

# APPLICATION TO VARY PERMIT REFERENCE: EPR/YP3030EX

Valero Energy Ltd, Pembroke Refinery

794-ENV-EPC-20231

4

2

14 August 2024

## Document status

Version	Revision	Authored by	Reviewed by	Approved by	Review date
1	0	Roger Newman	Jennifer Stringer	-	19 June 2024
1	1	Roger Newman	Richard Livock	-	24 June 2024
1	2	Roger Newman	Andrew Waterman	-	28 June 2024
2	0	Roger Newman Rayhela Ahmed	Jennifer Stringer	-	2 July 2024
2	1	Roger Newman	Jennifer Stringer	-	3 July 2024
2	1	Roger Newman	Richard Livock Gary Neville	-	9 July 2024
3	0	Rayhela Ahmed	Jennifer Stringer	-	10 July 2024
4	0	Rayhela Ahmed	Jennifer Stringer	-	13 August 2024
4	1	Rayhela Ahmed	Jennifer Stringer Gary Neville	-	13 August 2024
4	2	Rayhela Ahmed	Jennifer Stringer	Jennifer Stringer	14 August 2024

## Approval for issue

Jennifer Stringer

Technical Director



14 August 2024

## File Name

240814 R 20231 Valero Refinery Variation RN V4 R2.docx

© Copyright R P S Group Limited. All rights reserved.

The report has been prepared for the exclusive use of our client and unless otherwise agreed in writing by R P S Group Limited no other party may use, make use of or rely on the contents of this report.

The report has been compiled using the resources agreed with the client and in accordance with the scope of work agreed with the client. No liability is accepted by R P S Group Limited for any use of this report, other than the purpose for which it was prepared.

R P S Group Limited accepts no responsibility for any documents or information supplied to R P S Group Limited by others and no legal liability arising from the use by others of opinions or data contained in this report. It is expressly stated that no independent verification of any documents or information supplied by others has been made.

R P S Group Limited has used reasonable skill, care and diligence in compiling this report and no warranty is provided as to the report's accuracy.

No part of this report may be copied or reproduced, by any means, without the written permission of R P S Group Limited.

### Prepared by:

**RPS**

Newman, Roger  
Principal Consultant

3 Sovereign Square  
Sovereign Street  
Leeds LS1 4ER

T +44 1132 206 190

E [roger.newman@rps.tetratech.com](mailto:roger.newman@rps.tetratech.com)

### Prepared for:

**Valero Energy Limited**

---

# NON-TECHNICAL SUMMARY

## Introduction

Valero Energy Limited (“Valero”) operates a refinery [Pembroke Refinery] on the south shore of Milford Haven, Pembrokeshire, to process crude oil into its component parts for use in various downstream markets. The refinery has been operated by Valero under environmental permit reference: EPR/YP3930EX since 01/01/2014.

Pembroke Refinery is supplied with crude oil by sea in tankers. Crude oil is unloaded at 5-berth and 3-berth jetties connected to the refinery by pipeline and transferred to storage within the refinery operating area.

The crude oil is then subject to a series of processes to purify, distil and crack the crude into component fractions.

## The Site

Pembroke Refinery is situated on a peninsular on the southern shore of Milford Haven, on the edge of the Pembrokeshire Coast National Park, in the southwest of Wales. It occupies approximately 500 acres of a 1,275 acre site at Pembroke Refinery, Pembroke, Pembrokeshire, SA71 5SJ.

The installation is immediately surrounded by agricultural fields to the west, south and east, and the shore of Milford Haven to the north. Pembroke Power Station is located approximately 1,500 m east of the installation and the closest residential property is an isolated farmhouse approximately 1,250 m southeast of the installation boundary.

The installation boundary extends into the Milford Haven, which is designated as a Special Area of Conservation (SAC), Special Protection Area (SPA) and Site of Special Scientific Interest (SSSI).

## Description of Changes

Valero Logistics UK Limited intends to bring back into operation an existing pipeline between the Pembroke Refinery and Valero Pembrokeshire Oil Terminal (VPOT) to supply the refinery with crude oil from VPOT. VPOT are the owner and will be the operator of the pipeline. The pipeline runs under the Milford Haven and will operate under separate legislation.

This variation seeks to permit the receipt of crude oil at the refinery via the cross-Haven pipeline plus the installation of a new 14” diameter pipeline extending approximately 1,555 m between the cross-Haven pipeline and the crude oil blend pumps. Alternatively, Valero may opt for a combination of new and existing pipework, which will follow the same pipe-run/ route as a new 14” pipeline.

The raw materials, refining process, residues, wastes and products will remain unchanged. Likewise, the capacity of the Pembroke Refinery and the installation boundary will remain unchanged.

The variation application, therefore, seeks to include the receipt and handling of crude oil via the cross-Haven pipeline and the on-site transfer of the crude oil to the crude oil blend pumps in the permitted activities.

In addition, this application seeks to allow the transfer of wet crude, slop oil (off-specification liquid hydrocarbon) and dewatering effluent from the VPOT to the Pembroke Refinery either using the cross-Haven pipeline, road tankers, or ship. The dewatering effluent would be considered a hazardous waste and would be accepted under EWC waste code 16 10 01\*. Slop oil would be considered a hazardous waste under EWC waste code 13 07 03\*. Both waste codes would need to be added to the permit. However, the storage and treatment of the wastes is already permitted under directly associated activities listed in Schedule 1 of the site environmental permit. The Pembroke Refinery already accepts other wastes and has in place procedures for accepting wastes. These procedures would be extended to acceptance of the additional waste.

---

## Variation Application

This variation sets out the operational controls and management of the changes to the proposed activity that will ensure that the environmental risks and impact of the activity are minimised. It concludes that the changes to the installation are minor, will be well controlled, and that the environment or local residents will not be adversely affected.

Pembroke Refinery has previously been granted derogation from the emission limits set out in BAT52 of the BREF for Refining Mineral Oil and Gas<sup>1</sup>. The proposed change will have no impact on the existing or pending derogation decision.

---

<sup>1</sup> BAT conclusions document for the Refining of Mineral Oil and Gas: Implementing decision - 2014/738 - EN - EUR-Lex (europa.eu)

---

## Contents

<b>NON-TECHNICAL SUMMARY .....</b>	<b>2</b>
<b>1 INTRODUCTION .....</b>	<b>5</b>
1.1 Background .....	5
1.2 Site Location.....	6
1.3 The Applicant .....	6
1.4 Changes to the Regulated Installation .....	6
1.5 Pre-application Discussions .....	7
1.6 Structure of the Application Document .....	7
<b>2 DESCRIPTION OF THE CHANGES.....</b>	<b>8</b>
<b>3 MANAGEMENT OF THE PROPOSED ACTIVITY .....</b>	<b>10</b>
3.1 Environmental Management System .....	10
3.2 Operations and Maintenance .....	10
3.3 Competence and Training.....	11
3.4 Accident Management .....	11
3.5 Energy Efficiency .....	11
3.6 Raw Materials.....	11
3.7 Avoidance, Recovery and Disposal of Wastes .....	11
<b>4 OPERATIONS.....</b>	<b>12</b>
4.1 Delivery and Storage of Dewatered Crude Oil .....	12
4.2 Delivery and Storage of Wet Crude Oil .....	12
4.3 Delivery and Storage of Draw-off Waste Waters and Slop Oil .....	12
<b>5 ENVIRONMENTAL RISK AND EFFECTS .....</b>	<b>14</b>
5.1 Point Source Emissions .....	14
5.2 Fugitive Emissions to Air, Land and Water .....	14
5.3 Odour .....	14
5.4 Noise and Vibration.....	14
<b>6 CHANGES TO PERMIT CONDITIONS .....</b>	<b>15</b>

## Tables

Table 6-1: Current Table S1.1 - Activities.....	15
Table 6-2: Proposed Table S1.1 Activities .....	18
Table 6-3: Current Table S2.1(a) Permitted waste types and quantities to be imported to site for treatment within effluent plant. ....	20
Table 6-4: Proposed Table S2.1(a) Permitted waste types and quantities to be imported to site for treatment within effluent plant. ....	21

### Drawings

- Drawing 1** Site Layout Plan
- Drawing 2** Process Flow Diagram
- Drawing 3** Site Location Plan

## Appendices

- Appendix A Application Forms
- Appendix B Pre-Application

---

# 1 INTRODUCTION

## 1.1 Background

- 1.1.1 This document and associated appendices support the application to vary the Environmental Permit, reference: EPR/YP3930EX, for Pembroke Refinery, under the Environmental Permitting Regulations 2016 (as amended).
- 1.1.2 Valero Energy Limited (hereafter referred to as “Valero”) operates a refinery on the south shore of Milford Haven, Pembrokeshire, to process crude oil into its component parts for use in various downstream markets.
- 1.1.3 Pembroke Refinery crude distillation unit has the capacity to process 13,360,300 m<sup>3</sup> of crude oil per year. The supply of crude oil via the cross-Haven pipeline is anticipated to account for 3,600,000 m<sup>3</sup> (assuming a typical transfer rate of 410 m<sup>3</sup> per hour). In reality the pipeline is likely to supply less than this with the remainder of the raw material continuing to be supplied by sea to the refinery jetty, as described in 1.1.4.
- 1.1.4 Pembroke Refinery is supplied with crude oil by sea in tankers. Crude oil is unloaded at 5-berth and 3-berth jetties connected to the refinery by pipeline from which it is transferred to storage within the refinery operating area.
- 1.1.5 The crude oil is then subject to a series of processes to purify, distil and crack the crude into component fractions. These activities will not change as a result of this variation.
- 1.1.6 Pembroke Refinery was issued with an environmental permit in 2007 (Permit Reference EPR/QP3033LW). Prior to 2007, the refining activity was permitted by the Integrated Pollution Prevention and Control Directive (IPPC). The environmental permit was transferred to Valero under environmental permit reference: EPR/YP3930EX since 01/01/2014 which allows Valero to operate the following activities:
- Combustion activities (boilers),
  - Refining of mineral oils,
  - Handling and processing crude oil,
  - Producing inorganic chemicals’
  - Disposal of hazardous and non-hazardous waste,
  - Odourising LPG or natural gas,
  - Loading petrol into road tankers
- 1.1.7 The refinery processes give rise to emissions to:
- Air – through contained combustion gases, and fugitive emissions,
  - Water – treated process water discharged to Milford Haven.
- 1.1.8 Valero Energy Limited is seeking to reinstate a historic oil pipeline beneath the Milford Haven which connects the Pembroke Refinery to the Valero Pembrokeshire Oil terminal (VPOT) on the north shore of Milford Haven. The variation required, therefore, is to add the receipt and handling of crude oil by the pipeline as an activity.
- 1.1.9 The pipeline beneath Milford Haven between VPOT and Pembroke Refinery is the responsibility of Valero Logistics UK Limited.
- 1.1.10 The variation also seeks to add two EWC waste codes to the Pembroke Refinery permit to provide the flexibility to transfer liquid waste (wet crude / crude water drawings) from VPOT to Pembroke Refinery for treatment should the need arise.

---

## 1.2 Site Location

- 1.2.1 The Pembroke Refinery is situated on a peninsular on the southern shore of Milford Haven, on the edge of the Pembrokeshire Coast National Park, in the southwest of Wales. It occupies approximately 500 acres of a 1,275 acres site at Pembroke Refinery, Pembroke, Pembrokeshire, SA71 5SJ.
- 1.2.2 Pembroke Refinery is centred on NGR 190800 203000.
- 1.2.3 The shore and Milford Haven estuary are designated a Special Area of Conservation (SAC), Special Protection Area (SPA) and Site of Special Scientific Interest (SSSI). The installation boundary extends into these designated areas.
- 1.2.4 The immediate surroundings of the facility are comprised of agricultural land and isolated residential properties. Pembroke Power Station lies approximately 1,500 m to the east.
- 1.2.5 The closest residential property is a farmhouse approximately 1,250 m southeast of the installation boundary.
- 1.2.6 The Pembrokeshire Coast Path runs through the northern portion of the permitted facility.

## 1.3 The Applicant

- 1.3.1 The applicant and operator of the site is Valero Energy Limited, company No 8566216, the registered address of which is 27<sup>th</sup> Floor, 1 Canada Square, Canary Wharf, London, E14 5AA.

## 1.4 Changes to the Regulated Installation

- 1.4.1 The proposed changes will require an amendment to permitted activity A4 Section 1.2 A1 (e):
- The loading, unloading or other handling of, the storage of, or the physical, chemical or thermal treatment of
- (i) crude oil.
- (ii) Stabilised crude petroleum.
- 1.4.2 Activity A4 will need to acknowledge the acceptance of crude oil into the installation via pipeline transfer.
- 1.4.3 The variation also seeks to add the following EWC waste codes, to Table S2.1(a):
- 16 10 01\*, Aqueous liquid wastes containing hazardous substances,
  - 13 07 03\*, Wastes of liquid fuels including mixtures.
- 1.4.4 Waste code 16 10 01\* relates to aqueous tank dewatering effluent containing hazardous substances. This would give the refinery the capacity to receive dewatering effluent from VPOT.
- 1.4.5 The addition of EWC code 13 07 03\* is to allow the transfer of “slop oil” from VPOT to Pembroke Refinery.
- 1.4.6 Slop oil is any liquid hydrocarbon which does not meet feed or product quality and, therefore, must be reprocessed. Common sources are oil-water separators, pipeline interfaces (between grades) and the draining of equipment.
- 1.4.7 The storage and treatment of dewatering effluent is already carried out at Pembroke Refinery under activities A6, A16 and A17 (Table S1.1). This variation seeks to amend the limitations to activities under A6 (S5.3 A1 (a)) to include “dewatering aqueous effluent containing oil or slop oil”.

---

## 1.5 Pre-application Discussions

- 1.5.1 Pre-application discussions have been held between Valero and NRW and it has been agreed that this change constitutes a normal variation. Correspondence supporting this has been placed within Appendix B.

## 1.6 Structure of the Application Document

- 1.6.1 The subsequent sections of this document detail the changes to the operation of the installation as follows:
- Section 2 provides an overview of the proposed changes to the activities that necessitate this permit variation,
  - Section 3 addresses the operational measures which will be in place to prevent and/or control any potential environmental effects of the proposal,
  - Section 4 describes changes to the operational controls,
  - Section 5 identifies the nature of emissions from the installation and environmental risk,
  - Section 6 summarises the proposed changes to the permit.

---

## 2 DESCRIPTION OF THE CHANGES

- 2.1.1 This variation is instigated by the reinstatement of the historic oil pipeline between the VPOT and the refinery beneath the Milford Haven. Crude oil will be brought to VPOT by ships arriving at the jetty. The oil will be transferred into storage tanks which are already available on the VPOT site and then transferred from VPOT via the cross-Haven pipeline to the Pembroke Refinery where it will be used directly within the refinery process.
- 2.1.2 Crude oil will arrive at Pembroke Refinery at a “meter skid”. A flow meter will enable accounting of oil transfer between the two facilities and the detection of leaks in the pipeline, with an alarm being raised in the event that a potential leak is detected.
- 2.1.3 Upstream of the meter skid a pig receiver will be installed to facilitate inspection and cleaning of the cross-Haven pipeline. A shut-off valve will also be installed to compartmentalise the pipeline should a leak detection alarm be raised.
- 2.1.4 From the meter skid the crude oil will flow via a new 1,555 m pipeline to the existing crude blend pumps from which it will enter the crude unit feed. Alternatively, Valero may opt for a combination of new and existing pipework, which will follow the same pipe-run/ route as a new 14” pipeline.
- 2.1.5 Alternatively, crude oil transfer may be directed to existing crude storage tanks or, during pipeline cleaning, for instance, to the existing slop oil tanks.
- 2.1.6 The jetty operations will continue under this proposed change. However, the supply of oil from the cross-Haven pipeline will provide logistical flexibility for Valero.
- 2.1.7 The crude oil to be transferred from VPOT to Pembroke Refinery will be de-watered at VPOT prior to transfer. The aqueous effluent separated from the crude oil will be treated at VPOT prior to release into Milford Haven. This means that the volume of aqueous effluent produced at Pembroke Refinery from the de-watering of crude oil delivered by ship will be reduced.
- 2.1.8 The proposed import of crude oil via the cross-Haven pipeline will require an amendment to permitted activity A4 in Table S1.1: Activities.
- 2.1.9 However, whilst the above describes the expected normal mode of operation post this variation, Valero is seeking the flexibility to import wet crude, slop oil and aqueous effluent from dewatering of the wet crude from VPOT. The waste would be imported either via the cross-Haven pipeline, by road tanker, or ship.
- 2.1.10 Wet crude would be directed to one of the existing crude storage tanks within the Pembroke Refinery and would then be processed like other wet crude oil received direct to the Refinery.
- 2.1.11 Slop oil would be directed to existing slop oil storage tanks at Pembroke Refinery pending the same treatment as the slop oil generated on site.
- 2.1.12 The draw-off water from the VPOT would be treated to settle off hydrocarbons within the VPOT prior to transfer to the Pembroke Refinery. The aqueous effluent would be transferred either via the cross-Haven pipeline, with the flow diverted at the Pembroke Refinery to existing “slops” tanks on site (or if required any available crude tank), by road tanker which would likewise discharge to the existing slops tanks, or, by ship using the existing jetty infrastructure. Slop oil will be re-processed as part of the crude unit feed, as current. Aqueous waste will be processed through the site sour water stripping facilities if sufficiently sour, the effluent of which is routed to the WWTP, or treated directly at the WWTP.
- 2.1.13 Import of the aqueous effluent from the VPOT would require the addition of EWC waste codes 16 10 01\* (aqueous liquid wastes containing hazardous substances) and 13 07 03\* (wastes of liquid fuels including mixtures) to Table S2.1(a) of the Pembroke Refinery permit.
- 2.1.14 The storage and treatment of dewatering effluent and slop oil is already carried out on site under activities A6, A16 and A17 (Table S1.1 of the permit).

- 
- 2.1.15 Given that the dewatering of the crude oil used within Pembroke Refinery is currently undertaken on site, as is the receipt of wet crude and the generation of slop oil, the volume of effluent to be treated at Pembroke Refinery will not increase. Neither, therefore, will the volume of treated effluent discharged from Pembroke Refinery increase.
- 2.1.16 The import of hazardous wastes will introduce a change to the waste that Pembroke Refinery may receive. However, there will be no change to the storage or processing of crude oil, raw materials residues, final products or emissions from the site.
- 2.1.17 The processing capacity of the crude distillation unit will remain at 13,360,300 m<sup>3</sup>/year and crude oil storage will remain at 538,625 m<sup>3</sup>. The only change to the installation is the method of delivery of crude oil and the facility to receive additional waste streams, if required, from VPOT.
- 2.1.18 There will be no change to the installation boundary, all new pipework will be installed within the existing permit boundary.
- 2.1.19 Pembroke Refinery has previously been granted derogation from the emission limits set out in BAT52 of the BREF for Refining Mineral Oil and Gas<sup>1</sup>. The proposed change will have no impact on the existing or pending derogation decision.
- 2.1.20 The following drawings form part of the application:
- Drawing 1: A site layout plan showing the locations of the pipeline in relation to the permitted area.
- Drawing 2: A Process Flow Diagram (PFD) showing how the new activity links into the existing process at the site.
- Drawing 3: A site location plan showing the relative positions of the Pembroke Refinery and the VPOT.

---

## 3 MANAGEMENT OF THE PROPOSED ACTIVITY

### 3.1 Environmental Management System

- 3.1.1 Valero operate a Commitment to Excellence Management System (CTEMS), which includes an environmental management system. CTEMS establishes a systematic approach to planning, executing, checking and acting to improve Valero's everyday work activities. A guiding principle of CTEMS is to install and operate properly designed and engineered facilities, plant, equipment and to maintain them in a safe condition. A Health, Environment and Safety policy statement also forms part of the system.
- 3.1.2 CTEMS is a practical safety and environmental management system centred on how the work is done – a system that connects business-critical requirements to everyday operating policies, programs, procedures and practices. These procedures and policies manage safe work practices within the Pipelines and Terminals network ensuring safe, stable and reliable operations are maintained at all times. CTEMS will remain in place but will be subject to updates because of this variation and future continual improvement.
- 3.1.3 The CTEMS is reviewed at least once every four years or sooner where there is a significant change to the activities, or in the event of recommendations arising from investigations of accidents, incidents, emergencies or other non-compliances.
- 3.1.4 The EMS is designed to incorporate the needs of the relevant regulatory agencies, community and environment and uses ISO14001:2015 as its foundation.
- 3.1.5 The scope of the EMS extends to the import and storage of crude oil and other hydrocarbon feedstock, their refining and blending into intermediates and finished products with subsequent distribution by sea, road & pipeline. The EMS will be reviewed to incorporate the changes brought about by this variation.

### 3.2 Operations and Maintenance

- 3.2.1 The introduction of the new crude oil supply will have only limited effect on the operation of the Pembroke Refinery. Changes are limited to the transfer of crude oil by pipeline to the Pembroke Refinery in addition to its delivery by ship. In addition, wet crude, slop oil and aqueous effluent may be delivered by pipeline, road tanker or ship. All other activities at the Pembroke Refinery will remain unchanged. However, all relevant management systems and operating procedures will be reviewed to include the receipt and handling of oil via the reinstated cross-Haven pipeline and the new section of pipeline to be installed on site<sup>2</sup>.
- 3.2.2 Existing waste acceptance procedures will be revised to include the acceptance of the additional hazardous wastes by pipeline, road tanker or ship. Hazardous waste consignment notes will be generated for all hazardous waste transfer and held on site for inspection.
- 3.2.3 Planned and preventative maintenance routines have been established to ensure all key plant components which have the potential to affect the environmental performance of the installation remain in good working order. Maintenance routines draw on manufacturer's recommendations, modified as appropriate by operational experience during the lifetime of the installation. These maintenance routines will be extended to the new items of plant and infrastructure introduced by this variation.

---

<sup>2</sup> Note this would also apply to the alternative option of a combination of new and existing pipework, which will follow the same pipe-run/route as a new 14" pipeline.

- 
- 3.2.4 Maintenance activities will ensure compliance with the relevant elements of BAT51(i) of the BREF for Refining Mineral Oil and Gas<sup>3</sup>

### 3.3 Competence and Training

- 3.3.1 Operational staff at the Pembroke Refinery will be fully trained in the systems and procedures for the acceptance of crude oil via the cross-Haven pipeline, transfer into to the crude unit blend pumps and the actions to be taken in the event of an unexpected or abnormal operating condition and/or emergency. This will include, where relevant communication with the VPOT.
- 3.3.2 All personnel employed at the facility have the appropriate skills and technical capabilities to understand the operation of the process, and their obligations under the terms and conditions of the Permit.
- 3.3.3 Regular training ensures the facility is managed and operated by a fully trained workforce. Training will not only address normal operations but will also include those actions required in the event of abnormal operations and emergencies.
- 3.3.4 A training policy and training plans are in place for all staff roles at the facility, these include specific training relevant to the environmental permit and operation of the facility to minimise risk to the environment. Training records for all staff are kept demonstrating competency.

### 3.4 Accident Management

- 3.4.1 As part of the management system review prior to commissioning, the Accident Management Plan (AMP) will be reviewed and updated where required. This document identifies foreseeable accidents and assesses the likely risk posed to the environment, accounting for the management procedures which are in place.
- 3.4.2 The procedures to follow in the event of an incident will also be reviewed and updated.
- 3.4.3 The updated AMP and relevant procedures will be available for review as required.
- 3.4.4 Accident risks have been assessed as part of the COMAH Safety Report related Environmental Risk Assessment. This document is in the process of being revised to consider the risks from operating the cross-Haven pipeline. Once complete the AMP will be updated accordingly.

### 3.5 Energy Efficiency

- 3.5.1 The proposed variation is not expected to introduce significant changes to energy efficiency at the site.

### 3.6 Raw Materials

- 3.6.1 No new raw materials will be introduced as a result of this variation.

### 3.7 Avoidance, Recovery and Disposal of Wastes

- 3.7.1 The proposed changes will not change the types of wastes produced nor the approach for avoidance, recovery and disposal of waste.

---

<sup>3</sup> [Implementing decision - 2014/738 - EN - EUR-Lex \(europa.eu\)](https://eur-lex.europa.eu/uri/uri.do?uri=CELEX:32014D0738&fromDoc=32014D0738-01&fromUri=CELEX:32014D0738-01)

---

## 4 OPERATIONS

### 4.1 Delivery and Storage of Dewatered Crude Oil

- 4.1.1 As identified in section 2, the operational changes associated with this variation are limited. The supply from the existing 12" diameter pipeline under Milford Haven will be received at a skid on the refinery side and, under normal operation, will be conveyed by a new 14" pipe directly to the Crude Unit blend pumps, where it will be blended with crude oil from on-site storage, at the beginning of the refining process. The 14" pipeline will extend 1,555 m between the cross-Haven pipe and the blend pumps. Alternatively, Valero may opt for a combination of new and existing pipework, which will follow the same pipe-run/ route as a new 14" pipeline. There will also be the facility to transfer imported dewatered crude to existing dewatered crude storage tanks at Pembroke Refinery, should operational needs dictate.
- 4.1.2 The transfer of dewatered crude oil from VPOT to Pembroke Refinery via the cross-Haven pipeline will be monitored by a flow meter at either end of the pipeline which will monitor the quantity of oil transferred and raise an alarm if the metered flow indicated a potential loss in the pipeline.
- 4.1.3 As there will be no displacement of air associated with the crude oil delivered by pipeline there will be no new point source emissions to air.
- 4.1.4 All above ground transfer pipework including the new transfer line<sup>4</sup> and the cross-Haven pipeline will be subject to regular LDAR checks to ensure potential leaks are identified and repaired as necessary to reduce the risk to the environment from pollution. The cross-Haven pipeline will be fitted with a leak detection system for below ground pipework, most likely ATMOS<sup>5</sup> which will ensure any leaks from the pipeline are detected promptly. Should the system detect a leak, there will be an Emergency Procedure in place which will involve shut down, isolation and depressurising of the pipeline. The procedure will also include the mobilisation of the Emergency Plan and emergency responders.
- 4.1.5 The location of the new pipeline connection<sup>4</sup> between the crude unit blend pumps and the cross-Haven pipeline has been shown in the site layout plan can be found as Drawing 1. A process flow diagram for the crude oil transfer can be found as Drawing 2.

### 4.2 Delivery and Storage of Wet Crude Oil

- 4.2.1 As with dewatered crude oil, the transfer of wet crude oil from VPOT to Pembroke Refinery via the cross-Haven pipeline would be monitored by a flow meter at either end of the pipeline which would monitor the quantity of wet crude transferred and raise an alarm if the metered flow indicated a potential loss in the pipeline.
- 4.2.2 The density and flow meters at the Refinery record the transfer of wet crude oil. During the change in grades in the pipeline the off-specification oil would be directed either to existing wet crude oil storage tanks or existing slop oil storage tanks at Pembroke Refinery.

### 4.3 Delivery and Storage of Draw-off Waste Waters and Slop Oil

- 4.3.1 The transfer of hazardous aqueous effluent or slop oil from VPOT to Pembroke Refinery via the cross-Haven pipeline would be monitored by a flow meter at either end of the pipeline which would

---

<sup>4</sup> Or the alternative combination of new and existing pipework, which will follow the same pipe-run/ route as a new 14" pipeline.

<sup>5</sup> <https://www.atmosi.com/en/solutions/leak-detection/>

---

monitor the quantity of effluent transferred and raise an alarm if the metered flow indicated a potential loss in the pipeline.

- 4.3.2 When this method is used, the density and flow meters at the Refinery record the transfer of all oily water. During the change in grades in the pipeline, and once the transition is complete the slop oil or effluent would be directed to either crude storage or slop oil storage for processing at Pembroke Refinery.
- 4.3.3 Delivery of aqueous effluent or slop oil by road tanker would be recorded at the existing weighbridge as the tanker enters and leaves the site.
- 4.3.4 Road tankers will off-load slop oil directly to existing slop storage tanks or existing wet crude tanks.
- 4.3.5 Imported aqueous effluent will be discharged to the existing oily sewer and treated within the existing oil recovery and waste water or sour water stripping operations which are currently in use at the Refinery.
- 4.3.6 Aqueous effluent imported by ship will be transferred using the existing jetty infrastructure and will be discharged to crude tanks and handled as with existing crude, i.e., settled and water drawn to wastewater treatment. Slop oil will be transferred to existing slop tanks.

---

## 5 ENVIRONMENTAL RISK AND EFFECTS

### 5.1 Point Source Emissions

- 5.1.1 As discussed in Sections 2 and 4, the proposed changes introduce neither new emission points to air or water, nor any change to existing point source emissions.
- 5.1.2 The receipt of dewatered crude oil via the cross-Haven pipeline will reduce the volume of wet crude delivered to Pembroke Refinery by sea and, therefore, the volume of effluent produced by the dewatering process.
- 5.1.3 The contingency to receive wet crude, slop oil or aqueous effluent from VPOT via the cross-Haven pipeline, road tanker or ship may offset the reduction in effluent treated at Pembroke Refinery. However, the volume of effluent treated and discharged is not expected to exceed current levels.
- 5.1.4 There are no point source emissions to land, and this will not change as a consequence of this variation.

### 5.2 Fugitive Emissions to Air, Land and Water

- 5.2.1 There is the potential for fugitive emissions from the new plant and pipework required for this proposed change. As part of the commissioning phase works for the new transfer connection the pipework and connections to the cross-Haven transfer pipework will be subject to integrity testing to ensure it is leak free. During the operational life routine inspection and maintenance will be extended to these systems.
- 5.2.2 Procedures will be in place to contain and clear up any leak of crude oil from the new plant and pipework.

### 5.3 Odour

- 5.3.1 It is not anticipated that the proposed changes will introduce a new source of odour. There are no changes to raw materials, crude oil is already handled and stored at the site. Crude oil imported to the site via the cross-Haven pipeline will be fully contained within the pipework, thereby minimising the potential for odour release as a consequence of this variation.

### 5.4 Noise and Vibration

- 5.4.1 The proposed changes will not include any additional source of noise and vibration. The existing Pembroke Refinery already operates pumps for transferring fuels.
- 5.4.2 The closest residential property, in Rhoscrowther, is approximately 1,250 metres from the site boundary. However, it is not anticipated that the proposed changes on site will cause any significant difference beyond the site boundary.

## 6 CHANGES TO PERMIT CONDITIONS

6.1.1 Changes are required to Table S1.1 – Activities in Schedule 1 of the permit to include the delivery of crude oil to the refinery via the cross-Haven pipeline.

**Table 6-1: Current Table S1.1 - Activities**

Activity Ref.	Activity listed in Schedule 1 of the EP Regulations	Description of specified activity	Limits of specified activity
A1	S1.1 A(1)(a) – Burning any fuel in an appliance with a thermal input of 50 megawatts	Boiler plant	Refinery fuel oil storage and supply, boilers and abatement plant including: (i) 1 x 63.9 MW(th) boiler [designated B1] (ii) 2 x 63.8 MW(th) boilers [B2, B3] (iii) 1 x 78.9 MW(th) boiler [B4] (iv) 3 x 62.7 MW(th) boiler [B5, B6, B7] (v) 1 x 24.9 MW(th) boiler [B8] (vi) 1 x 74 MW(th) boiler [B9] (vii) 1 x 137 MW(th) natural gas fired cogeneration plant. From receipt of fuel to emissions of combustion products
A2	S1.2 A(1)(d) – Refining mineral oils	Refining mineral oil – primary operations	From feed to oil refining unit to use, intermediate or product storage, or export including each of the following units: (i) Vacuum distillation unit (typical throughput capacity – 640 m3/hr) and 2 x 47.5MW(th) heaters [H1, H2] (ii) Visbreaker unit (typical throughput capacity - 170 m3/hr) and 32.3MW(th) heater [H3] (iii) Fluidised catalytic cracker (typical throughput capacity - 625 m3/hr) and 318 MW (th) Regenerator [H5]. (iv) Kerosene Merox unit (typical throughput capacity - 223 m3/hr) (v) Hydro treater HTU-1 (typical throughput capacity - 275m3/hr) and 3 heaters (16.9MW(th) [H6], 14.2MW(th) [H7]and 6.5(th) [H8]) (vi) Hydro treater HTU-2 (typical throughput capacity - 220m3/hr) and 2 heaters (10.5MW(th) [H9] and 4.2MW(th) [H10]) (vii) Isomerisation unit (typical throughput capacity – 110m3/hr) (viii) LPG recovery unit (typical throughput capacity – 69,277 sm3/hr) (ix) Unifiner unit (typical throughput capacity - 340m3/hr) and 3 heaters (11MW(th) [H11], 9.6MW(th) [H12] and 7.3MW(th) [H13]) (x) Hydrogen recovery unit (typical throughput capacity - 18,645 sm3/hr) (xi) Platformer unit (typical throughput capacity - 255m3/hr) and 4 heaters

			(37.4MW(th) [H14], 30.4MW(th) [H15], 18.1MW(th) [H16] and 15.3MW(th) [H17]) (xii) FCC Merox unit (typical throughput capacity - 220m <sup>3</sup> /hr) (xiii)Alkylation unit (typical throughput 250m <sup>3</sup> /hr production of alkylate) and 2 heaters (28.8MW (th) [H18], and 22.1MW (th) [H19]. (xiv)Butamer unit (typical throughput capacity - 135m <sup>3</sup> /hr) and 1.75MW (th) heater [H20]
A3	S1.2 A(1)(d) – Refining mineral oils	Refining mineral oil – secondary operations – oil movements and blending	From receipt of feed, through blending (where necessary) to feed, intermediate and product storage including: liquefied petroleum gases, white oils, gas oils/ black oils, Crude oil/ slops. Road and ship loading and associated vapour recovery units.
A4	S1.2 A(1)(e) – The loading, unloading, handling or storage of, or the physical, chemical or thermal treatment of – (i) Crude oil (ii) Stabilised crude petroleum	Handling and processing crude oil	From receipt of crude to operation of crude distillation unit including: (i) jetty operations (ii) Crude distillation unit (typical throughput capacity 13,360,300 m <sup>3</sup> /year) and 3 crude heaters (48.6MW <sub>th</sub> [H21], 52.7MW <sub>th</sub> [H22] and 58.5MW <sub>th</sub> [H23]) Crude storage (storage capacity – 538,625 m <sup>3</sup> )
A5	S4.2 A(1)(a)(v) – Producing inorganic chemicals such as – non-metals, metal oxides, metal carbonyls, or other inorganic compounds.	Sulphur recovery and production	Removal of sulphur from aqueous waste stream by use of: (i) amine recovery unit (nominal throughput capacity – 185 m <sup>3</sup> /hr/train; 2 trains) (ii) FCCU sour water stripper (nominal throughput capacity – 32 m <sup>3</sup> /hr) (iii) CDU waste water stripper (nominal throughput capacity – 30 m <sup>3</sup> /hr) (iv) VDU waste water stripper (nominal throughput capacity – 55 m <sup>3</sup> /hr) (v) SRU 1 (nominal throughput capacity - 80 tonnes of sulphur/day). (vi) SRU 2 (nominal throughput capacity - 80 tonnes of sulphur/day). (vii) tail-gas incinerator (viii)Sulphur storage prior to export (storage capacity – 2pits of 1,400 tonnes each)
A6	S5.3 A1 (a)	Disposal of hazardous waste (other than by incineration or landfill) in a facility with a capacity of more than 10 tonnes per day.	From receipt of ballast water, through treatment (oil recovery operations) to disposal of treated water and solid waste.
A7	S5.4A(1)(a)(i)	Disposal of non-hazardous waste in a facility with a capacity of more than 50 tonnes per day by biological treatment	Removal of oil and other chemicals from process water by action of aerobic/anaerobic bacteria within bio-cell.
A8	S5.4 A(1)(ii)	Disposal of non-hazardous waste in a facility with a capacity	From formation of waste water stream, discharge into site drainage systems to discharge of effluents to Milford Haven waterway including interceptors,

		of more than 50 tonnes per day by physico - chemical treatment.	DAF units and clarifiers.
A9	S1.2 Part B (a) – Blending odorant for use with natural gas or liquefied petroleum gas	Odourising LPG (or natural gas)	From feed to unit to discharge for storage or export
A10	S1.2 Part B (b) – The storage of petroleum in stationary storage tanks at a terminal, or the loading or unloading at a terminal of petrol or from road tankers, rail tankers or inland waterway vessels.	Loading petrol into road tankers	Loading of petrol into road tankers
<b>Directly Associated Activities</b>			
A11	Flaring of gases	Burning of sour and sweet gases at flares.	Hydrocarbon gas recovery compressor, flare headers, knock-out pots and flare stacks and any ancillary equipment.
A12	Cooling water systems	Systems used for cooling.	All cooling water systems including storage, pipelines and equipment, to discharge to ETP.
A13	Lagoons	The holding or temporary storage of water, effluents or oil based liquids for settling (sedimentation) or other purposes	The feed point to the lagoon(s), the lagoon(s) and its drainage point.
A14	Oxygen or nitrogen generation	Air separation unit	Air separation plant to pipeline(s) delivering nitrogen to process plants
A15	Surface water drainage	Collection and handling of surface waters within installation	Handling and storage of site drainage until discharge to the site waste water treatment system or to discharge off-site.
A16	Water treatment	All water treatment activities	From receipt of raw materials to dispatch to effluents to sewer or site waste water treatment system.
A17	Storage of Hazardous Waste	R13: Storage of waste pending any of the operations numbered R1 to R12 (excluding temporary storage, pending collection, on the site where it is produced)	The waste shall only be stored within designated area(s) agreed in advance in writing with Natural Resources Wales. This activity is only permitted for storage of liquid oil based hazardous wastes. All waste European Waste Classification Codes to be accepted at the site must be agreed in writing in advance. Any agreement is time limited for a period of 28 days, after which a new agreement must be sought if further waste is to be accepted.
A18	Demineralisation Plant	De-mineralising a small flow of softened and filtered water to allow on-line and offline washing of the CTG and HRSG.	From receipt of softened and filtered water to the delivery at the CTG and HRSG. Neutralised regeneration fluid from the unit to the existing waste water drain line.

**Table 6-2: Proposed Table S1.1 Activities**

Activity Ref.	Activity listed in Schedule 1 of the EP Regulations	Description of specified activity	Limits of specified activity
A1	S1.1 A(1)(a) – Burning any fuel in an appliance with a thermal input of 50 megawatts	Boiler plant	Refinery fuel oil storage and supply, boilers and abatement plant including: (i) 1 x 63.9 MW(th) boiler [designated B1] (ii) 2 x 63.8 MW(th) boilers [B2, B3] (iii) 1 x 78.9 MW(th) boiler [B4] (iv) 3 x 62.7 MW th boiler [B5, B6, B7] (v) 1 x 24.9 MW(th) boiler [B8] (vi) 1 x 74 MW MW(th) boiler [B9] (vii) 1 x 137 MW(th) natural gas fired cogeneration plant. From receipt of fuel to emissions of combustion products
A2	S1.2 A(1)(d) – Refining mineral oils	Refining mineral oil – primary operations	From feed to oil refining unit to use, intermediate or product storage, or export including each of the following units: (i) Vacuum distillation unit (typical throughput capacity – 640 m3/hr) and 2 x 47.5MW(th) heaters [H1, H2] (ii) Visbreaker unit (typical throughput capacity - 170 m3/hr) and 32.3MW(th) heater [H3] (iii) Fluidised catalytic cracker (typical throughput capacity - 625 m3/hr) and 318 MW (th) Regenerator [H5]. (iv) Kerosene Merox unit (typical throughput capacity - 223 m3/hr) (v) Hydro treater HTU-1 (typical throughput capacity - 275m3/hr) and 3 heaters (16.9MW(th) [H6], 14.2MW(th) [H7]and 6.5(th) [H8]) (vi) Hydro treater HTU-2 (typical throughput capacity - 220m3/hr) and 2 heaters (10.5MW(th) [H9] and 4.2MW(th) [H10]) (vii) Isomerisation unit (typical throughput capacity – 110m3/hr) (viii) LPG recovery unit (typical throughput capacity – 69,277 sm3/hr) (ix) Unifiner unit (typical throughput capacity - 340m3/hr) and 3 heaters (11MW(th) [H11], 9.6MW(th) [H12] and 7.3MW(th) [H13]) (x) Hydrogen recovery unit (typical throughput capacity - 18,645 sm3/hr) (xi) Platformer unit (typical throughput capacity - 255m3/hr) and 4 heaters (37.4MW(th) [H14], 30.4MW(th) [H15], 18.1MW(th) [H16] and 15.3MW(th) [H17]) (xii) FCC Merox unit (typical throughput capacity - 220m3/hr) (xiii) Alkylation unit (typical throughput 250m3/hr)

			production of alkylate) and 2 heaters (28.8MW (th) [H18], and 22.1MW (th) [H19]. (xiv) Butamer unit (typical throughput capacity - 135m <sup>3</sup> /hr) and 1.75MW (th) heater [H20]
A3	S1.2 A(1)(d) – Refining mineral oils	Refining mineral oil – secondary operations – oil movements and blending	From receipt of feed, through blending (where necessary) to feed, intermediate and product storage including: liquefied petroleum gases, white oils, gas oils/ black oils, Crude oil/ slops. Road and ship loading and associated vapour recovery units.
A4	S1.2 A(1)(e) – The loading, unloading, handling or storage of, or the physical, chemical or thermal treatment of – (i) Crude oil (ii) Stabilised crude petroleum	Handling and processing crude oil	From receipt of crude to operation of crude distillation unit including: (i) Jetty operations (ii) Crude distillation unit (typical throughput capacity 13,360,300 m <sup>3</sup> /year) and 3 crude heaters (48.6MW <sub>th</sub> [H21], 52.7MW <sub>th</sub> [H22] and 58.5MW <sub>th</sub> [H23]) Crude storage (storage capacity – 538,625 m <sup>3</sup> ) <b>(iii) Connection to the cross-Haven pipeline for the receipt of crude oil and connection to the refinery process.</b>
A5	S4.2 A(1)(a)(v) – Producing inorganic chemicals such as – non-metals, metal oxides, metal carbonyls, or other inorganic compounds.	Sulphur recovery and production	Removal of sulphur from aqueous waste stream by use of: (i) amine recovery unit (nominal throughput capacity – 185 m <sup>3</sup> /hr/train; 2 trains) (ii) FCCU sour water stripper (nominal throughput capacity – 32 m <sup>3</sup> /hr) (iii) CDU waste water stripper (nominal throughput capacity – 30 m <sup>3</sup> /hr) (iv) VDU waste water stripper (nominal throughput capacity – 55 m <sup>3</sup> /hr) (v) SRU 1 (nominal throughput capacity - 80 tonnes of sulphur/day). (vi) SRU 2 (nominal throughput capacity - 80 tonnes of sulphur/day). (vii) tail-gas incinerator (viii) Sulphur storage prior to export (storage capacity – 2pits of 1,400 tonnes each)
A6	S5.3 A1 (a)	Disposal of hazardous waste (other than by incineration or landfill) in a facility with a capacity of more than 10 tonnes per day.	From receipt of ballast water, <b>dewatering effluent or slop oil</b> through treatment (oil recovery, sour water stripping operations) to disposal of treated water and solid waste.
A7	S5.4A(1)(a)(i)	Disposal of non-hazardous waste in a facility with a capacity of more than 50 tonnes per day by biological treatment	Removal of oil and other chemicals from process water by action of aerobic/anaerobic bacteria within bio-cell.
A8	S5.4 A(1)(ii)	Disposal of non-hazardous waste in a facility with a capacity of more than 50 tonnes per day by physico-chemical treatment.	From formation of waste water stream, discharge into site drainage systems to discharge of effluents to Milford Haven waterway including interceptors, DAF units and clarifiers.

A9	S1.2 Part B (a) – Blending odorant for use with natural gas or liquefied petroleum gas	Odourising LPG (or natural gas)	From feed to unit to discharge for storage or export
A10	S1.2 Part B (b) – The storage of petroleum in stationary storage tanks at a terminal, or the loading or unloading at a terminal of petrol or from road tankers, rail tankers or inland waterway vessels.	Loading petrol into road tankers	Loading of petrol into road tankers
<b>Directly Associated Activities</b>			
A11	Flaring of gases	Burning of sour and sweet gases at flares.	Hydrocarbon gas recovery compressor, flare headers, knock-out pots and flare stacks and any ancillary equipment.
A12	Cooling water systems	Systems used for cooling.	All cooling water systems including storage, pipelines and equipment, to discharge to ETP.
A13	Lagoons	The holding or temporary storage of water, effluents or oil based liquids for settling (sedimentation) or other purposes	The feed point to the lagoon(s), the lagoon(s) and its drainage point.
A14	Oxygen or nitrogen generation	Air separation unit	Air separation plant to pipeline(s) delivering nitrogen to process plants
A15	Surface water drainage	Collection and handling of surface waters within installation	Handling and storage of site drainage until discharge to the site waste water treatment system or to discharge off-site.
A16	Water treatment	All water treatment activities	From receipt of raw materials to dispatch to effluents to sewer or site waste water treatment system.
A17	Storage of Hazardous Waste	R13: Storage of waste pending any of the operations numbered R1 to R12 (excluding temporary storage, pending collection, on the site where it is produced)	The waste shall only be stored within designated area(s) agreed in advance in writing with Natural Resources Wales. This activity is only permitted for storage of liquid oil based hazardous wastes. All waste European Waste Classification Codes to be accepted at the site must be agreed in writing in advance. Any agreement is time limited for a period of 28 days, after which a new agreement must be sought if further waste is to be accepted.
A18	Demineralisation Plant	De-mineralising a small flow of softened and filtered water to allow on-line and offline washing of the CTG and HRSG.	From receipt of softened and filtered water to the delivery at the CTG and HRSG. Neutralised regeneration fluid from the unit to the existing waste water drain line.

**Table 6-3: Current Table S2.1(a) Permitted waste types and quantities to be imported to site for treatment within effluent plant.**

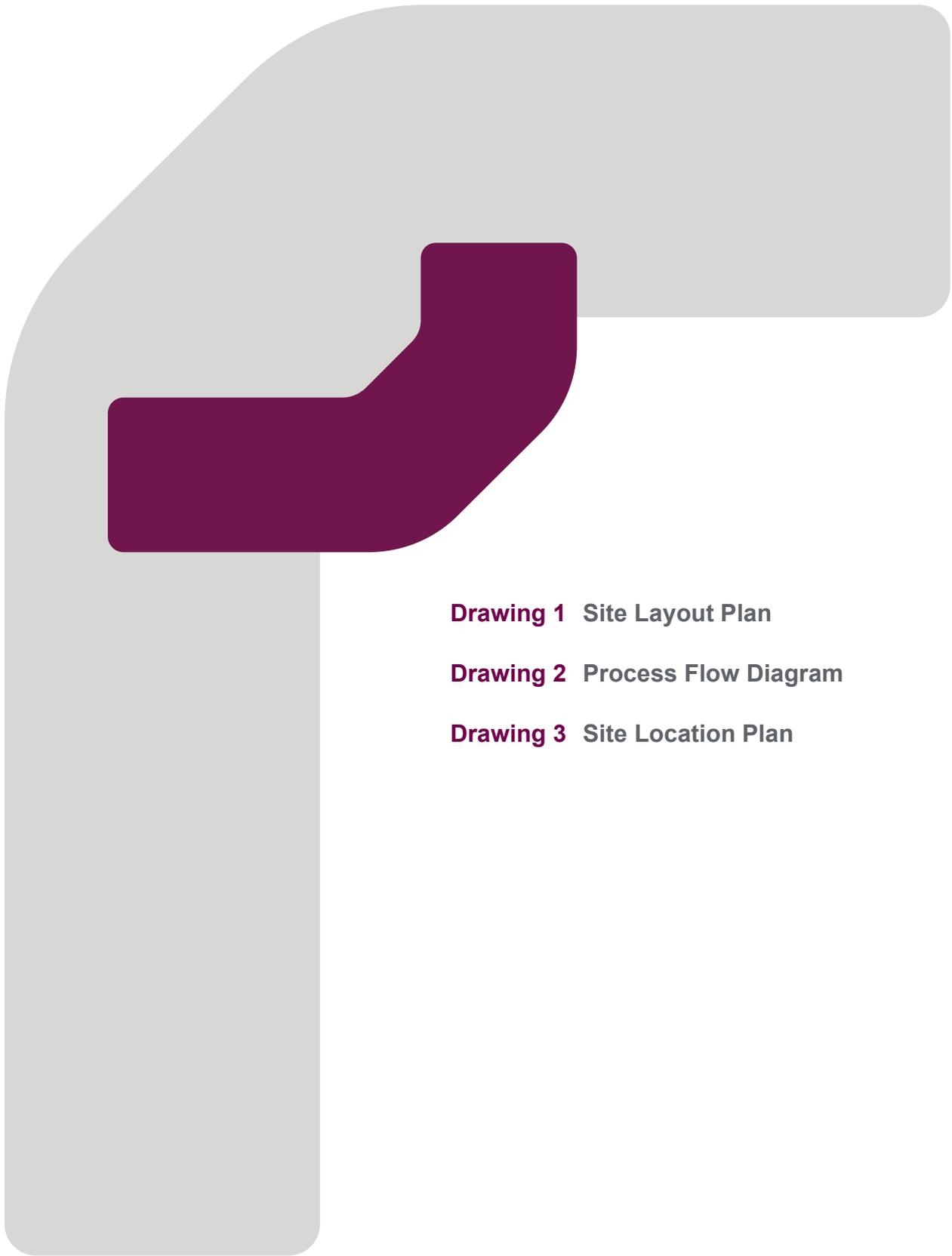
**Table S2.1(a) Permitted waste types and quantities to be imported to site for treatment within effluent plant.**

<b>Maximum Quantity</b>	No limit set
<b>Waste Code</b>	Description
16 07 08*	Ship ballast water containing oil/Wastes from ship transport tanks containing oil.

---

**Table 6-4: Proposed Table S2.1(a) Permitted waste types and quantities to be imported to site for treatment within effluent plant.**

Table S2.1(a) Permitted waste types and quantities to be imported to site for treatment within effluent plant.	
Maximum Quantity	No limit set
Waste Code	Description
16 07 08*	Ship ballast water containing oil/Wastes from ship transport tanks containing oil.
16 10 01*	Aqueous liquid wastes containing hazardous substances
13 07 03*	Wastes of liquid fuels including mixtures

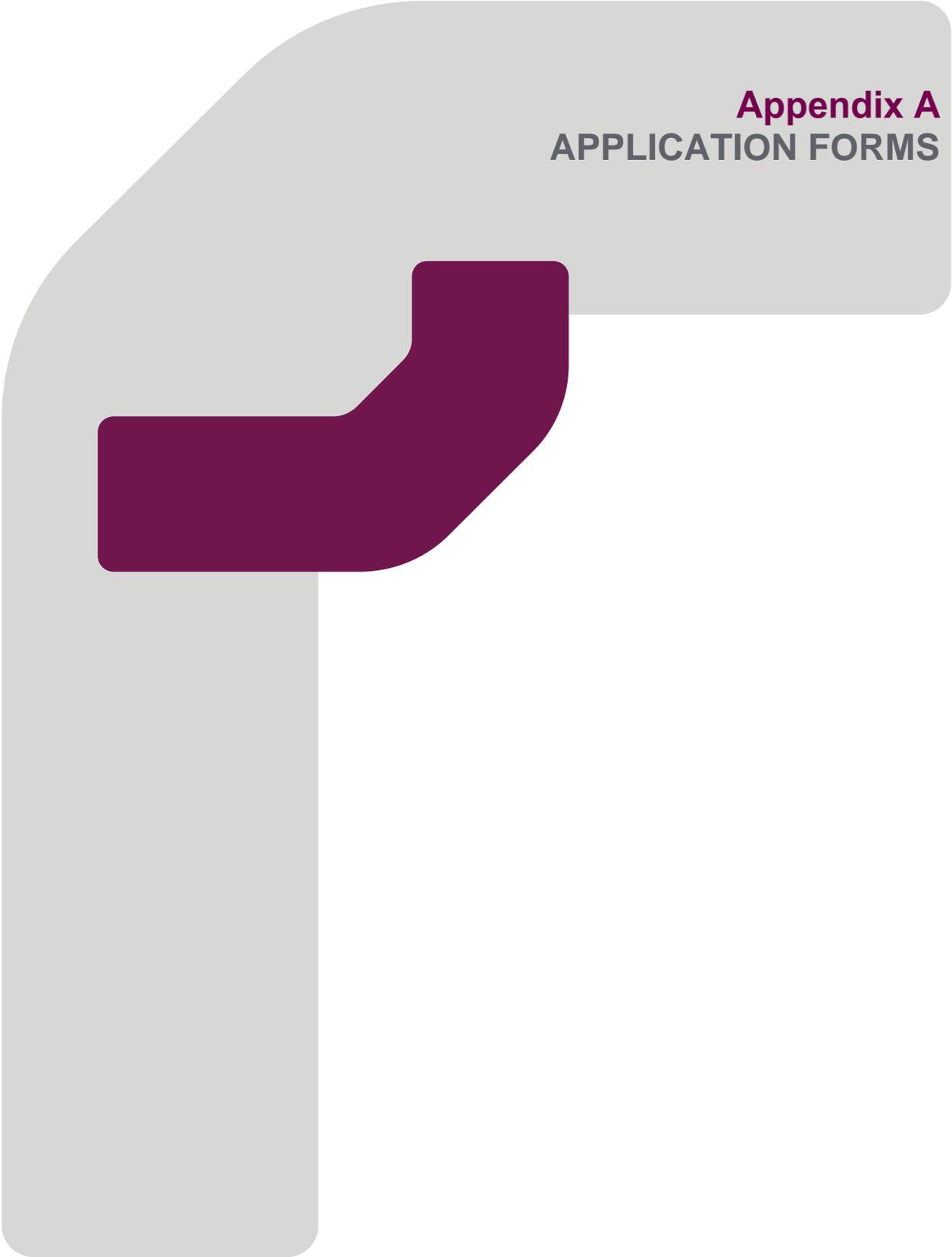


**Drawing 1** Site Layout Plan

**Drawing 2** Process Flow Diagram

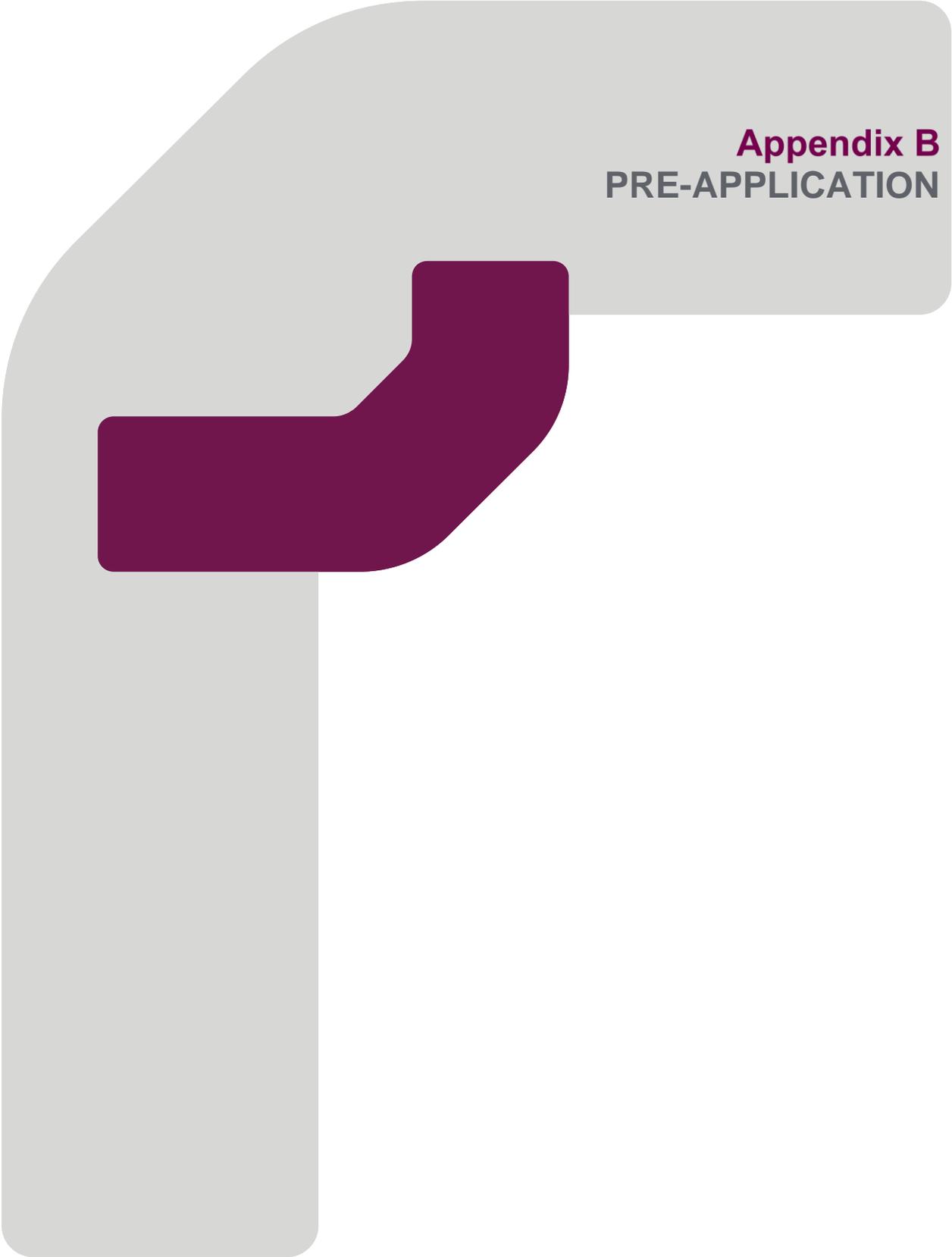
**Drawing 3** Site Location Plan

---



# Appendix A APPLICATION FORMS

---



**Appendix B**  
**PRE-APPLICATION**

# APPLICATION TO VARY PERMIT REFERENCE: **EPR/YP3030EX**

Valero Energy Ltd, Pembroke Refinery

14 August 2024

794-ENV-EPC-20231

4

2

## Contact

3 Sovereign Square  
Sovereign Street  
Leeds LS1 4ER  
+44 1132 206 190