ENVIRONMENTAL MANAGEMENT PLAN (EMP)
DRILLING ACTIVITY
PSC TL-OT-17-08

APPENDIX D - OIL SPILL CONTINGENCY PLAN

TR-HSE-PLN-004

Note: Operational Plans will be prepared for each well prior to spud

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BBL	Barrel
BOP	Blow Out Prevention
CMP	Crisis Management Plan
CMT	Crisis Management Team
ED	Eastern Drilling
ESD	Emergency shutdown
FCP	Forward Command Post
HR	Human Resources
HSE	Health, Safety and Environment
IC	Incident Controller
IMP	Incident Management Plan
IMT	Incident Management Team
MSDS	Material Safety Data Sheets
OSC	On Scene Commander
OSCP	Oil Spill Contingency Plan
OSRT	Oil Spill Response Team
PIC	Person in Charge
PPE	Personal Protection Equipment
SERP	Site Emergency Response Plan
SERT	Site Emergency Response Team
TR	Timor Resources

PREFACE

This Oil Spill Contingency Plan (OSCP) has been prepared to describe the oil spill contingency procedures that have been put in place by Timor Resources for the control and response to oil spillage arising from their operations.

The plan is divided into three parts:

Part A - Strategy Plan

Chapter 1 Introduction - Purpose of Plan; Document Control; Training and Policy; Legal Requirements; and Meteorological and Seasonal Characteristics.

Chapter 2 Spill Risk and Categories

Chapter 3 Response Strategy

Chapter 4 Response – Roles and Responsibilities

Part B - Action Plan

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PART A – STRATEGY PLAN

1 INTRODUCTION

1.1 PURPOSE OF THE PLAN

This Oil Spill Contingency Plan (OSCP) develops the strategy and the means of oil spill response to any instance of hydrocarbon spilt during Timor Resources drilling campaign in PSC TL-OT-17-08 and 09. The objective is to produce an "operational" document, known, understood and accepted by all users and response personnel. The OSCP forms part of the planning for crisis and emergency response as described in the Timor Resources Crisis and Emergency Management Standard (TR-HSE-STD-00-000-009) and is addressed as follows:

- **Site Emergency Response Plan (SERP)** - On site incident control.
- **Oil Spill Contingency Plan (OSCP)** - Oil pollution incident control - as a supplement to SERP.
- **Incident Management Plan (IMP)** - providing support to on site response.
- **Crisis Management Plan (CMP)** - executive and senior management control of crisis events and providing support to IMP.

1.2 SCOPE OF THE PLAN

The plan covers the drilling rig site and the immediate environment outside the 1 hectare site perimeter drain with an approximate 0.3m berm, thus the approximate capacity within the berm is some 3,000m^2.

Each well site has been mapped to show drainage catchments outside the berm, such as the example in Figure 1-1, showing the drainage surrounding the Karau well location, similar drainage maps are available for each location (See Section 12). A site-specific Operational OSCP will be prepared for each well ahead of spud identifying response strategies using the techniques identified in Section 3.

1.3 LEGAL REQUIREMENTS

1.3.1 Decree Law 18/2020 on Onshore Petroleum Operations in Timor Leste

Chapter XVII Environmental Affairs - Article 143 (3) Environmental Licenses for Petroleum Operations specifies that the Authorised Person shall ensure that an application for Environmental License for Petroleum Operations shall include amongst other things an Environmental Management Plan (see below) and an Oil Spill Contingency Plan.

Article 146 provides specific guidance on what the OSCP should include and obliges the Authorised Person to lodge the plan at least 30 days prior to commencement of petroleum operations. The plan shall include an analysis of the types and circumstances that might result in a spill and should be developed in accordance with Good Oil Field Practice (See for example: IMO/IPIECA (2012); IPIECA/IOGP (2014 and 2015); IPIECA (2004 and 2007).

Article 146 further requires that effective and timely measures are provided in the plan to eliminate and control, contain and clean up any resulting damage, and that tasks and responsibilities for the deployment of resources in combatting a spill are described, together with full details of the Command and Control organisation. The plan shall provide classification of potential spills together with an analysis of potential movement.

1.3.2 Ministerial Diploma 46 2017 Annex VI Environmental Management Plan

Annex VI details the minimum requirement for the Environmental Management Plan (EMP) in support of an Environmental Impact Statement and addresses mitigation and management measures in the different phases of the proposed project and includes a requirement for an attachment dealing specifically with Leaks and Spills.

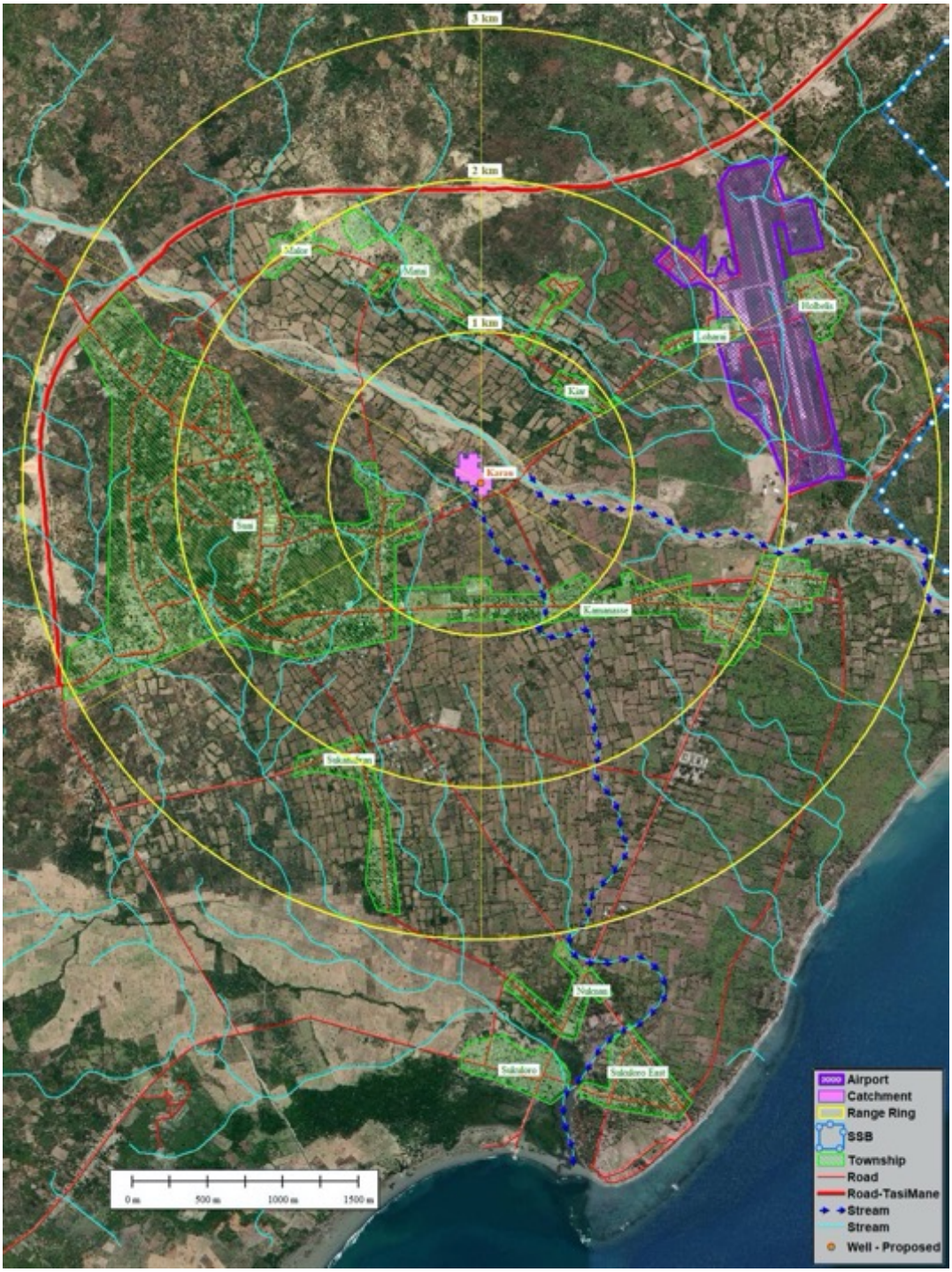


Figure 1-1: Example Drainage map outside well location (Karau Well Location)

1.4 METEOROLOGICAL AND SEASONAL CHARACTERISTICS

Climate

Timor-Leste is typical tropical country with all parts experiencing a monsoonal climate with distinct wet and dry seasons. The wet season in the project area typically runs from December to June with the dry season in August, September and October see Figure 1-2. July and November are transition months between the monsoons. The average minimum temperatures range from 21°C to 25°C with maximum around 30°C. The dry season tends to be cooler than the wet season.

Rain

The Suai region has its highest rainfall period in January - February (250mm) May - June (150mm) and December (150mm).

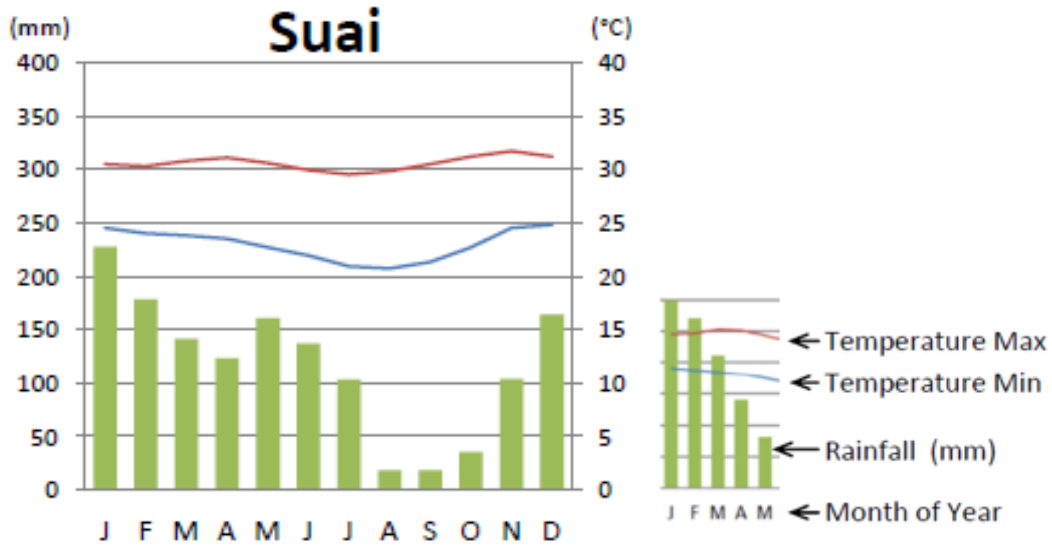


Figure 1-2: Annual Temperature and Rainfall in Suai Region
Source: Seeds of Life. (2013)

Wind

The available wind data demonstrates a dominant pattern from April to October from the northeast-southeast quadrants and for December to February from the northwest-southwest quadrants. In March and November, the wind direction transitions between the Monsoon and Tradewinds but is generally from the south or north respectively.

Wind data presented in the Suai Supply Base EIS (WorleyParsons 2012) shows the average wind speed is below 0.5m/s most of the time, with the highest wind speed being less than 2m/s. Wind direction was evenly distributed from the northwest to the south-east during the December-February during the wet season. See Figure 1-3.

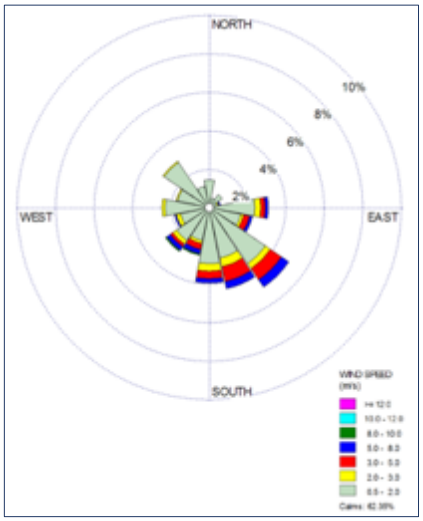


Figure 1-3. Wind speed and direction Suai region December 2011 to February 2012
Source: WorleyParsons, 2012

1.5 TRAINING, EXERCISE AND REVIEW

The General Manager Exploration is responsible for ensuring that all personnel involved in emergency response are trained in Oil Spill Response Team (OSRT) roles and responsibilities and, where required, in the Timor Resources Incident Management Team (IMT).

The full efficiency and effectiveness of response can only be obtained through regular training and exercise programmes and routine testing of support functions, including periodic access to external support agencies.

All staff, contractors and other personnel assigned to the OSRT must undertake regular and appropriate training and take part in drills and exercises according to this Oil Spill Contingency Plan and be acquainted in the use of any response materials and equipment. Key personnel identified in a spill response role include:

- Drilling Contractor - rig management
- Timor Resources Drilling Supervisor/Company-man
- Timor Resources - Operations
- Timor Resources - Finance
- Timor Resources - Logistics
- Timor Resources - HSE (Planning)

A timetable for training and exercises shall be established and programmes must be directed to all levels of the emergency response organisation.

1.6 DOCUMENT CONTROL

It is the responsibility of the General Manager Exploration, as Document Owner, to control and update the contents of this document. This document will be reviewed, revised and reissued annually or when any major changes are made to ensure that the plan reflects the current conditions and status of activities. Any changes or amendments noted by any party should be notified to the General Manager Exploration.

2 SPILL RISK AND CATEGORIES

The following sections describe the types of spillages that may arise from operations at the well site and may be considered as:

- **Worst Case Spill (WCS)** - The largest volume that could be spilled as a result of any event or combination of events. The results of a catastrophic event or failure, such as an uncontrolled blow out.
- **Maximum Credible Spill (MCS)** - The largest spill that is considered possible given the spill prevention, control and other mitigation methods in place. Temporary loss of well control with a resulting short term discharge.
- **Most Likely Spill (MLS)** - The most likely spill to occur during the drilling programme.

Timor Resources has adopted best industry practices approach to well planning, implementation and well control requirements and follow Decree Law 18/2020 in regard to onshore petroleum operations. The emphasis is on preventing the occurrence of a situation where reactive measures such as surface or relief well intervention are required. The drilling programme includes up to five wells, as shown in Table 2-1.

Table 2-1: Well Locations, subject to final survey of actual hole centre

Well	Karau	Kumbili	Lafaek	Laisapi	Raiketan
Seismic Line	Fafulu12	Fafulu14	SBT07	Fafulu17	Fafulu07
Easting (UTM 51S)	749182	754049	751730	768594	752700
Northing (UTM 51S)	8969941	8970568	8972766	8979648	8975602
Latitude	-9.31123	-9.30527	-9.28554	-9.22234	-9.25986
Longitude	125.26847	125.31272	125.29149	125.44448	125.30014
Drill Floor (mGL)	5.33	5.33	5.33	5.33	5.33
Ground Level (mSS)	-33	-16	-48	-16	-79
Total Depth (mMD)	1039	1471	2909	1771	1947

In order to address potential spill volumes data has been obtained from previous drilling campaigns in the region such as: Aliambata (1916), Matai-1 (1960), Tafara East-1 (1969) and Suai Loro-2 (1971). Whilst minor oil shows have been observed the maximum well flow rate was observed at Tafara East-1 which flowed water at some 2,400 barrels water per day that is approximately 400m^3 per day.

2.1 WORST CASE SPILL (WCS)

Estimates for the WCS are based on the time taken to mobilise a rig and drill a relief well. Numerous land rigs are available in the region and based on Timor Resources experience in mobilising the current rig to Suai by barge, it is estimated that a period of 60 days would be necessary to source transport and commission a suitable rig and 30 days to drill a relief well. Thus, the WCS spill is estimated in the region of 36,000 m^3, that is, 400 m^3/day for 90 days.

2.2 MAXIMUM CREDIBLE SPILL (MCS)

Estimates for the MCS are based on a similar flow rate but assuming a partial loss of control say 50% , and assuming that Timor Resources specialist well control contractor Wild Well Control Inc. would mobilise resources directly to site from Singapore and regain control of the well in 30 days. Thus, the MCS is considered at 6,000 m^3.

2.3 MOST LIKELY SPILLS (MLS)

The most likely spill based on experience is from fuel storage tanks or drums and may be addressed as follows.

2.3.1 Storage Tanks

Diesel fuel is stored at the rig site in a 20,000L tank within a bund. The design intent of the bund is that it will have a volume equal to 110% of the largest tank within the bund. In assessing potential loss it has been assumed that tank and bund have both failed, thus 20m^3 loss to the environment.

2.3.2 Drums

Cargo unloading/loading may include various products in drums (e.g. diesel and lube drums, and some drilling materials shipped in drums). Drums are typically unloaded on pallets with 4x 0.25m^3 drums per pallet, loss of 2 may occur if cargo is dropped during operations, thus resulting in a spill of 0.5 m^3. Potential losses are summarised in Table 2-2.

Table 2-2: Potential Losses During Drilling Project

Source	Type	Volume (m^3)
Worst Case Spill Uncontrolled well blow out requiring a relief well 400m^3/day x 90 days	Crude	36,000
Maximum Credible Spill Partial loss of well control requiring intervention by Wild Well Control Inc well control specialists 200m^3/day x 30 days	Crude	6,000
Most Likely Spill Loss of diesel fuel storage tank on well site and failure of bund	Diesel	20
Most Likely Spill Loss of bulk materials 2x 0.25m^3 drums	Diesel Lube Oil Drilling chemicals	0.5

2.4 RESPONSE LEVELS

Pollution response is based on an escalating scale whereby the resources, both equipment and personnel, mobilised for a response will vary according to the incident scale and characteristics, the response shall follow the Three-Tier concept, with response levels defined according to:

- The type and quantity of oil spilt
- The potential impact on the environment
- Potential media and public interest in the incident
- The amount and source of resources deployed
- The levels of support and higher-level management activated

Response will depend upon the spill size, severity, location, type of product and whether the spill is on-going. In order to describe the most appropriate contingency arrangements for oil spillages, spillages have been grouped into three categories, on the basis of quantity of hydrocarbons spilt. These are as follows:

- Tier 1 Spills < 5 m^3
- Tier 2 Spills >5 - 100 m^3
- Tier 3 Spills >100 m^3

If there is any doubt about the size of the spill and/or its duration, and therefore the appropriate spill category, then judgement must be used in deciding which are the most applicable procedures. In general, assume the worst case and be prepared to adjust response as the spill develops and additional information becomes available. For the purposes of this Oil Spill Contingency Plan, the three Tiers can be further described as follows:

2.4.1 Tier 1

A small sized spill or minor event within the Timor Resources field operations capacity. This event would be able to be controlled and corrected within the immediate vicinity of the operation by the Site Emergency Response Team (SERT) at the Incident Command Post (ICP) with minimal or no impact outside the localised area. The SERT would supervise the response and report progress to the Incident Management Team (IMT) in Suai/Dili.

2.4.2 Tier 2

A medium spill having local implications, again lead by Site Emergency Response Team deploying all available Tier 1 Resources and local contractors. Resource support in terms of heavy equipment and qualified personnel will be required.

2.4.3 Tier 3

A large spill beyond the capabilities and control of the onsite resources, thereby requiring the full support of Timor Resources Incident Management Team (IMT), government and third party assistance.

The Tier 3 response category can be divided into that which can be managed by local and national resources up to the Maximum Credible Spill size of 6,000 m^3. Any event in excess of the MCS will require external support such as related to an uncontrolled blowout with potential long-term local, national, international implications and/or that matches any of the following criteria:

- Major environmental damage
- Major social and socio-economic implications
- Major media coverage

2.4.4 Tier 2 and 3 Escalation and External Support

If the spillage is deemed beyond the capabilities of the onsite response for a Tier 1 event or requires rapid escalation to Tier 2 or Tier 3, then a tiered response is necessary. The following Tier 2 and Tier 3 support can be called upon.

Tier 2 A medium spill where local contractors are called in to provide heavy earth moving equipment and labour. Additional resources can be made available at the national level as required, and government agencies may be called on a mutual aid basis. If the situation warrants, then an immediate escalation to Tier 3 external support is recommended. For well control incident Wild Well Control Inc in Singapore may be mobilised.

Tier 3 A crisis situation where substantial further resources will be required from Wild Well Control Inc in Singapore together with the mobilisation of international drilling personnel and equipment.

Resources from international co-operative stockpiles such as OSRL Singapore may be required.

It is important to note that considerable logistical support is necessary when Tier 3 support agencies are involved. The following provides an indication of the requirements of supporting external resources:

- Support to international air and sea freight movements.
- Customs clearance.
- Adequate lifting equipment at airport/dock.
- Arrangements for transfer from airport to docks.
- Welding and heavy equipment support services.
- Adequate vessels and aircraft for transport and deployment of equipment and for response if necessary: recovery, storage and waste management operations.
- Accommodation and catering for personnel.
- Availability of locally available, trained personnel resources.
- Support from municipality and national government.
- Communications.
- Control centre and field control facilities.

NOTE:

Spills rarely fall into convenient categories.

The boundaries between categories of spill and response Tiers will inevitably be blurred.

It is, therefore, important to be prepared to escalate the response from the earliest moment.

It is better to over-react and downsize as required than to under-react and try to catch up later

2.5 CHARACTERISTICS OF THE EXPECTED OILS

The properties of oil from offset wells are summarised in Table 2-3 and the expected range is between 25-45°API. The heavy Cota-Taci 1 crude is considered likely to be degraded, the Matai wells and multiple Matai seeps exhibit APIs in the mid 30 region whilst the Suai Loro oil is a light oil with 45 °API. The most likely mid-case is considered to be in the region 35 °API, that is, a light oil with a specific gravity of 0.8498.

Table 2-3: Properties of Expected Hydrocarbons

	Cota Taci 1	Matai 1	Matai 3	Suai Loro	No. 2 Diesel Fuel	Lube Oil
Density @ 20°C g/cm²	0.9036	0.8398	0.8550	0.8017	0.820 to 0.845	0.881
°API	25.1	37	34	45	30 to 37	28
Viscosity mm²/s @ 80°C	-	-	-	-	1.9 to 4.1	12.5 to 22.0
Pour Point °C	-	-	-	-	-17 to -30	-24
Flash Point °C	-	-	-	-	52 to 96	220
ITOPF Group (1)	3	2	2	1	2	3

(1) See Table 2-4

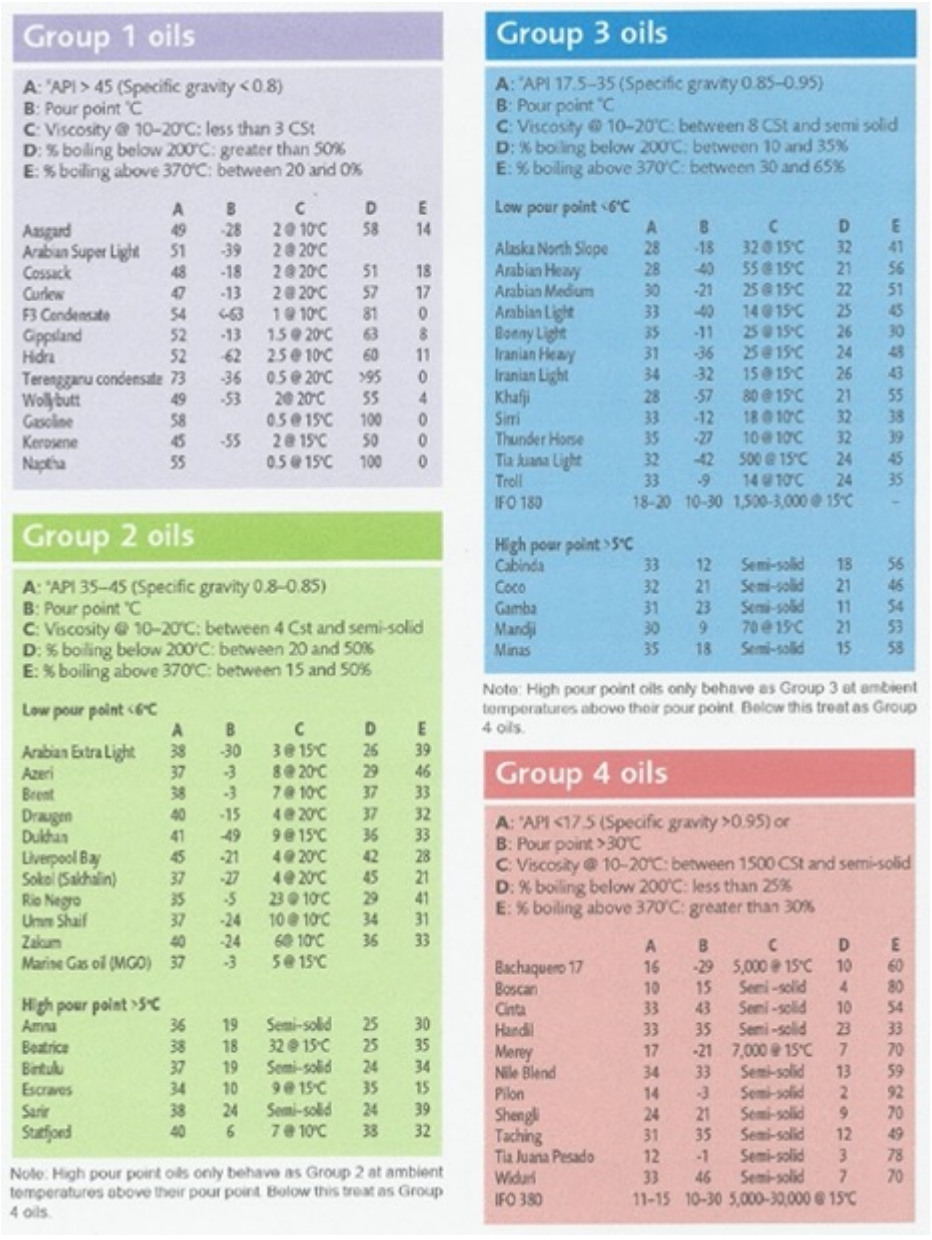
It is further considered, for the purposes of this assessment, that any oil encountered will have a low pour point <6°C typical of an ITOPF Group 1 or 2 oil (see Figure 2.3) and given the prevailing temperatures in Timor Leste are consistently high, 21°C -32°C, well above the expected pour point, the oil will be liquid. Any oil discovered will be subject to assays to confirm its characteristics.

The relatively high API and prevailing temperature indicate that the expected oil as well as diesel will evaporate and dissipate rapidly and, for small spillages, will pose more of a fire and safety threat than an environmental one, thus may require no response other than to monitor and observe. The specific

gravity of the oil and diesel indicate they will be mobile if spilt thus enhancing spreading and dispersion and both will float on water if they enter a water course. Spreading and dispersion are therefore likely to be important processes contributing to rapid removal of spilt oil from the surface of any water.

Table 2-4: Examples of Oils Classified According to °API Gravity (after ITOPF)

Group	Density	Examples
Group 1	<0.8	Condensate, Gasoline, Kerosene, Premium and No 2 Diesel
Group 2	0.8 - 0.85	Marine Gas Oil, Abu Dhabi Crude
Group 3	0.85-0.95	Intermediate Fuel Oil IFO 180, Arabian Light Crude, North Sea Crudes (e.g. Forties)
Group 4	>0.95	Intermediate Fuel Oil IFO 380, Heavy Fuel Oil, Venezuelan Crude Oils



Group 1 oils

A: °API > 45 (Specific gravity < 0.8)
B: Pour point °C
C: Viscosity @ 10–20°C: less than 3 CSt
D: % boiling below 200°C: greater than 50%
E: % boiling above 370°C: between 20 and 0%

	A	B	C	D	E
Asgard	49	-28	2 @ 10°C	58	14
Arabian Super Light	51	-39	2 @ 20°C		
Cossack	48	-18	2 @ 20°C	51	18
Curlew	47	-13	2 @ 20°C	57	17
F3 Condensate	54	<-63	1 @ 10°C	81	0
Gippsland	52	-13	1.5 @ 20°C	63	8
Hidra	52	-62	2.5 @ 10°C	60	11
Terengganu condensate	73	-36	0.5 @ 20°C	>95	0
Wollybutt	49	-53	2@ 20°C	55	4
Gasoline	58		0.5 @ 15°C	100	0
Kerosene	45	-55	2 @ 15°C	50	0
Naptha	55		0.5 @ 15°C	100	0

Group 2 oils

A: °API 35–45 (Specific gravity 0.8–0.85)
B: Pour point °C
C: Viscosity @ 10–20°C: between 4 Cst and semi-solid
D: % boiling below 200°C: between 20 and 50%
E: % boiling above 370°C: between 15 and 50%

Low pour point <6°C	A	B	C	D	E
Arabian Extra Light	38	-30	3 @ 15°C	26	39
Azeri	37	-3	8 @ 20°C	29	46
Brent	38	-3	7 @ 10°C	37	33
Draugen	40	-15	4 @ 20°C	37	32
Dukhan	41	-49	9 @ 15°C	36	33
Liverpool Bay	45	-21	4 @ 20°C	42	28
Sokol (Sakhalin)	37	-27	4 @ 20°C	45	21
Rio Negro	35	-5	23 @ 10°C	29	41
Umm Shaif	37	-24	10 @ 10°C	34	31
Zakum	40	-24	6@ 10°C	36	33
Marine Gas oil (MGO)	37	-3	5 @ 15°C		
High pour point >5°C					
Amna	36	19	Semi-solid	25	30
Beatrice	38	18	32 @ 15°C	25	35
Bintulu	37	19	Semi-solid	24	34
Escravos	34	10	9 @ 15°C	35	15
Sarir	38	24	Semi-solid	24	39
Statfjord	40	6	7 @ 10°C	38	32

Note: High pour point oils only behave as Group 2 at ambient temperatures above their pour point. Below this treat as Group 4 oils.

Group 3 oils

A: °API 17.5–35 (Specific gravity 0.85–0.95)
B: Pour point °C
C: Viscosity @ 10–20°C: between 8 CSt and semi solid
D: % boiling below 200°C: between 10 and 35%
E: % boiling above 370°C: between 30 and 65%

Low pour point <6°C	A	B	C	D	E
Alaska North Slope	28	-18	32 @ 15°C	32	41
Arabian Heavy	28	-40	55 @ 15°C	21	56
Arabian Medium	30	-21	25 @ 15°C	22	51
Arabian Light	33	-40	14 @ 15°C	25	45
Bonny Light	35	-11	25 @ 15°C	26	30
Iranian Heavy	31	-36	25 @ 15°C	24	48
Iranian Light	34	-32	15 @ 15°C	26	43
Khafji	28	-57	80 @ 15°C	21	55
Sirri	33	-12	18 @ 10°C	32	38
Thunder Horse	35	-27	10 @ 10°C	32	39
Tia Juana Light	32	-42	500 @ 15°C	24	45
Troll	33	-9	14 @ 10°C	24	35
IFO 180	18–20	10–30	1,500–3,000 @ 15°C		-
High pour point >5°C					
Cabinda	33	12	Semi-solid	18	56
Coco	32	21	Semi-solid	21	46
Gamba	31	23	Semi-solid	11	54
Mandji	30	9	70 @ 15°C	21	53
Minas	35	18	Semi-solid	15	58

Note: High pour point oils only behave as Group 3 at ambient temperatures above their pour point. Below this treat as Group 4 oils.

Group 4 oils

A: °API <17.5 (Specific gravity >0.95) or
B: Pour point >30°C
C: Viscosity @ 10–20°C: between 1500 CSt and semi-solid
D: % boiling below 200°C: less than 25%
E: % boiling above 370°C: greater than 30%

	A	B	C	D	E
Bachaquero 17	16	-29	5,000 @ 15°C	10	60
Boscan	10	15	Semi-solid	4	80
Cinta	33	43	Semi-solid	10	54
Handil	33	35	Semi-solid	23	33
Merey	17	-21	7,000 @ 15°C	7	70
Nile Blend	34	33	Semi-solid	13	59
Pilon	14	-3	Semi-solid	2	92
Shengli	24	21	Semi-solid	9	70
Taching	31	35	Semi-solid	12	49
Tia Juana Pesado	12	-1	Semi-solid	3	78
Widuri	33	46	Semi-solid	7	70
IFO 380	11–15	10–30	5,000–30,000 @ 15°C		

2.6 BEHAVIOUR OF SPILT OILS

A distinction is made between non-persistent oils that tend to disappear rapidly and persistent oils which, in contrast, dissipate more slowly and usually require a clean up response. Persistent oils embrace most crude oils and lube oil, non-persistent oils include distillates (e.g. gasoline and diesel) that are lighter and significantly less viscous. When oils are spilled, they undergo a number of physical changes, some of which lead to their removal from the surface, and some of which lead to their persistence. These changes are basic to determining the most appropriate response to a spillage.

Each oil spill incident must be evaluated independently, and the detailed strategy of response is primarily based on prevailing weather and water conditions i.e. wet versus dry season, as well as ecological sensitivity and the properties of the spilt oil. The following sections briefly discuss the key behaviours of oil when spilt.

2.6.1 Spreading and Penetration

Oil spilt on land or on water will spread horizontally with the main driving force being the oil's weight. The spread and penetration on land will depend on whether the surface is impermeable or permeable. On impermeable surfaces spilt oil will remain static until it is recovered, unless a gradient is present that may cause it to spread. The response should be to prevent the oil from spreading and potentially contaminating other surface areas, this will require containment such as the construction of berms around the spill. Once contained, the oil will then need to be recovered through either manual or mechanical methods.

Permeable ground poses challenges to the containment of oil as it flows in both a horizontal and vertical direction and will travel with the direction of groundwater flow once it is reached, however the freshwater aquifer in the project area is found at approximately 84m depth, with small pockets of perched water also found throughout the area between 5 and 10m depth.

Oil is unlikely to reach the main aquifer given its depth and the high retention capacity of the soils. However, groundwater movement is very slow, usually between 0.5m and 1.5m per day, hence if the aquifer is considered at threat there will be time to study the underlying hydrogeology and identify the most optimal location for the recovery of oil.

On permeable surfaces, the oil will penetrate into the soil due to its weight with each soil type allowing oil to permeate at different rates and to retain oil at varying capacities. See Table 2-5. The pore spaces in coarser soils are larger, oil will flow through more readily (due to gravity) thus giving a lower retention capacity. However, finely packed sediments retain the oil in two ways, firstly the oil molecules cannot pass so easily between the particles due to their size and secondly because the forces associated with capillary action hold the oil in the pore spaces.

Surface area is also a factor in soil retention capacities with small grain sediments having a higher surface area and therefore will hold more oil on the surface of the grains than larger grained sediments.

Table 2-5: Retention Capacities in Different Soil Types
(Source: OSRL 2013)

SURFACE TYPE	CAPACITY (ltrs/m^3)
Stones / Coarse Gravel	5
Gravel / Coarse Sand	8
Coarse Sand / Medium Sand	15
Medium Sand / Fine Sand	25
Fine Sand / Silt	40

Soil textures in the area are described in the project Environmental Impact Statement (Timor Resources 2020) and are dominated by Loam and Sandy Loam and Silty Clay and Clay, with soils around the Suai Supply Base area mostly Sandy Clay and Gravelly Sand. Loam is soil composed mostly of sand, silt, and a smaller amount of clay, hence has a high retention capacity, where water is easily retained in the soil, although doesn't enter easily. Clay will form an impermeable barrier to penetration.

When responding to spills on permeable surfaces, it is important to minimise the amount of oil that can penetrate below the surface; this may require the oil to be spread over a large surface area in an attempt to reduce head pressure on the surface to prevent penetration. This may well be the preferable option compared to long-term operations of subsoil and groundwater clean-up.

Inland water bodies can either be static, such as ponds or lakes, or moving, such as a river. Oil is likely to spread on the surface and where subject to wind and current, can also drift moving down or across the water body. Whilst containment takes place, it is important to maintain any water flow. During the early stages oil spreads rapidly under gravity and the viscosity of the oil influences the rate. Diesel and the expected oil have a low viscosity and, with prevailing temperatures well above their pour point, will tend to spread rapidly.

2.6.2 Evaporation

The greater the proportion of light ends, the greater the evaporation of the spilt oil, so the relatively high API and prevailing temperature indicate that the expected oil as well as diesel will evaporate and dissipate rapidly. The evaporative process is primarily dependent upon the density and viscosity characteristics of the oil and its initial spreading rate. Evaporation rates are dependent on the season (wet or dry), wind speed, air and/or water temperature, the amount of water and the state of the water surface.

2.6.3 Dispersion in Water

Depending on the characteristics of the water body: stream, river, pond, lake, depth, flow rate; the rate of dispersion is largely dependent upon the characteristic of water surface and water depth, proceeding most quickly in deeper water in the presence of waves and eddies.

2.7 SPILL MOVEMENT

See example drainage and response maps in Section 12.

3 RESPONSE STRATEGY

Oil and diesel spills should be dealt with as a hazardous material, and an exclusion zone established as soon as possible. Any product spilt on land or within the well site should be contained as quickly as possible to prevent spreading and recovered using absorbent material from the rig spill response kit, (see Section 9) to soak up residue material. Monitor and evaluate the incident.

Should spilt oil or diesel enter a water course "Monitor and Evaluate" response should be mounted immediately, and a reconnaissance survey of the immediate drainage courses conducted, see Section 12 for drainage map examples.

The expected oil and diesel are classified as a Group 2 "light oil" (see Section 2-5), and with a relatively low density has a half-life of a few hours under the temperature conditions in the drilling area, and given their low density, low viscosity and high volatility will dissipate rapidly by evaporation/natural dispersion.

Oil spilled on land will require a "Contain and Recover" response by the construction of berms, mounds around the spill site to stop oil entering drainage ditch around the site perimeter. To prevent oil leaving the site, the perimeter drain should be sealed.

Oil entering the natural drainage system outside the contained well site area will require a "Contain and Recover" response by the erection of berms/barriers across the waterway.

Table 3-1: Response techniques for each oil type

Section	RESPONSE STRATEGY	Expected Crude Oil	No.2 Diesel Fuel	Lube Oil [1]
3.1	Exclusion Zone	☑	☑	☑
3.2	Monitor & Evaluate	☑	☑	☑
3.3	On land Containment & Recovery Excavation and construction of berms/barriers around spill area	☑	☑ Be aware of fire risk ☒	☑
3.4	Water Courses Containment & Recovery Construction of berms/barriers in water courses	☑	☑	☑
9	Waste Storage Waste Management	☑	☑	☑

[1] Lube oil spills are limited to 0.25m3 drums

☑ = Recommended ☒ = Not Recommended

3.1 EXCLUSION ZONE STRATEGY

The spilt oil may pose a health and safety risk to personnel and the public due to release of flammable, toxic vapours and gases. There is an immediate need to evacuate non-essential personnel up wind and up slope from the spill. Evaluate the direction of spill movement to confirm spill areas, see Section 12 for example drainage and response maps.

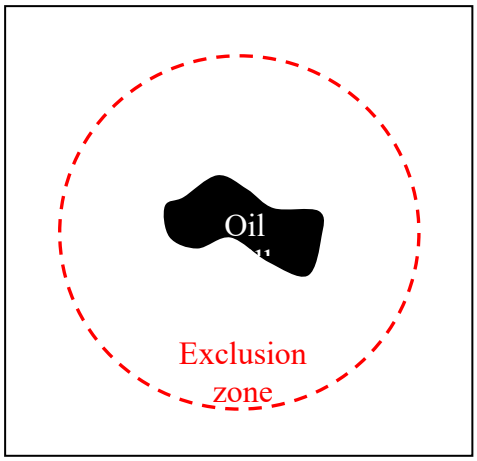


Figure 3-1: Safety exclusion zone

Once spill areas have been confirmed, implement safety exclusion zone(s) as needed:

Table 3-2: Exclusion zone strategy

Exclusion Zone	Extent of zone would depend on: • Proximity of spill to environmentally-sensitive areas • Accessibility of spill site to the responders and public • Nearness of spill site to urban or populated areas • tidal stream and wind
Resources	• Personnel as needed to maintain security for the area • Communications equipment (i.e. 2-way radios or “walkie-talkie”) • Gas monitoring detector should be set up to facilitate the site entry protocol
Actions	• Cordon off area with clear markings (i.e. “DO NOT CROSS”, “DANGER”) • Put clear and visible signs and markings along the periphery of the cordoned area (i.e. “DO NOT CROSS”, “DANGER”) • Prevent the public from coming near or in the vicinity of the spill by posting safety personnel in the area. If possible, alert police for possible assistance in policing the area • **Note: on the water, the zone is not static but moving with the flow**

3.2 "MONITOR AND EVALUATE"

There is a need to monitor exactly where the spill is and how it is moving in order to formulate future response and to assess how the spill evolves. Particular focus should be made when the spill escapes outside the well location perimeter.

Table 3-2: Data Sheet 2 – Monitor and Evaluate

Monitor and Evaluate	Monitor and evaluate spill source, location and behaviour: • Search for the origin of the pollution • Determine the nature and the characteristics of the oil • Forecast the evolution of the spill • Locate the affected areas and assess their extent
Resources	• Communications equipment (i.e. cell phone or 2-way radios) • Gas monitoring detector as required • Camera, video-camera, binoculars. • GPS • Sampling equipment
Actions	• Assess and report on the current situation at site of spill • Review and examine location of spill • Assess immediate environmental and social sensitivities • Provide a forecast its potential evolution in order to prepare or guide operations

3.3 ON LAND

3.3.1 Permeable Ground

When responding to spills on permeable surfaces, it is important to minimise the amount of oil that can penetrate below the surface; this may require the oil to be spread over a large surface area in an attempt to reduce head pressure on the surface to prevent penetration. This may well be the preferable option compared to long-term operations of subsoil and groundwater clean-up.

3.3.2 Impermeable Ground

If oil spills on impermeable ground, the response should first prevent the oil from further spreading and potentially contaminating other surface areas. Once contained, the oil will then need to be recovered through either manual or mechanical methods

ON LAND SPILLS

- **Impermeable surfaces**
  - stop release flow as quickly as possible
  - block inlets to drains, cable ducts, etc.
  - limit spread using ground booms, sorbent booms, earth banks, sandbags.
  - collect oil from pools and surfaces by pumping, vacuuming and by use of sorbents, aided by water spray if necessary
- **Bunded areas**
  - stop release flow as quickly as possible
  - ensure outlets such as surface water drains, are blocked
  - stop any leaks through bund penetrations e.g. around pipes
  - collect oil from pools and surfaces by pumping, vacuuming and use of sorbents, aided by water spray if necessary
- **Open areas**
  - stop release flow as quickly as possible
  - limit spread by building earth dams, digging interceptor trenches and/or collecting pits, and using ground booms and sorbents booms as necessary
  - collect oil from pools, trenches, pits and surfaces by pumping, vacuuming, and the use of sorbents
  - if the soil is highly permeable, containment that concentrates oil in pools may increase the speed that it soaks into the soil - use a water bottom or liner in the containment area
  - scrape off contaminated soil and move it to an impermeable surface or container for weathering or further treatment
  - thin layers of surface oil may be left to dry out for a few days before scraping.

VEGETATED AND AGRICULTURAL AREAS

- **Immediate response**
  - stop release flow as quickly as possible
  - prevent further oil from entering vegetated areas if possible using on-land spill techniques
  - avoid disturbing the affected areas by clean-up personnel, equipment and traffic until a specific plan has been approved
  - develop a specific clean-up plan for approval by management and the authorities. Use specialist environmental expertise
- **Vegetation clean-up**
  - put the approved plan into effect deploying and managing resources to minimise impact on the surrounding vegetation while achieving effective clean-up

3.4 WATER COURSES

IF SPILL REACHES WATER WAY

- **Immediate response**
  - stop release flow as quickly as possible
  - prevent further oil from entering waterways using on-land spill techniques by constructing earth bunds
  - If oil enters the water way consider building gravel berms and weirs as necessary
  - Use deflection berms in the waterway to recover oil
  - develop a specific clean-up plan for approval by management and the authorities. Use specialist environmental expertise
- **Clean-up**
  - put the approved plan into effect deploying and managing resources to minimise impact on the surrounding vegetation while achieving effective clean-up

3.4.1 On Static Water

On larger areas of static water, boom can be used to contain the floating oil. The water bodies can be subject to wind-induced wave action, causing the oil to drift, therefore making it necessary to prioritise the containment to prevent further spreading. Where lakes etc. are fed and drained by watercourses, their inlets and outlets need to be protected, methods described in oil on moving water can be utilised.

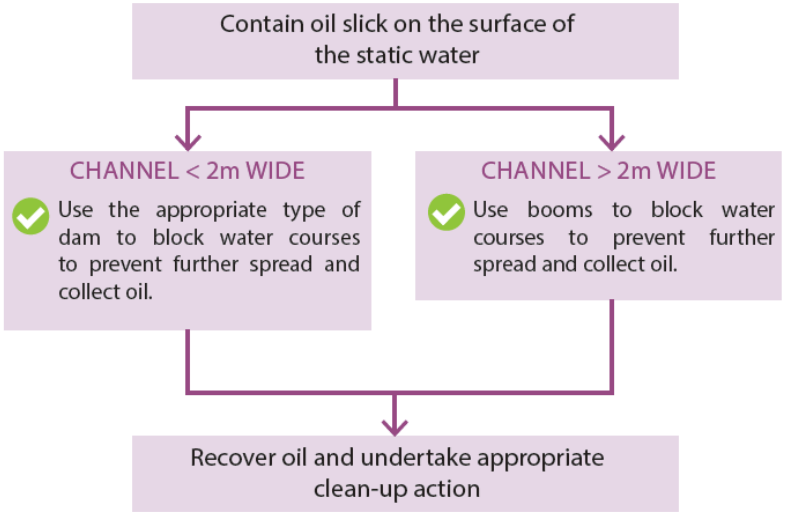


Figure 3-2: Response on Static Water

3.4.2 On Moving water

As over 60% of inland oil spills occur in rivers with currents in excess of 0.5 metres per second, various techniques and equipment, including booms and dams, have been developed to suit the relevant environmental conditions. In currents faster than 1 metre per second, it is advisable to use techniques that allows water to flow freely subsurface whilst containing the oil solely on the surface of the water, such as a spade, wooden plate or even a sand bag dam.

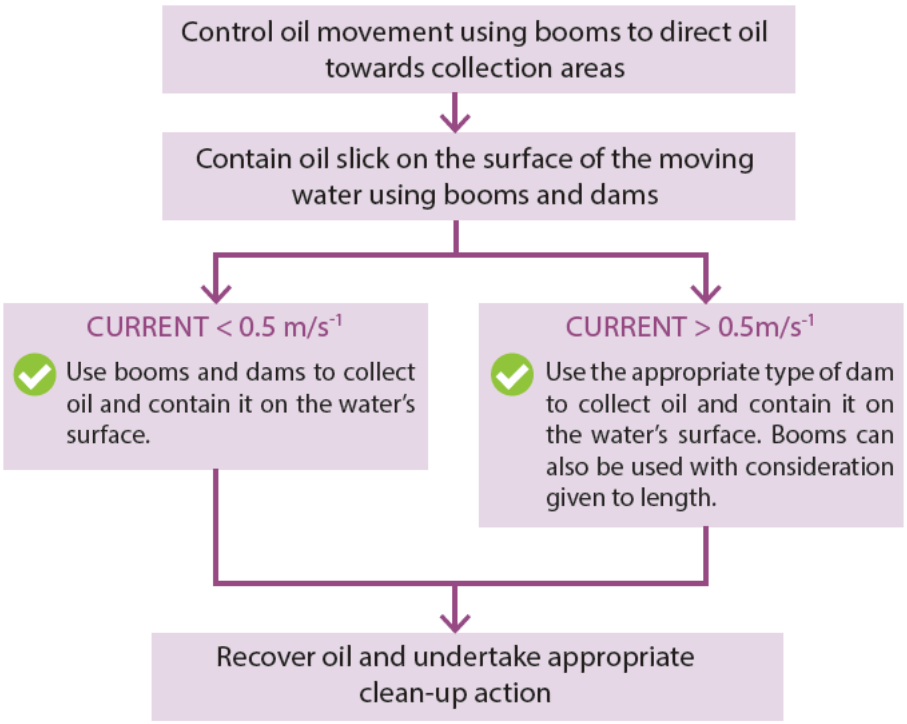


Figure 3-3: Response on Moving Wate

3.5 CONTAINMENT

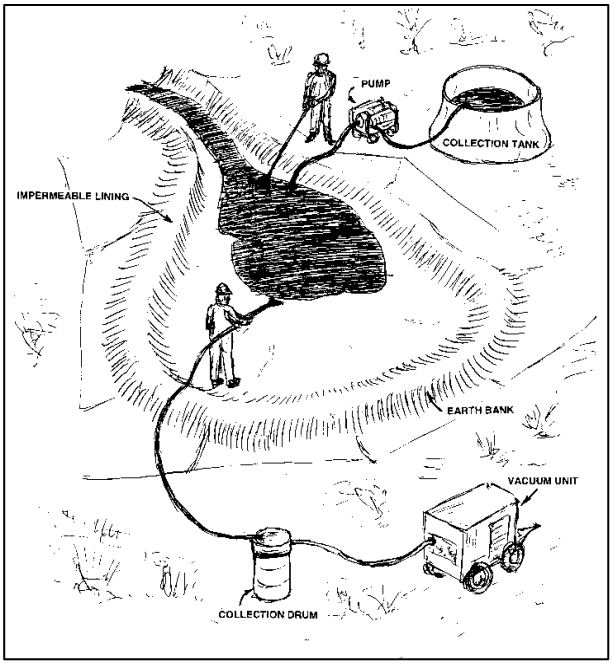
3.5.1 On Site - Small Spillages

The operations will have a suitable spill response kits as illustrated here (See 8.1 below).

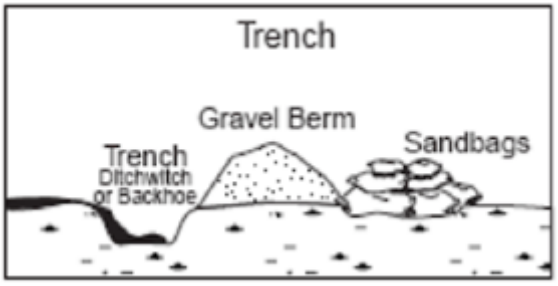
Figure 3-4: On site Spill Response Kit

3.5.2 Gravel Berms

Oil spilt on land can be corralled or contained within easily constructed berms as shown in Figure 3-5



Containment Berm

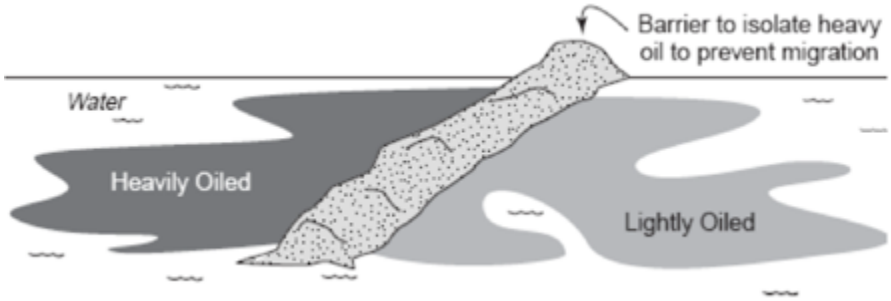


Berm with Trench for Recovery

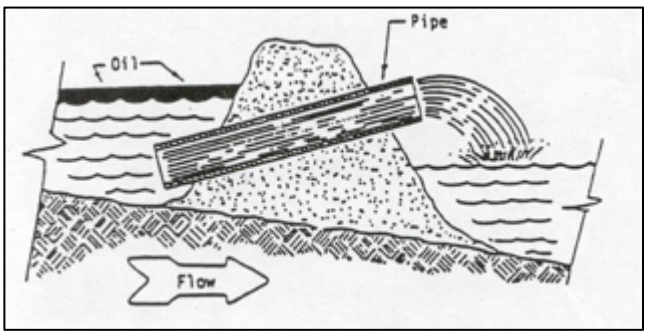
Figure 3-5: Gravel Berms for Spill Containment on Land

3.5.3 River Berms and Booms

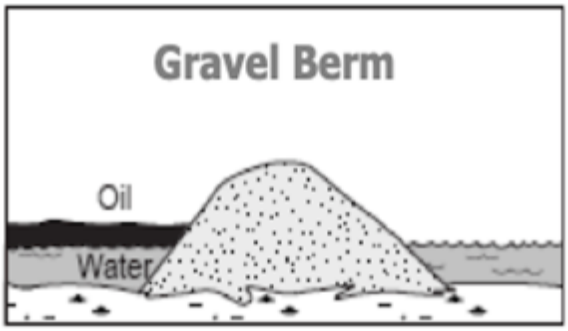
If oil escapes into a water course, berms may need to be constructed to contain the oil and prevent it from flowing further downstream and contaminating the surrounding area. It is important to maintain a water flow through the berm in order to avoid having a negative impact on the ecosystem downstream. Berms can be used in both narrow waterways and water courses with steep sides.



Gravel Berm Across Slow Moving Water



Berm in Moving Water



Berm in Still Water

Figure 3-6: Gravel Berms for Spill Containment on Water

Booms can be used to deflect the flow of oil to limit any further spread and contain it ready for recovery. However, boom deployment is limited to slow moving deeper water, in shallow fast flowing rivers oil will escape under the boom in flows >0.5m/s. Different techniques can be employed depending on the quantity of oil spilled and the surrounding operational and environmental conditions, such as the width of the channel, depth of water, flow rate and the presence of meanders.

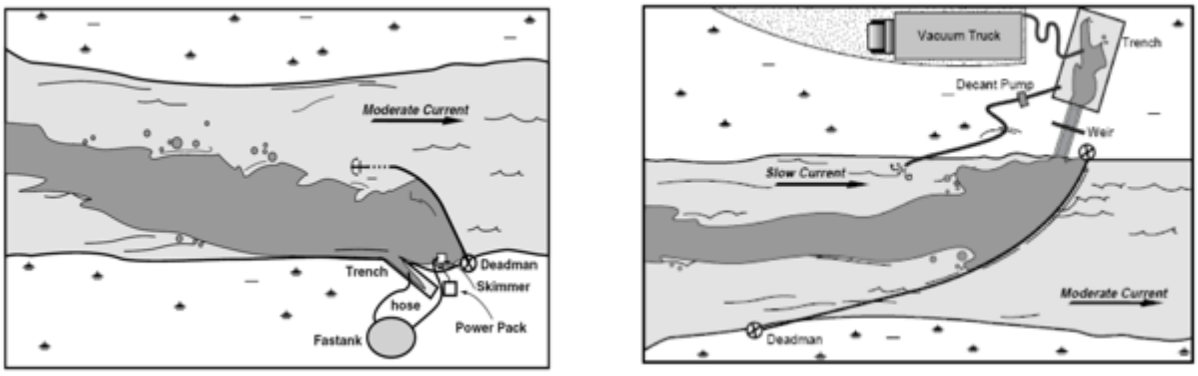


Figure 3-7: Deflection Booms for Rivers

3.6 RECOVERY OF OIL

Timor Resources have reviewed the Digital Mapping System a topographic GIS database for each of the well locations, examples of the product are provided in Section 12 and an example is shown in Figure 3.8 to illustrate how the careful selection of berm placement can assist in both blocking progress of a spill but also providing a temporary storage area to aid in recovery of spilt oil.

Figure 3-8 is for the Rusa well location and illustrate how drainage channels from the well site are identified (blue arrows) and further illustrate the area captured (white dotted line) behind a berm (red bar) constructed down slope from the well site. Similar Response Maps will be prepared for each well site prior to spud.

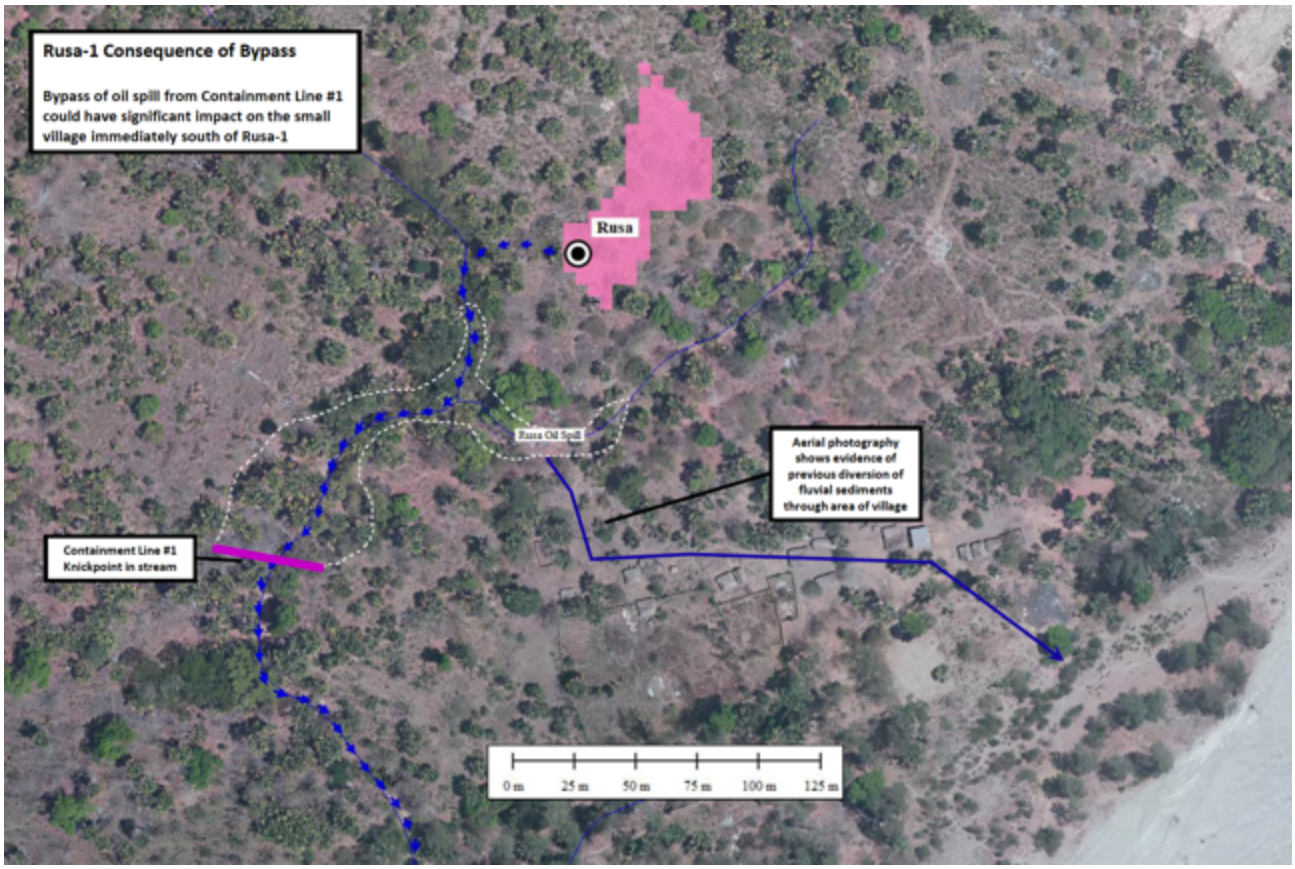


Figure 3-8: Example Berm Deployment in Drainage Channel Below a Well Site

Clean up is best accomplished by manual recovery which is labour intensive but the best environmental option when compared to the use of heavy equipment, particularly in sensitive areas. Manual recovery utilises large numbers of people collecting stranded oil with the necessary tools, shovels etc.

Manual recovery can be enhanced if the size of spill demands by using a multitude of machinery, including (specialist) pumps and vacuum equipment, scrapers, graders and oil skimmers. Figure 3-9 illustrates a recovery option

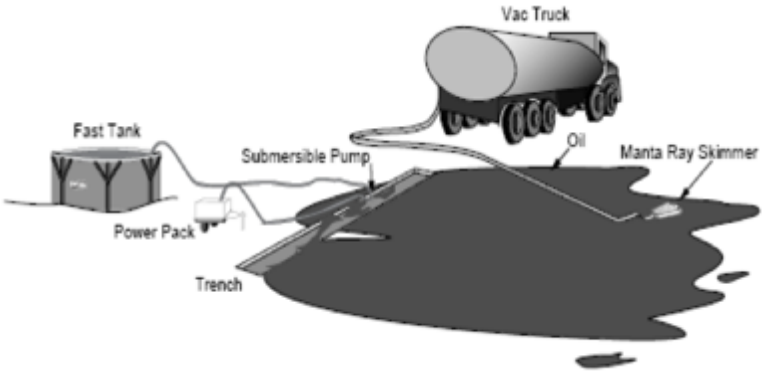


Figure 3-9: Recovery of Spilt Oil

Sorbants made of natural oleophilic materials such as straw, coconut husks, and synthetic materials (polypropene), can be introduced to selectively absorb the oil but will still require disposal.

In-situ burning may be considered when physical recovery is not feasible, particularly in inaccessible places and remote areas, some environments may recover from burning more readily than if left oiled without treatment. In-situ burning should be considered as part of a best practicable option assessment depending on what other options available locally

4 RESPONSE - ROLES AND RESPONSIBILITIES

Timor Resources is responsible for the preparation and implementation of the project's Oil Spill Contingency Plan (OSCP). TR Operations Manager is responsible to mount any oil spill response off-site. The Drilling Contractor shall maintain appropriate capability in order for immediate response to Tier 1 spills at the rig site. Timor Resources are responsible for:

- Developing and maintaining an OSCP for spills in the project area with support from the Drilling Contractor with regard to the rig site
- Maintaining appropriate oil spill response materials as required under the OSCP including contractor services and resources both equipment and labour.
- Conducting appropriate training for oil spill response to ensure proficiency in responding to spills.
- Ensuring management and insurers are fully briefed on matters concerning claims for damage resulting from a spill.

4.1 TIMOR RESOURCES EMERGENCY RESPONSE STRUCTURE

Crisis and Emergency events are managed through a multi-tiered system as shown in Figure 4-1. As discussed in Section 2.4, a response is Tiered depending on the severity of the incident and its effect, and different levels of the organisation are involved from the immediate responder(s) at the scene, the Site Emergency Response Team (SERT) at the operating site, the Incident Management Team (IMT) in Dili, to the Crisis Management Team (CMT) at the corporate office in Brisbane.

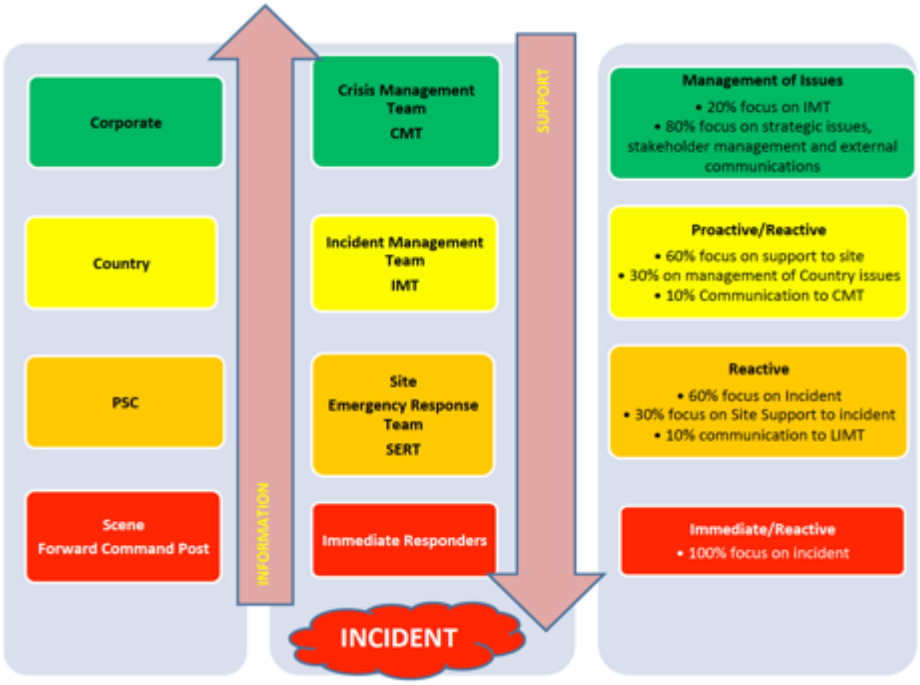


Figure 4-1: Timor Resources Incident Management Structure

In terms of operational response Timor Resources operates the internationally recognised Incident Management System (IMS) and best industry practice is provided in IOGP/IPIECA 2014, as described in Section 4.2 below.

4.2 INCIDENT MANAGEMENT SYSTEM (IMS)

IMS allows for the timely combination of resources and manpower during an emergency and promotes communications among responders. IMS requires that one individual has authority over all incident activities, this position is known as the Incident Commander (IC). In the case of an oil spill the Operations Manager will take the IC role. IMS is applicable to all scales of spills.

A structured Incident Management System (IMS) is critical in establishing command and control during a response to an emergency. IMS includes a modular organization that has pre-identified roles, responsibilities, reporting relationships and authorities necessary to manage an incident. IMS also includes a planning process necessary to ensure a direct link between the incident management objectives and response actions being taken in the field.

The IMS structure proposed for field operations emergency and oil spill response is as follows:

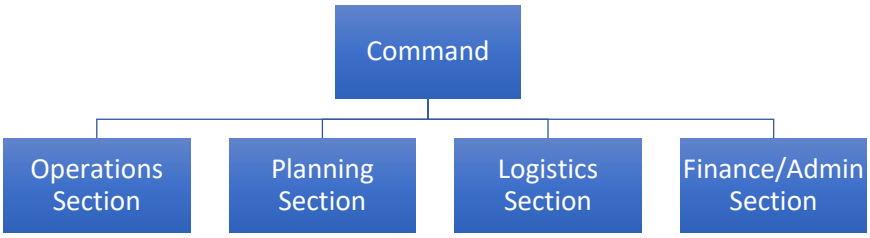


Figure 4-2: Organizational structure of the IMT

Responsibilities in each functional area include:

- **Command** - provide overall management and authority
- **Operations** - Oil Spill Response Team direct oil spill response operations
- **Planning** - prepare oil spill response action plan and maintain situation and resources status
- **Logistics** - provide services and support to the incident
- **Finance/Administration** - provide financial controls and claims management

Incident Commander maintains a strategic perspective to assess incident potential, establish an oil spill response strategy, and to provide clear direction for the response. The IC establishes the incident objectives and ensures that all team members work to accomplish these objectives through the Incident Action Plan.

Country Manager is responsible for liaison with government through ANPM, as and when necessary, and prepares information about the incident to the news media, to incident personnel and to other appropriate agencies and organisations.

HSE Officer acts as the On Scene Commander (OSC) at the spill location/Forward Command Post and supervises the Oil Spill Response Team (OSRT). OSC develops and implements response actions and ensures personnel and public safety are addressed.

Oil Spill Response Team (Operations Team) performs all tactical response operations to achieve key oil spill response priorities.

Logistics Team provides services and support to the oil spill response effort in the form of personnel, facilities, and materials.

Finance Team provides financial controls, supports contracting and procurement, tracks incident costs, manages claims, and accounts for reimbursements, in addition to providing tracking of all expenditures and recording of costs for personnel, equipment and assets. Incidents may involve claims for damage to property, business disruption, health or medical claims.

Administration Team provides administrative services in support of the Incident Commander and Country Manager as appropriate.

PART B – ACTION PLAN

5 ACTIONS

5.1 PERSON SIGHTING SPILL

Any person discovering an oil leak/spill should:

- Proceed up-wind of leak.
- Notify the PIC giving a concise report stating:
  - Location of leak
  - Extent and size of leak
  - Any action taken
- Seek assistance from Area Supervisor/Operator.
- Do not re-enter or allow other persons into affected area.
- If safe to do so use the on site spill response kit.

5.2 ON THE RIG SITE

5.2.1 Rig Superintendent (for rig incidents)

SMALL SCALE SPILLAGE

- STOP or REDUCE further spillage of oil.
- If there is a threat of fire suspend all response operations until the threat is eliminated.
- Account for personnel in the area of spill and ensure their safety. Report incident to TR Drilling Supervisor/Company Man.
- Assess the spill situation (see Section 7: Form 01 Pollution Report POLREP):
  - determine the source of the spill, if possible
  - determine the type of oil spilled
  - estimate the spill volume
  - estimate the direction and speed of the spill movement if the spill has escaped containment (e.g. fuel tank bund/location drainage bund and is moving off site).
- Assess weather conditions. Provide Drilling Supervisor with regular status reports.

WELL RELATED INCIDENT

Any rig incident related to a well control issue will always take primacy and the rig SERT will lead, any oil spill response will be secondary and lead by the OSCT.

5.2.2 Timor Resources Drilling Supervisor - Company Man

- The Drilling Supervisor shall immediately notify the TR Operations Manager (Incident Commander) and Oil Spill Response Team Leader (On Scene Commander) when a rig spillage moves off site i.e. outside the site drainage bund.
- Immediate notification shall be followed by a written notification as detailed in Section 7 - Form 02 Preliminary Spill Assessment.
- It is important to remember that an effective response strategy will require an on-going assessment of environmental and spill conditions. Once the initial spill assessment has been made, additional monitoring may be initiated by the IC and the spill assessment will be continuously updated.

5.3 TIMOR RESOURCES HSE OFFICER - ON SCENE COMMANDER

1. Mobilise Forward Command Post (FCP).
2. If the threat of fire or explosion exists, suspend all response operations until eliminated.
3. Account for personnel and public in the area of spill and ensure their safety.
4. Assess the spill situation
    - determine the source of the spill, if possible
    - determine the type of oil spilled
    - estimate the spill volume
    - estimate the direction and speed of the slick's movement (Section 7 - Form 02 Preliminary Spill Assessment).
5. Assess weather conditions.
6. Determine whether it is safe to activate the recommended response strategies. This decision will be based on the assessment of personnel safety considerations, the status of the source, and the ability of the response equipment to function effectively.
7. Make preliminary assessment of the resources at risk.
8. Initiate surveillance of oil spill.
9. Provide the IM with regular status reports.
10. Co-ordinate response operations with the SERT, as required.
11. Maintain a log of events, decisions, contacts.

5.4 TIMOR RESOURCES OPERATIONS MANAGER - INCIDENT COMMANDER

1. IC receives notification of spill and decides on appropriate level of immediate response.
2. Alert General Manager Exploration.
3. Confirm if SERT(s) have been activated as appropriate.
4. Confirm validity and details of first contact information.
5. Liaise with rig SERT or mobilise SERT for non-drilling related spillages.
6. Ensure following information has been received as a minimum:
    - location of spill
    - type of oil spilt
    - category of spill
    - direction of movement
    - response
7. Take immediate remedial actions to restrict or stop the spread of the problem.
8. Direct operations resources and activities as the situation demands
9. Formulate and follow tactical plans to deal successfully with the spill
10. Decide on SERT support requirements.
11. Inform and maintain communication with General Manager and local Government agencies
12. Ensure a chronological record of events is maintained - Administration Function i.e. logkeeper

5.5 INCIDENT RESPONSE ORGANISATION - DILI

1. General Manager Exploration - assess situation from information received and considers if IMT mobilisation needed. If IMT mobilised delegated Incident Manager.
2. Consider and determine response strategy with the On-Scene Commander
3. Notify CEO
4. HSE Officer Mobilise additional clean-up resources if needed
5. Contact Specialist Environmental Advisors as necessary
6. Provide advice on clean-up strategies, hazards to clean-up personnel, collected oil disposal, etc.
7. Liaise with On-Scene Commander
8. Manage the response as the situation develops
9. Maintain a log of events

5.6 INCIDENT MANAGEMENT TEAM

1. General Manager Exploration assesses situation with IMT
2. Consider & determine response strategy
3. Provide advice to OSC
4. Mobilise/authorise additional resources
5. Contact CEO, Partners and ANPM
6. Handle media enquiries with approval from CEO/ANPM
7. Maintain a log of events

6 COMMUNICATIONS AND EMERGENCY CONTACT DETAILS

6.1 COMMUNICATIONS

6.1.1 Rig

At least one landline telephone and one facsimile should be readily available at all times to ensure that the personnel conducting the operation have access to outside authorities. Records of all communications (telephone conversations, emails, faxes and file notes) must be entered in the log book in chronological order.

6.1.2 Rig/Logistics Warehouse Haemano

The project has VHF base station at Haemano camp. There will also be numerous hand-held portable VHF units for use by OSRT staff.

6.2 EMERGENCY CONTACT LIST

6.2.1 Rig Superintendent (SERT)

Contact Point	TO BE COMPLETED
Title	Rig Based Incidents SERT Team Leader
Department/Organization	Eastern Drilling
Phone	Ph: +607 XX YYYY
Email	
Address	

6.2.2 Drilling Supervisor/Company Man (SERT)

Contact Point	TO BE COMPLETED
Title	Rig Based Incidents SERT Member
Department/Organization	Timor Resources Drilling Department
Phone	Ph: +607 XX YYYY Fax: +607 XX YYYY
Email	
Address	

6.2.3 TR Operations Manager - Incident Commander (IC)

Contact Point	Luis Pereira
Title	Oil Spill Incidents - Incident Commander
Department/Organization	Timor Resources Operations Department
Phone	Ph: +670 7704 2531
Email	luis.pereira@timorresources.com.au
Address	**TO BE COMPLETED**

6.2.4 TR HSE Officer - On Scene Commander

Contact Point	TO BE COMPLETED
Title	Oil Spill Incidents On-Scene Commander
Department/Organization	Timor Resources HSE Department
Phone	Ph: +607 XX YYYY
Email	
Address	

6.2.5 TR IMT - Dili

Contact Point	**Jan Hulse**
Title	General Manager Exploration
Department/Organization	Timor Resources
Phone	Ph: +670 75 942 489
Email	Jan.Hulse@TimorResources.com.au
Address	Timor Plaza CBD 3 Suite # 303 Comoro Dili Timor -Leste

6.2.6 ANPM

Contact Point	**Verawati Corte Real de Oliveira**
Title	HSE Director
Department/Organization	HSE Directorate Autoridade Nacional do Petróleo e Minerais (ANPM)
Phone	Ph: +670 73099995 or +670 73099996 Mobile: + 670 7732 7634
Email	verawati.deoliveira@anpm.tl
Address	Autoridade Nacional do Petróleo e Minerais (ANPM) Edifício do Ministério das Finanças, Pisos 6 e 7 Apartado 113 Aitarak Laran Díli, Timor-Leste

PART C – APPENDICES

7 FORMS

FORM 01	**POLLUTION REPORT (POLREP)**	
INITIAL REPORT		
NAME OF PERSON REPORTING:	☐ Individual ☐ Rig Operations ☐ Other Operations: Logistics/Transport/Warehouse	
DATE	TIME:	
LOCATION: REFERENCE POINT:	LAT.	LONG.
PROBABLE SOURCE OF OIL SPILL:		
FOLLOW-UP REPORT		
NAME OF PERSON REPORTING:		
LOCATION OF INCIDENT	LAT.	LONG.
SOURCE OF OIL SPILL		
CAUSE OF OIL SPILL:		
DATE/TIME OF REPORT:		
CONTACTS- PHONE: FAX: EMAIL:		
OIL TYPE OR DESCRIPTION:		
SPILL HAS BEEN CONFIRMED: YES / NO		
NATURE AND EXTENT OF POLLUTION:	☐ CONTAINED ON SITE	☐ OFF SITE
MOVEMENT OF SPILL:		
LEAKAGE STOPPED: YES/NO	WEATHER/WATERCOURSE TYPE: GULLY-STREAM-RIVER-POND-LAKE/RIVER FLOW SPEED:	
SAMPLE TAKEN: YES/NO	BY WHOM:	
PHOTOGRAPHS TAKEN: YES/NO	BY WHOM:	
CONTACTS DETAILS: PHONE: FAX: EMAIL:		
ACTION(S) TAKEN:		
DETAILS OF EQUIPMENT USE:		
ADDITIONAL INFORMATION:		

Form 02	**SPILL ASSESSMENT & REPORT FORM**				
REPORT TO:		DATE:			
FROM:		TIME:			
SPILL INFORMATION					
TIME OF SPILL: AM/PM		QUANTITY OF OIL:			
LOCATION OF SPILL:		QUANTITY IN WATER:			
REASON/CAUSE OF SPILL:		TYPE OF OIL:			
		DESCRIPTION OF SPILLS/SLICKS			
		COLOUR: LENGTH:			
		WIDTH: OTHER:			
ENVIRONMENTAL CONDITIONS					
WIND SPEED:		WIND DIRECTION:			
RIVER STATE:		CURRENT SPEED (Est):			
ACTION TAKEN TO CONTROL SPILL		**LEVEL OF RESPONSE (Tier)** **(E= *Emergency &Immediate Action Required*)**			
		Site/Rig Request:	**E**☐	**1** ☐	**2** ☐	**3** ☐
		IC Confirmed:	**E**☐	**1** ☐	**2** ☐	**3** ☐
		GM Exploration Confirmed:	**E**☐	**1** ☐	**2** ☐	**3** ☐
ENVIRONMENTAL/SOCIAL/SAFETY HAZARDS					
SPECIFIC REQUESTS/COMMENTS					

Form 03	**PRELIMINARY SHORELINE OILING ASSESSMENT**
LOCATION:	REPORTING DETAILS:
MAP (No):	ASSESSMENT BY (Name):
MAP REFERENCE:	POSITION:
Name of Shoreline or Location Description:	DATE: TIME:
	REPORT TO (Name):
	POSITION:
	DATE REC'D: TIME:

REASON FOR ASSESSMENT
(Tick as appropriate)

☐ Public Report	☐ OSCT Request	☐ Known Spill
☐ Exercise Only	☐ Other	

OIL DISTRIBUTION & CHARACTER

Shoreline Type	
Percentage Oil Cover	
Oil Band Width	
Length of shoreline Oiled	
Depth of Oiling	
Surface Oil Thickness	
Appearance	
Debris Present	
Oiled Debris	

DIAGRAM/NOTES

8 TIER 1 – OIL SPILL RESPONSE EQUIPMENT

8.1 FACILITY OIL RESPONSE KIT (MINIMUM REQUIREMENT)

6 Absorbent Boom (12cm x 3m)
100 Absorbent Pads (40cm x 50cm)
4 Absorbent Pillows (40cm x 50cm)
2 Oil absorbent poly-roll
2 Pairs Nitrile Gloves
2 Pair Goggles
1 Jar of Plug n Dike
10 Disposable Bags w\Ties
1 Roll barrier/exclusion tape (yellow/black)

8.2 LOCAL/NATIONAL LABOUR AND HEAVY EQUIPMENT/CIVILS CONTRACTORS

TO BE COMPLETED

8.3 OIL SPILL RESPONSE LIMITED SINGAPORE

In the event of an incident, OSRL can be contacted by telephone: +65 6266 2312. Types of onshore response equipment is shown here:

Inshore Booms / Shoreline Recovery Devices

Application

We have a range of booms that can be used for offshore, near shore and shoreline responses. Due to differing operational conditions, a variety of boom types are held in our stockpile.

Offshore booms are larger and made from a heavier duty material. These are supplied on a reel to ease deployment, which can then be mounted on the deck of a suitable vessel.

The majority of the shoreline booms are air-inflatable and manufactured from polyurethane nylon fabric.

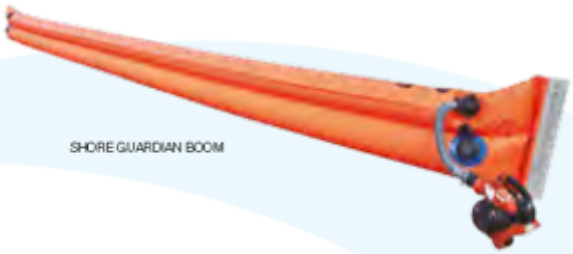
We have a large range of recovery devices that are used on light, medium and heavy oil. Oleophilic, weir and mechanical skimmers provide the ability to recover a range of oil types in a variety of environments.

The most important factor is the viscosity of the spilt oil and how it might change over time. In predictable situations where the type of oil handled is known, such as at marine terminals and refineries, a specialised skimmer most suited to that particular oil can be identified in advance.

Skimmers can be used in conjunction with containment booms where slick thickness is increased to maximise recovery efficiency. When choosing a skimmer type, identify first the oil viscosity, its propensity to emulsify, and the expected operational conditions. Our Duty Manager will be able to assist and to assess the conditions, to select the most appropriate equipment package.

EQUIPMENT	LOGISTICAL REQUIREMENT	TECHNICAL COMPLEXITY	MANPOWER	INLAND	SHORELINE	OFFSHORE
Sea Sentinel boom	2	1	2	✓	✓	✗
Shore Guardian boom	2	1	2	✓	✓	✗
Nearshore boom 20"	2	1	2	✓	✓	✗
Troil boom	2	1	2	✓	✓	✗
Sea curtain	2	1	2	✓	✓	✗
Boom vane	2	1	2	✓	✓	✗
Supermax boom	2	1	2	✓	✓	✗
OLEOPHILIC:						
Advancing brush skimmer	3	3	2	✓	✓	✓
Mop skimmer	1	1	1	✓	✓	✓
Drum/Brush	1	1	1	✓	✓	✗
Disc skimmer (capacity 7 ton/hr)	1	1	1	✓	✓	✗
Disc skimmer (capacity 12 ton/hr)	1	1	1	✓	✓	✗
Disc skimmer (capacity 20 ton/hr)	1	1	1	✗	✓	✓
Drum skimmer	1	1	1	✓	✓	✗
Toothed disc skimmer	2	2	1	✗	✓	✓
VACUUM:						
Mini vacuum skimmer	1	1	1	✓	✓	✗
Vacuum skimmer	1	1	1	✓	✓	✗
Tracked vacuum system	2	1	1	✓	✓	✗

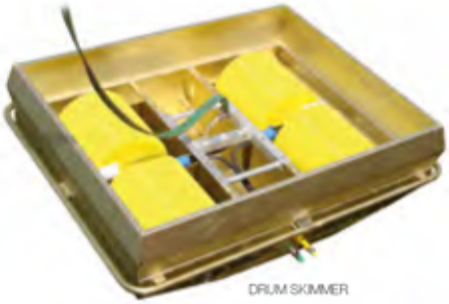
SEA SENTINEL BOOM



SHORE GUARDIAN BOOM

TROIL BOOM

BOOM VANE



DRUM SKIMMER

ADVANCING BRUSH SKIMMER

DISC SKIMMER
Disc skimmers are available in various capacities for inshore/harbour/river operating areas

MOP SKIMMER

TRACKED VACUUM SYSTEM

TOOTHED DISC SKIMMER

Oiled Wildlife Response

Application

We hold a range of specialist wildlife response equipment, which can be used to assist with the rescue, treatment and rehabilitation of wildlife that is affected by oil spill incidents. This equipment, which was selected by professional wildlife responders, can be easily shipped together with other response equipment and utilised by trained wildlife response experts.

OILED WILDLIFE RESPONSE PALLETS

EQUIPMENT	LOGISTICAL REQUIREMENT	TECHNICAL COMPLEXITY	MANPOWER	INLAND	SHORELINE	OFFSHORE
Wildlife response pallets	2	3	3	✓	✓	✗

Temporary Storage Equipment

Application

We have several options for temporary storage. If recovery storage vessels are not available during offshore containment, the recovered oil can be temporarily stored in inflatable barges which come in two sizes: 25m³ or 50m³.

Waste containment tanks are also available with a capacity of 9m³. These tanks are used together with a heating system that is capable of heating high pour point oil during the offshore and shoreline recovery.

Alternatively we can provide inflatable oil storage bags with storage capacities of 100m³, 200m³, and 500m³.

Temporary portable storage tanks are available in two sizes: 2,000 gallons and 1,100 gallons.

WASTE CONTAINMENT TANK

PORTABLE FRAME TANK

FLOATING STORAGE TANK

FLOATING COLLAR TANK

EQUIPMENT	LOGISTICAL REQUIREMENT	TECHNICAL COMPLEXITY	MANPOWER	INLAND	SHORELINE	OFFSHORE
Inflatable barge	2	1	1	✗	✗	✓
Oil bags	3	2	2	✗	✗	✓
Floating storage tank	3	2	2	✗	✗	✓
Portable frame tank	1	1	1	✓	✓	✗
Floating collar tank	2	1	1	✓	✓	✗
Waste containment tank	2	1	1	✓	✓	✓

9 WASTE MANAGEMENT

9.1 WASTE MANAGEMENT STRATEGY

Oil spill clean-up operations, particularly on shore, may result in substantial quantities of oil and oily mixture which must inevitably be dealt with.

The objective of the spill response effort is to remove oil from impacted areas as soon as possible and treat, recycle, or dispose of recovered oily material in the most efficient and environmentally feasible manner. Waste disposal includes in-situ burning, landfill disposal, stabilisation for use in land reclamation or road foundations and destruction through biological processes.

The disposal option chosen will depend upon the amount and type of oil and debris, the location of the spill, environmental and legal considerations, and the likely costs involved. In the case of large spills, it may be necessary to store collected material for some time before it can be dealt with.

To manage the disposal of oily waste material, TR will:

- Establish a contract with a recognised waste management company to manage collection, transport, containment, temporary storage and disposal.
- Appoint a suitably qualified waste management company or person to oversee all waste generation, collection, transport, containment, temporary storage and disposal, and to advise the ANPM accordingly.
- Adopt policies and practices during the spill response to minimise the amount of oily waste material generated and collected (e.g. shoreline clean-up techniques should minimise the amount material collected).
- Conduct site inspections prior to use and when the site has been rehabilitated.
- Sign off each waste site in consultation with a representative of ANPM.

9.2 PROCEDURE FOR MANAGEMENT OF RECOVERED OILY WASTE

During the oil spill response TR will:

- Where possible, temporary storage facilities should be operated under a system of controlled segregation and inventory (e.g. liquids and solids separated).
- Recovered oil and associated matter that is contained in temporary storage should remain in temporary storage until the appropriate recycling or disposal option has been decided.
- Recycle or dispose of the recovered oil in accordance with consents.

9.3 TYPE AND NATURE OF THE OIL AND OILY DEBRIS

- As a general rule oils that behave as non-persistent oils, such as expected in this programme, will not require collection and disposal as they will dissipate naturally, quickly. However, crude oil depending on its characteristics as discussed in Section 2.5, may give require treatment and disposal. If the oil can be collected soon after being spilled, it is likely to be fluid and relatively free of contamination. In most cases, however, collected oil will be viscous due to weathering.

- Each may require a different method of treatment and disposal. The type and volume of oily waste generated will depend on a number of factors, such as:
  - volume and type of oil spilled
  - environmental conditions (weather, sea state, etc)
  - characteristics of the sites impacted
  - clean up or recovery technique adopted.
- Oil stranded on the shore will normally be associated with quantities of solids and it is often difficult to separate the oil in a form suitable for recycling. Three main types of waste may be collected from the shore:
  - oil mixed with sand, pebbles, cobbles
  - oil mixed with wood, weed or garbage
  - solid tarballs.

9.4 STORAGE

The large volumes of material requiring disposal following clean-up can often present major logistic problems in handling and transportation. It is usually necessary therefore to store the material temporarily to provide a buffer between collection and final disposal and to allow time to select the appropriate disposal method. In remote areas transportation may not be feasible thus in-situ burning should be considered.

As far as possible, bulk oil should be stored separately from oily debris so that different methods of treatment and disposal can be followed. Provided the oil is pumpable at ambient temperatures, it can be stored in enclosed tanks. If special purpose containers are not available, bulk oil from shorelines can often be held within compacted earth walls or in simple storage pits approximately 2 m wide and 1.5 m deep are preferable. During the wet season, allowance should be made for this when filling the pits, to ensure that oil does not flow over the top causing further contamination.

9.5 LOGISTIC TRANSPORT

Transport of material to a disposal site can become a major cost item. It is therefore beneficial to reduce the amount of material to be transported by separating oil from water and sand during temporary storage.

9.6 RECOVERY AND TREATMENT

Under some circumstances, it may be possible to recover the oil for eventual processing or blending with fuel oils or for use in road materials. This should always be the first option to consider. A possible recipient for processing or blending is the Betano power stations. However, the quality of the material must be good since the plants can only operate with feedstocks meeting a narrow oil specification.

9.7 DISPOSAL

Plastic bags should be regarded as a means of transporting oil material rather than storage, since they tend to deteriorate under the effect of sunlight, releasing their contents. It should also be borne in mind that if the content is ultimately to be treated in some way prior to disposal, it will usually be

necessary to empty the bags and dispose of them separately. Wherever dug, pits should be filled in after complete removal of the oil and, as far as possible, the area restored to its original state.

Perhaps the most common disposal route adopted, when recovery of oil is impractical, is dumping in designated landfill sites. The co-disposal of oil and domestic waste is often an acceptable method even though degradation of the oil is likely to be slow due to the lack of oxygen. However, oil appears to remain firmly absorbed by all types of domestic waste with little tendency to leach out.

9.7.1 Stabilisation

An approach that is sometimes applicable to oily sand, provided it does not contain large amounts of debris, is to bind the material with inorganic substance such a quicklime (calcium oxide). This forms an inert product that does not allow the oil to leach out. The stabilised material can be disposed of under less stringent conditions than unstabilised oily sand and can also be used for land reclamation and road construction where there is not a requirement for high load-bearing properties. The suitability of the techniques is dependent upon a plentiful supply of stabilising material close to the spill location. Quicklime can usually be obtained from cement works.

9.7.2 In-Situ Burning

In-situ burning is recognized as a viable alternative for cleaning up oil spills on land and water. It can rapidly reduce the volume of spilled oil and eliminate the need to collect, store, transport, and dispose of recovered oil, and can also shorten the response time to a spill, thus reducing the chances that the spill will spread on the water surface or further into land (Michel 2018).

The intentional ignition of spilled oil on land or wetlands as part of an oil spill response plan is an accepted response tactic to reduce the impacts of oil in these habitats. Burning is often considered when access is limited, to reduce the amount of waste for transport and disposal, when there is a need to quickly remove the oil before it spreads and can affect sensitive resources or when other methods are likely to cause significant adverse impacts to the habitat. Burning is best conducted in habitats that are unvegetated or have grassy vegetation; burning of upland forests, swamps and mangroves is not recommended. It is preferred to have a water layer over the soil or, at a minimum, moist soils, to reduce thermal impacts to roots and tubers. Most crude oils and heavy refined products leave a burn residue that must be removed to reduce impacts to wildlife and speed recovery. Light crude oils and refined products will not leave a burn residue. However, burning will not remove oil that has penetrated into the soils, and these kinds of unburned residues must be removed after the burn.

Burned habitats often recover within 1–2 growing seasons, with exceptions for fire-intolerant vegetation, when the oil was toxic and affected the vegetation before the burn was conducted, very hot burns that damaged the roots, oil that penetrated deep into the soils or for vegetation that was flooded for long periods after the burn (Michel 2018).

9.7.3 Biodegradation

Oil and oily wastes can sometimes be broken down using biological processes. Biodegradation of oil by microorganisms can only take place at an oil-water interface, so that on land the oil must be mixed with a moist substrate. The rate of degradation depends upon temperature and availability of oxygen and appropriate nutrients, containing nitrogen and phosphorus. Some oil components such as resins and asphaltenes are resistant to degradation and, even after prolonged periods, up to 20% of the original material may be left unaffected.

There are a number of products on the market which contain oil degrading bacteria and other microorganisms. Some are intended for direct application to oil on shoreline together with nutrients to support the degradation process. Attempts to use these products in actual spills have met with very little success mainly due to the oil concentrations being too high and the difficulty in maintaining the required nutrient levels on a tidal shoreline. A more recent development which appears promising involves the addition of oil soluble nutrients to accelerate the process of natural degradation. These nutrients are more likely to remain at the oil-water interface rather than become dissolved in the sea.

A more effective approach is to distribute the oil and debris on land set aside for the purpose a technique sometimes referred to as land farming. It may take as long as three years before the bulk of the oil is broken down, although degradation rates can often be increased by regular aeration of the soil and by the addition of fertilisers, such as urea and ammonium phosphate. The method is only likely to be applicable to relatively small spills because of the amount of land required (0.25 hectares for 100 tonnes of oil).

10 CLAIMS, COMPENSATION & INTERNATIONAL REGULATORY FRAMEWORK

10.1 CLAIMS AND COMPENSATION

10.1.1 General Guidance

The "*polluter-pays-principle*" is enshrined in Decree Law No.26/2012 -Environmental General Law which stipulates that "*the cost of measures to prevent, combat, reduce and compensate activities that can have a negative impact on the state of the environment shall be borne by the polluter*". When an oil spill occurs claims for clean-up costs and damages can be brought against the person responsible for the incident and his insurer. Polluter shall be responsible for compensating for damages and losses caused by oil spill incidents. Timor Resources carries pollution insurance - Seepage and Pollution, Cleanup and Contamination.

10.1.2 Claim Process

Claims may arise from damage, loss and costs including:

- Environmental and resources destruction
- Costs of surveying and evaluating to determine damages and losses
- Human loss and health impact
- Public and personal assets
- Costs involving mobilisation of oil spill response equipment
- Facilities and manpower
- Handling of claims and compensation procedures.

Damage assessment should be carried out diligently to provide definitive evidence, thus professional consultancy may be required. Depending on the amount and nature of the claim, the claims report should be broken down into different categories, such as:

- Expense for preventive measures taken and clean up
- Replacement and repair costs
- Economic loss.

Each claim should contain the following particulars:

- The name and address of the claimant and his representative, if any
- The date, the place and specific details relating to the claim
- The type of oil, the clean-up measures taken, and the kind of pollution damage as well as the place where it was experienced
- The amount of the claim.

The Finance and Administration Section provides financial controls for the response, supports contracting and procurement, tracks incident costs, manages claims, and accounts for reimbursements. Therefore, the Section provides tracking of all expenditures and recording of costs for response personnel, equipment and assets. Incidents often involve claims for damage to property, business disruption, or other issues such as health or medical claims.

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12 EXAMPLE DRAINAGE MAPS AND RESPONSE LAYOUT FOR WELL LOCATIONS

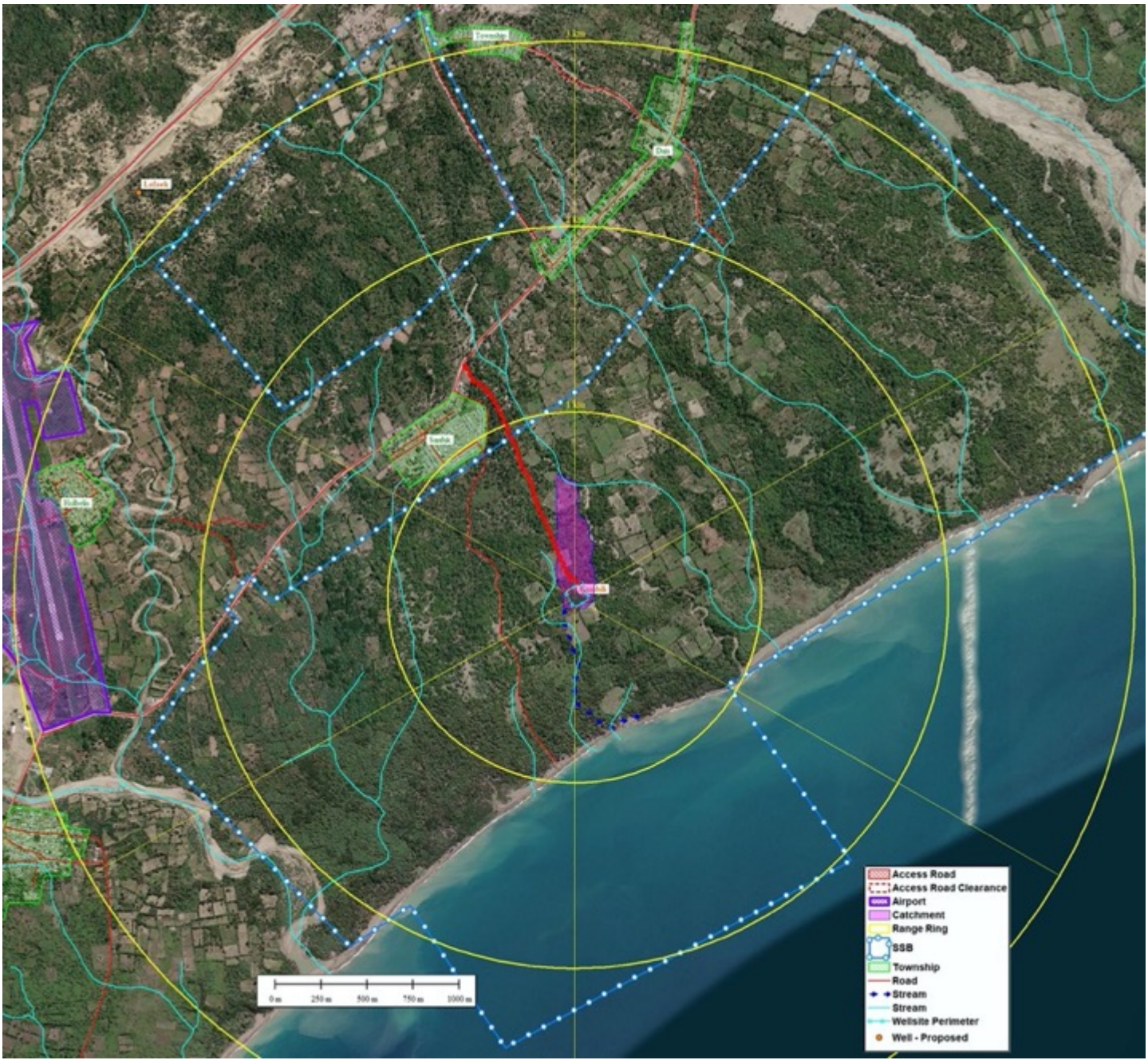

Figure 12-1: Kumbili Well Site Drainage

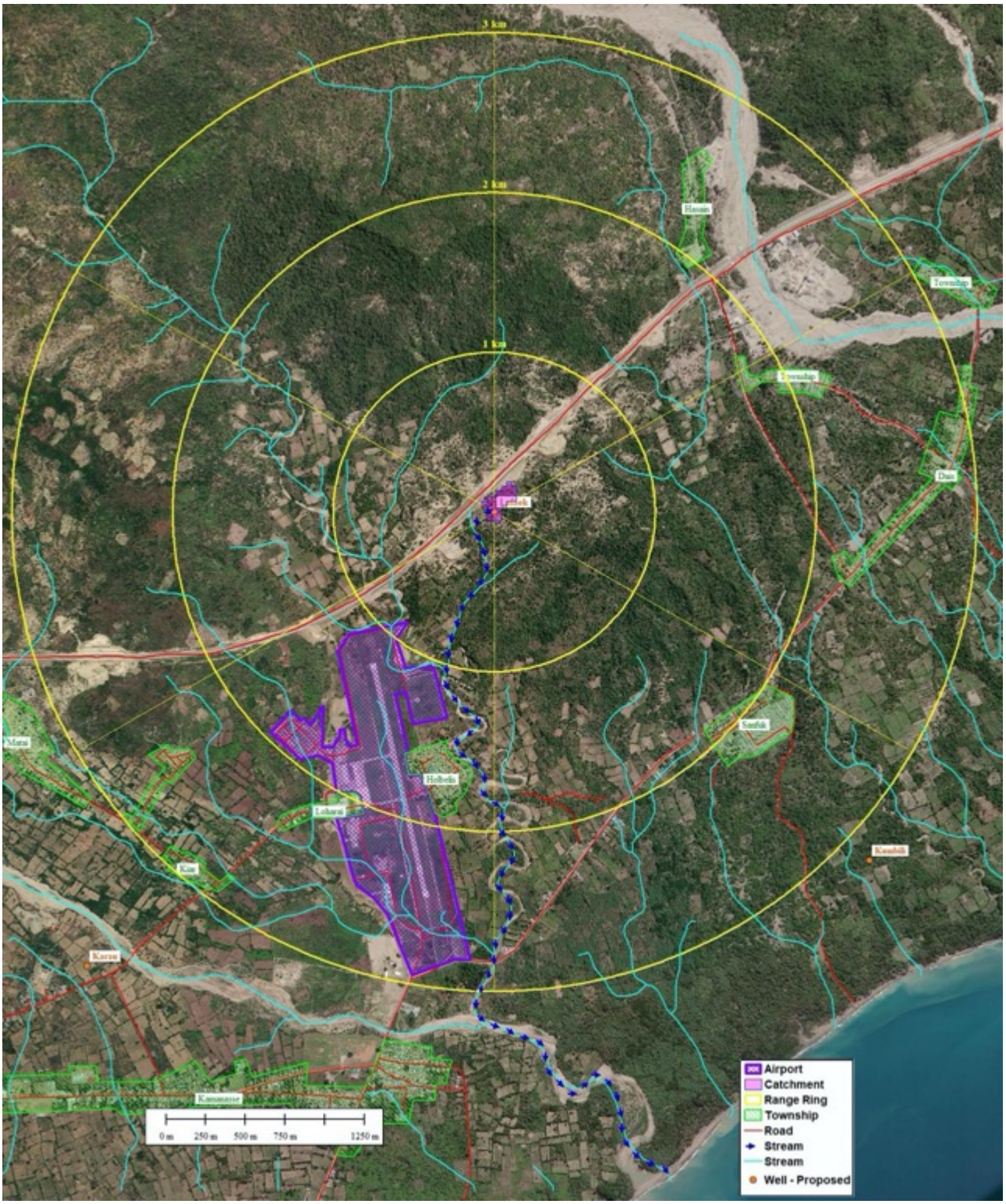

Figure 12-2: Lafaek Well Site Drainage

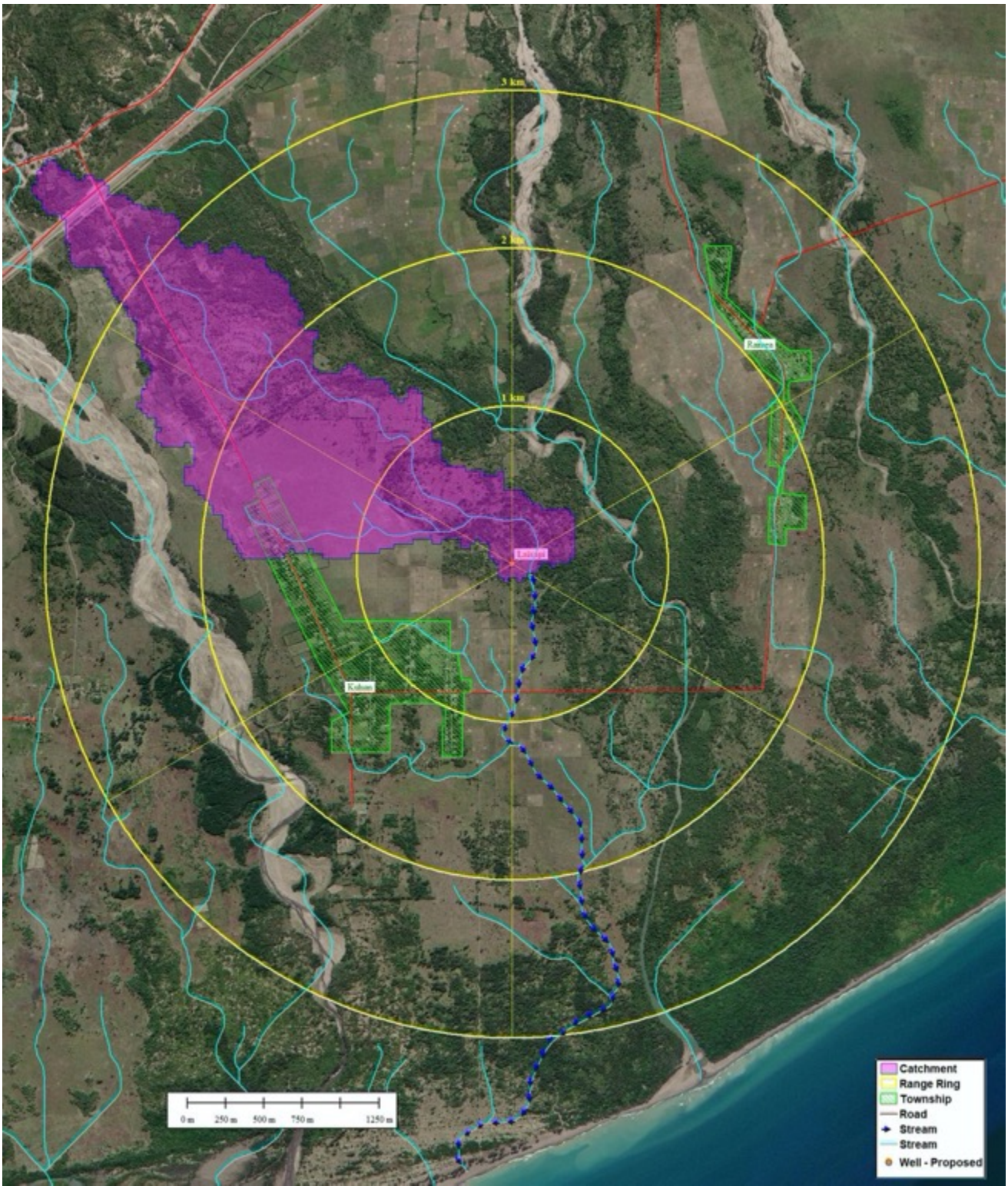

Figure 12-3: Laisapi Well Site Drainage

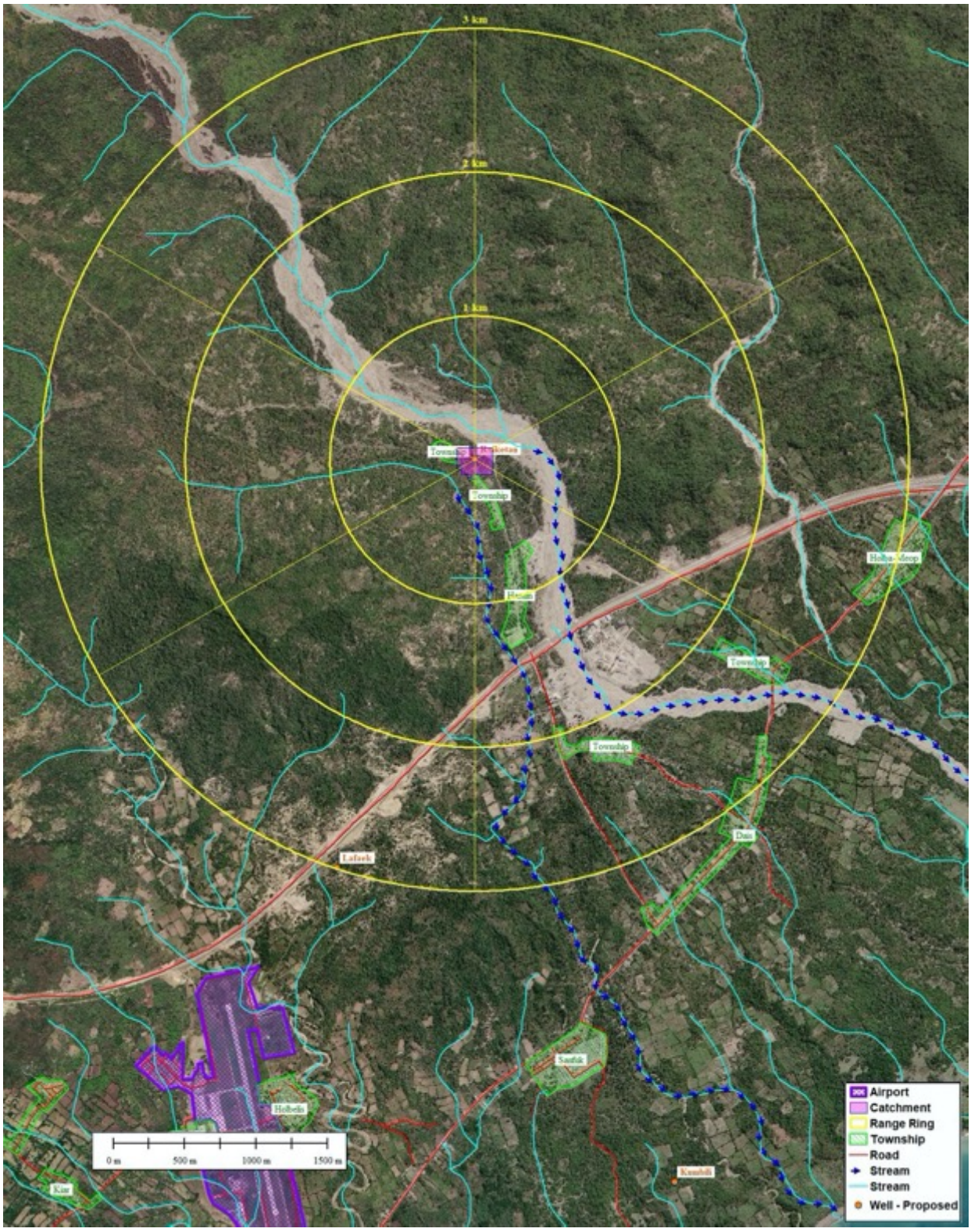

Figure 12-4: Raiketan Well Site Drainage

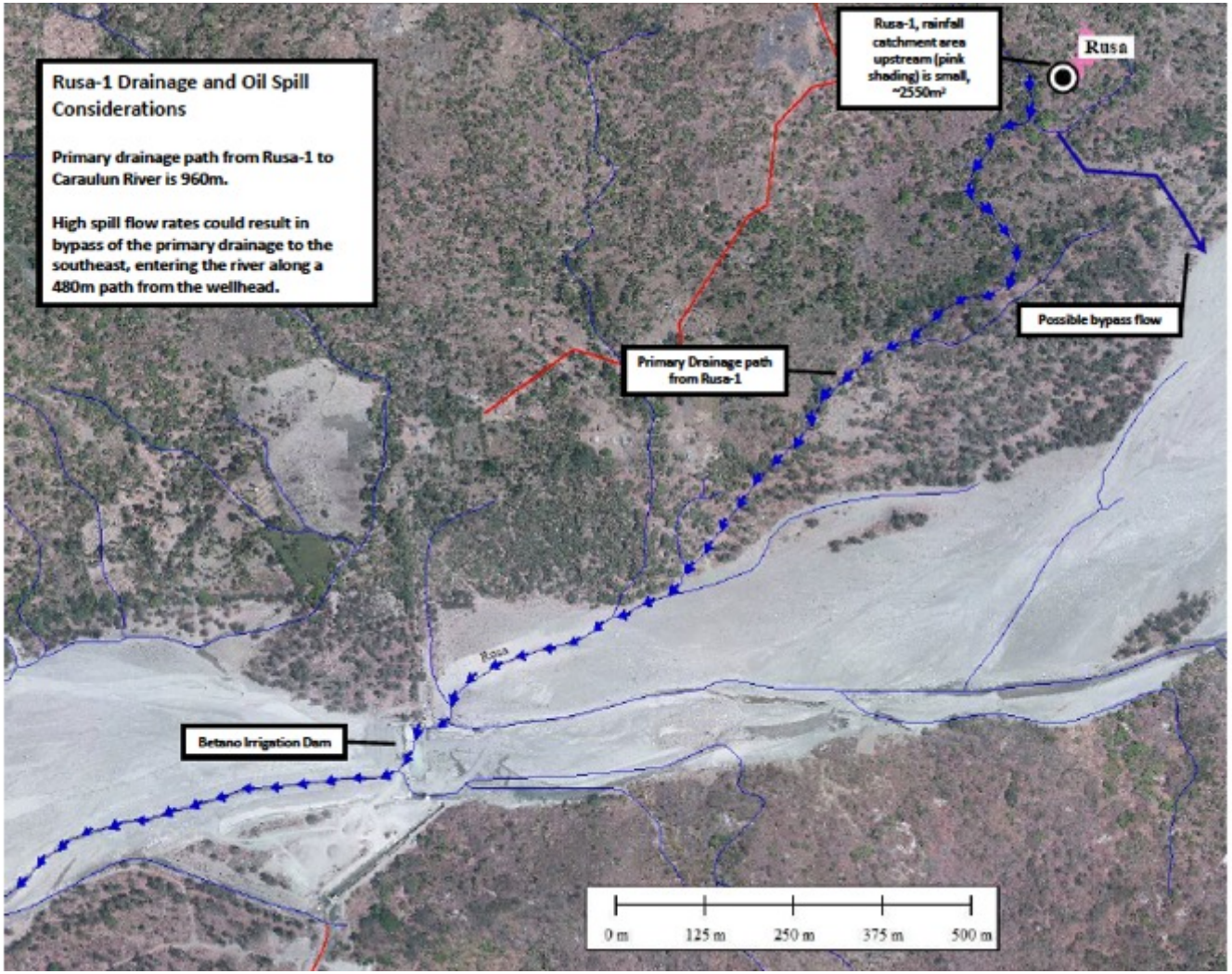

Figure 12-5: Example Well Site Drainage Diagram

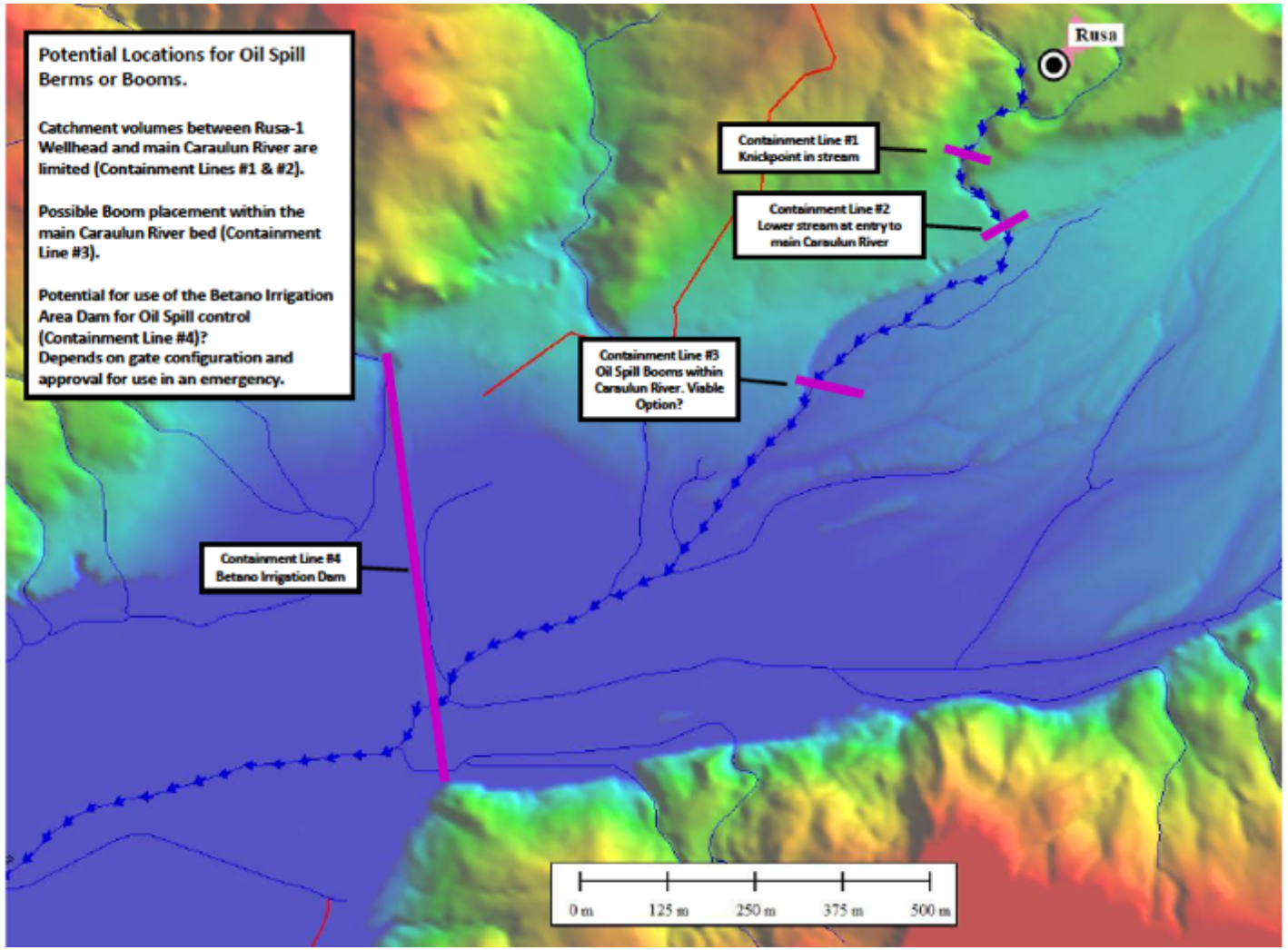

Figure 12-6: Example Well Site with Countermeasure Options

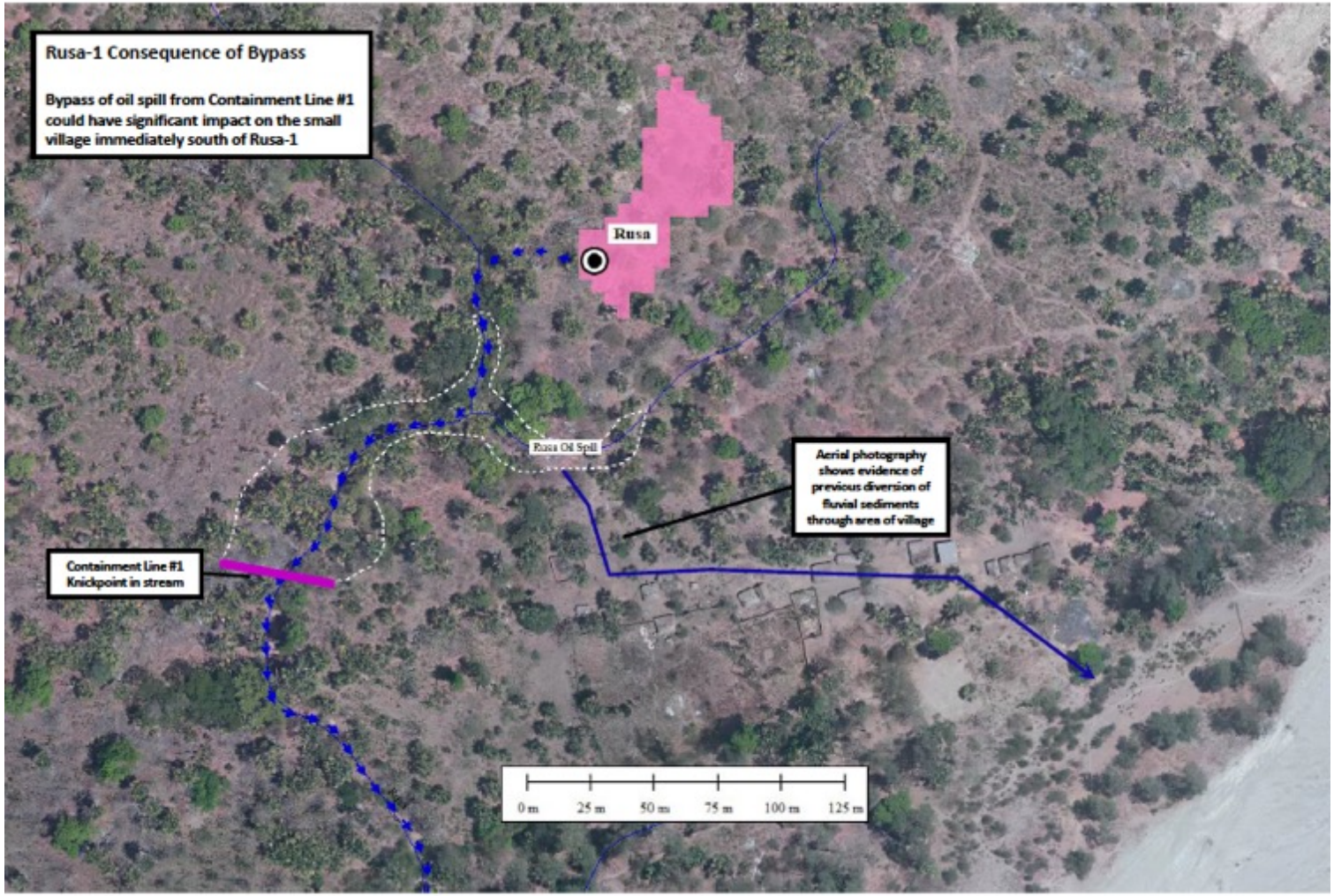

Figure 12-7: Example Well Site with Countermeasure and Catchment

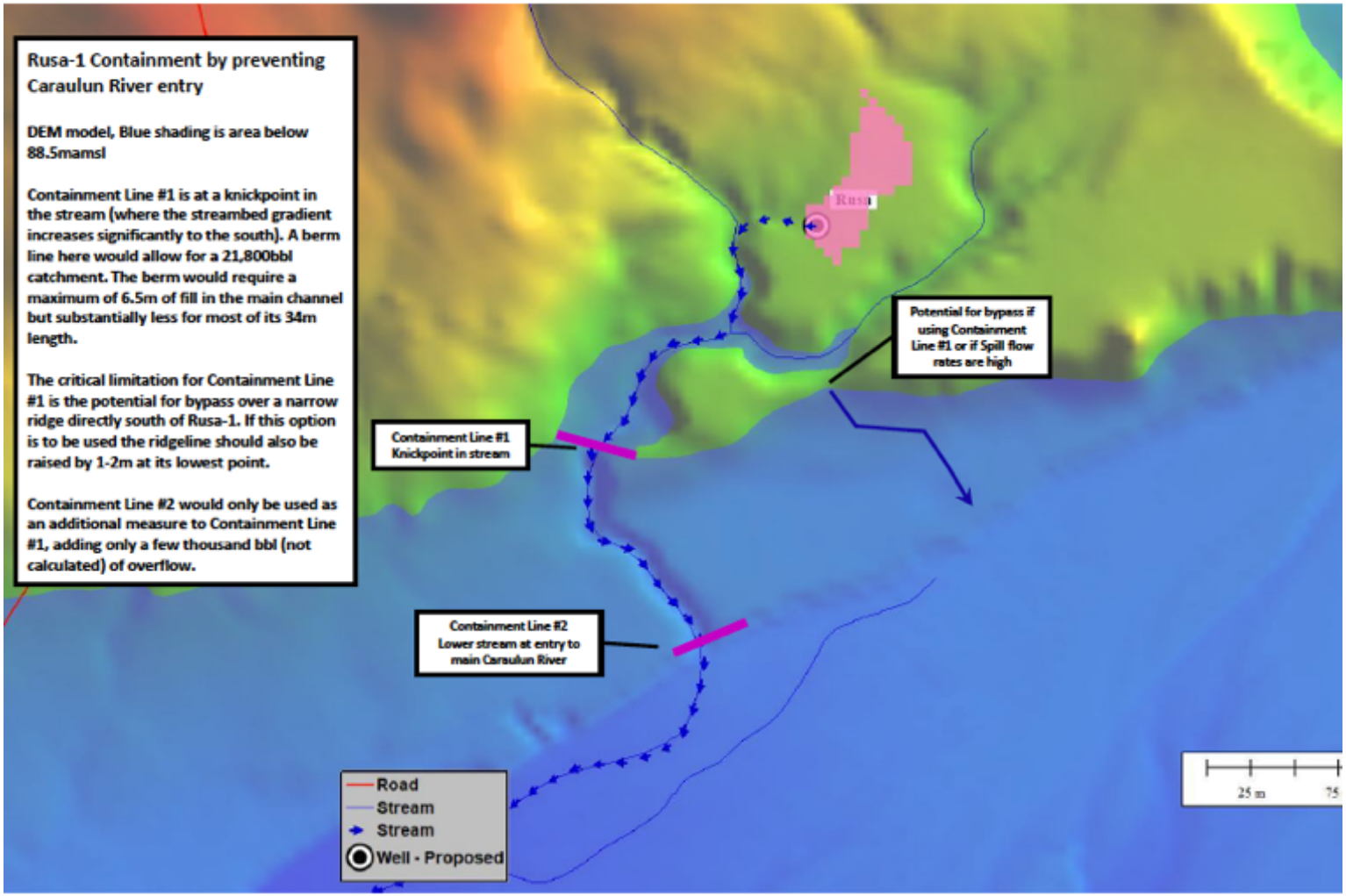

Figure 12-8: Example Well Site Catchment Construction Requirements