1.0 TEC	CHNICAL MEMO – STORMWATER
То:	Stacey Sharp & Blair Masefield, Beca (consultant planners)
From:	John McLaren, Senior Civil Engineer, Haigh Workman Limited
Date:	12 July 2023

1.1 Statement of Qualifications and Experience

My name is John Peter Richard McLaren. I am a director and Senior Civil Engineer at Haigh Workman Limited. I am a Chartered Member of Engineering New Zealand and a Chartered Professional Engineer (CPEng). I have a Bachelor of Engineering from the University of Canterbury and a New Zealand Certificate of Engineering from Carrington Technical Institute.

I have over 30 years of experience in Civil Engineering and Transportation Engineering, with the past 18 years of that in the Northland Region employed by Haigh Workman Limited. I have been actively involved in engineering matters of resource consent applications in the Northland Region including stormwater design and water quality, applicable to this application.

I have dual CPEng practice areas – civil and transportation engineering. In this matter I appear on behalf of the applicant Northland Regional Council (NRC) in relation to stormwater and water quality matters for the proposed port extension.

I confirm that the statements made within this memorandum are within my area of expertise and I am not aware of any material facts which might alter or detract from the opinions I express. Whilst acknowledging this consenting process is not before the Environment Court, I have read and agree to comply with the Code of Conduct for Expert Witnesses as set out in the Environment Court practice note. The opinions expressed in this memorandum, are based on my qualifications and experience, and are within my area of expertise. If I rely on the evidence or opinions of another, my statements will acknowledge that.

2.0 APPLICATION DESC	.0 APPLICATION DESCRIPTION		
Applicant's Name:	Northport Limited (Northport)		
Activity type:	Land Use (s9), Coastal Permit (s12), Water Permit (s14), Discharge Permit (s15)		
Purpose description:	Northport seek to construct, operate, and maintain an expansion of the existing port facility to increase freight storage and handling capacity, and transition into a high-density container terminal.		

Application references:	Northland Regional Council: APP.005055.38.01 Whangārei District Council: LU2200107
Site address:	Ralph Trimmer Drive, Marsden Point, Whangārei

3.0 SITE AND PROPOSAL DESCRIPTION

3.1 Site and Environmental Setting

A description of the subject site and surrounding environment was provided in section 4.16 of the Assessment of Environmental Effects (AEE) entitled: *Application for resource consents for the expansion of Northport*, prepared by Reyburn & Bryant, dated 6 October 2022.

Having undertaken a site visit on Tuesday 21 February 2023, I concur with that description of the site and surrounding environment and adopt that description for the purpose of this assessment.

3.2 Proposal

The proposal is as described in section 3.0 of the AEE and depicted on the design drawings attached as Appendix 3 of the application (referenced in Section 3.3 below).

I adopt that description for the purpose of this assessment and note the following key elements of the proposal with regard to stormwater matters:

- Proposed new eastern canal for the Northport expansion.
- Canal design capacity to accommodate the 2-year AEP event. The 2-year event is considered to be the "first flush" for removal of pollutants within the canal prior to overtopping.
- Construction of a new spillway at the upstream end of the eastern canal for discharge of rainwater.
- The sand filter at the base of the canal for filtration of contaminants. The sand membrane is replaced annually.
- An oil trap is proposed at each weir for removal of floating contaminates such as bark and hydrocarbons.

The memorandum is limited to the consideration of matters relating to stormwater.

3.3 Reference documents

The following application documents have been reviewed and inform this technical memorandum.

Application

Consent: Northport Ltd – APP.005055.38.01 and LU2200107 **Address:** Ralph Trimmer Drive, Marsden Point, Whangārei

- Assessment of Environmental Effects entitled: Application for resource consents for the expansion of Northport, prepared by Reyburn & Bryant, dated 6 October 2021 (henceforth referred to as AEE);
- Design Drawings entitled: *Northport Proposed Reclamation and Dredging*, prepared by WSP, sheets C01 C04, plan set dated 18 August 2022;
- Northport Stormwater Pond Assessment Report, prepared by Hawthorn Geddes, dated 10 April 2022, reversion 3;

s92 Request for Information

- Further information response prepared by Reyburn and Bryant dated 25 October 2022 with the email from Hawthorn Geddes dated 18 October 2022 subject: "12377 Northport Expansion RFI" and with the drawing labelled "Catchment Plan", Hawthorn Geddes print stamp dated 18 October 2022;
- Further information response prepared by Reyburn and Bryant dated 21 February 2023, with the letter from Northport "Re: Northport Expansion Project (App.005055.38.01 & Lu2200107) Response To S92(1) Request For Information" dated 21 February 2023, and contained in the same letter 21 February 2023 Attachment 11 being the "Northport Stormwater Pond Assessment Report", prepared by Hawthorn Geddes, dated 14 February 2023, revision 4. (henceforth referred to as s92 Response).

4.0 REASON FOR CONSENT

4.1 Reasons for Consent

A list of resource consents sought (as per the application documents as lodged) are summarised in Sections 1.5 - 1.7 of the AEE, and are as amended by the s92 Response.

In the context of stormwater, key components of the proposal are for treatment of operational stormwater via the existing pond-based stormwater system and/or proprietary systems, and subsequent discharge to the CMA.

The following have particular relevance to the consideration of stormwater matters:

- Northland Regional Council. Stormwater discharges onto or into contaminated land or from high risk industrial or trade premises – discretionary activity.
- Northland Regional Council. A coastal permit for a discretionary activity to discharge stormwater from open cargo storage or handling areas, including wharves to the CMA via a stormwater treatment and disposal system.
- Resource Management (National Environmental Standards for Freshwater) Regulations 2020 (NESFM). Regulation 45 – Earthworks, and the diversion and discharge of water within a wetland associated with 'specified infrastructure' as a discretionary activity.

4.2 Overall Activity Status

Overall, the resource consent is considered as a **Discretionary Activity**.

5.0 TECHINICAL ASSESSMENT OF APPLICATION

5.1 Assessment of the Application

The following components of the proposal relevant to stormwater have been identified and assessed:

- Water quality and impact of the proposed expansion on the existing ponds and infrastructure.
- Stormwater capacity within existing and proposed infrastructure, and the proposed "spill of stormwater into the harbour without treatment; and
- Adequacy of the "first flush" system proposed to manage contaminants from the proposed expansion.

Proposed Process - Overview

The proposed process for management and treatment of stormwater is as follows:

• Stormwater is to be collected from the port area by surrounding "port aprons" (canals and slot drains). The canals convey stormwater to the water quality pond. The pond has an inlet weir, with a screen/grill that screens large floating debris.

Slot Drains

• Slot drains are located at the upstream end of the catchment and collect water adjacent to the berths. Without the slot drains water at the berths would shed towards the harbour.



Figure 1 Slot drain inlet

- Slot drains discharge into the upstream end of the canals.
- This is one of the maintenance hot spots. Before large weather events, the outlet of the slot drains to the canal are cleaned and the channel is cleaned downstream of the outlet.

<u>Canals</u>

- Canals capture water from the docks and convey water to the ponds.
- Docks are RL5.0m and the invert of the canal is RL3.5m.
- The base of the canal is lined with sand for filtration. The sand lining is replaced annually.
- The canals are designed to accommodate a 2-year ARI event without spill. These events are described as the "first flush".
- In extreme rainfall events, excess surface water (after first flush is removed), is to be removed via flow over controlled weir devices. One such device is installed in the existing Western Canal, and one is proposed to be included in the future extended Eastern Canal.
- Weirs are installed at the upstream end of the canal where water intake is the cleanest.
- The spill level of the weir is RL4.7m. Anecdotal evidence is that canals have backed up and the weirs have operated only 3 times over the last 15 years.



Figure 2 Upstream end of the canal

<u>Forebay</u>

• The eastern and western canals combine to discharge to the pond forebay. There is a screen prior to the forebay to remove gross solids.



Figure 3 Screen at forebay



Figure 4 Forebay

- The forebay has a permeable weir that acts as an interceptor and oil trap. There are three 100mm dia uPVC pipes within the weir.
- The wider width of the forebay reduces velocity of the water and allows silt to drop out of the discharge. The forebay is currently maintained annually.
- During larger events, the weir will overtop with increased flows and discharge to the water quality ponds.

Ponds

 The pond is divided into two parts. The stormwater flows into the first half of the pond (which contains baffles with weirs – designed to reduce any short-cutting of water flow). This pond has a manhole riser ("scruffy dome") that allows surface water in extreme events to spill into a gravity system for discharge beneath the edge of the port.



Figure 5 Primary pond

- Aeration devices (sprinklers) are located within the primary pond to aerate the water to improve the natural treatment process. Baffles can be seen in the photo above and the scruffy dome located to the right of the photo.
- Water flows onwards to second part of the pond, separated from the first part by a low-level embankment. At low volume, flow occurs through seepage through the embankment soils, and when the water reaches a certain level flows through rock.



Figure 6 Secondary Pond

Consent: Northport Ltd – APP.005055.38.01 and LU2200107 **Address:** Ralph Trimmer Drive, Marsden Point, Whangārei Two pumps are located in this second half of pond to extract treated water from the surface of this pond. These pumps operate on a duty-assist arrangement (one pump is automatically assisted by a second pump when required). This water is discharged into the gravity system at the first pond scruffy connection.



Figure 7 Pump station / pump well

- In larger events, water will overtop the low-level embankment. Should the pump not cope with stormwater flows, the ponds become one large pond.
- In the event that in-flow exceeds pump capacity to the point that pond storage is also exceeded, the safety mechanism is for overflow via the scruffy dome into the gravity system. Anecdotal evidence is that this has only occurred once over the past 15 years because of a power cut during the recent cyclone Gabrielle.

Expansion

The new port expansion includes 4.6Ha consented expansion not constructed and 13.7Ha non-consented expansion (this application) to the east as shown below.



Figure 8 Proposed Port Expansion

Stormwater is managed by the existing eastern perimeter canal that will remain and a proposed permitter canal to the east and south of the un-consented expansion.



Figure 9 Eastern canal - (central canal after expansion)

The same slot drains will be installed along the berths to manage water shed from the northern half of the expansion and docks (refer fig 1). Canals will be designed to

accommodate the first flush as described in TP10. I recommend a consent condition that the design is reviewed.

The safety mechanism of a spillway will be installed at the upstream end of the canal (refer fig 2) on the proposed eastern canal. The applicant proposes to install an oil trap on both the proposed eastern and existing western spillway.

At the upstream end of the proposed eastern spillway the canal is deepened and maintenance access is provided for the slot drain outlets.

The same ponds will be used to manage water quality. The ponds have been checked for adequacy and capacity to accommodate the additional treatment volumes. I am satisfied that the ponds have sufficient capacity to accommodate the additional flows. The existing monitoring and compliance conditions should be applied to monitor compliance and water quality.

5.2 Conclusion

Overall, I conclude that, subject to conditions, the quantity and quality of stormwater discharges from the proposal to the receiving environment will be appropriately managed.

6.0 TECHNICAL RESPONSE TO MATTERS RAISED IN SUBMISSIONS

6.1 Stormwater Compliance with the Relevant Legislation and Standards

Relevant submissions expressed concern or proper consideration be given to stormwater, climate change, water treatment quality, underlying infrastructure, stormwater disposal, stormwater management, compliance with the National Policy Statement Freshwater Management including the principles of Te Mana o te Wai, and that effects are appropriately managed. Concerns from specific submitters are summarised as follows.

D & E Keay

Request proper consideration is given to all underlying infrastructure issues. Particularly impact on stormwater disposal.

MB Hicks

Climate change

Whangarei District Council - Parks and Recreation Department ('WDC Infrastructure')

WDC Infrastructure requests that the following are met:

- National Policy Statement Freshwater Management (NPS-FM)
- The principles of Te Mana o te wai

Stormwater management – disposal of stormwater to the beach by others/stormwater separation.

<u>S Tyson</u>

Current water quality pond not large enough.

The National Institute of Water and Atmospheric Research Limited (NIWA)

Water quality within Bream Bay is maintained and appropriately monitored; and all other effects are appropriately managed. NIWA considers similar detailed conditions be imposed on the Northport expansion to ensure adverse effects are avoided, managed and monitored.

Macartney

Water quality concerns.

6.2 Response

Water Quality

Rainfall data used in the design is consistent with industry best-practice. This is National Institute of Water and Atmospheric Research (NIWA), High Intensity Rainfall Design System (HIRDS) Version 4. This database provides rainfall data for given return period design events and event durations, such as a 10-year exceedance return period rainfall for a 24-hour event.

Water Quality Volumes (WQV) are laid out by Auckland Technical Publication, TP10, for storage volumes required to achieve water quality objectives. A WQV can be provided as a permanent "dead storage" volume below pump-out/discharge levels. TP10 specifies a volume of WQV equal to the rainfall collected from a one-third of a 2-year ARI, 24-hour duration rainfall event. The rainfall for one-third of this event at this site in Marsden Point, is 27.6 mm depth. Auckland Council GD01 also provides depths (for Auckland Region only) with an approximate Auckland-wide depth of 25 mm. GD01 does not provide a design rainfall depth for areas outside the Auckland Region. It is therefore considered suitable, that the TP10 depth of 27.6 mm be allowed for.

Our assessment of the Hawthorn Geddes WQV requirements, show the WQV calculated from the TP10 design rainfall depth to be conservative.

Our assessment of the model build shows an appropriate methodology. Some checks on parameters were made. The model was built using the system in place during the calibration event (in order to calibrate the model). nce calibrated and verified, the model was modified to include proposed future works.

I am satisfied that the model provided by the applicant is representative of the port system for current and proposed development for assessment of effects.

Future Port Required Modifications

To provide the required Water Quality Volumes, Hawthorn Geddes proposes to provide some dead storage (WQV) in the canals. The increase in WQV would equal to a 110mm depth of water in the canals. Due to the impact of flow in the canals, a conservative dead storage volume increase is to be provided by installing a 250 mm high weir in the canal.

The total proposed WQV in the ponds is to be 17,750 m³. Hawthorn Geddes calculate a (conservative), required WQV of 18,510 m³ (which is 760 m³, or 4%, less than the required WQV). Hawthorn Geddes proposes to create dead-storage in the base of the canals to make up the shortfall.

It should be noted that GD01 states that:

"When live storage has to be provided (i.e. stream protection is required), the PWV can be reduced by 50% if there is evidence that the device will function and there is improved amenity, environmental and cultural outcomes"

Allowance for this volume, would reduce the required WQV by 9,255 m³(much greater than the 760 m³ calculated shortfall). Hence the WQV can be provided without creation of weirs (dead storage) in the canals. It would be better that there be no restrictions (weirs) created in the canals, and therefore, less spills from the canals.

Future Port Forecast Performance

The proposed system was assessed by Hawthorn Geddes to have suitable treatment (dead-storage) volume capacity. With the proposed port expansion, and measures to provide WQV, the frequency of discharge from the stormwater components were assessed by the model for current climate, and for climate change.

Whangarei District Council Environmental Engineering Standards require an allowance climate change (for hydraulic calculations – not water quality volume calculations) as specified as: *"The Climate Change allowance shall be an addition of 20% to rainfall data for the design event."* The Hawthorn Geddes' model shows the system to have extremeweather flow capacity such that discharges occur with rainfalls in excess of the following magnitude design events. Table 1 below is tabulates different port infrastructure and their capacity under different rainfall events.

Condition	Pond Scruffy Dome	Western Spillway	Eastern Spillway
Baseline (existing port & current climate)	20-year ARI	10-year ARI	N/A
Future Port (current climate)	5-year ARI	10-year ARI	5-year ARI
Future Port (with Climate Change)	2-year ARI+CC	5-year ARI+CC	2-year ARI+CC

Table 1 Capacity of infrastructure under different rainfall events

Note events shown are conservative limiting frequency of how often discharge occurs. For example, a "2-year ARI" frequency (such as for eastern weir with Climate Change) means that a discharge occurs at a frequency between 2- and 5-year ARI.

Hawthorn Geddes' propose a floatables trap at weir-controlled-spillways (at both current existing Western Spillway, and also at the proposed Eastern Spillway). The Western Spillway does not currently have such a device. I agree that these devices should be installed.

The model indicates that in the event of a power failure, the pond, and canals, do not breach their banks in an extreme event (of magnitude much greater than a 100-year ARI design event).

Assessment of Future Port Forecast Performance

I assess the treatment Water Quality Volume to be appropriate.

I also assess the percentage of capture of canal waters and conveyance to the pond to be satisfactory. The system conveys stormwater in all storms with rainfall less than 2-year 24-hour ARI rainfall event.

For comparison, TP10 and GD01 allow for WQV up to 1/3 of a than 2-year 24-hour ARI rainfall event. Such design standards capture 95% of all expected rainfall.

In conclusion I am satisfied that with continuation of the requirements under the Water Quality Monitoring Programme, this will be adequately addressed.

Consistency between consents

The port is licenced to carry fertilizers. I recommend that the following condition be added: The concentration of ammoniacal nitrogen from the water quality pond discharge should not exceed 1.86 milligrams per litre.

Summary

With the recommended changes I consider that the matters raised by submitters have been addressed. Matters raised include proper consideration be given to climate change, water

treatment quality, underlying infrastructure, stormwater disposal, stormwater management, and that effects from the existing and proposed development are appropriately managed.

With regard to the National Policy Statement Freshwater Management (NPS-FW) and the principles of Te Mana o te Wai, the NES-FW consent component was removed post-lodgement. The NPS-FW is therefore not relevant to this proposal.

7.0 STATUTORY CONSIDERATIONS

7.1 Resource Management Act 1991

Relevant statutory considerations under the RMA include:

- Section 105 RMA restrictions relating to discharge and coastal permits
- Section 107 RMA restrictions on grant of certain discharge permits
- Regional Policy Statement for Northland
- Proposed Regional Plan for Northland (Appeals Version)
- Operative Regional Coastal Plan
- Whangārei District Plan Operative in Part.

7.2 Non-Statutory Documents

Other relevant statutory considerations include:

- WDC Engineering Standards 2022
- GD01
- TP10.

7.3 Duration and Review of Consents

The Applicant seeks 35-year durations for the regional consents.

I see no reason, from a stormwater perspective, to recommend a shorter duration than the 35 year period sought.

8.0 **RECOMMENDATION**

8.1 Adequacy of information

The above assessment is based on the information submitted as part of the application. It is considered that the information submitted is sufficient to enable the consideration of the above matters on an informed basis.

8.2 Recommended Conditions and Advice Notes

Should consents be granted, the following conditions and advice notes are recommended to avoid, mitigate, or remedy environmental effects of the proposal and to implement mitigation proffered by the Applicant.

The following conditions are based on the existing stormwater consent held by Northport (*CON20090505532*). Changes or additions to conditions proposed by the Applicant have been highlighted in yellow.

Definitions

"CEMP"	means the Construction and Environmental Management Plan;		
"CMA"	means the coastal marine area as defined in s2 of the RMA;		
"Council"	means Northland Regional Council or its successor;		
"CRMS"	means Craft Risk Management Standard;		
"EMMP"	means the Environmental Monitoring and Management Plan;		
"Exceedance"	means the exceedance of an Allowable Duration;		
"Expansion Project"	means the Northport expansion to the east of the existing port authorised by these consents (and associated district consents), including reclamation and wharf construction and all associated activities and works;		
"NTU"	means nephelometric turbidity unit;		
"PAH"	means Polycyclic Aromatic Hydrocarbons		
"Practical Completion"	in relation to the reclamation, means the date that the completed reclamation (or any part thereof) is available for port activities;		
"RMA"	means the Resource Management Act 1991;		
"TSS"	means Total Suspended Solids;		

"VSS"	me	eans Volatile Suspended Solids
"Working Day"	Me	eans any day of the year other than:
	(a) A (Saturday, a Sunday, Waitangi Day, Good Friday,
	Ea	ster Monday, Anzac Day, the Sovereign's
	bir	thday, Matariki, and Labour Day; and
	(b) If V	Naitangi Day or Anzac Day falls on a Saturday or
	a	Sunday, the following Monday; and
	(c) A	day in the period commencing on 20 December in
	an	y year and ending with 10 January in the following
	ye	ar.

8.3 Discharge Consent :

- The stormwater discharge outlet structure at the Marsden Point port terminal berthface shall be in general accordance with the attached drawings entitled "Marsden Point Port Development Stage 1 Stormwater Outfall" prepared by Civil Structural, drawing number 9101101 SO 33^A, and entitled "Northport Development Layout at Western End of Wharf" prepared by Northport, drawing number D60-30-06-01-015 dated June 2002.
- 2. Operational stormwater must be treated either:
 - (a) via connection to the existing canal and pond-based stormwater system discharging to the CMA at co-ordinate location 1733997E 6033711N, and/or
 - (b) via alternative proprietary stormwater treatment systems/devices prior to discharge to the CMA, subject to prior certification by Council.
- 3. The consent holder must make an underwater examination of diffuser(s) and pipelines at least once every two (2) years, and take such measures as are necessary to ensure that diffuser(s) operate as designed and that all the stormwater discharges, except for the emergency overflow(s), pass through diffuser(s).
- 4. A report on all such examinations and action taken to remedy defects, as required under condition 3, must be forwarded to the Council's Compliance Manager within once month of the examination being completed.
- 5. Operational stormwater discharges must not result in any of the following effects on coastal water quality at or beyond the mixing zone, as shown on [insert plan ref] at Appendix XXXX:
 - (a) The temperature shall not be changed by more than 3°C;
 - (b) The pH shall not be changed by more than 0.2;
 - (c) The concentration of dissolved oxygen shall not be reduced below 80% saturation;
 - (d) The visual clarity shall not be reduced by more than 20% of the median

background visual clarity at the time of measurement, as measured by black disk or an authorised alternative method;

- (e) The hue shall not be changed by more than 10 Munsell units of the median background hue at the time of measurement;
- (f) There shall be no conspicuous oil or grease films, scums or foams, or floatable or suspended materials, or emissions of objectionable odour;
- (g) There shall be no destruction of natural aquatic life by reason of a concentration of toxic substances; and
- (h) The concentrations for the following determinands shall not be exceeded;

Determinands	Concentration in milligrams per cubic metre
Total copper	1.3
Total lead	4.4
Total zinc	15

- 6. The quality of stormwater discharged from the storage and settlement pond system by the pumps shall meet the following:
 - (a) A pH within the range of 6.5 to 9.0;
 - (b) A total suspended solids median concentration not greater than 50 grams per cubic metre and a 95 percentile concentration not greater than 100 grams per cubic metre.
 - (c) The concentration of ammoniacal nitrogen from the water quality pond discharge should not exceed 1.86 milligrams per litre.
- 7. The operational port area must, as far as practicable, be maintained free of accumulation of wood debris and other organic product such that it is limited in its ability to be conveyed to the stormwater drains and cause objectionable odours beyond the site boundary.
- 8. The stormwater storage and settlement pond system shall, as far as is practicable, be maintained free of floatable solids, oil and grease, and foams, and shall not emit objectionable odours.
- 9. To minimise the potential for the contamination of stormwater by natural wood chemicals, the Consent Holder shall, as far as is practicable, maintain log storage areas, internal drains and any debris traps, so that they are free of wood material that is being stored on-site.
- 10. The consent holder must undertake the following measures to minimise adverse effects associated with operational stormwater discharges:
 - (a) Removal of bark and wood debris to off-site landscape suppliers.
 - (b) Routine sweeping of the operational port area.
 - (c) Dust suppression measures.
 - (d) Regular cleaning of catchpits.

- 11. Sediment collected from the maintenance of the stormwater system, including internal drains and any debris traps, must be disposed of at a site that is authorised to accept such wastes.
- 12. The Consent Holder shall notify the Council Monitoring Manager as soon as practicable once the stormwater storage and settlement pond system reaches its design discharge level and shall then commence stormwater monitoring in accordance Schedule 1 (attached). The Consent Holder may make changes to Schedule 1 with the written approval of the Council Monitoring Manager.
- 13. Where from any cause a contaminant (including fuel) associated with the Consent Holder's operations escapes otherwise than in conformity with this consent, the Consent Holder shall:
 - (a) Immediately take such action or execute such work as may be necessary to stop and/or contain such escape; and
 - (b) Immediately notify the Council by telephone of an escape of contaminant; and:
 - (c) Take all reasonable steps to remedy or mitigate any adverse effects on the environment resulting from the escape; and
 - (d) Report the escape to the Council within one week of its occurrence and the steps taken or being taken to clean up, remedy any adverse effects and prevent any recurrence of such escape.
- 14. The Council may in accordance with Section 128 of the Resource Management Act 1991, serve notice on the Consent Holder of its intention to review the conditions of these consents. Such notice may be served annually during the month of March. The review may be initiated for any one or more of the following purposes:
 - (a) To deal with any adverse effects on the environment that may arise from the exercise of the consents and which it is appropriate to deal with at a later stage, or to deal with any such effects following assessment of the results of the monitoring of the consents and/or as a result of the Council's monitoring of the state of the environment in the area;
 - (b) To require the adoption of the Best Practicable Option to remove or reduce any adverse effect on the environment;
 - (c) To provide for compliance with rules in any regional plan that has been made operative since the commencement of the consents;
 - (d) To deal with any change(s) to the materials handled through the Port Terminal. (Notice may be served at any time for this reason.); and
 - (e) To deal with any material inaccuracies that may be found in the information made available with the application. (Notice may be served at any time for this reason.)

The Consent Holder shall meet all reasonable costs of any such review.

SCHEDULE 1 MONITORING PROGRAMME

The Consent Holder shall undertake the monitoring as follows:

1.0 WATER QUALITY OF DISCHARGES FROM THE STORMWATER SETTLEMENT AND STORAGE POND SYSTEM

1.1 Routine Water Monitoring for Discharges from the stormwater settlement and storage pond to Whangarei Harbour

The stormwater system and discharges shall be monitored in accordance with Table 1 attached below.

If any of the following determinands in the stormwater being discharged to the coastal marine area exceed the Action Values specified in Table A, the Consent Holder will notify the NRC within two weeks of receiving the sample result and investigate the source of the contaminant and advise the NRC as to the findings of the investigation and any management response.

Determinands		Action values:		
		Concentration in milligrams per cubic metre		
Tota	al Aluminium	5		
Tota	al copper	13		
Tota	al lead	44		
Tota	al zinc	150		
PAHs				
_	Acenaphthene	58		
_	Anthracene	0.1		
_	Benzo(α)anthracene	0.18		
_	Benzo(α)pyrene	0.1		
_	Fluoranthene	10		
_	Fluorene	30		
_	Napthalene	500		
-	Phenanthrene	6		
-	Pyrene	0.25		

Table A

Note: ANZECC for PAH, 99% protection level as recommended in Section 8.3.7.7 and also CEQG (Canadian aquatic guidelines). For aluminium, ANZECC 8.3.7 Marine guidelines recommend 0.5 mg/m as an indicative low reliability figure.

Values in Table A are intended to act as an early warning to identify if concentrations are increasing relative to previously documented monitoring values/trends and warrant investigation notwithstanding that they may be well below levels of environmental concern taking into account mixing and dilution.

TABLE 1: SCHEMATIC MONITORING DIAGRAM

Location	Sampling Frequency	Parameters	Criteria	Notes
Point of discharge from treatment pond system	First discharge per season, and two other discharge events each year			Advice NRC when ponds reach design discharge level for the first time each year prior to discharge occurring
	One sample per day until discharge has ceased. First sample to be taken as close as possible to when discharge first occurs.	TSS, VSS, NTU and pH	TSS as in Condition 5(b)	T and DO are considered not useful in this situation as they will reflect conditions intrinsic to the wetland and in any event cannot have any influence on water quality in this particular marine receiving environment.
	Taken with first sample from first discharge event only.	Al, Cu, Pb, Zn, PAH, and resin acids. Total N and Total P to be included if fertiliser products have been stored on site in the previous season.	Action values see table A in 1.1 above. Resin acids, Total N and P concentrations will be assessed against available literature and previous concentrations to determine potential for adverse effects. All parameters to be	If the resin acid results for the first discharge of the season are below any applicable ANZECC effect threshold after theoretical mixing, resin acids need not be further analysed in that season.

Sensitivity: General

			assessed for any increasing trends over time.	
	One-off under existing regime	WETT (Toxicity Testing)	As specified in point 1.3 below	One further WETT will be undertaken under the present port conditions. The need for any further WETT will be considered only if new port operations introduce new contaminant(s) into the stormwater.
Pond Influent	To be done with " <i>First discharge per season</i> " referred to above	T, pH, DO, TSS, Cu, Pb, Zn, resin acids, phenols, PAH, VSS	Trend data only, no compliance limits.	Test to be used as an indication of pond effectiveness under different conditions eg size of storm, contributing area
Stormwater Canals, western/eastern arms	One off	<u>Sediment</u> samples: Cu, Pb, Zn, PAH	Trend data only but reference to ANZECC ISQG values to	Samples to be taken at: Join of arms, 100m upstream on eastern arm, 100m upstream on western arm Test to be used to determine any disposal issues for sediment
			assess pollution status.	

	<u>Water</u> :Winter months (when ponding in canals following rainfall) pH, Cu, Pb, Zn, resin acids, phenols, PAH	Trend data only. No compliance limits	Both sediment and water samples to be representative based on 3 sub-samples from different points of each arm composited for analytical purposes
Groundwater			All results from the water quality and sediment quality monitoring will be reviewed after 5 years of exercise of this consent for the purpose of-determining if groundwater quality is at risk.

Abbreviations

ANZECC	The Australian and New Zealand Environment and Conservation Council
Т	Temperature
DO	Dissolved oxygen (both g/m ³ and % saturation)
TSS	Total Suspended Solids
Total N	Total Nitrogen
Total P	Total Phosphorus
FC	Faecal Coliforms

Consent: Northport Ltd – APP.005055.38.01 and LU2200107 **Address:** Ralph Trimmer Drive, Marsden Point, Whangārei

Sensitivity: General

Cu	Copper
Pb	Lead
Zn	Zinc
PAH	Polycyclic aromatic hydrocarbon
WETT	Whole Effluent Toxicity Test
VSS	Volatile Suspended Solids
NTU	Nephelometric Turbidity Unit

1.2 Pumping Hours

The Consent Holder shall measure the pumping hours, the date, the time, and the quantity of water when the discharge to Whangarei Harbour occurs.

Advice Note: The application states that the approximately average volume of stormwater to be discharged is assessed at 200,000 cubic metres per annum. The size of the discharge pipe and the proposed capacity of the pumps limit the pumped discharge rate to approximately 2,520 cubic metres per hour.

1.3 Wett Method

The WETT method for toxicity analyses shall be undertaken on not less than three representative marine species, including at least one algae, one invertebrate, and one fish. The choice of toxicity test species, dilutions, test endpoints to be measured, and "toxicity effect" shall be submitted to the Council for approval at least twenty working days prior to stormwater sampling. For each of the three [3] toxicity tests the EC₂₅ (the concentration of stormwater estimated to produce a toxic effect in 25% of the test organisms) shall be greater than the equivalent of a 200-fold dilution of the stormwater. The dilution water used for toxicity tests shall be an uncontaminated sample of Whangarei Harbour water, collected on an incoming tide at the harbour entrance, at a point agreed to by the Council. There shall be no significant toxicity after a 200-fold dilution of the stormwater. For the purposes of this condition "significant toxicity" is defined as no more than a 25% toxic effect measured in the most sensitive test species used. Testing of the samples shall be carried out in accordance with the methodology outlined in the NIWA document entitled "Standard Methods for Whole Effluent Toxicity Testing: Development and Application" dated November 1998.

1.3 pH

The pH and TSS results taken in accordance with Table 1 will be recorded in an ongoing spreadsheet a copy of which shall be forwarded to the Council Monitoring Manager as required by Condition 2 below. Any results recorded which do not achieve the criteria included in Condition 5 shall be reported to the Council Monitoring Manager together with an explanation within seven days of their receipt by Northport.

2 REPORTING

2.1 The Consent Holder shall forward to the Council Monitoring Manager by 31 August each year an annual report for the previous period 1 July to 30 June detailing the results

assessment of compliance with the conditions of consent.

3 REVIEW

The Regional Council, in conjunction with the Consent Holder, may undertake a review of the monitoring programme every two years. The review will take into account the Consent Holders monitoring results, any monitoring undertaken by the Regional Council and the level of development within the catchment areas. The Consent Holder shall meet the reasonable costs of any such review.

4 FIELD MEASUREMENTS, RECORDS, SAMPLE COLLECTION, SAMPLE TRANSPORT, DETECTION LIMITS, AND LABORATORY REQUIREMENTS

4.1 Records

A record of rainfall conditions preceding and during sampling shall be kept. This record shall be based on a nearby rainfall recording site agreed by the Council.

4.2 Sample Collection

All samples collected as part of this monitoring programme shall be collected using standard methods and approved containers.

4.3 Sample Transport

All samples collected as part of this monitoring programme shall be transported in accordance with standard procedures and under chain of custody to the laboratory.

4.4 Detection Limits

The detection limits for the analysis of metals in sediment and water samples collected shall be equivalent to, or better than, those specified below:

Metal	Sediment samples	Water samples
	(milligrams per kilogram)	(milligrams per cubic metre)
total copper	2	1.0
total lead	0.4	0.2
total zinc	4	2.0
total arsenic	2	N/A
total cadmium	0.1	N/A
total chromium	2	N/A

4.5 Laboratory Requirements

Consent: Northport Ltd – APP.005055.38.01 and LU2200107 **Address:** Ralph Trimmer Drive, Marsden Point, Whangārei All samples collected as part of this monitoring programme shall be analysed at a laboratory with registered quality assurance procedures (see definition below), and all analyses shall be conducted using standard methods.

Registered quality assurance procedures are procedures that ensure that the laboratory meets good management practices and would include registrations such as ISO 9000, ISO Guide 25, and Ministry of Health Accreditation.

8.4 Whangarei District Consent - I recommend the following conditions of consent relating to construction operations:

Approval of Weirs Modified to Contain Floatables

The consent holder is to submit a detailed engineering drawings and calculations (if applicable) for Engineering Plan Approval of the proposed floatables trap at weir-controlled-spillways.

It is to be noted that certain designs may only be carried out by a Chartered Professional Engineer (CPEng) working within the bounds of their assessed competencies.

All work needing design/certification by a CPEng will require completion of a producer statement (design) (EES-PS1 or similar).

Engineering Plan Approval

The consent holder is to submit detailed design drawings and calculations of the canals, weirs, spillways and stormwater infrastructure of the proposed stormwater system for Engineering Plan Approval. This is to enable assessment of a complete drawing set of all components of the stormwater system.

It is to be noted that certain designs may only be carried out by a Chartered Professional Engineer (CPEng) working within the bounds of their assessed competencies.

All work needing design/certification by a CPEng will require completion of a producer statement (design) (EES-PS1 or similar).

Operations & Maintenance Plan

The consent holder is to submit an Operations and Maintenance Plan for the proposed stormwater system.

This to include operations & maintenance of:

- Pond and Associated Pumps
- Channels
- Spillways
- Removal of silt and any contaminants settled in spillways
- Isolation and removal of any spills on the port apron entering a canal
- Repair of any erosion
- Removal of blockages

Monitoring Programme

Requirement is recommended for an update Monitoring Programme. This to add to the existing monitoring programme with some further specification of sampling sites as listed below:

- Samples to be taken near the (existing) western
- Samples to be taken near the (proposed) eastern spillway

Memo prepared by:	Sean Kelly, Senior Engineer, Haigh Workman John McLaren, Senior Engineer, Haigh Workman	
Date:	12 July 2023	

Memo reviewed and approved for release by:	Blair Masefield, Technical Director, Beca Limited	
	On behalf of the Whangārei District Council and Northland Regional Council	
Date:	2 August 2023	