Assurance


The Contract Administrator will conduct quality audits and reviews with the Owner to that all material and services provided by the Contractor are completed in accordance with all Contract Documents, including the Drawings and Construction Specifications, environmental and permit requirements, and landowner requirements.

14.0 Safety

14.1 Meetings, Reports, and Forms

The contractor will attend the following meetings during the administration of the Contractor

- Kick-off meeting:
 - During the kick-off meeting following items will be reviewed.
 - Persons responsible for execution of the contract and their qualifications (Project Supervisor, Safety Supervisor, Quality Supervisor)
 - Scope of work
 - Contract execution plan
 - Safety plan
 - Quality plan & Inspection & Test Plan (ITP)
 - No work will take place without the kick-off meeting and acceptance of the Safety Quality and inspection test plan
- Progress review/planning meeting: one per shift
- Tool talks: one per shift

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- Near miss and accident investigation meetings

The following reports or documentation are required during administration of the Contract:

- Progress & planning report: one per shift
- Safety and Loss Management Reports
 - Loss Control reports
 - Incident/investigation reports
 - Contractor safety activity report
 - Safety Statistics Reports

14.2 Safety and Loss Management


Below is a list of safety requirements to be adhered to by the contractor while on the construction site.

- All site personnel will be familiarized with the site safety requirements.
- The Contractor will submit a copy of their Loss Management program and/or safety manual for review upon award of the contract prior to the kick-off meeting.
- The minimum requirements for Personnel Protective Equipment are:
 - Head Protection
 - Eye Protection
 - Foot Protection
 - CSA 196-02 Class II Level 2 high visibility safety vest
 - Hearing protection for noise level exceeding 85 decibels

14.3 Ground Disturbance Activity

As part of the construction ROW staking program, the Contractor shall notify “OneCall” and arrange to have a line sweep completed to determine whether other buried utilities or facilities exist. Further to this, the Contractor shall arrange to have a third party to carry out an independent line sweep. The Contractor shall follow the minimum guidelines in conjunction with the Contract Administrator’s and Owner’s Ground Disturbance Standards:

- All supervisors and persons directing equipment and operators involved in ground disturbance activities need to attend ground disturbance training and need to be in possession of a valid Ground Disturbance Certificate.
- Only designated operators shall be allowed to excavate within 5 m of a buried facility.
- No ground disturbance activity shall occur within the ROW of a buried foreign facility or within 5 m of a buried facility not located within a ROW until:
 - The required notification has been made to the owner of the buried facility,

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- A Ground Disturbance checklist has been completed,
- A Crossing Agreement is on site,
- The buried facility is fully exposed, and
- The owner, or a representative, of the buried facility is on site.
- After a pipeline has been located, no person shall use or cause to be used mechanical excavation equipment within 600 mm of the pipeline or beneath the pipe except under the direct supervision of a representative of the Owner.
- The Contractor shall give 72 hours' notice prior to undertaking ground disturbance, excluding weekends and statutory holidays.
- The person undertaking ground disturbance who exposes any part of the pipeline must give 24 hours' notice to the Owner prior to backfilling.

14.4 Pipe Demolition and Tie-in

During the demolition and final tie-in procedures, the following safety procedures shall be in place in the event hydrocarbons are encountered:


- Muster points shall be identified and communicated to all personnel on-site
- A shutdown and evacuation plan shall be developed and communicated to all personnel on-site
- Lower Explosive Limit (LEL) Detectors shall be on-site
- Cell phones (unless intrinsically safe) and pocket lighters shall not be allowed on the jobsite.
- All equipment on the jobsite shall have spark arrestors installed or be positive pressure inhibited
- All personnel on-site during the demolition and tie-in operations shall have H2S Alive certification

15.0 Environment

15.1 General

The Contract Administrator is committed minimizing adverse impacts on the environment during construction. Special attention and focus shall be directed the Contractor at all construction activities to ensure the complete implementation and enforcement of environmental requirements including, but not limited to the following:

- Environmental Protection Plan (EPP)
- Pipeline Environmental Field Reports
- CSA Z662-11
- Manitoba Oil & Gas Act

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- Manitoba Workers Compensation Board Occupational Health and Safety Act and Regulations
- Manitoba Environment – Water Resources and Public Land Divisions
- Canadian Transportation of Dangerous Goods regulations


The Contractor shall:

- Work in accordance with the best pipeline construction practices to minimize impacts on environment
- Assess for potential impacts to the wildlife and propose mitigation measures for the wildlife as required
- Not harass wildlife
- Remove and dispose of the existing pipeline in accordance with regulator and environmental requirements
- Ensure no hydrocarbons are released during the demolition of the original pipe
- Protect any archaeological and heritage sites
- Minimize all emissions of dust and noise
- Limit all types of pollution to acceptable levels
- Prevent the spread of weeds
- Advise Contract Administrator who will in turn notify Owner of any suspected contamination from existing pipelines or soil conditions which do not meet environmental standards

15.1 Adverse Weather Conditions

The Contractor shall suspend all construction activities during adverse weather or under wet construction ROW conditions. Throughout the execution of the Work the Contractor shall make its best efforts to remedy and mitigate the impacts of weather weather-related conditions on the ROW and the Work, and shall justify to the Contract Administrator's satisfaction any and all circumstances which prevent the Contractor from fully or partially engaging its workers and equipment affected by weather or weather-related events elsewhere on the Work.

Written requests by the Contractor for any extension of the Contract Schedule as a result of the Contract Administrator's decision to implement an environmental shutdown of all or part of the Work must be received within 2 days of each such environmental shutdown being ordered.

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Appendix A – Attachments

This appendix lists the attachments to this scope of work.


No.	Description
1	Pipeline Material Take-off
2	Construction Alignment Sheets
3	ROW Cross-Section Configuration & Typical Trench Detail

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ATTACHMENT 1: PIPELINE MATERIAL TAKE-OFF

IMPERIAL OIL
Phase III - NPS 10 RELOCATION
BILL OF MATERIAL


Item	NS	Description	QTY
1	10"	PIPE, 10.75" OD (273.05 mm OD), 0.25" WT (6.35 mm WT), CS, API 5L CAT II, CLASS 600, X42, SMLS CSA Z245.1, EXTERNALLY COATED USING YJ2K TYPE, DSAW, WELDED IN ACCORDANCE WITH GP 29-03-18.	135 m
2	10"	ELBOW, 10.75" OD (273.05 mm OD), 5D, 0.25" WT (6.35 mm WT), CS, BW, CAT II, X42, CLASS 600, CSA Z245.11, EXTERNALLY COATED USING YJ2K TYPE	4 EA.

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ATTACHMENT 2: CONSTRUCTION ALIGNMENTS

Refer to drawing numbers:

- U238-2014-3006– WPL NPS 10 Gretna to IOL Pipeline Replacement Plan & Profile – IOL North of Valve Station

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ATTACHMENT 3: ROW CROSS-SECTION CONFIGURATION & TRENCH DETAIL

Refer to drawing numbers:

- U238-2014-3006– WPL NPS 10 Gretna to IOL Pipeline Replacement Plan & Profile – IOL North of Valve Station
- U238-2014-3010 – Typical Trench Detail