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# MARSDEN POINT CRUDE SHIPPING PROJECT LANDSCAPE ASSESSMENT (FINAL)



PREPARED FOR REFINING NEW ZEALAND

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## 1.0 INTRODUCTION

This report addresses proposed alterations to the shipping channel at Marsden Point – including:

- Realignment of the current channel;
- Deepening of the channel to accommodate more heavily laden tankers than those currently able to unload at Marsden Point;
- Extraction of harbour floor material to accommodate this realignment and deepening of the main navigation channel;
- Disposal of that material within parts of Bream Bay;
- Reconfiguration of some channel buoys in the vicinity of Busby Head, Home Point and Taurikura Bay at the entrance to Whangarei Harbour;
- The addition of a new beacon and navigation lights within the outer harbour; and
- Installation of two new channel marker buoys.

These modifications and developments are evaluated in terms of their visual, landscape, amenity and natural character effects, and are assessed in the context of both existing activities within Whangarei Harbour and Bream Bay, as well as against relevant statutory instruments – including sections 6 and 7 of the Resource Management Act, Policies 13 and 15 of the New Zealand Coastal Policy Statement and relevant provisions of the Northland Regional Coastal Plan.

In addition, this report addresses the temporary effects associated with dredging operations in the general vicinity of a series of bays that contain settlements, popular local beaches and reserves – stretching from Darch Point and Reotahi to Urquharts Bay – and disposal of harbour floor material within Bream Head.

## 2.0 PROJECT DESCRIPTION

The proposed deepening and realignment of the harbour channel to and from the Marsden Point Refinery is designed to accommodate more efficient use of the terminal and, in particular, the greater use of more fully laden, Suezmax type vessels carrying crude oil. A number of options for navigation channels have been subject to evaluation against a broad range of criteria before selection of the preferred route. The relevant criteria included basic navigation requirements, evaluation of wave and tidal conditions, effects on the sea floor and aquatic environment, effects on those living and recreating within Whangarei Harbour's outer northern bays, effects on recreational use of the harbour and Bream Bay, and even the visual effects derived from the relocation of navigational aids – notably lighting and buoys. A similar exercise has been undertaken to identify preferred disposal sites for both capital and maintenance dredging activities.

Option 4.2 (Rev. M) was ultimately chosen as the preferred navigation channel for Marsden Point (see the map on p.4). It extends for 8km between the centre of Bream Bay and Marsden Point, requiring the removal of some 3.7 million m<sup>3</sup> of sand from the harbour entrance's sea floor. Tonkin & Taylor's AEE report (*Crude Shipping Project – Coastal Processes Assessment*) dated February 2017, summarises the proposed extraction and disposal processes as follows in the Executive Summary:

### ***Proposed channel***

*The preferred channel alignment has evolved through the design process taking into account navigational safety, potential changes to the hydrodynamic system and environmental considerations and will provide for unrestricted design vessel access except in extreme wave climate or swell events (i.e. accessible for 98% of the time).*

*The proposed channel depths vary from 19.0 m below Chart Datum (CD) at the entrance to the channel, to 16.5 m below CD at the berth area with -17.9 m CD at the berth pocket. ....*

*Estimated disposal volume and areas of disturbance are 3,700,000 m<sup>3</sup> and 1.44 km<sup>2</sup> respectively (refer Table 2-1). ..... The main areas for dredging are the outer channel and the berth pocket. In the remaining areas only targeted dredging is required. Total footprint of proposed channel area is 3.9 km<sup>2</sup>.....*

### ***Proposed marine disposal areas***

*Refining NZ seeks some operational flexibility in the volume of material to be disposed at specific locations. Two marine disposal areas are proposed. Area 3-2 is situated approximately 45 m below Chart Datum to the south east of the channel within Bream Bay and Area 1-2 is situated on the outer part of the ebb tide shoal. Area 1-2 is included to provide a means of maintaining a sediment transport pathway to the coast. Accordingly, it is anticipated that up to 97.5% of capital dredging is to be placed in Area 3-2, between 2.5% and 5% is placed in Area 1-2 .....*

*Assuming the sediment is uniformly distributed, the average height of the placement mound as a result of the capital dredging will be approximately 1.5m. However, it is possible that targeted disposal may occur within the larger disposal area to reduce capital disposal footprint and should that happen then a maximum placement height of not more than 4 m would result. ....*

*The maximum placement height within Area 3-2 after 35 years of capital and then maintenance dredging would be no more than 4 m based on the conservative assumptions of 1) the upper rate of predicted annual sedimentation, 2) all maintenance dredging being placed in this area and 3) no settlement or loss of material from this area. ....*

*Both Areas 3-2 and 1-2 areas comprise sand of a similar composition to the channel area to be dredged. From a geomorphological perspective, it is appropriate to dispose of material in areas of similar composition (i.e. on a 'like for like' basis). ....*

Tonkin & Taylor's report also describes the proposed capital dredging, maintenance dredging and marine disposal areas in some detail at pages 3, 5 and 6:

## 2.2 Capital dredging requirements

Based on the channel alignment and section shown in Drawing 01 and Figure 2-1 the estimated disposal volume and areas of disturbance (3,638,000 cubic metres (m<sup>3</sup>) rounded up to 3,700,000 m<sup>3</sup> and 1.44 square kilometres (km<sup>2</sup>) respectively, refer Table 2-1.....

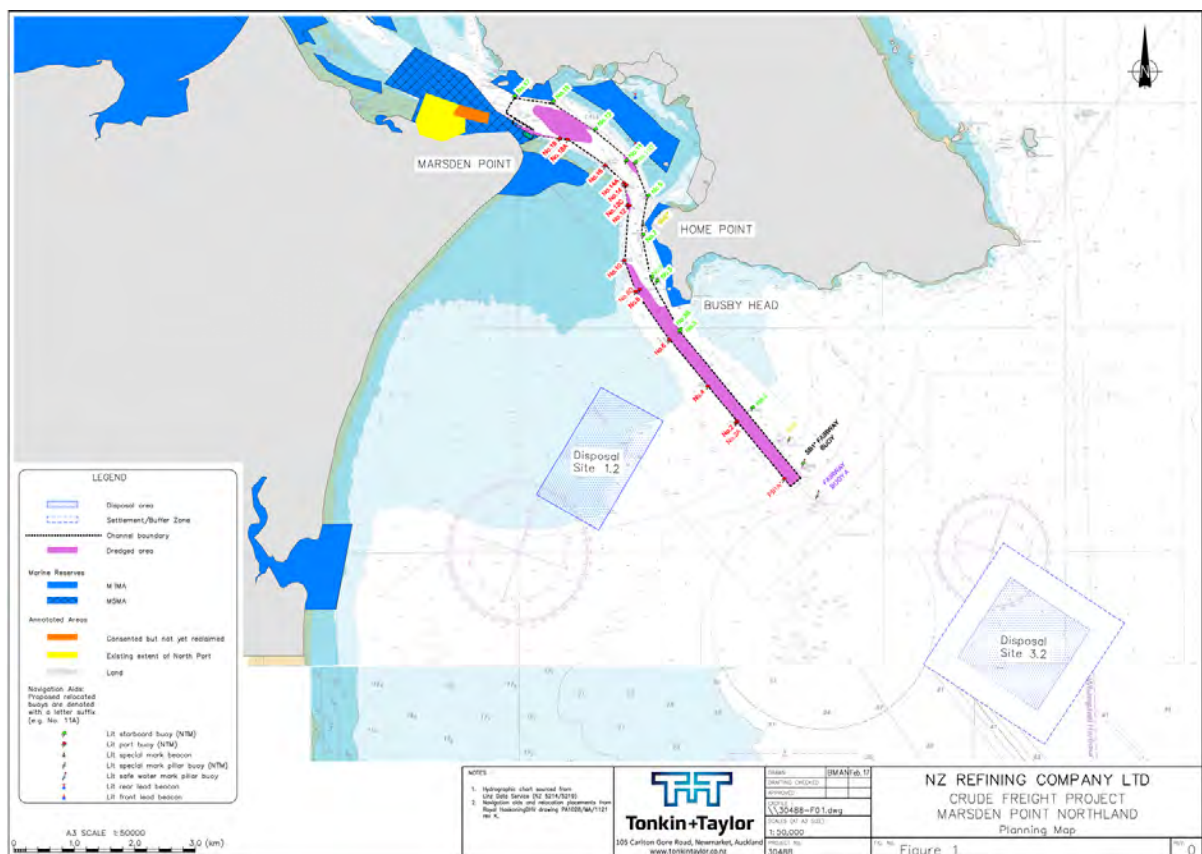
## 2.3 Maintenance dredging

Maintenance dredging is to be expected to be necessary, particularly within the first few years following the capital dredging as side slopes settle. The main areas where maintenance dredging will be undertaken is in the berth pocket area due to sand transported from the ebb delta over Mair Bank, and at the outer section of the channel where the majority of capital dredging has occurred. ....

Over the maximum duration of the expected consent (35 years), the volume of material required to be dredged is between 1,960,000 and 4,270,000 m<sup>3</sup>, representing some 1.2 to 2.5% of the current ebb tide delta volume.

Maintenance dredging may need to occur every 2 to 5 years in the berth pocket area to maintain navigable draft around the jetty dolphins as well as at localised areas along the channel such as adjacent to Busby Head .....

The Nearshore Disposal Area 1.2 (overleaf) would lie some 3.5km offshore off Ruakaka's foreshore and the adjoining Marsden B Power station site (decommissioned). The proposed capital dredging disposal site – Area 3.2 – would be located some 10.9km from the same beachfront.



Proposed Option 4.2 Rev, M Navigation Channel & Locations For Sediment Disposal

Focusing on some of the potential effects associated with the dredging and sand disposal operations, Tonkin & Taylor's report describes the sediments currently found within the proposed 'dredge area' as follows (pp.14 & 15), followed by the proposed disposal areas (pp.14 & 17):

### 3.5.1 Channel area

..... The surficial sediments within the main channel of Whangarei Harbour are a mix of sands and coarser material (likely to be shell) in varying proportions. Coring has shown that a minor fraction of silty material is also found at depth (around 3% silts and 0.3% clay). The

*subtidal regions of the ebb tidal shoal along the edges of the proposed channel are mainly made up of sandy material (around 95%) with around 5% silts. This was observed both by diver survey as well as coring, with some shell material (5 to 10%) also found at depth in the cores. The vibrocoring data shows similar grading information to the previous studies.*

### **3.5.2 Seabed area along ebb tide shoal and within proposed disposal areas in Bream Bay**

*..... Mair Bank is covered with a shell substrate, mostly consisting of Pipi shells, with deposits of fine sands in the lee of shell ridges. With increasing water depth the amount of sand interspersed with the shells increases down the edge of the bank and the remaining ebb tide shoal is predominantly fine to medium sands.*

Turning, therefore, to the issue of water turbidity or plumes that might be generated by dredging and deposition in the same areas, MetOcean Solutions' report (*Crude Shipping Project, Whangarei Harbour – Predicted Physical Environmental Effects From Channel Deepening and Offshore Disposal*, June 2016) summarises the likely effects of such operations as follows (pp. iv - vi):

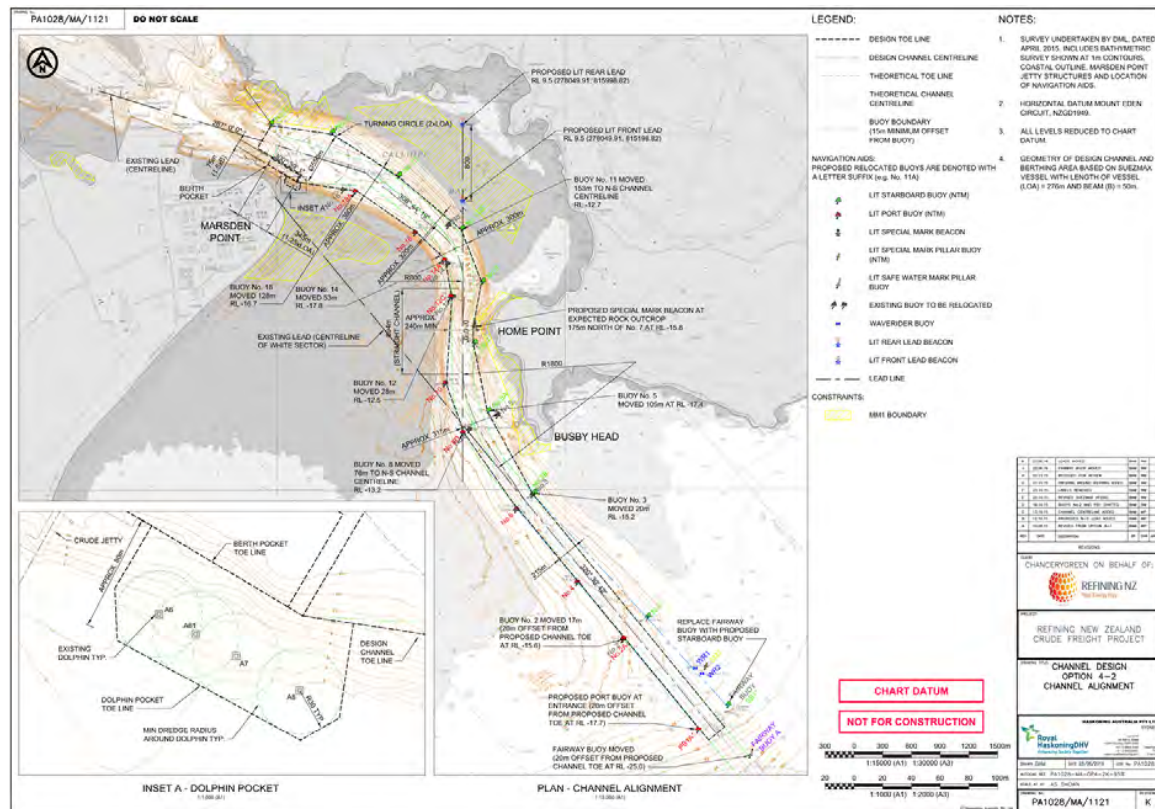
#### **Dredging plumes**

*The plume dispersion associated with two different (large and small) trailing suction hopper dredgers (TSHD), one cutter suction dredger (CSD) and one Backhoe Dredger (BHD) was simulated in the present study. The sediment plumes associated with dredging, caused by the action of the drag head, are constrained within the lower water column, with negligible expression at mid-water and surface levels. In contrast, the sediment plumes associated with the overflow phase are spread across the entire water column. The resultant plumes from either source are predicted to follow the general channel alignment, consistent with the tidal currents. The maximum excursion of any plume modelled based on the 12 mg/L suspended solids concentration (SSC) threshold did not exceed 1200 m (maximum extension near bottom) and all were confined to the channel. There is no evidence of the plume dispersing to the adjacent beaches, sand banks, Marine 1 Management Areas and Marine Reserves. ....*

#### **Disposal plumes**

*The plumes caused by disposal are short lived and not highly dispersive. They typically extend along a northeast – southwest axis, preserving the adjacent reef from settlement, and 99% of the plume material is predicted to settle to the seabed within 14 hours. The disposal plumes calculated from the measured current profiles have a lesser excursion than those determined from the long term environmental hindcast, and do not show incursion towards the adjacent 3 Mile Reef to the west of the proposed disposal ground.*

Other key components of the proposal include disturbance of the sea floor – mostly within the existing channel between Marsden Point and Home Point, but also affecting Mair Bank – while the relocation and / or addition of navigation lights and buoys would be more obvious signals of the change occurring underwater. The plans of Option 4.2 prepared for Refining New Zealand by Royal Haskoning DHV show the locations of these changes and new structures.



**Proposed Option 4.2 Navigation Channel In Detail**

In particular, DHV Royal Haskoning's report (*Refining NZ Crude Shipping Project Shipping Channel – Concept Design Report*; November 2016, pp.24, 26, 27, 32, 35, & 45) identifies that:

- The existing Fairway Buoy A at the entrance to the navigation channel would be shifted to a position offset from the new entrance by some 20m;
- The other existing Fairway Buoy would be replaced by a new Starboard Buoy;
- A new Port Buoy would be offset 20m from the southern side of the channel entrance;
- Buoys 2, 3, 5, 8, 11, 12 and 14 would all be relocated to accommodate the revised "S" footprint of the revised navigation channel;
- A new 'lateral marker' would be located off Home Point to mark a rock outcrop next to that feature – within an HNC area identified in the Northland RPS and close to the ONL (Whangarei DP) covering Home Point;
- A new 'Front Lead' light would be located on the southern edge of Calliope Bank, offshore of McKenzie Bay: some 1150m from that bay and more than 1400m from Taurikura's main beach – within an HNC area identified in the Northland RPS; and
- A new 'Rear Lead' light would be located on the northern side of Calliope Bank, directly offshore of the main beach at Taurikura but still some 740m from it – also within an HNC area identified in the Northland RPS.

## 2.1 EFFECTS ASSESSMENT

Most of the proposed developments and activities at Marsden Point would affect the harbour's underwater environment to a greater degree than its above-water landscape, with the current tidal channel requiring substantial modification to accommodate more heavily, laden ships. The key landscape / natural character / amenity issues associated with the proposal are more specifically linked to the following project components and activities:



- Changes to the sea floor and biota associated with dredging;
- Modifications associated with the disposal of dredged material within Bream Bay;
- The permanent addition of the two new Lead Lights near Taurikura – affecting views from Taurikura and McKenzie Bays;
- The introduction of a new ‘lateral marker’ to a rock outcrop adjacent to Home Point;
- Associated plumes / water turbidity;
- Dredging and disposal activities – mainly pertaining to the effects of vessel lighting and operational noises on local residents.

Although the relocation of buoys would also signal changes to the alignment of the navigation channel in and out of Marsden Point, the overall number of buoys would scarcely change and their repositioning would have no appreciable effect on either the quantum of man-made elements found within the marine environment or their general disposition – particularly given the close proximity of a string of coastal settlements, a major oil refinery, wharves, existing vessel movements, and even the remains of a former coastal gun battery. These elements are all located in close proximity to the harbour entrance. Consequently, the balance between man-made and natural elements found at the mouth of Whangarei Harbour would be little altered by the re-positioning of existing buoys.



### 3.0 LANDSCAPE CONTEXT

The approaches to Whangarei Harbour are framed by the expansive coastal plain around Ruakaka to the south, and the volcanic peaks of Home Point, Mt Lion, Bream Head, then Taurikura, Mt Manaia and Mt Aubrey, to the north. At the junction of these contrasting landforms, the Marsden Point Oil Refinery also sits at the end of a distal spit that marks the very entrance to Whangarei Harbour and a succession of bays – from Little Munroe to Urquharts – that directly frame the northern side of its mouth. West of the oil refinery, Marsden Bay and One Tree Point enclose the shoreline west of Blacksmiths Creek, while a series of headlands and indented bays / coves – including McLeod Bay and Munroe Bay, together with Reserve Point and Manganese Point – line the harbour's northern coastline.

However, the catchment more directly associated with Marsden Point's navigation channel is effectively framed by the adjoining deep-water port and, across the harbour, by Darch Point – at the western edge of Reotahi (below Mt Aubrey). Home Point and Busby Head define the outer limits of the main channel, although its outer reaches – extending into Bream Bay – are more loosely framed by Bream Head and the dune / sedimentary plain around Ruakaka.

The nature of this landscape is as variable as its topographic underpinnings. The Ruakaka coastline is fronted by a shallow, mostly low lying, dune corridor, but the remains of the old Marsden B Power Station and substation, various industrial premises, the Ruakaka Sewerage Plant and scattered pockets of residential development all face out across Bream Bay. These culminate in the oil refinery at the harbour's edge – clearly defined by its complex array of storage tanks, pipe work, buildings and other infrastructure. Two unloading wharves and gantries are outliers to the main refinery, projecting out into the enclosed harbour. Tankers are often located at these wharves and their 'dolphins'. Immediately west of the refinery, Northport's deep water berths are constantly in motion, with logs being loaded onto freighters, while trucks re-supply the large timber and timber chip stockpiles behind the main wharves. This industrial node, including storage sheds, additional storage tanks and light industrial premises flanking Marsden Point Rd, is separated from Blacksmiths Creek by a planted bund.

Immediately west of the creek, a sequence of residential development – mostly traditional bungalows facing the open waters of the harbour, while more modern, beach houses cluster around the enclosed waterways of the Marsden Bay development – expands the harbour frontage subject to active occupation and use. Although views from this quarter include the margins of the deep water port and vessels berthed at both the port and oil refinery, the main outlook from Marsden Bay and One Tree Point is directly across the harbour, towards Mt Aubrey, Taurikura and the matrix of forested hills filling the northern horizon.



*Looking from One Tree Point towards Mt Aubrey, Taurikura, Mt Lion & the Marsden Point Oil Refinery*

This sequence of razor-edged, volcanic peaks and its broad expanse of native forest is broken into the series of headlands and bays as the individual hills descend towards the harbour's edge. These bays – sharply defined and framed by both ridges and headland promontories – contain a series of coastal settlements and developed areas:

- pockets of rural-residential development amid a 'farm park' at the western end of Parua Bay and across Reserve Point;
- more traditional bach settlements at Reotahi, Little Munroe Bay, McGregors Bay, Taurikura bay, McKenzie Bay and Urquharts Bay; and
- a small marina next to Solomons Point.

Bush, and pockets of residual pasture, extend down from the sharply elevated peaks above to wrap around, and separate, these pockets of residential occupation and activity. At the very end of this 'chain', Mt Lion and Home Point decisively mark the outer limits of the harbour, while a broad phalanx of bush extending from Home Point to Busby Head, then from the northern side of Smugglers Bay to Bream Head, helps to further reinforce the more natural qualities of this 'bookend'.

Most of the settlements between Reotahi and Urquharts Bay lie within the visual catchment of the existing refinery and its navigation channel. As a result, the refinery acts as the visual centrepiece of most views to, and across, the harbour entrance. However, this is not always the case: descending towards McGregors Bay and Taurikura Bay on Whangarei Heads Rd, the volcanic relief of the surrounding hills, and their interplay with the waters of the northern harbour reaches, is a defining feature of many views. In particular, the distinctive profile and visual presence of Mt Lion and Home Point – joint sentinels at the harbour mouth – is a key facet of the Whangarei Heads landscape. They combine to share the role of a signature feature within it.



*Looking from Whangarei Heads Road near Mt Manaia towards Mt Lion and Home Point*

In addition to affording a key landmark within this coastline, Mt Lion and Home Point help to imbue the wider harbour setting with a level of naturalness and aesthetic appeal that contrasts with the situation evident directly across the harbour. This, of course, is part of the appeal that the Whangarei Heads coastline continues to display for visitors and locals alike. It is precisely why so many small settlements line the northern side of the harbour: nestled into the coastline's amalgam of bush and volcanic landforms, while Whangarei Harbour's expansive water area and long views stretching down to the Brynderwyn Range both contrast with, and complement, this intimate landscape experience.

Beyond the sheltered waters and terrestrial confines of the outer harbour, the steep faced peaks and slopes of Busby Head, Mt Lion and Bream Head provide a more wholly natural setting for the existing and proposed navigation channels. Bush dominates the DoC reserve facing out into Bream Bay, contrasting with the band of remnant pasture that extends from Smugglers Bay up and over a low saddle to meet the western end of Urquharts Bay. The waters off Smugglers Bay and Bream Head mark the junction with Bream Bay and its even more open, physically exposed, sea area – with just the distant Hen and Chicken Islands (Taranga island and the Marotere Islands), on the far side of the Parry Channel, providing any degree of protection and containment from the Pacific

Ocean's swells. As a result, the waters facing the northern edge of Bream Bay are frequently wind-tossed and flecked with spray. The often wild, but also enduringly scenic qualities of this coastal landscape are therefore often matched by the turmoil of its sea surface. Although lying close to the string of coastal settlements just described, it has a much more remote, elemental, even raw nature, and, unlike the other parts of the Marsden Point's landscape setting, there is little sense of contact with the oil refinery or other areas of more obvious human activity – apart from the ships lined up offshore, waiting to berth.



*Looking from the base of Busby Head across Smugglers Bay to Mt Lion*

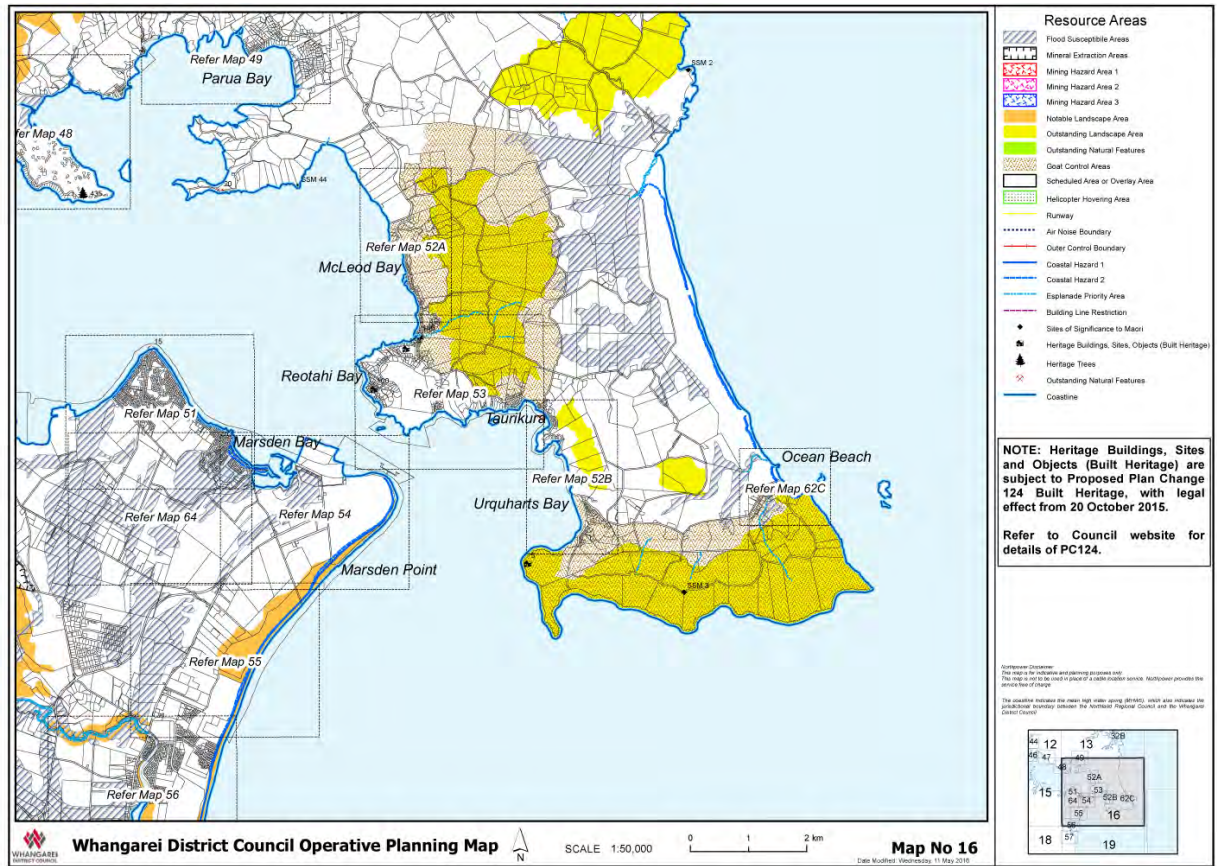
### 3.1 IDENTIFIED VALUES

The Whangarei District Plan identifies Outstanding Natural Landscapes (ONLs) within Bream Bay and around Whangarei Heads on Map 16 of the Operative District Plan (see overleaf). In addition, the Northland Regional Policy Statement, which became operative on 9 May 2016, identifies both ONLs at the regional scale and areas of High and Outstanding Natural Character. Of most relevance to the current proposals, the Regional Policy Statement's more recent maps identify:

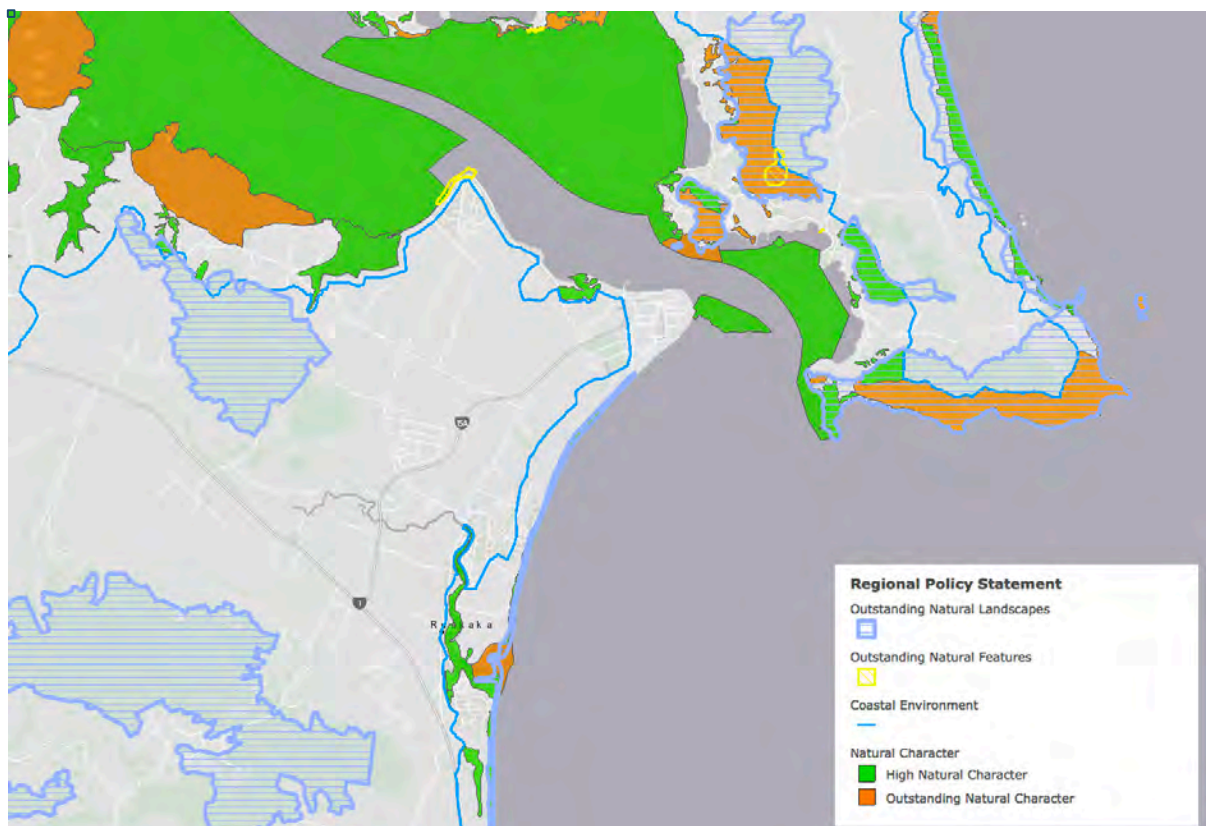
- Areas of high Natural Character within the harbour either side of the current navigation channel in and out of Marsden Point. Part of the HNC area covering Calliope Bank extends down past Home Point and lies north to east of the Option 4.2 corridor, while another HNC area on part of Mair Bank lies south of the proposed channel.
- A strip of Notable Landscape (district plan) and ONL (regional policy statement) running along Bream Bay's beachfront and dune corridor, south of the oil terminal boundary.
- ONLs (district plan and regional policy statement) covering the broad sweep of hills and coastal ridges that frame Whangarei Heads and Home Point, including Taurikura, Mt Lion, Busby Head, and the coastal ridges above Smugglers Bay extending out to Bream Head.
- Areas of High Natural Character flanking Home Point and the series of coastal ridges and promontories in its vicinity that culminate in Busby Head.



- An area of Outstanding Natural Character covering the seaward slopes and bluffs from Smugglers Bay through to Bream Head.



Operative Whangarei District Plan Map 16 Showing ONLs (yellow) & Notable Landscapes (orange)



Operative Northland Regional Policy Statement map showing areas of Outstanding Natural Character (orange), High Natural Character (green) & ONLs (horizontal green stripes framed by a mauve border)

To the west, most of Mt Aubrey and part of its apron of CMA either side of Lort Point is also identified as an ONC area, while Mounts Manaia, Aubrey and Taurikura – facing Whangarei Harbour and Marsden Point – are each subject to an ONL overlay.

This complex situation and the proliferation of areas subject to landscape and natural character overlays, highlights the dichotomy evident within and around the outer harbour. While its outer waters are physically enclosed and overlooked by a sequence of forested, and spectacular volcanic landforms, the margins of the harbour also engage with pockets of settlement, slopes that were once mostly in pasture and still remain so in part, and the southern harbour margins that contain an increasingly solid matrix of houses, industrial development and port related activities. Even though the crescent of Bream Bay, further south again, retains vestiges of natural character and an area of high public appeal down its coastal edge, this façade is soon succeeded by the housing development around Ruakaka, industrial premises lining Marsden Point Rd, the remains of the old Marsden B thermal power station and the local sewerage works.

This creates a highly complex, contextual setting for the navigation corridor, although the current channel – complete with its array of buoys, lighting, recreation vessels, Northport shipping and Aframax / Suezmax movements – suggests that the degree of above-surface change likely to register with both the general public and local communities would be limited.

## 3.2 POTENTIAL EFFECTS

In addressing the effects that the proposed dredging, disposal and infrastructure development would have on both the harbour entrance and Bream Bay, it is important to take into account the values associated with different parts of the landscape / environmental setting already described. The following are brief descriptions of some of the factors that need to be addressed as part of this process.

### LANDSCAPE

The channel / harbour / Bream Bay surrounds are highly variable. However, key parts of that setting are identified as ONLs. Section 6(b) of the Resource Management Act identifies “*The protection of outstanding natural features and landscapes from inappropriate subdivision, use, and development*” as a matter of national importance. The so called ‘modified Pigeon Bay’ factors, that emerged in the findings of the Environment Court in the Pigeon Bay Aquaculture Limited v Canterbury Regional Council case and subsequent Wakatipu Environmental Society Inc (WESI) v Queenstown Lakes District Council cases, are now largely accepted as a starting point for the identification of such landscapes:

- a) *natural science factors: the geological, topographical, ecological and dynamic components of the landscape;*
- b) *aesthetic values including memorability and naturalness;*
- c) *expressiveness (legibility): how obviously the landscape demonstrates the formative processes leading to it;*
- d) *transient values: occasional presence of wildlife; or its values at certain times of the day or of the year;*
- e) *whether values are shared and recognised;*
- f) *the landscape’s value to tangata whenua;*
- g) *its historical associations.*

At the very least they provide a comprehensive check list of landscape ‘layers’ that may or should be addressed in making determinations about the relative values to be attributed particular landscapes, and the related effects that development proposals – like the Crude Shipping Project – would have on them. The Operative Northland Regional Policy Statement builds on this by including the following summary of key characteristics and qualities associated with the ONLs surrounding Marsden Point and down the Bream Bay coastline:

### **BREAM HEAD / MANAIA SEQUENCE**

#### ***Landscape characterisation (including the identification of any specific characteristics)***

*A highly distinctive and ‘iconic’ landscape sequence that defines the outer harbour and links out across the CMA toward Great Barrier Island. A gateway scene to entering mid Northland when passing over the Brynderwyn ridge. An anchoring element in a sequence of “ecological islands” with similar coastal indigenous forest associations that progress up the eastern coastline to the Bay of Islands and bridging into the mainland from local offshore islands. Collectively provide critical part of the Whangarei Heads area’s social identity, providing an enframing/backdrop landform to each bay neighbourhood and a repeating theme that structures the experience of travelling through the broader Heads landscape.*

*Characteristic features are a very steep landform, rocky pinnacles (and headlands in some instances), high consistency of forest/shrubland cover (but with diversity in its composition) and close association with nearby harbour and open coast seascapes*

*Part of the distinction and definition of the component parts of this OLA results from the fact that each is typically isolated from the next within a fringe of agricultural grassland in more gentle foothills, further highlighting the rugged terrain and forest cover of the outstanding areas.*

*Whilst the majority of the identified unit encompasses contiguous areas of forest, scrub or shrubland vegetation, where linking or adjoining landform under pasture is clearly a part of the dominant elevated landscape element, these areas have also been included. Thus, the majority of the Bream Head sequence is within the unit, including:*

- *pastured areas at the western and eastern ends;*
- *the forested ridge face of the Mt Lion Range, including the narrow areas of pasture between the forest and ridge crest;*
- *pastured areas linking Mt Aubrey with the harbour, and;*
- *areas of pasture on elevated land contained within the wider forest on the eastern face of the Manaia range.*
- *The unit is closely related to Hen and Chickens Island group (which is identified as a discrete OLA) in terms of landform, ecology, and sequence.*

<b>EVALUATION</b>		
<b>Criteria</b>	<b>Rank</b>	<b>Comment</b>
<b>Natural Science Factors</b>		
Representativeness	<b>5</b>	Heads sequence a signature of the Whangarei district and Northland region. Relates to view from Brynderwyn. Commonly found in photographs and other images that seek to convey an impression of Whangarei and Northland.
Rarity	<b>5</b>	High level of rarity at New Zealand level – very distinctive to this local area in terms of visual identity, geology and ecology.

Aesthetic Values		
Coherence	4	Strongly unified by rugged landform and contiguity of vegetation cover. Repetition of those key themes, and relationship with adjacent maritime area serves to bring an overarching coherence to the respective discrete areas, despite these being physically separated by lower land and pastoral cover.
Diversity & Complexity	5	Detailed and distinctive skyline. Convoluting site slopes with multitude of minor catchments. Diverse ecology.
Vividness	5	A bold signature and strong part of Northland's identity. Extremely distinctive and memorable. Commonly referred to at many levels by those living in the Heads area.
Naturalness	4	Very high levels of naturalness within unit, but influenced by proximity of settlements, farming and port complex. Proximity in turn allows for weed invasion and abutting uses that diminish naturalness.  Indigenous forest cover is largely consistent over the unit, but there are some localized exceptions where elements of pasture are found in elevated locations such as the northern end of the Manaia range, where paddocks have been created near the ridgeline on localized areas that are less severe in their terrain.  Closely related to marine waterbody. Small and complex drainage patterns on hill faces, largely ephemeral. Evidence of dramatic drainage and scouring during intense rainfall indicates ongoing formative processes, even in areas where landcover is predominantly natural.
Intactness	4	Good level of intactness within unit, although much of the vegetation cover is relatively young. Influence of natural cover along ridges on visual identity.
Experiential Values		
Expressiveness	5	Volcanic origins clearly conveyed by both landform and eroded skyline detail.
Sensory Qualities	5	Powerful views of unit entering Whangarei District and along harbour and Heads.
Transient Values	4	Strongly influenced by light conditions. Ridges create extremely distinctive silhouettes during dawn and dusk. Seasonal influences of rata and pohutukawa bloom.
Remoteness / Wildness	3	Proximity of settlements diminished, but strongly experienced to south of Bream Head and within forest.
Shared & Recognised Values	5	Landforms definitive in Heads community and physically shape and define where settlement has occurred.
Spiritual, Cultural & Historical Associations	5	Consultation was initiated during the mapping process, but has not led to any feedback within the required period. Well recorded and widely known Maori mythology applying to Manaia particularly. This is summarized on a public sign at Manaia's foot. Broad body of historical knowledge relating to early European and Nova Scotian settlement and use of Heads area.

## BREAM BAY OCEAN BEACH

### *Landscape characterisation (including the identification of any specific characteristics)*

*The ocean beach extending between Marsden Point and the Waipu River represents the largest example of this land type on the east coast of the Region. It forms a gentle and graceful curve which, when looking north from locations to the south such as that illustrated on the photograph below, is terminated by the distinctive silhouette of the sequence of landforms making up the Manaia group.*

*The beach is backed by low dunes which in places forms an extensive dunefield (described above), however only the seaward margin of the foredunes are included within the landscape given the modification and weed infestation associated with the remainder of the area.*

*The landscape has a powerful simplicity engendered by the limited palette of colours, and the scale and form of the beach.*

EVALUATION		
Criteria	Rank	Comment
Natural Science Factors		
Representativeness	5	Whilst not readily seen from the State Highway, Bream Bay the curve of Bream Bay is visible from the crest of the Brynderwyn range in context with Bream Head in the distance. The southern part of the Whangarei District coastline is characterised by the ocean beach that extends for some 20 km between Marsden Point at the mouth of the harbour, and Waipu Cove.



		The beach has strong endemic associations due to the native spinifex and other dune species present on the foredunes.
Rarity	5	The beach is similar in scale and character to a limited number of ocean beaches within the region, but retains its own character due to the beach backdrop dunelands and framing topographical features.
<b>Aesthetic Values</b>		
Coherence	3	The beach and its immediate backdrop retain a high level of coherence as a result of the simplicity of the components, and form of the feature. The modified character of the adjoining land to the west tends to detract from the coherence of the feature where built development, such as in the vicinity of the Ruakaka settlement, or Marsden Point, and encroachment by weed species.
Diversity & Complexity	2	The beach and its setting display a limited degree of diversity and complexity, although the ocean tends to be a dynamic element which provides its own ever changing complexity to the landscape, against the simple foil of the beach.
Vividness	5	The simplicity of form and colour, and the scale of the beach and its interplay with the sky results in the feature being particularly striking and displaying a high level of vividness
Naturalness	4	Whilst the backdrop to the beach has undergone a level of modification as a result on weed invasion, and with pockets of development encroaching on the dunefield, the beach and its immediate fore dune retain a high level of naturalness that is devoid of built development, and exotic vegetation, and maintains strong natural and coastal processes, both hydrological, and ecological.
Intactness	3	The beach and its immediate backdrop retain a coherence and intactness and does not show signs of modification. The backdrop to the beach does display a greater level of modification and this does, in places detract from the intactness of the landscape.
<b>Experiential Values</b>		
Expressiveness	5	The beach clearly displays the coastal processes, which formed it and continue to shape it.
Sensory Qualities	4	The experience of arriving at the beach is a gradual one and one that is generally experienced on foot, passing some distance though the dunes. As such, the moment of experiencing the beach is delayed and the impact of the scale of the beach, the smell of the sea and feel of the wind has greater impact than if the visitor were to arrive in a vehicle.  The level of weed infestation within the back dunes, and the level of modification in terms of built development in some places tend to detract slightly, in some locations, from the sense of naturalness and therefore the sensory qualities of the beach.
Transient Values	4	A number of transient values are evident on the beach, including changes evidenced the tides, by changing weather and the seasons, but also by the arrival and departure of migrating birds.
Remoteness / Wildness	3	The beach is accessed from a limited number of locations in its mid and mid southern portion. In this area the visitor is able to experience a greater level of remoteness, which increases as the distance from the access point increases.  At the northern end of the beach where greater development has occurred the sense of remoteness and wildness has been diminished.
Shared & Recognised Values	5	The Bream bay beach is a widely recognised feature within the Region despite its limited visibility. Its visual relationship with both Bream Head and Bream Tail is striking and an 'iconic' image of the east coast of Northland.
Spiritual, Cultural & Historical Associations	4	Consultation was initiated during the mapping process, but has not led to any feedback within the required period.  The beach is, however valued by the community for recreational purposes and is heavily used, especially during the summer period when the camp ground at Uretiti is busy.

## NATURAL CHARACTER

Policy 13 of the new NZ Coastal Policy Statement requires that the following matters be evaluated when exploring the natural character effects of development proposals within the coastal environment:

- (1) *To preserve the natural character of the coastal environment and to protect it from inappropriate subdivision, use, and development:*
  - (a) *avoid adverse effects of activities on natural character in areas of the coastal environment with outstanding natural character; and*
  - (b) *avoid significant adverse effects and avoid, remedy or mitigate other adverse*

*effects of activities on natural character in all other areas of the coastal environment; including by:*

- (c) assessing the natural character of the coastal environment of the region or district, by mapping or otherwise identifying at least areas of high natural character; and*
  - (d) ensuring that regional policy statements, and plans, identify areas where preserving natural character requires objectives, policies and rules, and include those provisions.*
- (2) Recognise that natural character is not the same as natural features and landscapes or amenity values and may include matters such as:*
- (a) natural elements, processes and patterns;*
  - (b) biophysical, ecological, geological and geomorphological aspects;*
  - (c) natural landforms such as headlands, peninsulas, cliffs, dunes, wetlands, reefs, freshwater springs and surf breaks;*
  - (d) the natural movement of water and sediment;*
  - (e) the natural darkness of the night sky;*
  - (f) places or areas that are wild or scenic;*
  - (g) a range of natural character from pristine to modified; and*
  - (h) experiential attributes, including the sounds and smell of the sea; and their context or setting.*

Again, the NRPS has evaluated areas of High and Outstanding Natural Character around Marsden Point with reference to such factors. However, the worksheet descriptions of those areas close to the proposed navigation channel are largely devoid of detail apart from rather generic descriptions of the different Natural Character areas identified within the Coastal Environment and a summary of the referenced ecosystems applicable to each area:

**Coastal Area Covered:** *North of Uretiti to north of Marsden power station site, including Ruakaka estuary*

**Dominant Coastal Criteria Used:**

*Ridgeline/land contour: Yes*

*Presence and extent of dunefields: Yes*

*Presence and extent of coastal lakes, lagoons, tidal estuaries, saltmarshes, or coastal wetlands:*

*Ruakaka River estuary, Ruakaka Racecourse Dune Lake*

**Other Relevant Factors:**

*Defined areas of coastal hazard risk:*

*Bream Bay/Ruakaka Beach*

*Presence and extent of coastal vegetation:*

*See Q07/128 Ruakaka Dunelands; and*

*Q07/130 Ruakaka River Estuary*

*Natural Areas of Waipu Ecological District 2007*

*Presence and extent of habitats of indigenous coastal species including migratory birds:*

*See Q07/128 Ruakaka Dunelands*

*Q07/129 Ruakaka Racecourse Dunelake; and*

*Q07/130 Ruakaka River Estuary .....*

**Coastal Area Covered:** Whangarei Harbour – Darch Point to Home Point  
Open Coast – Home Point to Ocean Beach including Bream Head

**Dominant Coastal Criteria Used:**

Ridgeline/land contour: Yes Presence and extent of dunefields:

Ocean Beach

Presence and extent of coastal lakes, lagoons, tidal estuaries, saltmarshes, or coastal wetlands: N/A

**Other Relevant Factors:**

Defined areas of coastal hazard risk: Ocean Beach

Presence and extent of coastal vegetation:

See Q07/069 Manaia Ridge Scenic Reserve and Surrounds  
Q07/070 Mount Aubrey Coastal Forest and Shrubland  
Q07/073 Taurikura Ridge Bush  
Q07/074 Bream Head Scenic Reserve and Surrounds; and  
Q07/075 Ocean Beach Recreation Reserve and Surrounds in  
Natural Areas of Manaia Ecological District 2010

Presence and extent of habitats of indigenous coastal species including migratory birds: N/A .....

**Coastal Area Covered:** Bream Bay – north of Marsden power station site to Marsden Point  
South Whangarei Harbour – Marsden Point to Takahiwai  
North Whangarei Harbour – Mount Aubrey

**Dominant Coastal Criteria Used:**

Ridgeline/land contour: Yes

Presence and extent of dunefields:

North end of Bream Bay beach

Presence and extent of coastal lakes, lagoons, tidal estuaries, saltmarshes, or coastal wetlands:

Blacksmith's Creek, Takahiwai Creek

**Other Relevant Factors:**

Defined areas of coastal hazard risk:

Bream Bay Beach, Marsden Cove, One Tree Point

Presence and extent of coastal vegetation:

See Q07/128 Ruakaka Dunelands  
Q07/144 Blacksmith's Creek Estuary  
Q07/143 Takahiwai Creek Estuary; and  
Q07/167 Takahiwai Saltmarsh and Shrubland  
in Natural Areas of Waipu Ecological District 2007

And Q07/058 Whangarei Harbour  
in Natural Areas of Whangarei Ecological District 2001 And  
Q07/070 Mount Aubrey Coastal Forest and Shrubland  
in Natural Areas of Manaia Ecological District 2010

Presence and extent of habitats of indigenous coastal species including migratory birds:

See Q07/128 Ruakaka Dunelands  
Q07/144 Blacksmith's Creek Estuary  
Q07/143 Takahiwai Creek Estuary; and  
Q07/167 Takahiwai Saltmarsh and Shrubland  
in Natural Areas of Waipu Ecological District 2007

And Q07/058 Whangarei Harbour  
in Natural Areas of Whangarei Ecological District 2001

In fact, these somewhat rudimentary descriptions provide very little appreciation of the environmental conditions associated with the multiple areas identified as having ONC and HNC values around the entrance to Whangarei Harbour and down Bream Bay. As a result, the RPS's landscape assessment and its descriptions of individual ONLs offer more insight into the nature of the environmental setting for the proposed navigation channel than the worksheets directly addressing Natural Character values.

Underwater conditions also have a bearing on both the state of the current marine conditions at Marsden Point and the evaluation of Natural Character effects that would be generated by the Crude Shipping Project. In both respects, substantial reliance has been placed on the assessment of the current sea floor by MetOcean Solutions Ltd and of the existing aquatic biota in Bioresearchers' assessment of the Dredge Area ecology.

## AMENITY

Section 7(c) of the Resource Management Act states that those exercising power under the Act shall have regard to (among other matters) *"The maintenance and enhancement of amenity values"*. Such values are defined as being *"those natural or physical qualities and characteristics of an area that contribute to people's appreciation of its pleasantness, aesthetic coherence, and cultural and recreational attributes"*. Thus, whereas landscape is often associated with the sort of parameters already described, the concept of "amenity" focuses more directly on a certain cohesion of expression and unity of elements that give rise to a locality or landscape being considered 'pleasant', 'aesthetically cohesive' and having cultural or recreational appeal. Thus, for example, rural amenity has more to do with an area's continuity of character and aesthetic appeal than with how natural, endemic or structured and patterned it is. This may be reinforced by legible, repeated patterns – such as those associated with shelterbelts or stands of trees and repeated landforms – which become part of a locality's signature. Moreover, such patterns and elements can reflect the actions and imprint of humankind on a landscape although, more commonly, it reflects a certain repetition of residual natural features e.g. stands of bush, stream corridors or karst (limestone) outcrops.

Consequently, just as Whangarei Head's volcanic terrain, bush and harbour waters comprise the landscape's basic 'building blocks', local amenity values reside in a wide range of experiences that contribute to the aesthetic value, identity and sense of place associated with the local area – including:

- the myriad views to, and from, the harbour and its varied coastal margins;
- the recreational resources provided by local beaches and beachfronts;
- the spectacle and resource offered by the DoC reserve covering the northern side of the harbour mouth from Home Point to Bream Head, with its trails, beaches, bush and scenic promontories; and
- the waters of the harbour and Bream Bay – catering to fishermen, boaties and visitors alike.

The outlook to Whangarei Harbour and Bream Bay clearly underpins much of the locality's residential appeal, and the interaction between land and sea is unquestionably a key part of the northern coastline's identity and sense of place. Local residents on both sides of the harbour are exposed on a daily basis to the dynamic, at times dramatic, interplay between its expansive sea area with both an array of enclosing volcanic peaks and the dune plain around Ruakaka marching southwards towards the Brynderwyns.

Yet, these experiences don't exist in a vacuum, as if divorced from the very human activities and structures that surround most of the vantage points which afford this engagement and interaction.

Just as the sharp faced hills, native forest and harbour waters are key components of the outer harbour's coastal landscape, it also contains a multiplicity of long established cultural elements – from the many local settlements already described, to the oil refinery, neighbouring deep water port and current shipping lanes. These are also 'part and parcel' of the present-day Marsden Point / Whangarei Heads experience.

## 4.0 EFFECTS

Adverse impacts upon landscape, amenity and natural character values typically arise where there is evident discontinuity between the character and values of an existing environment and what is proposed, and where the resultant ‘challenge’ to the existing landscape ‘order’ is perceived in a negative light. Consequently, this section of the report addresses the degree of landscape / environmental change associated with the Crude Shipping Project and the nature / quality of landscape / amenity / natural character modification arising from such change.

Most projects focus on a single development and site. In this instance, however, the Crude Shipping Project involves multiple sites and a range of developments – from channel realignment (including widening and deepening) to the erection of new navigation markers and lights, and the processes of both dredging and disposal. As a result, this assessment addresses the project in terms of its key components – as set out in Section 2.1:

- The formation of the proposed channel with outer Whangarei Harbour and northern Bream Bay;
- The disposal of sand from capital dredging and maintenance dredging at Sites 3.2 and 1.2 within Bream Bay;
- The erection of two new Lead Lights near Taurikura;
- The erection of a new ‘lateral marker’ on an exposed rock outcrop off Home Point;
- The sand plumes / water turbidity associated with sand dredging and disposal; and
- The dredging and sand disposal operations.

Of note, and as indicated at Section 2.1, the relocation of navigation buoys is not addressed in this assessment, as it is considered that the quantum and nature of landscape / natural character effects would be little changed by this aspect of the crude shipping project.

Each of the remaining project components, identified above, is, however, analysed in detail. This involves identification of the receiving environments and audiences exposed to each component, followed by evaluation of their landscape / natural character / amenity effects. This involves the systematic analysis of factors or considerations under the following headings:

- **Existing Landscape / Natural Character / Amenity Values**
- **Prominence / Visibility** (of the proposed reclamation, piers and berths) and
- **Landscape Effects**
- **Natural Character Effects**
- **Amenity Effects**

Analysis under these ‘headings’ takes into account the following factors / considerations:

### **Existing Values:**

Reflecting the relative extent to which a landscape / environment is valued in terms of:

- Its Biophysical Components: including landforms, vegetation cover, sea area and key cultural elements / features: buildings, other structures and activities
- Its Perceptual Components: aesthetic value, expressiveness, legibility (focusing on the degree to which landscape elements combine to create an attractive composition, 2D patterns, 3D sense of structure) and ephemeral / transient values

### Prominence:

- Visibility / Legibility Of The Proposed Development / Activities: indicating the extent to which the development / activity proposed would be visible and visually prominent in views towards and of the outer harbour and / or Bream Bay.

### Landscape Effects:

- Impacts On Landscape Elements & Patterns: the extent to which the proposal would adversely affect the structure of the landscape: its layering of elements, the interplay between different types of land use / structures, and the interaction between land and sea / harbour.
- Impacts On Visual Coherence / Unity: the extent to which the proposal would adversely affect the perceived integrity of Whangarei Harbour or Bream Bay by altering the mix of land uses and the balance between natural and man-made elements within the landscape.
- Impacts on Key Features / Landscapes (where applicable): the extent to which the presence of the proposed development / activity would disrupt or disturb views to, and of, Whangarei Harbour or Bream Bay.

### Natural Character Effects:

The degree to which the development proposal would adversely affect perception and appreciation of the following characteristics associated with the existing Coastal Environment:

- Abiotic factors (essentially landform)
- Vegetation Type (native / endemic to exotic)
- Vegetation Cover & Patterns
- Land Uses / Activities: Buildings & Structures (their presence / absence)
- Water Areas
- Natural Processes

### Amenity Effects:

- Visual Intrusion & Disruption of Aesthetic Cohesion: the degree to which the proposal's visual 'presence' would impair or disrupt the aesthetic cohesion of the outlook from the viewpoint and specific features / landmarks within that outlook.
- Impacts On Public Amenity: the extent to which the development / activity would adversely affect public perceptions of Whangarei Harbour or Bream Bay and their related sense of place and identity.
- Impacts on Residential Amenity: the degree to which the proposal would adversely affect residential views to, and of, Whangarei Harbour or Bream Bay and their related sense of place and identity.

Impact ratings for most viewpoints are also inevitably affected by other key factors, including viewing distances to the application site and the elevation of the proposed development / activity relative to both public and private vantage points. Where these factors alter the level of effect identified for specific viewpoints, this is also identified. Taking all of the above into account, each viewpoint analysis concludes with an overall **Impact Rating** for the individual development component. These ratings employ the following impact scale:

- No Effect
- Very Low
- Low
- Moderate
- High
- Very High
- Severe Effect



## 4.1 CHANNEL FORMATION

### DESCRIPTION OF PROPOSAL:

Option 4.2 provides an 'S' shaped approach to Marsden Point, threading between the Mair and Calliope Banks. As a result, the proposed channel would largely follow the channel alignment created by natural tidal flows in and out of Whangarei Harbour (**Figure 1** below) that is currently used for shipping in and out of Marsden Point and the adjacent Northport facilities.

As shown on the **Figure 2** (overleaf), the majority of dredging would occur off the Marsden Point dolphins, as well as between Busby head and the channel entry at the centre of Bream Bay.

The process of capital dredging and maintenance dredging would be as described at pages 3 and 5 of Tonkin & Taylor's report: *Crude Shipping Project – Coastal Processes Assessment* (February 2017).

It would involve the removal of a mixture fine, medium and coarse sands, together with shell debris, making up the majority of the total 3,638,000m<sup>3</sup> to be extracted in the course of capital dredging, then maintenance dredging in the range of 50,000 to 100,000m<sup>3</sup> per annum. Silts and clays would also be removed, but these would only make up approximately 2.0% of excavated material in the Outer Channel (Bream Bay), rising to approximately 6.0% in the Inner Channel (outside the berth pocket).

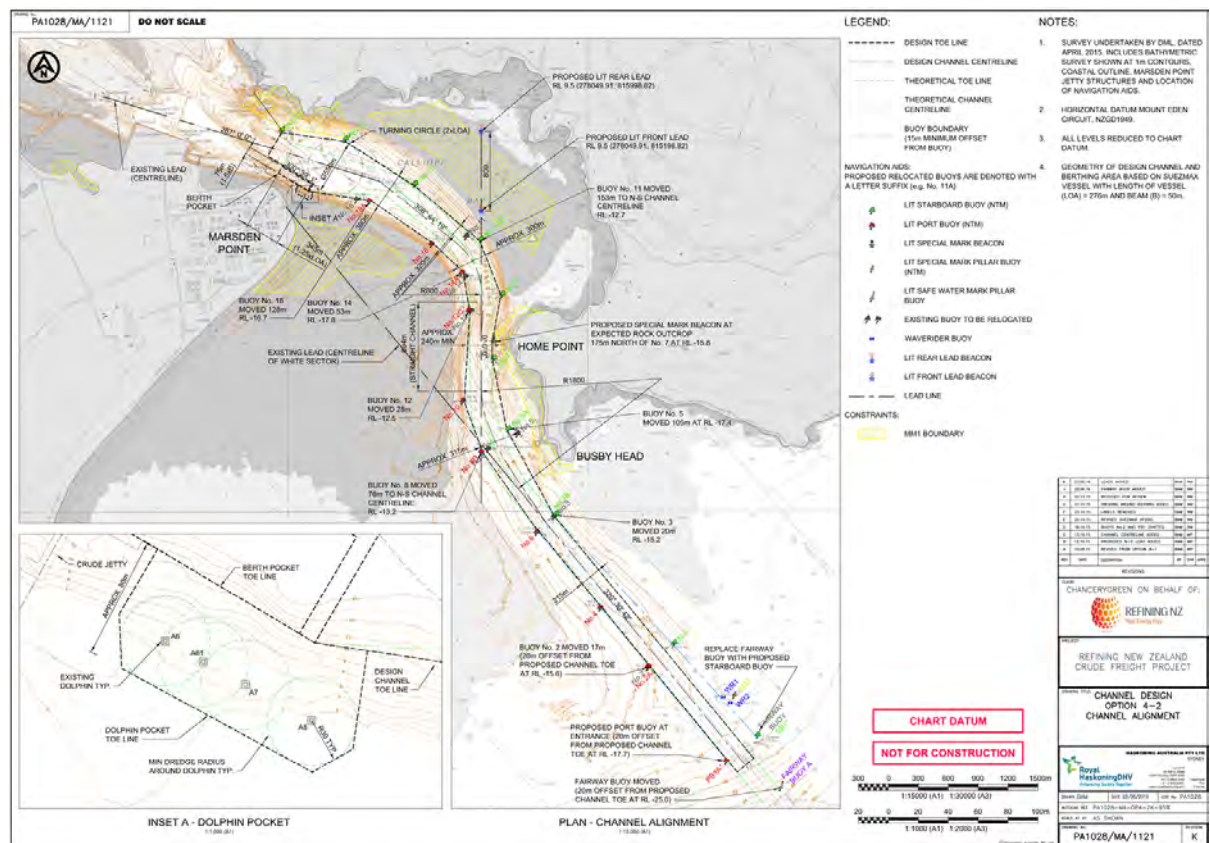


Figure 1. Final Option 4.2 Alignment (Royal Haskoning DHV: Refining NZ Crude Shipping Project Shipping Channel – Concept Design Report)

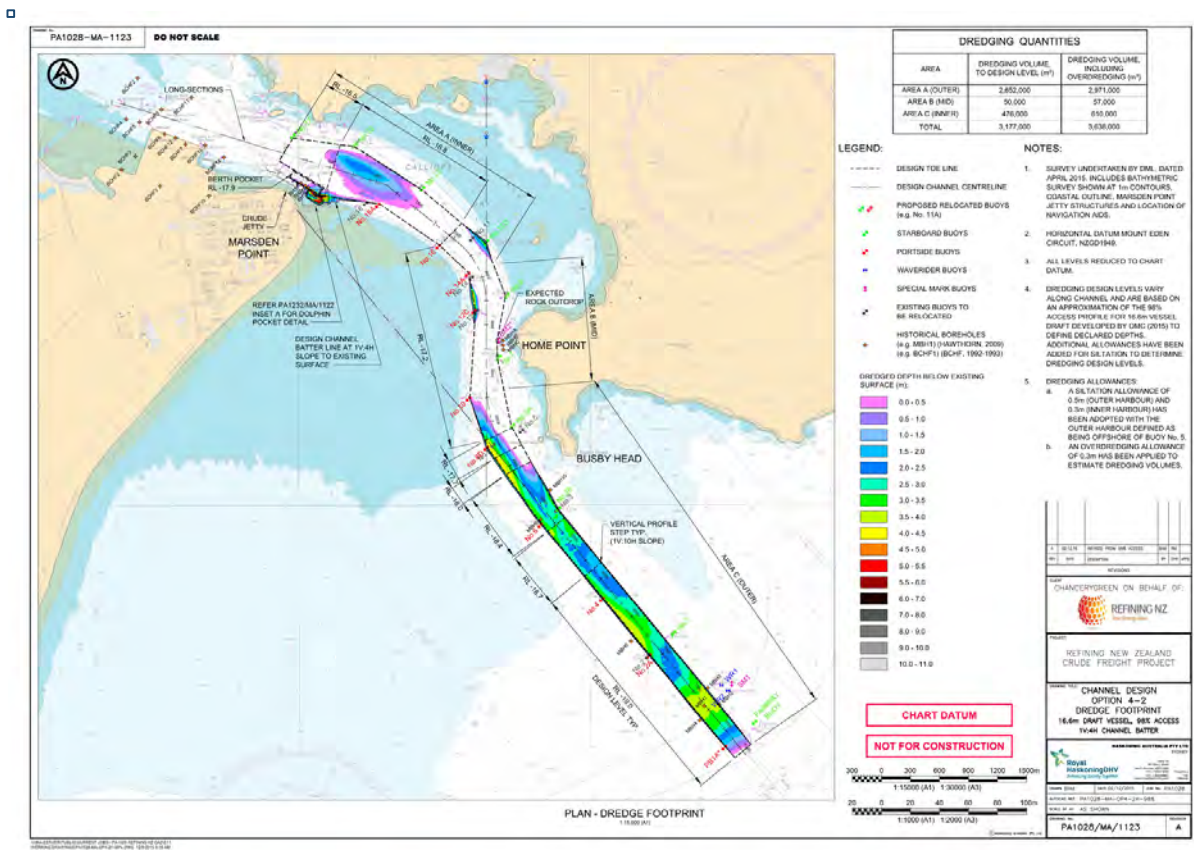


Figure 2. July Proposal for Option 4.2 showing the proposed areas of dredging (Royal Haskoning DHV: Refining NZ Crude Shipping Project Shipping Channel – Concept Design Report)

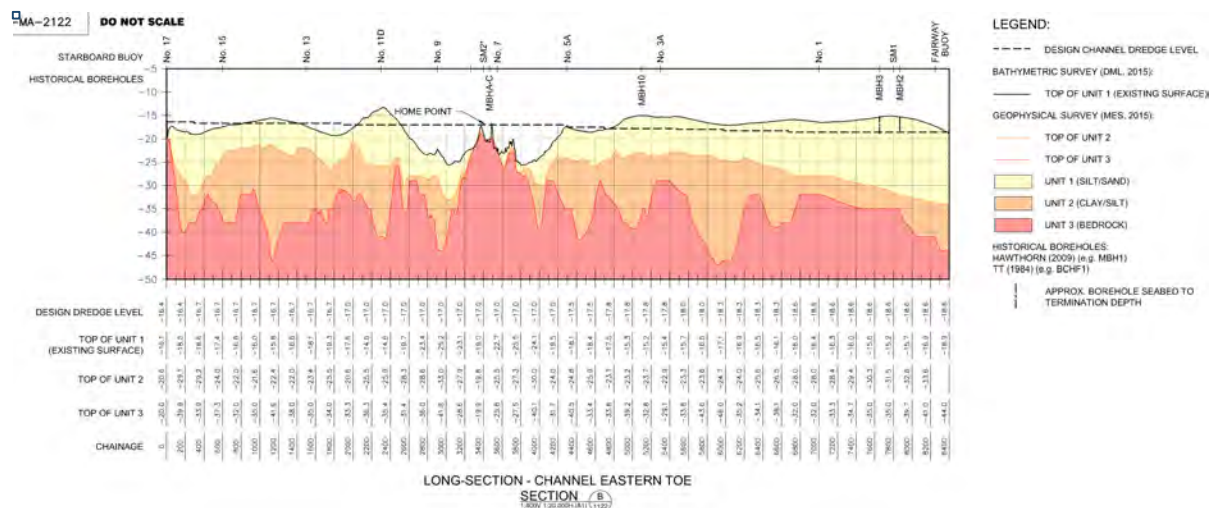


Figure 3. Long Section of Dredging showing the depth of proposed dredging and typical sea bed formations within and under the dredged corridor – comprising layers of: silt / sand; silt / clay & bedrock (Royal Haskoning DHV: Refining NZ Crude Shipping Project Shipping Channel – Concept Design Report)



RECEIVING  
ENVIRONMENT(S):

The receiving environments exposed to the proposed navigation channel would be much the same as those already exposed to the current tidal channel, including (see map overleaf):

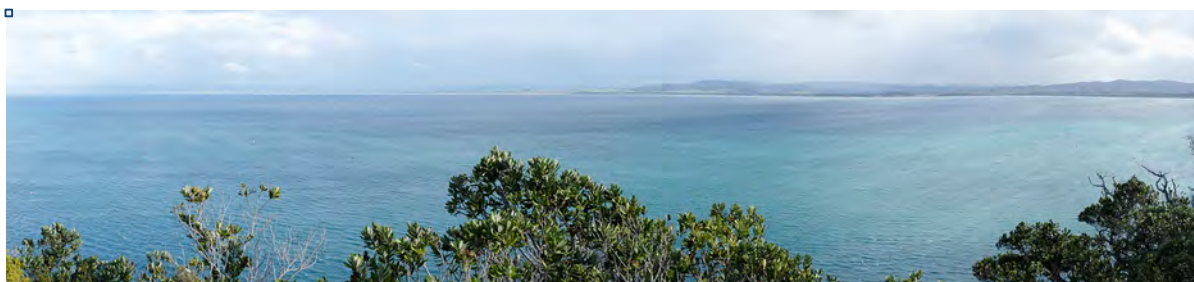
- the shoreline around Marsden Point and the oil refinery, extending down the Ruakaka coastline & past the Northport facilities towards One Tree Point;
- the margins and elevated vantage points of the DoC Reserve stretching from Bream Head to Home Point;
- the settlements of Reotahi, Little Munroe Bay, McGregors Bay, Taurikura Bay, McKenzie Bay and Urquharts Bay;
- associated public beaches;
- parts of Whangarei Heads Rd;
- the public tracks to and around Mt Lion, Taurikura, Mt Aubrey and Mt Manaia;
- the water areas of outer Whangarei Harbour and the northern half of Bream Bay



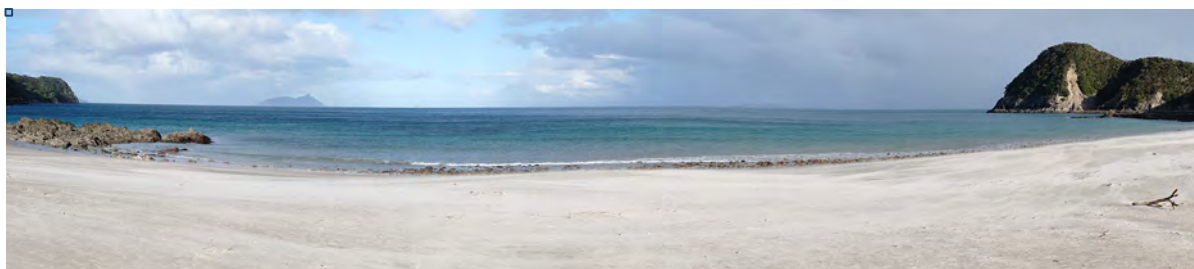
*Looking towards the current navigation channel within Whangarei Harbour from Reotahi (above) & Urquharts Bay (below)*



*Looking towards the current navigation channel off Busby Head – with Bream Head to the left of view*



*Looking towards the current navigation channel off Busby Head – with the Brynderwyn Hills to the right of view*



*Looking seaward & towards the current navigation channel from Smugglers Bay*

<p><b>AUDIENCES:</b></p>	<p>Those more likely to see the revised channel – if only because of its realigned buoys – include:</p> <ul style="list-style-type: none"> <li>▪ Boaties using the outer harbour and / or the northern half of Bream Bay;</li> <li>▪ Recreational users of Home Point, Busby Head and Smugglers Bay – within the DoC reserve extending across Mt Lion to Bream Head;</li> <li>▪ Residents within, and visitors to, the settlements of Reotahi, Little Munroe Bay, McGregors Bay, Taurikura Bay, McKenzie Bay and Urquharts Bay;</li> <li>▪ Those using the associated public beaches;</li> <li>▪ Those using the public tracks to and around Mt Lion, Taurikura, Mt Aubrey and Mt Manaia;</li> <li>▪ Those working at the Marsden Point Oil Refinery;</li> </ul> <p>In addition, it is conceivable that some of those living next to, or visiting, the margins of the Ruakaka and / or One Tree Point coastlines would be exposed to the new channel. In reality, however, it is doubtful that members of the public would notice any appreciable change within either Whangarei's outer harbour or Bream Bay.</p>
<p><b>EXISTING VALUES:</b></p>	<p><b>MODERATE / HIGH:</b> the landscape and natural character conditions of the harbour at and near Marsden Point are highly variable, combining natural headlands, volcanic peaks and forested areas with the oil refinery, deep water port, pockets of settlement and existing shipping lanes and berths. The outer reaches of Bream Bay – flanked by Bream Head and Mt Lion – together with Home Point, afford a more natural and highly appealing landscape setting for the proposed channel. Yet, this cohesion and 'unity of expression' diminishes elsewhere due to the residential occupation concentrated around Urquharts Bay, Taurikura and Reotahi, while the combined oil refinery and Northport facilities leave a much more industrial, utilitarian, 'stamp' on the outer Whangarei Harbour landscape as a whole.</p>

Underwater, Bio researchers' report (*Existing Environment Assessment: Ecology Of The Dredge Area – Whangarei Heads*) dated September 2016, summarises the underwater ecological habitats potentially affected by the channel developments at pages 37-39:

*Biota and sediment characteristics within and adjacent to the proposed dredge area have been defined by samples collected at 117 sites.....*

*The seabed photographs showed the presence of five distinctly different habitat types;*

- 1. Fine clean sand,*
- 2. Coarse sand with shell,*
- 3. Coarse shell gravel,*
- 4. Rocky reef,*
- 5. Sponge garden.*

*..... The fine sand habitat was the most common, most diverse, and dominated by smaller biota such as polychaete worms and amphipods.*

*The coarse sand habitat was present both seawards and inshore of Busby Head but differed slightly in composition inshore compared to seawards. Seawards of Busby Head the biota was dominated by the bivalve *Tawera spissa* and the primitive chordate, *Epigonichthys hectori*. Inside the harbour mouth the coarse sand habitat was dominated by the community defining bivalve *Venerupis largillierti* and juvenile gastropods.*

*The shell gravel habitat had a higher proportion of larger species than the sandy habitats. The species composition was different from the sandy habitats with 36 taxa only found in the shell gravel habitat. The community defining bivalve *Tucetona laticostata* and the primitive chordate, *Epigonichthys hectori* were abundant in the shell gravel seaward of Home Point, but almost absent inside the harbour mouth. Inside the harbour mouth the shell gravel had greater numbers of bivalves *Corbula zelandica* and *Venerupis largillierti* and juvenile gastropods.*

*The entire rocky reef and sponge garden habitat was located at Home Point and immediately up harbour from Home Point. The rocky reef habitat is significant within the harbour in that it is one of only three such subtidal reef habitat areas in the harbour mouth. That said the shallow reef area was typical of similar shallow reef habitats in north eastern New Zealand. Consequently it is locally but not regionally significant. While the deeper reef sponge garden habitat had higher numbers of schooling fish such as butterfly perch and snapper than typically seen, fish numbers were low at all other sites sampled. The sponge garden habitat had significant numbers of yellow finger sponges and grey sponges both of which are assumed to be relatively slow growing and this habitat would require a longer period of recolonisation if removed.*

*No species of marine invertebrates (worms, crustacea, molluscs, etc.) reported as present in the dredge area (Appendix 3) are listed as Threatened, At Risk or Not Threatened. Species of marine fish observed are similarly not listed Threatened, At Risk or Not Threatened. The habitats within the dredge area are therefore not considered to be of national significance. The rocky reef that extends from Home Point is locally significant in that it differs ecologically from the remainder of the dredge area which is all "soft" sediment environments. The Home Point habitat is similar to habitats located in the Motukaroro Island Whangarei Marine Reserve. Several habitats adjacent to the dredge area are considered to be of ecological significance. The Motukaroro Island Whangarei Marine Reserve immediately to the west of the dredge area by its definition as marine reserve is considered to be of national significance. The intertidal and shallow subtidal flats of Snake, Calliope and Mair banks are considered to be of regional significance based on the populations of shellfish present, and other non-marine species that are dependent on these habitats.*

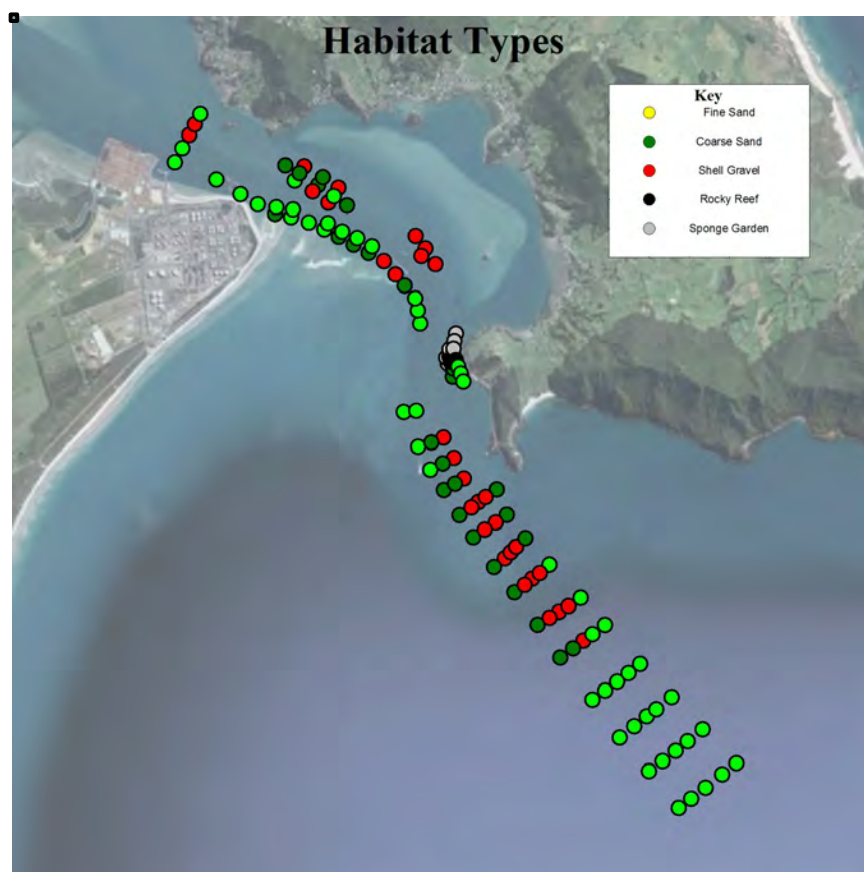
*Sediment chemistry and particle size were assessed at all sites to ascertain the risk associated with the disturbance of this material during dredging. The chemistry results were compared against the ANZECC interim sediment quality guidelines (where available). None of the surface sediment samples exceeded the ANZECC ISQG Low values with exception of Fluoranthene, Phenanthrene and Pyrene at site C26S. This minor exceedance at one site suggests that no adverse effects are expected to occur from the redistribution of sediments during dredging or from the disposal of the dredge spoil at a nearby marine disposal site.*

*Higher percentages of very fine sands and silts will likely result in greater plumes of sediment discoloured water at the point of dredging and at the disposal site. In addition there would be greater spread of fine sediments which could potentially*



smother some habitats, resulting in loss of or changes in biota. The proportion of very fine sand and silt is generally very low in the surface sediments in the proposed dredge area. The proportion of very fine sand is highest at the furthest extent offshore of the proposed dredge area (C01) and beyond (C00). Silt was only detected in abundance at two sites; C11M, mid channel adjacent to Frenchman Island. Both samples up and downstream from this site were considerably coarser, suggesting the sample was anomalous or the result of some peculiarity in the currents in this area.

Similarly silt was detected at site HP01 in the small bay between Home Point and Busby Head. Current flow data provided by Ocean Currents Ltd. (2015) showed that a counter current (eddy) is formed in this area on both the rising and falling tides; thus the deposition of silts is natural.



These findings reveal a seabed within the proposed channel that largely comprises broad layers of sand interposed with patches of gravels and sea shells. Most of this environment has a sparse, undifferentiated, character. It is relatively homogeneous, without a great deal of diversity and biotic content.

Even so, Bioresearchers' report also identifies an important 'rocky reef and sponge garden habitat' (one of only three such sub-tidal habitats in Whangarei Harbour) northeast of Home Point: the deeper sponge garden is important in terms of both its sponge colony and the high concentration of schooling fish within it. Consequently, if affected by channel formation, recolonisation of this part of the sea floor by fish species and other taxa would take longer than within the rest of the seabed affected by dredging. Most of the remaining sea floor near Home Point was, by contrast, more notable for its relatively low fish numbers and lesser sensitivity overall. The images (overleaf) are also extracted from Bioresearchers' assessment of the seabed and its aquafauna.

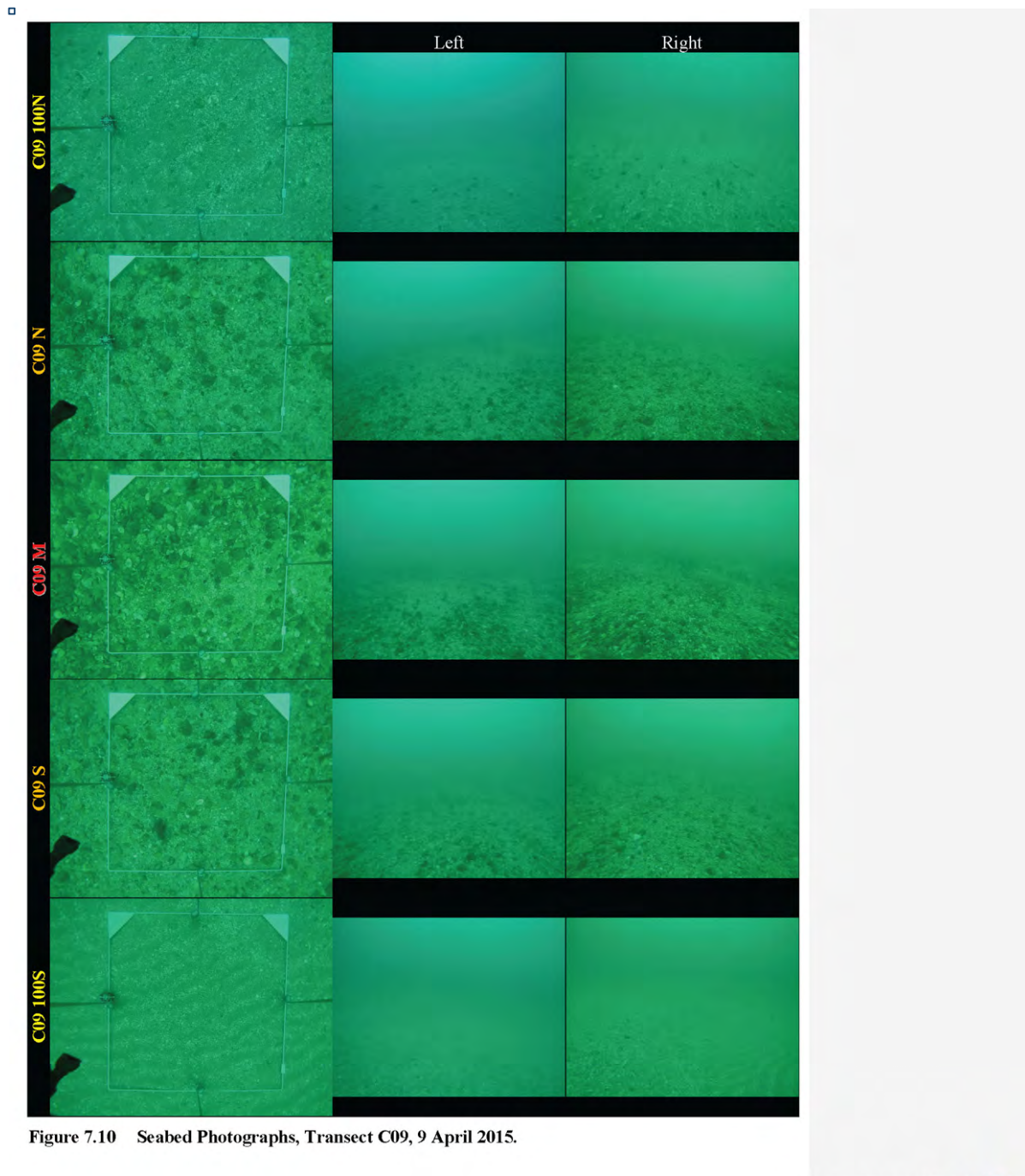


Figure 7.10 Seabed Photographs, Transect C09, 9 April 2015.

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**Bioresearches**  
A Babbage Company

*Typical sample of seabed video images captured by Bioresearches in their assessment of effects on marine biota – showing a sea floor dominated by sand, gravels and shell fragments: Transect C09 – located on the south side of the Inner Channel close to Mair Bank*

**PROMINENCE /  
VISIBILITY:**

**VERY LOW:** The outer harbour and northern Bream Bay are focal elements within the wider coastal landscape and environment. However, the natural tidal channel has little visual presence in its own right, with the channel markers that define its course largely 'lost' amid the array of man-made structures – from moored boats to the existing wharves and berthage dolphins – that already line the harbour margins. The oil refinery and port are commanding features within this landscape, while the sheer expanse and openness of Bream Bay – combined with the scale and grandeur of the volcanic landforms that overlook both it and Whangarei Harbour – diminish the current navigation markers to the point where they are insignificant components of the current coastal environment and landscape.



LANDSCAPE EFFECTS:	<p><b>VERY LOW:</b> The rearrangement of buoys within both the outer harbour and Bream Bay would make little, if any, difference to the current delineation of the navigation channel. For all intents and purposes, once dredged and re-marked, the channel would appear almost identical to that which exists at present. In addition, the relatively flat angle of viewing from most beaches and many lower lying areas of settlement means that the buoys are often viewed set against the highly modified coastline of Marsden Point and / or the landform of Home Point: their visual presence is currently quite limited and this likely to remain the case. Consequently, the proposal would have a limited effect in relation to the ONL values of Home Point.</p>
NATURAL CHARACTER EFFECTS:	<p><b>LOW / MODERATE:</b> There would be no significant change to the man-made elements (essentially buoys) that define the limits of the proposed navigation channel. As a result, any direct modification of natural character values above the sea surface would be very limited – as per the discussion of landscape effects (above).</p> <p>Underwater, MetOcean Solutions’ report shows that the sea floor around the northern to eastern edge of Mair Bank and along the southern edge of Calliope Bank would be subject to modification. The natural tidal channel would be reconfigured and extended to create an artificial formation, as is shown in the cross-sections and long-sections prepared by Royal Haskoning DHV. In effect, parts of the current channel would be extended laterally, deepened and ‘squared off’ – although the resulting side batters would have a natural angle of repose once given time to settle. Figure 2 highlights where this modification would be most pronounced: between the entry point to the channel in Bream Bay and Home Point, then on the final approach to the current ‘dolphins’ and unloading facilities.</p> <p>In a related vein, MetOcean Solutions report (<i>Crude Freight Project – Predicted Effects on the Physical Environment</i>, June 2016) concludes that off Marsden Point (p.iii &amp; iv):</p> <p><i>The proposed channel modifications are not expected to significantly change the governing sediment dynamics of the harbour entrance, and the existing complex asymmetries induced by the ebb and flood tidal flows will be maintained after deepening.</i></p> <p><i>The morphodynamics of Mair Bank are largely influenced by the bio-stabilisation provided by live shellfish and their residual shell fragments. This bio-stabilisation is expected to have a more significant effect on future evolution of the Bank than the effect of the proposed channel deepening. The studies undertaken here do not indicate that channel deepening will materially change the sedimentary outcomes on the Mair Bank.</i></p> <p><i>The sedimentary stability of Ruakaka Beach is not expected to be influenced by the slight variation in the wave conditions caused by channel deepening. However, enhanced wave refraction along the eastern ridge of the channel on the delta may increase the bed shear stress around Busby Head somewhat and Smugglers Bay in a lesser extent, although this not anticipated to disturb the stability of the sea bed, which is largely composed of sandy and shelly gravel and already occasionally subjected to 4 m wave height during storms.</i></p> <p><i>Sedimentation is expected to occur immediately adjacent to the Marsden Point jetty. Here, the tidal flows reduce and the tidal asymmetry is expected to promote infilling of the deepened areas over time at a relatively constant rate. While a reliable volumetric estimate is difficult to make with confidence, the likely evolution pattern will be of accretion from the southern shore. A degree of infilling at the toe of Mair Bank may occur where the channel has been realigned. These areas of sedimentation will require regular maintenance dredging to ensure on-going navigability.</i></p> <p><i>Infilling of the main channel south of Busby Head toward the distal margin is expected, and a programme of maintenance dredging will also be required here for ongoing navigability.</i></p> <p>Further, at p. 76 it is pointed out that:</p> <p><i>Subtle changes in the tidal and wave-driven currents over the eastern part of Mair Bank may result in zones of deposition and erosion on the toe of the Bank. Note the historical survey data have shown that this area is dynamic and natural bed variability of the order 0.5 m already occurs.</i></p> <p>In effect, the proposed dredging should have an appreciable impact on the morphology of the seabed at the mouth of Whangarei Harbour, although it will also be subject to changes generated by storm events and natural tidal sequences. Once the configuration of the seabed is modified, it is expected to naturally stabilise, although maintenance dredging will</p>

	<p>have to respond to on-going in-filling of the berthage area off Marsden Point, around the toe of Mair Bank and off Busby Head. Tonkin &amp; Taylor's February 2017 report also indicates that there may be some long term changes to Mair Bank, in particular (p.59):</p> <p><i>.....it is recognised that both the capital dredging and ongoing maintenance dredging may result in a net loss of sediment from the ebb tide shoal over time that may not be replenished from natural sources (refer Figure 5-1 and Figure 5-2). While the capital dredge volumes are small in comparison to the volume of sand stored in the ebb tide delta (around 2% of the estimated volume of the ebb tide shoal) and the expected maintenance dredging volumes are also small (between 0.03% and 0.07% of the estimated volume of the ebb tide delta), these net losses of sediment may result in a reduction in the total volume of the ebb tide shoal over time. Assuming full removal of both capital and maintenance dredging from the ebb tide delta over the 35 period of the consent, this would result in around 5.6M to 7.9Mm3 of sediment removal that equates to around 3.3 to 4.7% of the existing ebb tide delta volume.</i></p> <p><i>The reduction in volume could manifest in a reduction in level of the existing ebb tide shoal area (i.e. assuming the footprint of the shoal remains the same). However, it is more likely to result in both a reduction in level and a reduction in overall plan form size of the delta, as it would be expected that ongoing coastal processes would move sand towards the shoreline. An overall change in area and height would result in smaller observed changes than if only height was reduced.</i></p> <p>Bioresearchers' analysis confirms that most of the sea floor is dominated by medium-grain sands that this would limit the smothering of local marine habitats by dredging plumes and assist with the recolonisation of most of the sea bed. Other underwater effects would be limited by the sand-dominated, relatively depauperate, conditions within and around most of the channel corridor.</p> <p>In relation to the identified 'sponge garden' and, to a lesser degree, the adjoining 'rocky reef' habitat, it is clear that both lie outside the footprint of the era subject to dredging and channel formation. In addition, Refining NZ has agreed to manage the turbidity of the waters around the 'rocky reef and sponge garden' to ensure that neither is affected by the dredging operations. Consequently, the proposed channel formation would have no appreciable effect in relation to these regionally significant, and highly sensitive, habitats.</p>		
AMENITY EFFECTS:	<p><b>NONE:</b> there would be no appreciable change to the above water profile of the channel and the amenity associated with either the outer harbour or Bream Bay; changes to the configuration of the marker buoys would be insignificant once completed.</p>		
	<table> <tr> <td data-bbox="526 1234 734 1312">Impact Rating:</td><td data-bbox="734 1234 1458 1312">LOW / MODERATE</td></tr> </table>	Impact Rating:	LOW / MODERATE
Impact Rating:	LOW / MODERATE		

## 4.2 SAND DISPOSAL

The two sites proposed for sand disposal are both located within the centre of Bream Bay, some 3.5km and 10.9km offshore of the Ruakaka coastline and some 1.8km south and 6km southeast of Busby Head. Up to 97.5% of the 3,700,000m<sup>3</sup> of material dredged from the new channel would be disposed of at Site 3.2 ('offshore') as part of the Capital Dredging programme, while the remaining material – up to 2.5% – would be disposed of at Site 1.2 ('inshore'). Once the capital works are completed, maintenance dredging and disposal would also be required.

Site 3.2 would cover some 2.5km<sup>2</sup>, with a maximum area of 5.75 km<sup>2</sup> defining the outer limit of the area within which sediment is expected to settle. This area is situated around 45m below Chart Datum, south-east of the proposed Dredge Channel, and has been sized to accommodate all of the capital and maintenance dredging proposed for the 35 year duration of the consent period. The resulting 'placement mound' for capital dredging would have an average height of approximately 1.5m, although this could periodically rise to a maximum of 4.0m in places. Site 1.2 would also cover an area some 2.5km<sup>2</sup> of the seabed and would be located at the southern end of Whangarei Harbour's ebb tidal delta at a depth of 7m to 15m chart datum.

Area 1- 2 is designed to enable placed sediment to be slowly transported inshore during higher energy wave events to maintain sediment volumes within the ebb delta, and would be large enough to provide a range of locations for targeted placement of the dredge material. It seems likely that this would result in targeted areas having average placement depths of around 0.6 m across 250,000m<sup>2</sup> at any one time, or 10% of the total disposal area.

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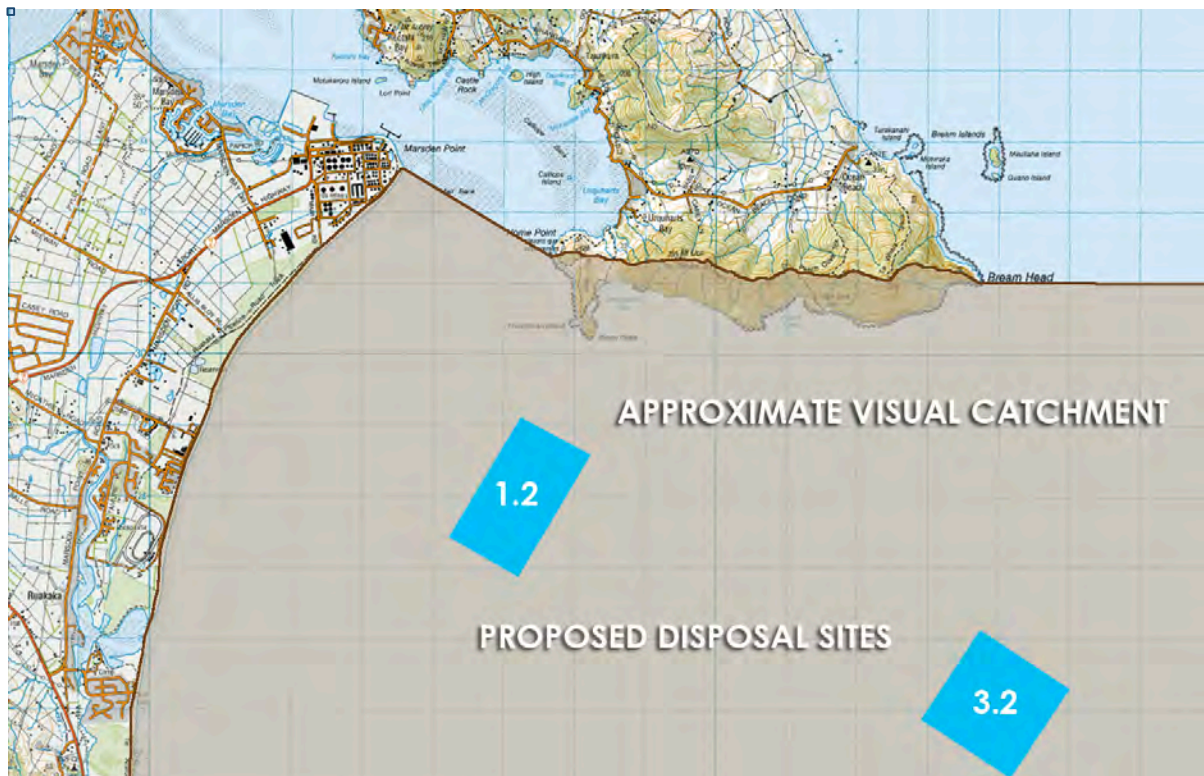
The two sites proposed for sand disposal are both located within the centre of Bream Bay, some 3.5km and 10.9km offshore of the Ruakaka coastline and some 1.8km south and 6km southeast of Busby Head. Up to 97.5% of the 3,700,000m<sup>3</sup> of material dredged from the new channel would be disposed of at Site 3.2 ('offshore') as part of the Capital Dredging programme, while the remaining material – up to 2.5% – would be disposed of at Site 1.2 ('inshore'). Once the capital works are completed, maintenance dredging and disposal would also be required.

Site 3.2 would cover some 2.5km<sup>2</sup>, with a maximum area of 5.75 km<sup>2</sup> defining the outer limit of the area within which sediment is expected to settle. This area is situated around 45m below Chart Datum, south-east of the proposed Dredge Channel, and has been sized to accommodate all of the capital and maintenance dredging proposed for the 35 year duration of the consent period. The resulting 'placement mound' for capital dredging would have an average height of approximately 1.5m, although this could periodically rise to a maximum of 4.0m in places. Site 1.2 would also cover an area some 2.5km<sup>2</sup> of the seabed and would be located at the southern end of Whangarei Harbour's ebb tidal delta at a depth of 7m to 15m chart datum.

Area 1- 2 is designed to enable placed sediment to be slowly transported inshore during higher energy wave events to maintain sediment volumes within the ebb delta, and would be large enough to provide a range of locations for targeted placement of the dredge material. It seems likely that this would result in targeted areas having average placement depths of around 0.6 m across 250,000m<sup>2</sup> at any one time, or 10% of the total disposal area.

RECEIVING  
ENVIRONMENT(S):

The main receiving environment likely to be exposed to disposal vessels and activity plumes is Bream Bay itself, and in particular, those parts of the central to northern bay utilised for recreational fishing and boating (see below). Yet, even within this area, most boaties and other users of Bream Bay would find it very difficult to differentiate disposal activities from more general boating and shipping activity unless very close to the area of disposal.







*Looking out across central Bream Bay from the Ruakaka Surf Club (above & below)*



*The outlook from the southern side of Home Point towards Disposal Sites 1.2 & 3.2 south to southeast of the proposed navigation channel*



*The outlook from the western side of Home Point towards Disposal Site 1.2 south of the proposed navigation channel*

AUDIENCES:	Those more likely to see sand disposal operations comprise recreational boaties traversing Bream Bay to and from Whangarei Harbour or the Hen and Chicken Islands.
EXISTING VALUES:	<p><b>HIGH / MODERATE:</b> the landward margins of Bream Bay are highly modified, containing pockets of residential development, including baches and beach houses, together with the oil refinery, the former Marsden B Power Station site, the Ruakaka Race Course, an industrial park, the local sewerage treatment plant and ponds, two camping grounds and the Waipu Cove Golf Club.</p> <p>Even so, the dunes and beachfront directly facing, and physically abutting, Bream Bay has been identified as an ONL in the RPS, with the narrow dune corridor behind the beach and lagoons at the mouth of the Ruakaka and Waipu Rivers anchoring this area. The dune system provides a buffer between the beachfront and its developed hinterland, with both the seaward edge of the dunes and the beachfront ‘in front of it’ offering spectacular views out over the expanse of Bream Bay to the Hen and Chicken Islands and the spectacular sequence of volcanic peaks clustered around Mt Lion and Bream Head.</p> <p>Notwithstanding the more utilitarian components of this coastal landscape, Bream Bay therefore retains a powerful focus on its least modified component – the sea – and the amalgam of islands and jagged peaks that frame Bream Bay.</p>

PROMINENCE / VISIBILITY:	<b>VERY LOW:</b> Views to the disposal vessel from most of the land areas near Ruakaka and Home Point (stretching through to Bream Head) would be over distances of 1.8-3.5km and 6.1-10.9km to the maintenance and capital dredging sites, respectively. This, together with low viewing angles, would limit exposure to the disposal operations, from most quarters.	
LANDSCAPE EFFECTS:	<p><b>VERY LOW:</b> The only discernible ‘effect’ associated with sand disposal would be the location of a vessel within the broad expanse of Bream Bay and the placement of sand down on the seabed. It is doubtful that either the disposal vessel or disposal process would have a significant visual presence, given the viewing distances indicated above.</p> <p>Viewed from other vessels traversing Bream Bay, the dredging vessel and disposal operations would be more obvious. But they would not be so dissimilar to other maritime activities within the Bay – associated with the passage of vessels to and from the oil refinery and Northport facilities – that they would appreciably alter perceptions of Bream Bay. To a certain extent, the dredging vessel would also become a ‘known’ part of the sea environment by locals, but would not greatly disturb the more important characteristics and values of Bream Bay.</p> <p>As a result, it is anticipated that the dredging vessel and sand disposal would have a quite limited impact on perceptions of the Bream Bay landscape.</p>	
NATURAL CHARACTER EFFECTS:	<p><b>LOW:</b> The above water effects of disposal operations would be largely restricted to awareness of an additional vessel within Bream Bay on a regular basis. At worst, this would add to the incursion of man-made vessels into the local maritime environment, resulting in a very slight diminution of its naturalness in absolute terms. Yet, such effects would be essentially small scale and incremental, given the sheer scale and expansive qualities of Bream Bay.</p> <p>Underwater, disposal would create layers and mounds of material that merge seamlessly with the relatively homogeneous sand floor found at both disposal sites. Wave and tidal action would help to disperse the mounds so that they physically coalesce with the existing sea floor.</p>	
AMENITY EFFECTS:	<b>VERY LOW:</b> Taking into account the various factors discussed in relation to Landscape and Natural Character Effects, it is considered that disposal at both sites would have a low public profile and would scarcely affect perceptions of Bream Bay’s character, identity and sense of place.	
	Impact Rating:	LOW

## 4.3 LEAD LIGHTS NEAR TAURIKURA

### DESCRIPTION OF PROPOSAL:

The following specifications have been supplied by Refining NZ and accords with the description of proposed Lead lights at pages 43 and 44 of DHV Royal Haskoning's report: *Refining NZ Crude Shipping Project Shipping Channel – Concept Design Report*:

#### Taurikura Front Lead:

<i>Position:</i>	<i>35° 50.375 S, 174° 31.293 E</i>
<i>Height:</i>	<i>8.7m above chart datum, 6.0m above Mean High Water Spring</i>
<i>Width:</i>	<i>600mm diameter</i>
<i>Construction:</i>	<i>Tubular steel with steel ladder and basic 1.2m x 1.2m platform for equipment</i>
<i>Colour:</i>	<i>Rescue Orange front (2m x 500mm stripe) facing 180° S, remainder of the tower light cloud grey (BS5252 colour Y81-011-082)</i>
<i>Light:</i>	<i>Day/night range light VLB-91 of 3nm</i>

**Photo 1** shows one of 39 similar designs being used on the Whangarei Harbour. Each of the existing beacons is 5-6m in height above Chart Datum (an average 2.8m above MHWS), and of the same proposed construction as the Taurikura Front Lead.

#### Taurikura Rear Lead:

<i>Position:</i>	<i>35° 49.990 S, 174° 31.293 E</i>
<i>Height:</i>	<i>15.7m above chart datum, 13.0m above Mean High Water Spring</i>
<i>Width:</i>	<i>850mm diameter</i>
<i>Construction:</i>	<i>Tubular steel, two 6m enclosed ladders with platform at each level. Bottom platform, 850mm x 850mm and the top platform 2m x 1.8m for equipment.</i>
<i>Colour:</i>	<i>Rescue Orange front (4m x 750mm stripe) facing 180° S, remainder of the tower light cloud grey (BS5252 colour Y81-011-082)</i>
<i>Design:</i>	<i>As per <b>Photo 2</b>: the lead shown has the light head elevated 19m above Chart Datum; whereas the light on proposed design would be 15.7m above Chart Datum</i>
<i>Light:</i>	<i>Day/night range light VLB-91 of 5nm</i>

**Photo 2** is of a Lead called "Skips Rocket" that is currently sited near Limestone Island in the Upper Whangarei Harbour. It is employed as the 'Shell Cut Inbound Rear Lead'. This structure is 19m high (16.3m above MHWS) at chart datum to the light and 21m at chart datum (18.3m above MHWS) to the top. It has the same design specification as the proposed Taurikura Rear Lead.

Both proposed Leads would be located on the northern side of the proposed navigation channel: the Front Lead some 1150m from McKenzie bay and 1450m from Taurikura Bay – on the southern edge of Calliope Bank – and the Rear Lead some 740m from Taurikura Bay. Both lights would oriented towards the navigation channel, with their lights facing southwards, away from Little Munroe Bay, McGregors Bay, Taurikura Bay and McKenzie Bay.

In addition, they would both have a very slender, vertical profile, not unlike a power pole when viewed over any distance, although their yellow and yellow-orange colouring would set them somewhat apart from such structures. The actual light heads and reflectors would be largely absorbed by the pole structure and ladders attached to the Rear Lead, in particular.



**Photo 1. A Front Lead as proposed for Taurikura at the outer, southern, edge of Calliope Bank 1450m from Taurikura Bay**



**Photo 2. "Skips Rocket" off Limestone Island – as proposed for the inner side of Calliope Bank some 740m offshore of Taurikura Bay**

#### RECEIVING ENVIRONMENT(S):

The receiving environments exposed to the proposed navigation channel would be much the same as those already exposed to the current tidal channel, including (see map overleaf):

- the settlements of Taurikura Bay, McKenzie Bay and – to a lesser degree – Urquharts Bay;
- associated public beaches; and
- the water areas of outer Whangarei Harbour.

Other areas that would be theoretically exposed to the Leads, but which, in reality, would offer only distant and / or fragmented views to them include:

- the shoreline around Marsden Point and the oil refinery;
- the margins and elevated vantage points of Home Point;
- parts of Whangarei Heads Rd; and
- the public tracks on Taurikura, Mt Aubrey and Mt Manaia.





***Looking towards the locations of the proposed Leads from the western (above) & eastern ends of Taurikura Bay (below)***



***Looking towards the locations of the proposed Leads from McKenzie Bay***

#### **AUDIENCES:**

Those more likely to see the proposed Leads include:

- Residents within, and visitors to, the settlements of Taurikura Bay, McKenzie Bay and, possibly, Urquharts Bay;
- Those using the associated public beaches; and
- Boaties using outer Whangarei Harbour.

In addition, some of the following might be able to obtain distant and / or fragmentary views of the Leads:

- Recreational users of Home Point, Busby Head and Smugglers Bay – within the DoC reserve extending across Mt Lion to Bream Head;

	<ul style="list-style-type: none"> <li>Those using the public tracks to and around Mt Aubrey, Taurikura and Mt Manaia; and</li> <li>Those working at the Marsden Point Oil Refinery.</li> </ul>
<i>EXISTING VALUES:</i>	<p><b>MODERATE / HIGH:</b> As is explained in relation to the Navigation Channel Assessment (Section 4.1), the landscape and natural character conditions of the harbour at and near Marsden Point are highly variable, combining natural headlands, volcanic peaks and forested areas with the oil refinery, deep water port, pockets of settlement and existing shipping lanes and berths. The outer reaches of Bream Bay – flanked by Bream Head and Mt Lion – together with Home Point afford a more natural and highly appealing landscape setting for the proposed channel. However, this cohesion and ‘unity of expression’ diminishes elsewhere due to the residential occupation concentrated around Urquharts Bay, Taurikura and Reotahi, while the combined oil refinery and Northport facilities leave a much more industrial, utilitarian, imprint on the outer Whangarei Harbour landscape.</p> <p>On the other hand, it is important to recognise that Taurikura Bay is the focus for significant recreational use, especially over the summer months and its caters to year-round use by a sizeable residential community. Nearby McKenzie Bay has a much smaller community of users, but also enjoys a relatively high level of appeal and amenity in its own right.</p> <p>In addition, both the proposed Leads would sit within part of the harbour environs and on part of Calliope Bank that is identified (in the Northland RPS) as having high natural character in the Northland Regional Policy Statement.</p>
<i>PROMINENCE / VISIBILITY:</i>	<p><b>LOW / VERY LOW:</b> The <u>Front Lead</u>, located some 1150m from McKenzie Bay and 1450m offshore of Taurikura Bay would be all but invisible, due to its ‘pencil’-like profile and its mid-harbour location set (in most views) against the backdrop of the oil refinery’s complex industrial matrix and the landforms of both Marsden Point and Home Point.</p> <p>The <u>Rear Lead</u> would sit more directly offshore of a more heavily used, Taurikura Bay. It would be framed, visually, by the headlands at each end of the Bay, together with High Island, to the west, and a more distant Home Point to the east. However, viewed at a distance of some 740m from Taurikura’s beachfront the Rear Lead would appear to rise just 2.5cm above MHW<sup>1</sup>, while the Lead’s width would approximate that of a distant yacht’s mast. It would, however, be considerably shorter than the masts on the yachts shown moored off Taurikura Bay (above).</p> <p>Viewed from the eastern end of Taurikura Bay or parts of McKenzie Bay the Lead would merge seamlessly with the distant structures of the oil refinery, whereas when viewed from the western end of Taurikura Bay it would emerge as a finely wrought, structure that sits within the harbour’s water area, but is substantially ‘lost’ amid the masts of vessels moored closer to the shoreline (see photos above), as well as against the more remote backdrop of the Brynderwyn Hills and the margins of Marsden Point.</p> <p>In more dynamic views from vessels passing Calliope Bank, the <u>Front Lead</u>, especially, would be more apparent (as it is meant to be), but it would comprise one of a sequence of navigation structures – more than 40 markers and lights in total – that mark the lanes to and from the Port of Whangarei and the Town Basin. The outer harbour is also flanked by Northport’s wharves and operational area, the oil refinery and its dolphins, and the sequence of residential development both at One Tree Point / Marsden Bay and strung along the northern reaches of the harbour. Consequently, the Leads would be visible, but are unlikely to be particularly prominent. Even at night-time, their reflectors would focus on the shipping channel, away from Taurikura Bay and the other settled beaches lining the northern side of the harbour.</p>

<sup>1</sup> Perceived scale is a function of height divided by distance. Allowing for parallax – which accommodates the curvature of the Earth – would reduce this apparent height even further, albeit to a very slight degree.

<i>LANDSCAPE EFFECTS:</i>	<b>VERY LOW:</b> Both Leads would have an extremely limited, to inconsequential, effect on the landscape values of Taurikura Bay, McKenzie Bay and the outer harbour.	
<i>NATURAL CHARACTER EFFECTS:</i>	<b>VERY LOW:</b> Both Leads would have an extremely limited, to inconsequential, effect on the natural character values of Taurikura Bay, McKenzie Bay and the outer harbour, and the Calliope Bank HNC area overall.	
<i>AMENITY EFFECTS:</i>	<b>VERY LOW:</b> Both Leads would have an extremely limited, to inconsequential, effect on the amenity values of Taurikura Bay, McKenzie Bay and the outer harbour.	
	<b>Impact Rating:</b>	<b>VERY LOW</b>

## 4.4 A NEW LATERAL MARKER OFF HOME POINT

### DESCRIPTION OF PROPOSAL:

The proposed lateral marker to be located on an exposed rock outcrop directly west of Home Point would be appreciably smaller than the Leads just discussed (DHV Royal Haskoning's report: Refining NZ Crude Shipping Project Shipping Channel – Concept Design Report; pp.24 & 45). As shown in **Photo 3**, it would comprise a 250mm diameter tubular steel, pole that is 4.5m high – above chart datum, approximately 1.8m above MHWS. A triangular marker would be attached to the top of the pole, together with a small light.



*Photo 3. – typical lateral marker of the kind proposed off Home Point*

### RECEIVING ENVIRONMENT(S):

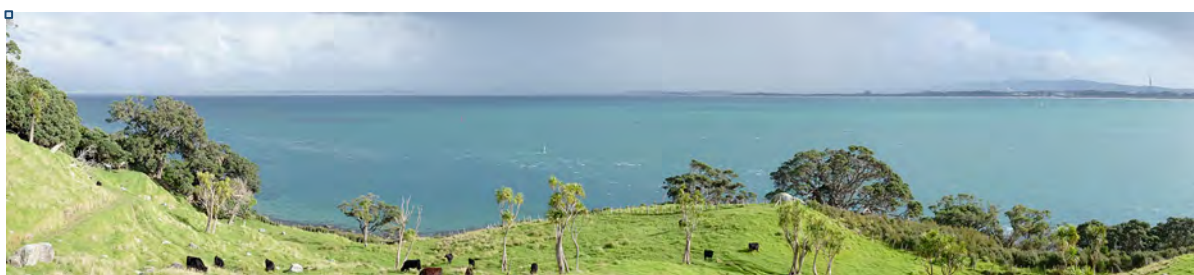
The receiving environments theoretically exposed to the proposed navigation marker next to Home Point would be similar to the areas exposed to the proposed Leads, including (see map overleaf):

- Home Point Reserve, especially near the historic gun emplacements and immediately west to southwest of them;
- the settlements of McKenzie Bay and Taurikura Bay;
- associated public beaches; and
- the water areas of outer Whangarei Harbour.

Other areas that would be theoretically exposed to the Leads, but which, in reality, would offer only distant and / or fragmented views to them include:

- the shoreline around Marsden Point and the oil refinery;
- the more distant settlements and beaches at McGregors Bay and Little Munroe Bay;
- parts of Whangarei Heads Rd; and
- the public tracks on Taurikura, Mt Aubrey and Mt Manaia.





*Views up Whangarei Harbour from near the Home Point gun emplacements, which could reveal the proposed marker (both above)*



*The outlook from the western side of Home Point; the proposed lateral marker is unlikely to be visible from this part of the reserve (both above)*

<p><i>AUDIENCES:</i></p>	<p>Those more likely to see the proposed lateral marker include:</p> <ul style="list-style-type: none"> <li>▪ Recreational users of the reserve at Home Point; and</li> <li>▪ Boaties using outer Whangarei Harbour.</li> </ul> <p>In addition, some of the following might be able to obtain distant and / or fragmentary views of the lateral markers, although it is likely to be faintly visible at best:</p> <ul style="list-style-type: none"> <li>▪ Residents within, and visitors to, the settlements of Taurikura Bay, McKenzie Bay and – perhaps – parts of McGregors Bay and Little Munroe Bay;</li> <li>▪ Those using associated public beaches; and</li> <li>▪ Those using the public tracks to and around Mt Aubrey and Taurikura; and</li> <li>▪ Those working at the Marsden Point Oil Refinery.</li> </ul>
<p><i>EXISTING VALUES:</i></p>	<p><b>HIGH:</b> As is explained in relation to the Navigation Channel Assessment and Leads (Sections 4.1 and 4.3), the landscape and natural character conditions of the harbour at and near Marsden Point are highly variable, combining natural headlands, volcanic peaks and forested areas with the oil refinery, deep water port, pockets of settlement and existing shipping lanes and berths. Although, the outer reaches of Bream Bay – flanked by Bream Head, Mt Lion and Home Point – afford a more natural and highly appealing landscape setting for the proposed channel, this cohesion and ‘unity of expression’ diminishes elsewhere due to the residential occupation concentrated around Urquharts Bay, Taurikura and Reotahi. Moreover, the combined oil refinery and Northport facilities leave a much more industrial, utilitarian, imprint on the outer Whangarei Harbour landscape. Home Point also contains the remains of WWII gun emplacements that leave a somewhat different type of cultural / man-made mark on the local landscape; one that is entirely positive in terms of Heritage Associations, but less so in respect of the area’s natural character.</p> <p>Even so, Home Point is part of a sequence of more natural landscapes that are experienced at the southern terminus of the Whangarei Heads, extending through to Busby Head, Mt Lion, and Bream Head. This, combined with the area’s considerable aesthetic appeal, expressiveness, and other values, provide the basis for its ONL status, while the remote and wild nature of the coastline along the outer edge of the DoC reserve sets it apart from the typically more tranquil and modified confines of Whangarei Harbour.</p> <p>As a result, the proposed navigation marker would sit within part of Home Point’s coastal environment that is identified as having high natural character value within the Northland Regional Policy Statement.</p>
<p><i>PROMINENCE / VISIBILITY:</i></p>	<p><b>VERY LOW:</b> The proposed lateral marker would sit well below the main planes of viewing from Home Point and, in particular, the elevated tracks and area around the gun emplacements. It would only become visible if and when those visiting Home Point set out to either clamber down the steep escarpment at the coastal edge or glimpse it through bush and mature pohutukawas along the cliff-line near the old bunkers and observation point.</p> <p>The lateral marker would theoretically be visible from a series of bays to the north and northeast, as well. However, its thin profile and small overall size, together with its close association with the rising profile of Home Point would render it all but invisible from most such vantage points. Even in comparison with the yachts and other leisure craft commonly moored in nearby Urquharts Bay, its scale would be diminutive, and it would often be viewed set against the backdrop of Home Point’s varied, rocky shoreline.</p> <p>In more dynamic views from passing vessels, it would be more apparent, especially from those straying closer to the rock outcrops fringing the DoC reserve. Yet, as with the Leads, it comprises one of the 40 or more navigation markers that line the shipping lanes between Bream Bay and the Port of Whangarei and nearby Town Basin. Further contextualised by the oil refinery, its berthage area and the sequence of residential development strung along the northern reaches of the harbour, it is most unlikely that the marker would have any real prominence or visual presence. At night-time, its light would be low powered, and the marker’s physical separation from most nearby settlements, combined with its screening by the land mass of Home Point, would limit any effects to a very low level.</p>

<i>LANDSCAPE EFFECTS:</i>	<b>NONE:</b> The lateral marker would have no appreciable impact on the Landscape values of Home Point and its DoC reserve, or the wider harbour / Bream Bay coastline, nor would it affect the adjoining Home Point ONL.	
<i>NATURAL CHARACTER EFFECTS:</i>	<b>VERY LOW:</b> The lateral marker would, in absolute terms, very slightly reduce the natural character content and values in the vicinity of Home Point, by incrementally adding to the array of structures both within and next to the harbour's water area. Yet, this change would be so slight that it is doubtful that it would have any appreciable impact on the wider natural character values of the outer harbour and its margins, or those of Bream Bay. Consequently, it would have a minimal effect on the Home Point HNC area.	
<i>AMENITY EFFECTS:</i>	<b>NONE:</b> Public appreciation of Home Point and its coastline, including the reserve's identity and sense of place, would not be appreciably altered by the physical presence of the proposed marker.	
	<b>Impact Rating:</b>	<b>NONE</b>

## 4.5 PLUMES ASSOCIATED WITH DREDGING & DISPOSAL

### DESCRIPTION OF PROPOSAL:

The processes of dredging and disposal would result in some spillage of extracted material, resulting in the creation of colloidal plumes around the vessel(s) undertaking dredging and deposition. MetOcean Solutions Ltd has modelled a range of types of plume associated with different forms of dredging. At p.102 and 103 of their report, the following conclusions are reached:

*The modelling of the dredging plumes has showed that:*

- *The sediment plumes associated with dredging and caused by the action of the drag head (TSHD) are predicted to remain constrained within the lower water column, with negligible expression at mid-water and surface levels. In contrast, the sediment plumes associated with the overflow phase are predicted to be spread across the entire water column.*
- *The resultant plumes from either source are predicted to follow the general channel alignment, consistent with the tidal currents. The maximum modelled excursion of any plume did not exceed 1200 m, with the plume constrained to the channel. The modelling shows no evidence of plume dispersion to the adjacent beaches, sand banks, Marine 1 (Protection) Management Areas or Marine Reserves.*
- *The modelling shows that the large TSHD generates more extended and concentrated plumes than the smaller vessel. The overflow duration has a significant effect on the magnitude and extent of the plumes.*
- *The sediment plumes associated with dredging and caused by the action of the rotating cutter head (CSD case) are predicted to remain constrained within the lower water column, with no expression at mid-water and surface levels.*
- *The sediment plumes associated with dredging and caused by the excavation, hoisting and slewing phases (BHD case) are expected to generate sediment losses over the entire water column. The low production rate associated with the BHD lead, however, to a low discharge rate compared to the TSHD case.*
- *Comparisons between plumes generated for the existing channel and the post-dredging scenario indicates that the plume excursions will decrease slightly as the channel becomes deeper due to the slightly reduced tidal velocities.*
- *No plume dispersion extending to the adjacent beaches, sand banks, Marine 1 Management Areas and Marine Reserves were generated by the dredging plume modelling for any of the dredge scenarios.*

Turning to the issue of plumes within and around the disposal sites, MetOcean's modelling further indicates that (p.121):

*The predicted SSC [suspended solid concentrations] plumes clearly follow a northeast-southwest axis, which was expected given the current climate at the disposal ground ..... Surface plumes are insignificant and the SSC progressively increases with increasing depth due to the rapid settlement of the sediments through the water column. The simulations suggest that the mid water plume may extend about 500 m from the release location for both the small and the large dredge, to the minimum concentration threshold of 12 mg/L. However, most of the plume is constrained within a radius of 50 and 100 m for the small and the large dredge, respectively. Notably, the highest SSC levels within the lower water column are predicted to the southwest of the disposal ground; consistent with the flow regime being biased to this octant. The plumes do not show significant differences in extent or direction between sites inside the disposal ground. At site PW, the closest to the 3 Mile Reef [at the proposed channel entry in Bream Bay], it is important to note that the plume does not intersect with the reef area, and the probability of a plume reaching the reef is considered very low.*



*As a form of corroboration, a disposal plume modelling scenario was also undertaken using the current velocity profiles recorded inside the proposed disposal ground from 15 January to 5 March, 2016. For this scenario, the plume results for both the large and the small vessels over a 24 h period exhibit a different behaviour ..... likely due to the shorter duration and the particular weather patterns at the time. Nonetheless, the results show less dispersion than the longer term modelling and no evidence of trajectory over the reef to the west of the disposal ground. .... We therefore conclude that even taking into account this bias there is a very low probability of the plume reaching 3 Mile Reef.*

As a result, it is anticipated that plumes will generally be limited to the more immediate confines of the areas subject to dredging and disposal operations. The rapid tides past Marsden Point would help to keep dredging plumes within the main tidal channel – effectively stretching them out, but keeping them well away from local beaches – while the more limited plumes around disposal vessels would often remain below the sea surface. The MetOcean Solutions Ltd report also confirms that the medium-grain sands that dominate the sea floor at Marsden Point would further assist settlement of any suspended material, and because of both tidal dilution and relatively rapid settlement, most plumes are likely to be of relatively short duration.



***View of current maintenance dredging (under a separate resource consent) from Mt Aubrey:  
80mm telephoto lens – January 2017***



*View of current maintenance dredging (under a separate resource consent) from Taurikura:  
50mm (standard) lens – January 2017*



*View of current maintenance dredging (under a separate resource consent) from Little Munroe Bay:  
50mm (standard) lens – January 2017*



RECEIVING  
ENVIRONMENT(S):

The receiving environments / catchments theoretically exposed to dredging plumes would be very similar to those identified in relation to the proposed navigation channel / shipping lane: (see map overleaf):

- the water areas of outer Whangarei Harbour and the northern half of Bream Bay; and
- the margins and elevated vantage points of the DoC Reserve stretching from Bream Head to Home Point.

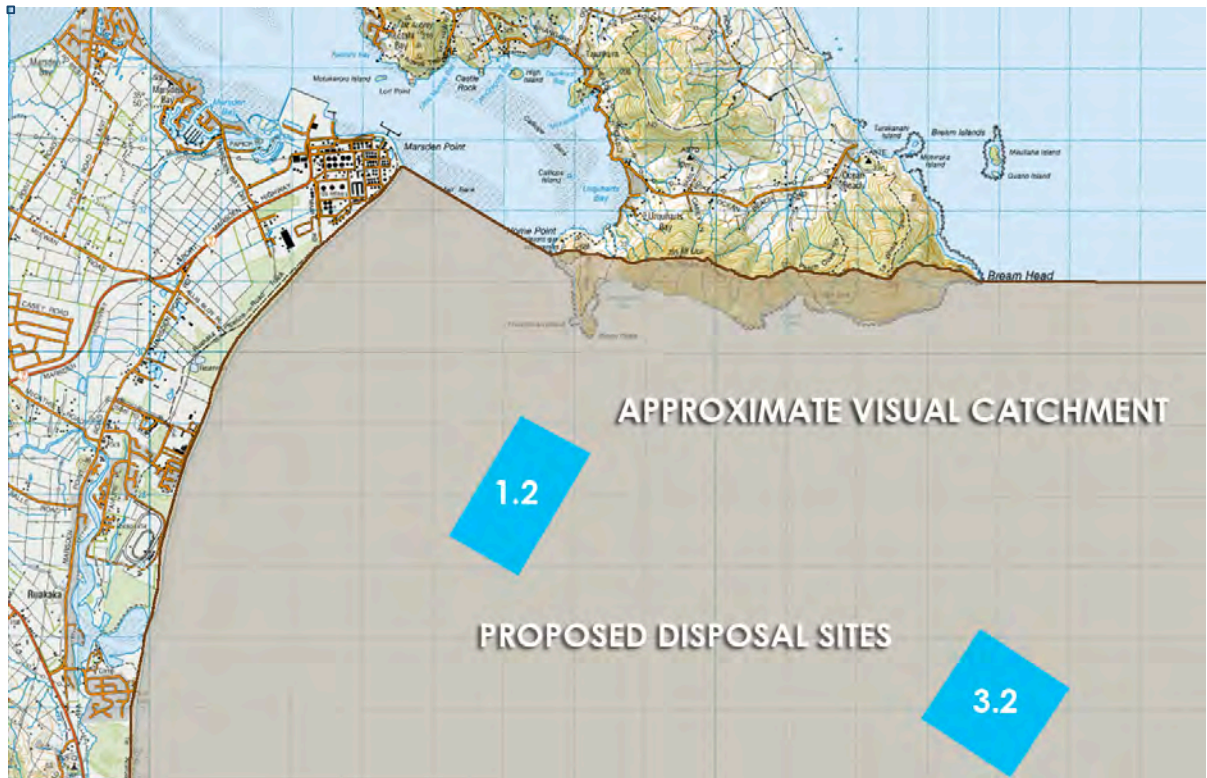
It might also be possible that other areas would be exposed to the dredging plumes, as set out below, although it is less likely that views from these locations would differentiate plumes from the surrounding mass of water within the outer harbour and Bream Bay:

- the shoreline around Marsden Point and the oil refinery, extending down the Ruakaka coastline & past the Northport facilities towards One Tree Point;
- the settlements of Reotahi, Little Munroe Bay, McGregors Bay, Taurikura Bay, McKenzie Bay and Urquharts Bay;
- associated public beaches;
- parts of Whangarei Heads Rd; and
- the public tracks to and around Mt Lion, Taurikura, Mt Aubrey and Mt Manaia.

The main receiving environment likely to be exposed to disposal plumes comprises Bream Bay itself, and in particular, those parts of the central to northern bay utilised for recreational fishing and boating.

In addition, those parts of the DoC estate stretching from Home Point to Bream Head, including Busby Head, would also be theoretically exposed to the disposal sites, as would the western coastline from Marsden Bay down to Ruakaka, stretching towards the Waipu River and Waipu Cove. In reality, however, it is considered most unlikely that anyone would be able to see a plume from within the vast majority of this catchment (as will be explained shortly).





*Looking towards the current navigation channel & area of dredging operations from Reotahi (above) & Urquharts Bay (below)*



***Looking out across central Bream Bay from the Ruakaka Surf Club***





*Looking out across central Bream Bay from the Ruakaka Surf Club*

<p><b>AUDIENCES:</b></p>	<p>Those more likely to see any plumes associated with dredging include:</p> <ul style="list-style-type: none"> <li>▪ Boaties using outer Whangarei Harbour and / or the northern half of Bream Bay; and</li> <li>▪ Recreational users of Home Point, Busby Head and Smugglers Bay – within the DoC reserve extending across Mt Lion to Bream Head.</li> </ul> <p>Other audiences that might see a plume, depending upon its location and scale, include:</p> <ul style="list-style-type: none"> <li>▪ Residents within, and visitors to, the settlements of Reotahi, Little Munroe Bay, McGregors Bay, Taurikura Bay, McKenzie Bay and Urquharts Bay;</li> <li>▪ Those using the associated public beaches;</li> <li>▪ Those using the public tracks to and around Mt Lion, Taurikura, Mt Aubrey and Mt Manaia;</li> <li>▪ Those working at the Marsden Point Oil Refinery.</li> </ul> <p>Those more likely to see sand disposal plumes comprise recreational boaties traversing Bream Bay to and from Whangarei Harbour or the Hen and Chicken Islands. They are unlikely to be visible from any land based vantage points.</p>
<p><b>EXISTING VALUES:</b></p>	<p><b>MODERATE / HIGH:</b> The landscape and natural character conditions of the harbour at and near Marsden Point are highly variable, combining natural headlands, volcanic peaks and forested areas with the oil refinery, deep water port, pockets of settlement and existing shipping lanes and berths. The outer reaches of Bream Bay – flanked by Bream Head, Mt Lion and Home Point – afford a relatively natural and highly appealing landscape setting for the proposed channel. However, this cohesion and ‘unity of expression’ diminishes elsewhere due to the residential occupation concentrated around Urquharts Bay, Taurikura and Reotahi, while the combined oil refinery and Northport facilities leave a much more industrial, utilitarian, imprint on the outer Whangarei Harbour landscape.</p> <p>Further south, the landward margins of Bream Bay are highly modified, containing pockets of residential development, including baches and beach houses, together with the oil refinery, the former Marsden B Power Station site, the Ruakaka Race Course, an industrial park, the local sewerage treatment plant and ponds, two camping grounds and the Waipu Cove Golf Club.</p> <p>Even so, the dunes and beachfront directly facing and physically abutting Bream Bay has been identified as an ONL in the RPS, with the narrow dune corridor behind the beach and lagoons at the mouth of the Ruakaka and Waipu Rivers anchoring this area. The dune corridor provides a buffer between the beachfront and its developed hinterland, with both the seaward edge of the dunes and the beachfront ‘in front of it’ offering spectacular views out over the expanse of Bream Bay to the Hen and Chicken Islands and the spectacular sequence of volcanic peaks clustered around Mt Lion and Bream Head.</p> <p>Notwithstanding the more utilitarian components of this coastal landscape, Bream Bay therefore retains a powerful focus on its least modified component – the sea – and the amalgam of islands and jagged peaks that frame Bream Bay.</p>
<p><b>PROMINENCE / VISIBILITY:</b></p>	<p><b>LOW:</b> Most vantage points around the outer reaches of Whangarei Harbour would be too low lying for easy recognition of a dredging plume and differentiation of it from the surrounding harbour waters. In particular, views from most of the settlements around its periphery, from Marsden Point and Marsden Bay / One Tree Point, even from parts of Home Point and Smugglers Bay, would be too low lying – affected by reflections off the sea and wave fetch – for a plume to clearly register. Consequently, views of a plume would be largely restricted to the more elevated tracks around Home Point extending out to Busby Head, and vessels passing in close proximity to the dredge.</p>

<p><i>LANDSCAPE EFFECTS:</i></p>	<p><b>LOW:</b> Based on analysis undertaken by MetOcean Solutions, it appears that the discolouration of water around dredging operations would be quite physically confined. This concentration of dredging plumes would be assisted by the natural flushing of the outer harbour and the rates of settlement associated with a preponderance of medium sands (finer sands and silt would be more likely to exacerbate the suspension of material in the water column and would slow down settlement). MetOcean's modelling confirms that most dredging plumes would be confined to the area around the actual dredge and the tidal channel, well away from the harbour margins. This would keep such 'incursion' away from the more sensitive receiving environments down the northern side of the harbour – between Reotahi and Home Point – and around Marsden Bay. As a result, the anticipated plumes, with either kind of dredge, would have little impact on the perceptions of the harbour waters and their quality.</p> <p>At both sediment disposal sites, it is anticipated that the plumes would be even smaller and even more physically / visually isolated. They would also dissipate rapidly, without any appreciable impact on perceptions of the Bream Bay seascape.</p> <p>Furthermore, while such effects would be concentrated over an initial period of 5 to 6 months for capital dredging, maintenance dredging would be more infrequent and targeted – particularly around the berth pocket on the Marsden Point side of the harbour. Consequently, once the capital dredging programme is complete, the seascapes of both Whangarei Harbour and Bream Bay would return to a more stable and 'normal / natural' state.</p>		
<p><i>NATURAL CHARACTER EFFECTS:</i></p>	<p><b>LOW:</b> Any plume would inevitably have an adverse effect on the natural processes and patterns found within Bream Bay and the outer reaches of Whangarei Harbour. Yet, the greater bulk of effects on the maritime environment and its coastal margins would be confined to those underwater locations very close to the proposed channel and berth pocket, occasionally extending into the above-sea realm with plumes visible from passing vessels. The plumes created would have an impact on the appearance of the underwater environment and its habitats, but it appears that any such effects would be both physically very restricted and temporary.</p> <p>As is also indicated in Bioresearchers' report, most of the affected underwater environment comprises sand banks and troughs, and the nature of sand particles found within the new channel would both help to limit water turbidity changes and effects on marine habitats.</p> <p>Within the broader expanse of Bream Bay, disposal plumes would be screened and 'masked' by wave fetch, reflections and the sheer scale of the surrounding maritime environment. They would dissipate rapidly. Underwater, the dredge material would either settle and merge with the existing sea floor (as described at Section 4.2) or be rapidly diluted by wave action and tidal flows. As a result, effects in relation to Bream Bay would be very limited and largely restricted to the immediate vicinity of the disposal vessel.</p>		
<p><i>AMENITY EFFECTS:</i></p>	<p><b>LOW:</b> Public perception of plumes would be intermittent and specific to particular locations, as is discussed in relation to landscape effects. Although the capital dredging has the potential to create the perception of the outer harbour's waters being muddied and 'tainted' by some of those works – especially when dredging strikes pockets of silt and finer grained sand – any such effects would be of a short duration and would not have a significant impact on the longer term appeal of Whangarei Harbour from an aesthetic standpoint. The sense of place and identity of the Whangarei Heads area would not be appreciably affected by the dredging plumes.</p> <p>Effects associated with disposal plumes within the much more expansive, 'open ocean, environment of Bream Bay would be even more limited – as described above in relation to landscape and natural character effects. Any amenity effects would be minimal.</p>		
	<table> <tr> <td data-bbox="544 1832 708 1912">Impact Rating:</td><td data-bbox="708 1832 1453 1912">LOW</td></tr> </table>	Impact Rating:	LOW
Impact Rating:	LOW		

## 4.6 DREDGING & SAND DISPOSAL OPERATIONS

### DESCRIPTION OF PROPOSAL:

A dredging vessel has yet to be specified for the Crude Shipping Project. However, in a Technical Memo dated 25 May 2016, Royal Haskoning DHV recommended the use of a Trailing Suction Hopper Dredge for most of the proposed channel and a Backhoe Dredger for the berth pocket. The former (see Figure 7 below) would involve use of a dredging head that maintains contact with the sea floor, while a Backhoe Dredger (see Figure 12 below) would involve use of an excavator mounted on a dredging pontoon. The TSHD – proposed for more widespread use by Royal Haskoning would limit the spill of material during operations, while a BHD would result in more spillage, but within a confined part of the proposed channel closer to the existing dolphins at Marsden Point. Both types of dredge would generate appreciable noise, although this is subject to specialist analysis by John Styles. Lighting would also be required on such a vessel, both at and near night-time, for operational and navigation purposes.

□



Figure 7: Trailing Suction Hopper Dredger (TSHD) (Source: IHC (Artists impression))

□



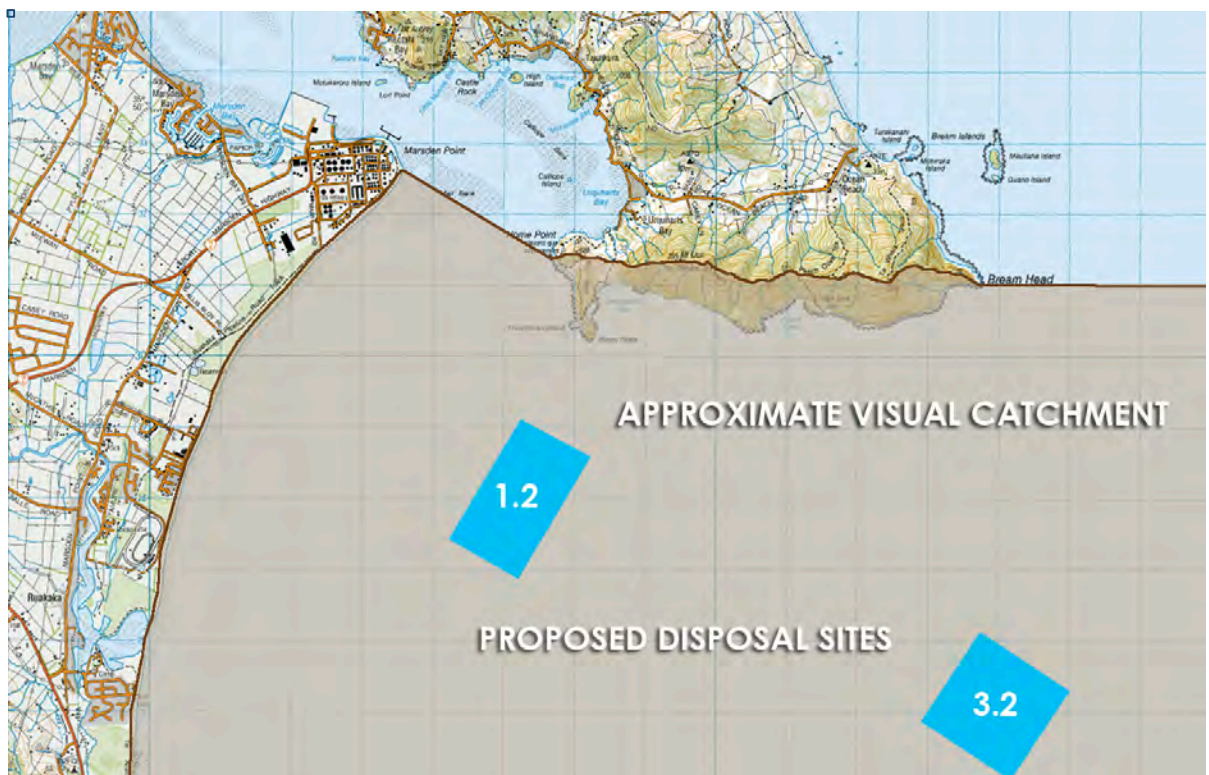
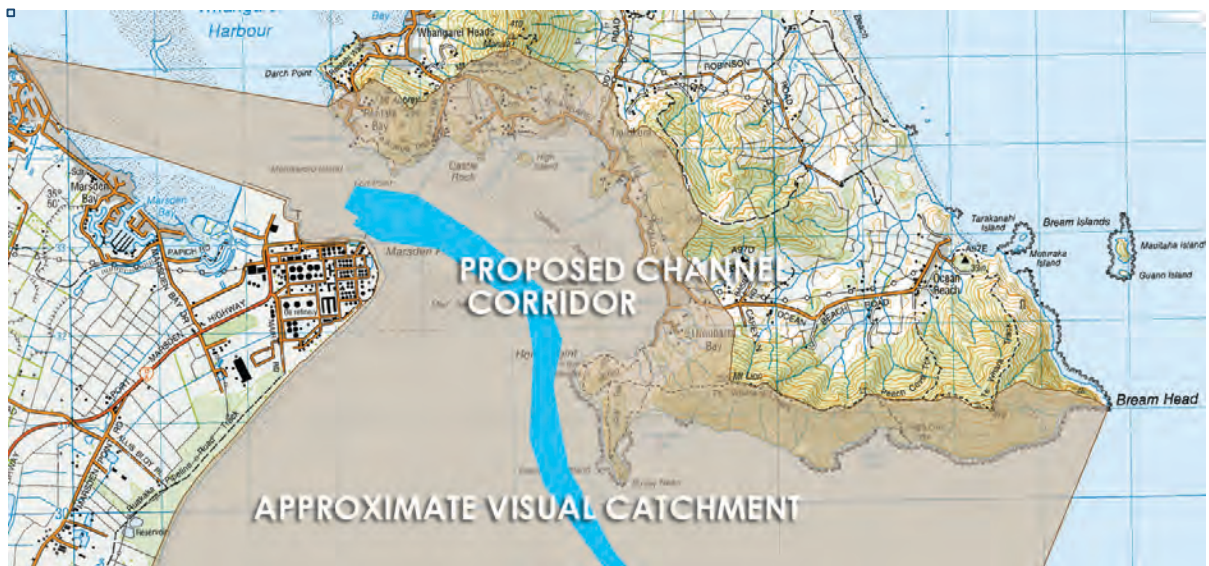
Figure 12: Backhoe Dredger (BHD)  
Source: IADC, 2016

**Dredges described in Royal Haskoning DSV Memo: Trailing Suction Hoper Dredge (above) & Backhoe (below): images from RHDSV memo**



**RECEIVING ENVIRONMENT:**

See Section 4.1 for a description of those areas exposed to the proposed navigation channel and Section 4.5 in relation to disposal of sand within Bream Bay



**AUDIENCES:**

See Section 4.1 for a description of the audiences potentially exposed to dredging operations within and around the proposed navigation channel and Section 4.2 in relation to the audiences potentially exposed to sand disposal within Bream Bay.

**EXISTING VALUES:**

**MODERATE / HIGH:** See Section 4.1 for a description of the Existing Values pertaining to those areas around the proposed navigation channel and Sections 4.2 and 4.5 in relation to Bream Bay.

**PROMINENCE / VISIBILITY:**

**LOW:** The dredge would share much the same level of visibility and public exposure as other vessels operating at and near Marsden Point, and within Bream Bay, at present, although it would be significantly smaller than most freighters (timber) and tankers.

<p><b>LANDSCAPE EFFECTS:</b></p>	<p><b>LOW:</b> Freighters, oil tankers, and leisure craft are familiar components of Bream Bay and Whangarei Harbour. Tankers are frequently anchored off Marsden Point waiting to unload oil and petroleum products, while a regular parade of vessels either docks at, or passes, both the oil refinery and Northport facility. Dredging vessels would sit mid-stream on a more regular basis and noise could be generated in the immediate vicinity of the dredge, as indicated above, depending on the type of dredging method employed. In addition, the process of dredging would differ from that of conventional loading and unloading of vessels at Northport and terminal dolphins, and a dredge would also become an additional source of lighting at night-time.</p> <p>However, noise effects and their attenuation would be subject to the NZ Noise Standard and related conditions, while the dredge's illuminated profile would be little different from that of other anchored vessels when sitting offshore within the open expanse of Bream Bay. Within the more confined waters of Whangarei Harbour, the dredge would be closer to the settlements stretching from Reotahi to Urquharts Bay, but the oil refinery and Northport facilities would be its primary backdrop, complete with an array of lighting associated with both the refinery, port facilities and berthed vessels. In addition, it would be effectively screened from One Tree Point and Marsden Bay by the current port wharves and berthed ships, both during the day and at night.</p> <p>As a result, any changes to the landscape of Marsden Point would be incremental and relatively small scale, taking into account the existing operational environment.</p>
<p><b>NATURAL CHARACTER EFFECTS:</b></p>	<p><b>VERY LOW:</b> A dredge would add to the man-made content of the outer harbour and associated activity. However, it would not alter the fundamental balance and interplay between natural and man-made components of this environment: the dredge would remain within that part of the harbour already strongly influenced by the existing oil terminal and port facilities. Furthermore, while it would be more static than other ships in the main harbour channel, it is doubtful that the issue of movement is as significant as the presence – or otherwise – of vessels in respect of such effects.</p> <p>Overall, it is considered that the dredge would reinforce perceptions of a maritime working environment at Marsden Point, in the general vicinity of both the oil refinery and Northport facilities. But, it would not appreciably encroach on, or degrade, those more natural features and patterns – found down the northern side of Whangarei Harbour – that remain fundamental to the natural character values identified in the Northland RPS.</p>
<p><b>AMENITY EFFECTS:</b></p>	<p><b>LOW:</b> Set against the backdrop of the current refinery and Northport facilities, and the broad expanse of Bream Bay, the proposed dredging operations would be a minor component of the maritime landscape evidence at Marsden Point. It would largely merge with the existing shipping and related activities at the refinery and port. Theoretically, the proposed dredging and disposal operations might exacerbate a subtle shift away from the more tranquil, natural, qualities of the harbour's northern beaches and coastline by introducing another industrial element and activity to the main body of the harbour. As such, it has the potential to become the focus for concerns about 'nuisance effects' derived from the dredge's noise, lighting and activity. More objectively, however the analysis of noise effects by Styles Group (<i>Whangarei Harbour Entrance and Marsden Point Channel Realignment and Deepening: Assessment of Environmental (Airborne) Noise Effects</i>, February 2017) concludes, on p.17, that:</p> <p><i>The noise modelling shows that comfortable compliance with the relevant noise limits is achieved for dredging inside the harbour, except when dredging is undertaken generally north of the No. 18 navigation buoy when the 45dB LAeq noise limit applies (from 8pm to 6.30am on weeknights and from 6pm to 7.30am on Saturdays, Sundays and Public Holidays) and, during unfavourable wind conditions, when the wind is blowing from any direction other than the northern quarter. The predicted noise levels for all other dredging positions under various meteorological conditions show that compliance with all of the relevant noise limits at all times of the day can be achieved, in most cases by a large margin. We have recommended that dredging activities are not undertaken north of the No. 18 buoy</i></p>

*during unfavourable wind conditions (identified above) at times when the 45dB LAeq noise limit applies. ....*

In relation to potential effects associated with night-time lighting Bio researchers report on potential bird strike and other avian effects, states at paragraph 5.2.4 (AEE Coastal Birds, March 2017) that: *"Light is well known to attract a variety of marine birds (Montevecchi, 2016). The adverse attraction to vessel lights by seabirds is considered to be more likely in Bream Bay beyond Busby Head."* In the same section, it is then recommended that the following measures be adopted to minimise lighting related effects on sea birds:

- "(a) reduce all unnecessary deck and cabin lighting, cover accommodation windows at night with blinds and curtains;*
- (b) where possible, orientate all deck lights so they shine only downwards and shield them to prevent upwards or horizontal light projection.*
- (c) use light dimmers and timers to minimise lighting in areas where people are not constantly active;*
- (d) trial different light colour options such as green coloured lights in operational areas to reduce overall light intensity levels on the vessel;*
- (e) investigate the use of LED floodlights with computer controlled light levels, colours and timers."*

These measures would also appreciably reduce the visual signature of the dredge at night-time for local residents and beach users, further minimising the true potential for 'nuisance' effects derived from the dredging operations. The largely industrial backdrop to such activities near Marsden Point would further limit the potential for such concerns to be realised, while the relatively small scale of the vessel involved in dredging activities would limit its perceived incursion or encroachment into the wider environs of the outer harbour and Bream Bay.

Finally, most of the proposed dredging and disposal process would occur during an initial 6 month period, then become more intermittent after that – occurring again every 2 to 5 years. Consequently, the level of effect would diminish very rapidly after the initial 6 months of capital dredging.

LOW

## 4.7 KEY FINDINGS

The following table summarises the various rating derived from the assessment of effects in Sections 4.1 to 4.6:

	VALUES	PROMINENCE	LANDSCAPE EFFECTS	NATURAL CHARACTER EFFECTS	AMENITY EFFECTS	IMPACT RATING
<b>4.1 CHANNEL FORMATION</b>	MODERATE / HIGH	VERY LOW	VERY LOW	LOW / MODERATE	NONE	LOW / MODERATE
<b>4.2 DISPOSAL AREAS</b>	HIGH / MODERATE	VERY LOW	VERY LOW	LOW	VERY LOW	LOW
<b>4.3 LEAD LIGHTS</b>	MODERATE / HIGH	LOW / VERY LOW	VERY LOW	VERY LOW	VERY LOW	VERY LOW
<b>4.4 HOME POINT MARKER</b>	HIGH	VERY LOW	NONE	VERY LOW	NONE	NONE
<b>4.5 DREDGING &amp; DISPOSAL PLUMES</b>	MODERATE / HIGH	LOW	LOW	LOW	LOW	LOW
<b>4.6 DREDGING &amp; DISPOSAL OPERATIONS</b>	MODERATE / HIGH	LOW	LOW	VERY LOW	LOW	LOW

Given the physical extent and footprint of the Crude Shipping Project, it is perhaps surprising that both the mean effects ratings and overall impact of the proposal are not higher. However, four factors limit the overall scale of landscape, natural character and amenity effects:

- The proposed channel and disposal sites would have a very limited visual ‘signature’ above sea level, mainly limited to the relocation of buoys, positioning of new buoys near the channel entrance and the addition of lights and markers of the kind that are already common near Marsden Point and other parts of Whangarei Harbour. For the most part, these would be dwarfed by the combination of dramatic landforms, existing oil terminal and port facilities, and the open expanse of Bream Bay.
- Underwater, the areas subject to dredging and disposal comprise largely undifferentiated, even depauperate, sand environments. For the most part, the margins of Mair and Calliope Banks comprise relatively bare, ‘sandscapes’ that are dominated by medium grained sand, albeit with patches of shell, silt and gravels. A very similar situation is found within and near Disposal Sites 3.2 and 1.2. Although the ‘sponge garden’ and ‘rocky reef’ identified by Bio researchers near Home Point deviate from this norm, they comprise relatively small components of the undersea environment overall and management of water turbidity would preclude any adverse effects on those more sensitive habitats.
- Much of the dredging activity and relocation of buoys, leads, etc would either be concentrated near the current oil refinery and port, or near the existing shipping lanes that are already quite heavily trafficked by a wide range of sea-going vessels – from Suezmax tankers to leisure craft and yachts. Even the leads off Taurikura and new lateral marker off Home Point would be viewed in the context of a landscape that contains both significant development and a scattering of moored vessels. These would help to absorb and integrate the finer grained structures proposed for closer to the northern harbour shoreline.
- The expansive scale and openness of Bream Bay, together with viewing distances to the proposed channel and disposal sites, would help to isolate activity focused on these locations.

It is anticipated that the dredging vessel – of whichever kind is finally chosen – would provide much of the focus for attention while dredging is underway. However, it would still integrate, to a considerable extent, with the existing shipping activity and movements near Marsden Point, as well as in and out of Whangarei Harbour. This, together with the physical isolation of the dredge within Bream Bay (more so once the capital works programme is completed) should ensure that any effects associated with its presence and activities are limited and essentially incremental. In particular, Biosearchers' recommendations in relation to lighting (to avoid bird strike) and Styles Group's conclusions and operational recommendations in relation to noise directly address such effects (see Section 4.6, Amenity Effects, above).

### **Cumulative Effects:**

The Crude Shipping Project would give rise to multiple small scale effects, both above sea level and underwater, that pertain to specific locations within Whangarei Harbour. Moreover, the combination of dredging, sand disposal, buoy relocation, provision of new lights and markers, and even dredging plumes, could give rise to cumulative effects that affect a combination of catchments and receiving environments around Marsden Point. In particular, there would be some aggregation of underwater effects, within and around the footprint of the new shipping channel

Yet, the proposed activities and structures would be largely separated from one another both spatially and temporally, and the greater bulk of such effects would be concentrated either near Marsden Point – almost literally in the 'shadow' of the existing oil refinery and Northport facilities – or within the outer reaches of Whangarei Harbour and the more open expanse of Bream Bay, well away from most sensitive receiving environments and audiences.

Importantly, the effects identified would have a low to very low level of effect in relation to the areas of High Natural Character covering Calliope Bank, Mair Bank and the Home Point coastline, as well as the ONL that extends from Home Point to Ocean Beach. As a result, I am not concerned about the potential for the crude shipping project to adversely affect these sensitive environments in a cumulative fashion.



## 5.0 STATUTORY CONSIDERATIONS

The Crude Shipping Project would occupy part of the Coastal Marine Area that is subject to both regional and district provisions under the aegis of sections 6(a), 6(b), &(c) and 7(f) of the Resource Management Act, together with the NZ Coastal Policy Statement 2010 – specifically, Policies 13 and 15 in relation to landscape and natural character matters. As a result, the proposal is subject to assessment against relevant objectives and policies in the Northland Regional Coastal Plan (2004), the Northland Regional Policy Statement (2016) and the Whangarei District Plan (2004).

The **Northland Regional Coastal Plan** directly addresses structures, reclamation, dredging and other activities within the CMA. In relation to that operative document, the proposed channel formation and dredging proposed by Refining NZ would fall within the following Coastal Plan ‘zones’:

- a. Marine 2 (Conservation) Management Area (or ‘M2MA’); and
- b. Marine 5 (Port Facilities) Management Area (or ‘M5MA’).

The proposed disposal of dredged material would occur in two areas: Disposal Area 1.2 and / or Disposal Area 3.2 – as described at Sections 4.2 and 4.5 of this report. Both of these disposal areas are also zoned M2MA. Importantly, none of the proposed works encroach into any area of the CMA that is zoned Marine 1 (Protection) Management Area (or ‘M1MA’). Even so, a range of objectives and policies within the operative NRCP are directly pertinent to the current proposals and assessment of them as Discretionary Activities – including the following:

### 7.3 OBJECTIVE

***The preservation of the natural character of Northland's coastal marine area, and the protection of it from inappropriate subdivision, use and development.***

### 7.4 POLICIES

1. *In assessing the actual and potential effects of an activity to recognise that all parts of Northland's coastal marine area have some degree of natural character which requires protection from inappropriate subdivision, use and development.*
2. *As far as reasonably practicable to avoid the adverse environmental effects including cumulative effects of subdivision, use and development on those qualities which collectively make up the natural character of the coastal marine area including:*
  - (a) *natural water and sediment movement patterns;*
  - (b) *landscapes and associated natural features;*
  - (c) *indigenous vegetation and the habitats of indigenous fauna;*
  - (d) *water quality;*
  - (e) *cultural heritage values, including historic places and sites of special significance to Maori; .....**and where avoidance is not practicable, to mitigate adverse effects and provide for remedying those effects to the extent practicable.*
3. *Within Marine 1 and Marine 2 Management Areas and the rules that apply to each of those, identify what subdivision, uses and developments may be appropriate taking into consideration the actual or potential effects on natural character as required by, amongst others, Policy 1.1.1 of the New Zealand Coastal Policy Statement.*
4. *Subject to Policies 1 and 2 above, through the use of rules in this Plan, to provide for appropriate subdivision, use and development in areas where natural character has already been compromised, including within Marine 3, Marine 4, Marine 5, and Marine 6 Management Areas. ....*

7. *To promote, where appropriate, the restoration and rehabilitation of the natural character of the coastal marine area where it has been significantly degraded.*

The **NRCP's** Appendix 3 also identifies the following Outstanding Geological Features and Landforms' that are listed as being of international, national or regional significance in the NZ Geopreservation Inventory within and around Marsden Point:

*Reserve Point nephelenite flow, garnet andesite and sedimentary rock;*  
*McLeod Bay unconformity;*  
*Taurikura natural jetty;*  
*Port Whangarei fossil beds;*  
*One Tree Point dunes; and*  
*Bream Head stratovolcano*

The assessments undertaken by MetOcean Solutions (*Predicted Physical Environmental Effects From Channel Deepening and Offshore Disposal*) and Tonkin & Taylor (*Coastal Processes Assessment*) provide no indication that these features and landforms would be adversely affected by the proposed channel dredging.

Turning to the **Northland Regional Policy Statement**, which became operative on 9<sup>th</sup> May 2016, Policy 4.5.2 addresses the location of particular parts of the coastal environment (including the CMA) and landscapes that are particularly sensitive to new development – stating as follows:

*The Regional Policy Statement Maps of high and outstanding natural character and outstanding natural features and outstanding natural landscapes identify areas that are sensitive to subdivision, use and development. The maps of these areas identify where caution is required to ensure activities are appropriate.*

In my opinion those parts of the coastal environment around Marsden Point and Whangarei Heads appear to accord with the requirement [under sections 6(a) and (b) of the Resource Management Act] to identify and preserve / protect such areas from inappropriate subdivision, use and development. I have identified the Crude Shipping Project's effects on those areas accordingly. In a related vein, the following landscape and natural character provisions are relevant to the current proposals:

**3.14 Natural character, outstanding natural features, outstanding natural landscapes and historic heritage**

*Identify and protect from inappropriate subdivision, use and development;*

- (a) *The qualities and characteristics that make up the natural character of the coastal environment, and the natural character of freshwater bodies and their margins;*
- (b) *The qualities and characteristics that make up the outstanding natural features and outstanding natural landscapes; .....*

**4.6.1 Policy – Managing effects on the characteristics and qualities natural character, natural features and landscapes**

(1) *In the coastal environment:*

- a) *Avoid adverse effects of subdivision use, and development on the characteristics and qualities which make up the outstanding values of areas of outstanding natural character, outstanding natural features and outstanding natural landscapes.*
- b) *Where (a) does not apply, avoid significant adverse effects and avoid, remedy or mitigate other adverse effects of subdivision, use and development on natural character, natural features and natural landscapes. Methods which may achieve this include:*

- (i) *Ensuring the location, intensity, scale and form of subdivision and built development is appropriate having regard to natural elements, landforms and processes, including vegetation patterns, ridgelines, headlands, peninsulas, dune systems, reefs and freshwater bodies and their margins; and*
  - (ii) *In areas of high natural character, minimising to the extent practicable indigenous vegetation clearance and modification (including earthworks / disturbance, structures, discharges and extraction of water) to natural wetlands, the beds of lakes, rivers and the coastal marine area and their margins; and*
  - (iii) *Encouraging any new subdivision and built development to consolidate within and around existing settlements or where natural character and landscape has already been compromised.*
- (2) *Outside the coastal environment avoid significant adverse effects and avoid, remedy or mitigate other adverse effects (including cumulative adverse effects) of subdivision, use and development on the characteristics and qualities of outstanding natural features and outstanding natural landscapes and the natural character of freshwater bodies. Methods which may achieve this include:*
- a) *In outstanding natural landscapes, requiring that the location and intensity of subdivision, use and built development is appropriate having regard to, natural elements, landforms and processes, including vegetation patterns, ridgelines and freshwater bodies and their margins;*
  - b) *In outstanding natural features, requiring that the scale and intensity of earthworks and built development is appropriate taking into account the scale, form and vulnerability to modification of the feature;*
  - c) *Minimising, indigenous vegetation clearance and modification (including earthworks / disturbance and structures) to natural wetlands, the beds of lakes, rivers and their margins.*
- (3) *When considering whether there are any adverse effects on the characteristics and qualities of the natural character, natural features and landscape values in terms of (1)(a), whether there are any significant adverse effects and the scale of any adverse effects in terms of (1)(b) and (2), and in determining the character, intensity and scale of the adverse effects:*
- a) *Recognise that a minor or transitory effect may not be an adverse effect;*
  - b) *Recognise that many areas contain ongoing use and development that:*
    - (i) *Were present when the area was identified as high or outstanding or have subsequently been lawfully established*
    - (ii) *May be dynamic, diverse or seasonal;*
  - c) *Recognise that there may be more than minor cumulative adverse effects from minor or transitory adverse effects; and*
  - d) *Have regard to any restoration and enhancement on the characteristics and qualities of that area of natural character, natural features and/or natural landscape.*

Finally, Section 10 ('The Coast') of the operative **Whangarei District Plan** contains objectives and policies that largely echo those outlined above:

#### **10.3 Objectives 10.3.1**

*Preservation and protection of the natural character of the coastal environment from inappropriate subdivision, use or development.*

#### **10.3.2**

*The maintenance or, where appropriate, enhancement of the amenity, landscape, cultural, intrinsic and ecological values of the coastal environment by taking account of the cumulative effects of subdivision development.*

#### **10.3.3**

*Maintain and enhance public access, where appropriate, to and along coastal areas.*

#### **10.3.4**

*Recognise those activities which have locational requirements and/or effects on both sides of the Coastal Marine Area boundary.*

### **10.4 Policies**

#### **10.4.1 Natural Character**

*To ensure that subdivision, use and development is managed in a manner that seeks to preserve, enhance and restore (where appropriate) the natural character of the coastal environment. Particular consideration should be given to:*

- *Landscapes, seascapes and landforms;*
- *Significant indigenous vegetation and significant habitats of indigenous fauna;*
- *Intrinsic values of ecosystems;*
- *Sites of Significance to Maori;*
- *Significant places or areas of historic or cultural significance;*
- *Heritage values, including cultural, historical, spiritual and intrinsic values;*
- *Amenity values.*

#### **10.4.2 Natural Character**

*To recognise, in assessing the actual and potential effects of an activity, that most parts of Whangarei District's coastal environment have some degree of character which requires protection from inappropriate subdivision, use and development.*

#### **10.4.3 Location of Activities**

*To ensure that, as far as practicable, subdivision, use and development is located in areas where the natural character has already been substantially modified.*

#### **10.4.4 Services and Infrastructure**

*To avoid adverse effects on the natural character, amenity, landscape, cultural, intrinsic and ecological values and functioning of an area by ensuring that subdivision, use and development occur where there is adequate infrastructure, services and on-site mitigation measures.*

#### **10.4.7 Future Development**

*To ensure that subdivision, use and development in the coastal environment for business and residential use is located within existing coastal settlements. Subdivision, use or development should only occur in other areas where there will be no more than minor adverse effects, taking into account:*

- *The objectives and policies in this chapter (Chapter 10);*
- *Landscape values, landform and scenic values;*
- *Indigenous flora and habitats of indigenous fauna;*
- *Heritage values including archaeological sites and sites of significance to Maori;*
- *Amenity values;*
- *The degree of modification from the natural state; .....*

### **10.6 Anticipated Environmental Results**

*The following results are expected to be achieved by the foregoing Objectives, Policies and Methods. The means of monitoring whether the Plan achieves the expected outcomes are set out in the Whangarei District Council Monitoring Strategy.*

- *The preservation and/or enhancement of the natural character of the coastal environment, and its protection from inappropriate subdivision, inappropriate use and inappropriate development. Included here are landscapes, seascapes and landforms; significant indigenous vegetation and significant habitats of indigenous fauna; air, water and soil quality; the intrinsic values of ecosystems, including biodiversity along with other ecological values.*
- *The maintenance and/or enhancement of the historic and cultural heritage of the coastal environment, and the protection of it from inappropriate subdivision, use and development. Included here are cultural, historic and spiritual values; amenity values; places and areas of historic or cultural significance; and sites of significance to Maori.*
- *A settlement and development pattern in the coastal environment that does not adversely affect natural and cultural/historic heritage values, is able to be*

*served efficiently, and does not result in sporadic, sprawling or ribbon development. Future intensive development is largely confined to existing settlements where the above values are already compromised.*

- *The maintenance and/or enhancement of public access, to and along the coastal marine area, except where it is desirable to restrict public access to protect areas of significant indigenous vegetation and significant habitats of indigenous fauna, Maori cultural values, public health and safety; to ensure a level of security consistent with the purpose of a resource consent or a permitted activity; or in other exceptional circumstances.*

The Whangarei District Plan and the Northland Regional Policy Statement are responsible for management of the district and regional ONLs, and areas of high or outstanding natural character. The key issues identified in relation to these statutory documents are:

- The removal of dredged material from between Mair and Calliope Banks, which are identified as areas of Outstanding Natural Character – although not from the actual banks; and
- The location of a new navigation marker next to Home Point, within part of the coastline identified as being an HNC area.

The positioning of a new marker next to Home Point is considered likely to have a very low level of effect. It would sit, almost literally, in the shadow of Home Point itself, enclosed and backed by the rising mantle of rocks shelves, coastal scarp and pohutukawa lined slopes that flank the harbour mouth. The marker would be dwarfed by the adjoining landforms and its scale would be minimal even in relation to the buoys and other markers also on the margins of the new entry channel. It would become one of a chain of such navigation aids that line the harbour entrance and shipping route. Even its light would be of a low wattage. As a result, it would be difficult to distinguish and differentiate the marker from its Home Point backdrop other than when viewed from the shipping channel and surrounding harbour waters. It would have no effect in relation to nearby settlements, public beaches (within Urquharts Bay and elsewhere) or the Home Point reserve itself. It would have little, if any, impact on the dramatic interplay of volcanic landforms and harbour waters at the harbour entry and would not affect or erode the qualities of Home Point and adjoining reserve land.

Within the adjoining harbour, the dredging of material from the channel footprint would affect the topographic profile of the sea floor and erode material – mostly fine to medium grained sands and shell – from the harbour corridor between Mair Bank and Calliope Bank. Physically, this would change the profile of the sea floor near both banks, but would not significantly alter the composition of the material found on the sea floor. The new channel would have a more linear, geometric, profile than the natural harbour channel, but would not significantly alter the habitat values of the affected sea floor, its food gathering value or its materiality overall. The proposed changes proposed would also occur within part of the coastal environment that is highly dynamic and subject to on-going, natural change. Taking these various factors into account, it is considered that any effects in relation to the harbour floor would be of a low order, and any effects in relation to the Mair Bank and Calliope Bank HNC areas (and their natural character values) would be of a very low order overall.

In reaching these conclusions, I also note that Biosearchers has identified the ‘rocky reef and sponge garden’ habitat near Home Point as being particularly susceptible to modification, which is relevant to assessment of the proposal against District Plan Policies 10.3.2, 10.4.1 and 10.6, together with RPS Policy 4.6.1 (1)(b)(i). However, any potential effects associated with changes to water turbidity near Home Point are to be managed to prevent such effects. Accordingly, it is my opinion, that the proposal is consistent with the management and protection of marine habitats in line with those policies.



These findings are also relevant to assessment of the project against Northland Regional Coastal Plan Policy 7.4 and its various sub-clauses, even though these have their genesis in the now superseded 2004 NZCPS. In particular, the greater bulk of proposed activities and modification would occur within that part of Whangarei Harbour and Bream Bay that is already subject to the regular movement of shipping, the positioning of channel buoys and other navigation markers, and activities associated with current refinery and Northport facilities – with reference to Policy 7.4(4). In my assessment, the crude shipping project is consistent with Policy 7.4.

## 6.0 CONSULTATION

Discussions with Nga Kaitiaki / Tangata Whenua o Whangarei Te Rerenga Paraoa, as the local representatives of mana whenua, have identified a number of potential issues in relation to the 'landscape' effects of the proposal, including:

- amenity effects associated with the operation of the dredge and associated vessels; and
- potential impacts on the form and seascape values of Mair Bank, Busby Head and other important landmarks that have cultural significance for iwi.

I have addressed these matters in detail within Sections 4.1 and 4.4 to 4.6 of this report. In particular, it is important to recognise that both Mair Bank and Calliope Bank are dynamic features that are continually shaped and reconfigured by tidal flows in and out of Whangarei Harbour and storm events. Both banks are capped by a mixture of medium to fine grained sands, gravels and shell fragments, and their physical equilibrium relies on a constant cycle of deposition and erosion. The proposed channel formation would affect the outer margins of both banks near the berth pocket, in particular. However, it would leave the main body of both banks intact, and the fundamental composition, character and extent of the banks would be unchanged from at present.

Although the proposed channel would extend to within 100m of the rocky margins of Home Point, it would not directly affect or modify that feature. I have described the effects of the proposed lateral navigation marker off Home Point at Section 4.3 of this report, and consider that it would have a negligible effect (if any at all) in relation to that key landmark. The proposed channel and its navigation markers would be much further separated from Busby Head and would have no impact on that feature or nearby Smugglers Bay.

Consequently, I remain of the opinion, that the proposed channel and its navigation markers would have a very low level of effect to no effect at all in relation to all of the coastal features and landmarks that line the Whangarei Heads coastline. Once the new channel is formed, it would be very difficult for those living around, or visiting, that coastline to identify any appreciable differences between Whangarei Harbour's 'pre-channel' and 'post channel' landscapes. The only new structure of any significance would be a new lead light off Taurikura, but its physical isolation within the harbour would result in it having much the same degree of visual presence as a yacht mast when viewed from most shoreline vantage points, including Taurikura Beach.

As a result, I have determined that the proposed channel and its navigation system would have no appreciable effect on the ONLs and areas of high to outstanding natural character that extend out from Mair Bank and Calliope Bank to Home Point and Busby Head, then along the dramatic volcanic coastline framed by Taurikura and Bream Head.

The issue of the dredging operations is also of concern to local iwi, in particular the activities of the dredging vessel within Whangarei Harbour. I have addressed this matter in some detail at Section 4.6 of this report. Even so, it is important to reiterate that the entrance to Whangarei Harbour already witnesses the passage of vessels that range from Suezmax tankers to timber carriers, tuna boats and wide range of recreational vessels heading in and of Whangarei Harbour and its town basin.

Any vessel undertaking dredging of the proposed navigation channel would be quite literally dwarfed by the vessels heading to and from Northport and Marsden Point's berthage dolphins, while much of the more intensive activity around the oil refinery's berthage area would take place almost literally in the shadow of that major industrial complex. Consequently, much as a dredging vessel would add to the catalogue of vessels found within the harbour and Bream Bay, it would have

a limited visual presence in its own right. Any amenity effects associated with the operation of the vessel would be incremental and of a low order overall.

## 7.0 CONCLUSIONS

On the basis of this assessment, including evaluation of the proposal against relevant statutory provisions, it is considered that the Crude Shipping Project would have a typically low level of effect on the landscape, natural character and amenity values of Whangarei Harbour, Whangarei Heads and Bream Bay.

In effect, the current proposal would adhere to the maxim of concentrating new development and related effects within parts of the CMA and Coastal Environment that are already significantly modified. Consequently, the proposal would effectively avoid having an adverse effect on those parts of Whangarei Heads, Marsden Point and Bream Bay that are identified as having outstanding landscape or natural character values. It would also avoid having a significant effect in relation to the rest of the coastal environment and surrounding landscapes. Most components and activities associated with the project would have a quite limited impact on perceptions of the area's character, identity or sense of place.

A handwritten signature in black ink, appearing to read 'S. Brown', with a long horizontal flourish extending to the right.

**Stephen Brown**

BTP, DIP LA, Fellow NZILA, Affiliate NZPI