APPLICATION NUMBER:	LUC-2016-189
RELATED APPLICATIONS/LICENCES:	

PLANNING APPLICATION DETAILS FORM

Property Address	40 Beach Street Port Chalmers
Property Description:	Property No: 5104065, Legal Description: LOT 1 DP 18957, LOT 2 DP 18957, SEC 466 SO 21294 TN OF PORT CHALMERS, SEC 467 SO 21294 TN OF PORT CHALMERS, LOT 1 DP 18978, SEC 427 SO 13003 TN OF PORT CHALMERS, SEC 100 SO 14725 TN OF PORT CHALMERS, SEC 417 SO 13003 TN OF PORT CHALMERS, LOT 1 DP...

First Contact: (Applicant)	**Name:**	Port Otago Limited
	Mail Address:	PO Box 8, Port Chalmers 9050
	Phone Number:	03 472 9873
Second Contact: (Agent)	**Name:**	
	Mail Address:	
	Phone Number:	
	Contact Person:	

Description of Application:	undertake 45000m3 of earthworks to stablise Flagstaff Hiill

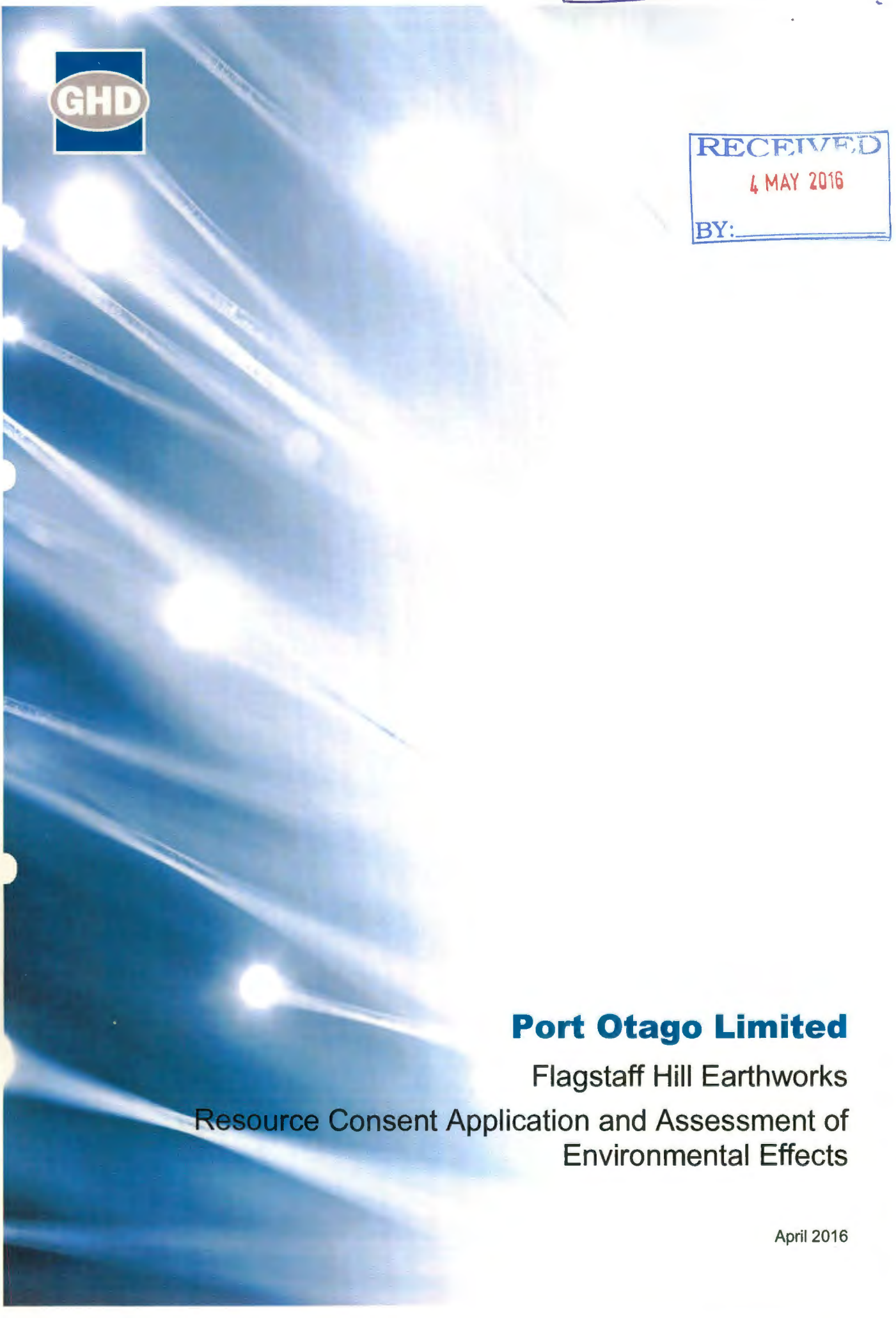
Application Type:	Land Use Consent		
Consent Type:	Full Notified Land Use Consent	***Consent Nature***	Full Notified Land Use Consent

Major Category	Notified
Minor Category	Notified - Restricted Discretionary
Senior Planner or Responsible Officer:	John Sule

Lodgement Date:	04 May 2016	**Lodgement Officer:**	Paula Myers
Amount Paid:	$7,000.00	**Invoice Number:**	577035
Waived: ☐			

Application Requirements	**Signed Application Form**		**Copy of Title**	
	Locality Plan		**Site Plan**	
	Plans and Elevations		**AEE**	
	Affected Persons Consent			
Counter Comments:				

Full copy.



Port Otago Limited

Flagstaff Hill Earthworks

Resource Consent Application and Assessment of Environmental Effects

April 2016

Table of contents

Appendices

Appendix A – Certificate of Title

Appendix B – Opus Report

Appendix C – Assessment of Noise and Vibration Effects

Appendix D – Landscape Development and Management Plan

Form 9

APPLICATION FOR RESOURCE CONSENT

UNDER SECTION 88 OF THE

RESOURCE MANAGEMENT ACT 1991

TO: Dunedin City Council

Port Otago Limited, applies for the resource consents described below.

1. **THE NAME AND ADDRESS** of the owners and occupiers of any land to which the application relates are as follows:

   Owner/Occupier: Port Otago Limited

2. **THE LOCATION** to which this application relates is:

   Physical Location: Flagstaff Hill, Dunedin

   Legal Description: Lots 1 and 2 DP 26574

   Certificate of Title: OT 18D/5 and OT 18D/5

   A copy of the Certificate of Title is included as **Appendix A**.

3. **THE TYPE** of resource consent sought from Dunedin City Council is:

   - A land use consent for earthworks

4. **A DESCRIPTION** of the activity to which the application relates is:

   - To undertake up to 45,000 m^3 of earthworks on the site for the purpose of slope stabilisation.

   A detailed description of the proposal is included on the attached plans and Assessment of Environmental Effects (AEE) which forms part of this application.

5. **NO ADDITIONAL RESOURCE CONSENTS ARE REQUIRED:**

   - There are no relevant rules in the Regional Plan: Water for Otago as sediment will be removed from stormwater generated from the site prior to it being discharged into the reticulated network.
   - There are no relevant rules in the Regional Plan: Coast for Otago as the works are not being undertaken within the Coastal Marine Area.
   - There are no relevant rules in the Regional Plan: Waste for Otago as the proposed works will not be taking place on contaminated land and do not involve the handling or production of waste materials.
   - The proposed activity complies with the relevant rules in the Regional Plan: Air for Otago. The proposed earthworks will not generate PM10, any discharge to air is not from an industrial or trade premise and the activity is considered to fall under the 'General Permitted Activities' criteria.

6. **AN ASSESSMENT** of any effects that the proposed activities may have on the environment in accordance with the fourth schedule to the Resource Management Act 1991 is attached.

7. **THE ATTACHED** assessment of environmental effects also contains any other such information required to be included in the application by the District or Regional Plan(s) or Act or Regulations.

Signed on Behalf of the Applicant

Lincoln Coe
Port Otago Limited

Dated 15 April 2016

ADDRESS FOR SERVICE of Applicant:

Port Otago Limited
P O Box 8
Port Chalmers

Ph: (03)472 9884
Email: lcoe@portotago.co.nz

1. Introduction

Port Otago Limited ('Port Otago') owns the land on which a log marshalling and storage operation in undertaken, on reclaimed land at the base of Flagstaff Hill in Port Chalmers, Dunedin. There have been ongoing stability issues with the north eastern slopes of the hill, including a significant slip in 1999. In 2010, Port Otago commissioned a report by Opus International Consultants Limited to look at the stability issues and provide a cut design for the slope that would provide a long term solution to the problem and ensure that Port operations, as well as public safety on the road and footpath are not compromised by future slips. The design would also allow Peninsula Beach Road to be fully reopened, providing safe access to Back Beach in accordance with community expectations. A copy of the Opus report is attached as Appendix B.

Port Otago are now seeking consent in order to carry out the proposed earthworks and stabilisation of the hillside.

2. Site Description and Locality

The subject site is legally described as Lots 1 and 2 DP 26574 and is a total of 1.9085 hectares in area. The following aerial photo (DCC Webmaps) shows the general locality of the activity,

To the south and west of the site are residential properties, some of which are also owned by Port Otago. The northern and eastern portion of the site contains a reclamation which is currently used by the port for the storage of forestry products. A road (Peninsula Beach Road) runs to the north of the hill, however this local road has been formed on Port land outside the actual road reserve. The top of the hill contains a "Flagstaff" which is listed as a heritage structure in the Dunedin City Plan and was constructed around 1910. The New Zealand Archaeological Association does not show any archaeological sites in proximity to the proposed earthworks.

The oblique aerial photo below shows the slope and adjacent port activities.

As noted above, a significant slip occurred on the site in 1999, which resulted in some benches being cut into the hillside as an interim stability measure.

Peninsula Beach Road is now partially obstructed by shipping containers in order to protect road users from any further land slippage. Traffic signals have also been installed to prevent vehicle movements when the Peninsula Beach Road train tracks are in use (see photo below). The road is regularly used by the community to access back beach and the port peninsula, including vehicles towing boats and yachts as it provides sole access to the launching ramp at Back Beach. As such, there are public inconvenience and safety issues associated with the current situation.

Specific details of the sites geology are contained in the Opus report. In summary, the slope consists of Dolerite overlain by Port Chalmers Breccia. The Port Chalmers Breccia is carbonate cemented Breccia which consists of unsorted fragments of volcanics and minor schist.

3. Proposed Activity

The applicant proposes to undertake earthworks in order to stabilise the northern and eastern face of Flagstaff Hill and ensure that Port operations and public safety are not jeopardised or potentially affected by future slips. The proposed activity entails approximately 45,000 m^3 of earthworks. Drawings illustrating the proposed earthworks are included in Appendix B (within Appendix A of the Opus Report). They show that the dolerite will be cut as a single slope at 40 degrees along the north eastern section to tie in with the existing slope. As the cut moves south to the east facing slopes, the slope will be reduced to 35 degrees.

The upper breccia will be benched in accordance with the existing works with a 5m wide bench and more than 6m vertical separation between the benches. Bench height will not exceed 6m and bench widths will not be less than 4m.

The slopes will be grassed and the benches will be vegetated to improve stability and to mitigate adverse visual effects associated with the proposed works.

The excavated material will be removed and transported to either a disposal site or to an interim storage site, by either road or rail. It is noted that Port Otago have been liaising with the New Zealand Transport Agency about the potential for the excavated material to be used for the St Leonards to Port Chalmers Shared Path Project, if this project goes ahead. Such a solution would be to the mutual benefit of Port Otago, the Transport Agency and the community. Port Otago will continue to liaise with the Transport Agency about the prospects and timing of the St Leonards to Port Chalmers Shared Path Project, and whether the excavated material is needed. This application does not include disposal of the excavated material to any site. Any consents associated with the use of the excavated material for the Shared Path Project (if this project goes ahead), or any other site/project, will be sought separately.

The shipping containers and barrier arms will also be removed from Peninsula Beach Road, and the railway tracks will be fenced off within the port security area. This will rectify the current situation and improve public access and safety by separating rail and port activities from the street and footpath. A catch fence, as detailed in the Opus report, will also be installed and certified by producer statement by suitable qualified engineer if necessary.

3.1 Management Measures

Prior to the works being undertaken, a detailed Construction Programme will be prepared confirming construction timing, storage and disposal of excavated material. It is anticipated that the earthworks will be undertaken during normal working hours and will take between 3 – 12 months to complete.

An Construction Management Plan will also be prepared by the appointed contractor which will address environmental matters arising from construction activities including sediment management, erosion, dust control and blasting (if required as part of the construction methodology). The purpose of this management plan will be to minimise potential environmental impacts and manage operations to achieve best practice outcomes. The plan will detail controls and procedures for addressing specific environmental issues, and it will detail the management responsibilities of individual construction and Port Otago Ltd personnel.

Accordingly, the applicant anticipates a condition of consent requiring the preparation of a Construction Management Plan which is provided to the consent authority at least two weeks prior to work commencing. This would be appropriate in mitigating construction related effects.

4. Statutory Assessment

4.1 Operative Dunedin City District Plan

The Dunedin City District Plan (the Plan) became operative in July 2006 and is currently subject to a review.

The site is located in the Port 1 Zone in the Operative Plan. The Flagstaff, located at the top of the hill, is listed as a 'Heritage Structure'. The immediately surrounding environment contains a mix of port and residential activities, with a public road running immediately around the base of the hill.

Ports are identified in the Plan as one of the City's physical resources which are to be managed sustainably, and are an integral part of the regions transport network. The Plan acknowledges that the operational requirements for port areas are changing and that there needs to be some flexibility in the amount and type of space that is available for port operations. The Plan also acknowledges that Port activities can have adverse effects related to noise and glare as well as visual impacts.

The proposed earthworks are necessary for the safe ongoing operation of Port Chalmers so the activity is consistent with the zone purpose and anticipated environmental results. The works also rectify the current public safety issues associated with the shared use of Peninsula Beach Road and the low (albeit) risk of unexpected slip failure.

The relevant objectives and policies are discussed later in this AEE.

The proposed earthworks are not specifically provided for as a permitted activity in the Port Zone. The following general earthworks rules are therefore relevant to the application:

Rule 17.7.2(ii) states that all earthworks that are not listed in Table 17.4 or provided for in Rule 17.7.2(i), are permitted provided that the works comply with Rules 17.7.3(i) to 17.7.3(vi).

The following is an assessment of the proposed activity against Rules 17.7.3(i) to 17.7.3(vi) following:

Rule	Activity	Compliance
17.7.3(i) Minimum Setback Distance: The minimum setback distances set out in 17.7.3(i)(a), (b) and (c) shall apply between earthworks over 600 mm in height or depth and the property boundary, the foundation of any existing building, or the top or toe of any cliff. *(a) For earthworks not supported by a retaining wall the minimum setback distance:* *(i) to the toe of any fill shall be at least equal to the maximum height of the fill.* *(ii) to the toe of any cut shall be at least equal to 1.5 times the maximum depth of the cut, plus a minimum of 300mm.* *(iii) to the crest of any cut shall be at least 300mm.* ...	The proposed earthworks will be over 600 mm in height and will be undertaken right up to the property boundary.	No
17.7.3(ii) Scale Thresholds: Earthworks shall not, within any consecutive 2 year period, exceed either	The proposed earthworks will result in a change in ground level greater	No

the 'Change in ground level' threshold or the 'Volume of excavation and fill' threshold listed in Table 17.5 for the area or zone in which they are located. *Table 17.5 states that in all zones other than Rural Zones, Landscape Management Areas and Urban Landscape Conservation Areas, the volume of excavation and fill thresholds for site areas less than 2 ha are a maximum change in ground level of 1.5m and a maximum volume of excavation and fill of 100m^3*	than 1.5m and in a total volume of excavation greater than 100m^3, accordingly this rule is not complied with.	
17.7.3(iii) Distance from Water: *Earthworks shall not exceed 1m^3 in volume or 25m^2 in area in any of the following locations:* *(a) Within 20m of any natural surface water body with a clearly defined bed and a continual flow, or any wetland identified in Schedule 25.4 or in Schedule 9 or 10 of the Regional Plan: Water for Otago as it is at 1 July 2010, in the Rural Zone. If a wetland is marked on more than one of these schedules, the more extensive boundary of that wetland applies.* *(b) Within 7m of any natural surface water body with a clearly defined bed and a continual flow, or any wetland identified in Schedule 25.4 or in Schedule 9 or 10 of the Regional Plan: Water for Otago as it is at 1 July 2010, in any other zone. If a wetland is marked on more than one of these schedules, the more extensive boundary of that wetland applies.* *(c) Within 7m of the mean high water springs in any Residential or Activity Zone.*	The proposed earthworks will be undertaken in excess of 100m from a water body and as such comply with this rule.	Yes
(iv) Groundwater Protection Zones: Within Groundwater Protection Zones as shown on District Plan Maps 6, 7, 8, 27, 28, 29, 30, 41, 42 and 53, excavations other than those required for roading or foundations for buildings shall not exceed 250mm in depth or 10m^3 in volume.	The site is not located within a Groundwater Protection Zone.	Yes
(v) Distance from Water and Waste Infrastructure: *Earthworks shall be located at least 1.5m from the centreline of any Council-owned stormwater or foul sewer line, and at least 2.5m from the centreline of any Council-owned water mains.*	The earthworks will be located at least 1.5m from the centreline of any Council-owned stormwater or foul sewer line, and at least 2.5m from the centreline of any Council owned water main.	Yes
(vi) Distance from High Voltage Transmission Lines and Support	The proposed earthworks will not	Yes

Structures *(a) Except for earthworks for new and/or existing network utilities, earthworks shall be located at least 12m from of the closest visible edge of the foundation of a high voltage transmission line support structure as shown on District Plan Maps 4-6, 8-10, 16-19, 29-32, 45-47, 49 & 53.* *(b) Except for earthworks for new and/or existing network utilities, earthworks that result in an increase in ground level shall be located at least 12m from the centreline of a high voltage transmission line as shown on District Plan Maps 4-6, 8-10, 16-19, 29-32, 45-47,49 & 53.*	be undertaken with proximity to any High Voltage Transmission Lines or Support Structure.

The proposed earthworks cannot comply with Rules 17.7.3 (1) and (ii) but will comply with Rules 17.7.3 (iii) to (vi).

Rule 17.7.4 outlines certain circumstances where earthworks that do not meet the conditions contained in Rule 17.7.3 may be assessed as a controlled activity. However, in this instance, due to the scale of the earthworks, the earthworks do not meet the controlled activity criteria and must therefore be assessed as **a restricted discretionary activity** in accordance with Rule 17.7.5 (ii).

This rule states that Councils discretion shall be restricted to:

- Adverse effects on the amenity of neighbouring properties.
- Effects on visual amenity and landscape.
- Effects on any archaeological site and/or any cultural site.
- Effects on the transportation network caused by the transport of excavated material or fill.
- Effects from the release of sediment beyond site boundaries, including transport of sediment by stormwater systems.
- Cumulative effects relating to any of these matters.

For earthworks that were not granted an earthworks permit prior to 1 July 2010 and that do not form part of a project that was granted building consent on or after 1 July 2010, the Council's discretion will also extend to the following matters:

- Design and engineering of retaining structures and earthworks.
- Effects on the stability of land and buildings.
- Effects on the surface flow of water and on flood risk.
- Effects on underground utilities.

These matters are considered further below.

4.2 Proposed Dunedin City Plan (2GP)

Dunedin City Council notified the review of its District Plan, with its "second generation plan" or 2GP, on 26 September 2015, some of which has legal effect from this date.

From 26 September the objectives and policies of the 2GP have to be considered alongside the objectives and policies of the current district plan. Relevant objectives and policies are addressed later in this report.

Some rules in the proposed 2GP have legal effect from notification and others take effect when all submissions in opposition and appeals have been determined by the Environment Court; or if there are no submissions on them.

The only rules which have legal effect at the time of writing relate to indigenous vegetation removal and certain subdivision matters. The landscape report in Appendix D confirms that the only vegetation to be removed for the proposed earthworks is exotic vegetation.

The zoning for the site remains similar in the 2GP as for the Operative Plan, with the site being zoned as a Major Facilities (Port) Zone. An archaeological alert layer is also shown across the site in the 2GP.

5. Assessment of Environmental Effects

This assessment has been prepared in accordance with the requirements of Section 88(2)(b) of the Resource Management Act 1991 and the Fourth Schedule of the Act. Section 88 requires any application for resource consent to include an assessment of environmental effects in such detail as corresponds with the scale and significance of the effects that the activity may have on the environment.

In this instance, Council has specifically restricted its discretion to those outlined above, accordingly each of those matters are examined in detail below.

5.1 Adverse Effects on the Amenity of Neighbouring Properties

As outlined in Section 2 above, the site is surrounded by a mix of Port and Residential uses. The area to the north and east contains a reclamation that is used by the port for the storage of wood products. Given the nature of the wider port activities, the short term nature of the actual earthworks activity and the remediation of the site that will occur when the work is completed, it is considered that any effects on the amenity of neighbouring properties will be less than minor.

A number of potential excavation methods may be used in order to undertake the proposed earthworks, the method used will depend on the rock characteristics, and the type and capacity of the plant that is available. Mechanical breakers will be required and it is possible that some blasting may also be necessary.

Marshall Day Acoustics has carried out an assessment of the likely noise and vibration effects of the proposed works, including the possibility of blasting (Appendix C). In particular, the assessment has considered effects on 11 Island Terrace, 2 Aurora Terrace and 17 Scotia Street, being the nearest properties not owned by Port Otago (see map figure in Section 2, page 2). The assessment anticipates that construction activity will comply with the appropriate noise limits as set out in NZS 6803:1999 'Acoustics – Construction Noise', and the vibration limits contained in German Standard DIN 4150-3:1999-02 'Structural Vibration – Part 3: Effects of Vibration on Structures'.

Overall, it is considered that any adverse effects on the amenity of neighbouring properties, specifically in relation to noise and vibration effects will be less than minor.

5.2 Effects on Visual Amenity and Landscape

The proposed activity has the potential to result in adverse natural character and visual effects on the surrounding environment if not managed correctly.

The works will be visible over a distance of approximately 1 km from a small number of Careys Bay residences, and further north along parts of Aramoana Road. The works will also be visible from Harwood on the Otago Peninsula at a distance of over 3 km. Users of the public road and harbour channel will be afforded closer views of the works. However, the works will not be visible from either the Port Chalmers township or the residences located on Aurora Terrace.

The proposed earthworks will initially result in adverse natural character and visual effects in the form of a previously vegetated but modified landscape being exposed and further modified. The earthworks have been designed to be consistent with the form of the adjacent 'engineered' slopes and surrounding port environment. Furthermore, mitigation planting is proposed to soften the visual appearance of the works and re-establish the character of the surrounding environment.

It is proposed to topsoil and plant the benches at the top of the slope with locally appropriate indigenous species. This will help to both stabilise the slope and soften its visual appearance. It

is anticipated that this planting will be well established after approximately 5 years. The bare rock below the level of the benches will be hydroseeded and thereafter left to revegetate naturally. Revegetation on this part of the slope will take longer to establish, but as has happened since the last time the headland was cut back, natural revegetation will occur. A Landscape Development and Management Plan has been prepared (Appendix D) and contains a planting plan which illustrates the proposed planting.

Overall, the Landscape Development and Management Plan concludes that the adverse natural character and visual effects will be of short-medium term duration and appropriately mitigated through the cut design and proposed planting, such that the effects will be minor over the long term.

5.3 Effects on any Archaeological Site and/or Cultural Site

As noted previously, the top of the hill contains a "Flagstaff" Structure which is listed as a heritage structure in the Dunedin City Plan and was constructed around 1910. The New Zealand Archaeological Association does not show any archaeological sites in proximity to the proposed earthworks and it is therefore considered unlikely that there will be any adverse effects on any archaeological or cultural site. Notwithstanding this, the applicant anticipates a condition of consent requiring an Accidental Discovery Protocol to be adopted in the event that human remains or cultural artefacts are unearthed during the proposed works.

5.4 Effects on the Transportation Network

There are significant traffic safety benefits associated with the proposed works. As noted above, the works will allow the Peninsula Beach Road railway tracks to be fenced off within the Port security area. This will separate port and rail activities from the public road and footpath. The shipping containers and barrier arms will then be removed, further improving the transportation network between Port Chalmers and Back Beach.

The proposed activity will generate a number of vehicle movements associated with the removal of 45,000 m^3 of earth from the hillside. It is anticipated that a standard truck and trailer unit will be used which has a capacity approximately 20 m^3. This equates to approximately 4,500 vehicle movements (2,250 movements to and from the site) over the duration of the project. Material could be transported by rail if it is to be used for track improvements. This removal methodology would cause less effects on to the road network, if it was to occur.

Peninsula Beach Road is a local road that feeds State Highway 88 (SH88). SH88 is the primary access route between Port Chalmers and SH1. In 2008, Traffic Design Group were commissioned by Port Otago Limited to ascertain the existing capacity and level of service of the highway as well as its potential future capacity. Although this report did not identify a specific maximum capacity for the highway, it did identify that there was scope for additional traffic growth to be accommodated without compromising the level of service. While this report has not been updated for this application, it is noted that some improvements have been made to SH88 which would further improve this level of service.

No haulage of excavated material or spoil will be undertaken on local streets such as Aurora Terrace, Scotia Street or Constitution Street. However, light vehicles movements associated with the construction works can be expected. Notwithstanding this it is noted that the applicant will undertake all practicable measures to minimise adverse effects on the surrounding roading network. This will include limiting vehicle movements during times of peak flow, and where possible using truck and trailer units to reduce the total number of required vehicle movements.

It is acknowledged that the site is located immediately adjacent to an existing road and as such some work within the formed carriageway will be unavoidable. In order to ensure that the safety of other road users is not compromised, a Traffic Management Plan will be prepared prior to the

commencement of the works. This will be as detailed in the NZTA Code of Practice for Temporary Traffic Management (which has supercedes and replaces the TNZ G/1 specification, which is referred in the Opus report). The traffic control will ensure that the safety of the road user will be retained and that confusion and inconvenience for the road user will be minimised.

Overall it is considered that any adverse effects on the transportation network arising from the proposed earthworks will be minor and of a limited duration, and that there are significant positive traffic safety benefits associated with the proposal. Furthermore, it is considered that sufficient capacity exists for the construction traffic movements to be accommodated without jeopardising the safety or efficiency of the network.

5.5 Effects from the Release of Sediment beyond the Site Boundaries, including Transport of Sediment by Stormwater Systems

In order to avoid the conveyance of sediment beyond the site boundaries, the appointed contractor will develop an erosion and sediment control plan that addresses the issue of sediment and erosion control and form part of the Construction Management Plan.

This erosion and sediment control plan will detail site management practices and mitigation measures to avoid, remedy or mitigate adverse effects. At a minimum, this will include measures to prevent or minimise erosion and sedimentation at source through:

- minimisation of bare areas;
- earthworks methodology;
- runoff control;
- dust control; and
- stabilisation.

It is considered that the inclusion of these types of environmental management measures within the Construction Management Plan will ensure that any adverse effects associated with the release of sediment are appropriately avoided, remedied or mitigated.

5.6 Cumulative Effects Relating to any of these Matters

While the proposed earthworks may result in some minor adverse effects on the surrounding environment, these will be of a short term duration and are considered unlikely to result in any cumulative adverse effects.

A previous traffic study has identified that the road network has sufficient capacity to provide for growth, and as such it is considered unlikely that the proposed short term earthworks will result in any cumulative effects on the traffic environment. Appropriate mitigation is proposed to ensure that sediment is contained within the site, accordingly it is considered unlikely that there would be any cumulative adverse effects associated with sediment discharges.

5.7 Design and Engineering of Retaining Structures and Earthworks

The earthworks are proposed in response to ongoing concerns about the stability of this hillside. They have been designed by an appropriately qualified engineer and are considered to be consistent with current best practice for a hillside of this nature. The works can also be certified by a chartered professional engineer, if required, as a condition of consent.

5.8 Effects on the Stability of Land and Buildings

The proposed earthworks are required to improve the stability of the slope and avoid future slope failures similar to that which occurred in 1999. The earthworks have been designed to ensure that they will not adversely affect the stability of any adjoining sites, or the nearby historic flagstaff structure. As such, the works will have a positive effect on the stability of land and buildings.

5.9 Effects on the Surface Flow of Water and on Flood Risk

Given the elevated nature of the site, it is considered that the proposed earthworks will not affect the surface flow of water or exacerbate any flood risk.

5.10 Effects on Underground Utilities

A review of the information contained on Councils website indicates that proposed earthworks will be undertaken away from existing underground utilities. Notwithstanding this, the contractor will seek a utilities clearance prior to the works commencing from the relevant utility providers. Accordingly, it is considered that there will be negligible adverse effects on these services.

5.11 Summary

Overall, it is considered that the proposed earthworks will be able to be undertaken in a manner that ensures any adverse amenity, traffic and sedimentation effects are appropriately avoided, remedied or mitigated such that the effects beyond the boundary of the site are no more than minor, and not inconsistent with effect that can reasonably be anticipated in the Port Zone.

6. Objectives and Policies

6.1 Operative Dunedin City District Plan

The following objectives and policies of the Operative Dunedin City District Plan are considered to be relevant to the proposed activity:

Objective 17.2.3

Earthworks in Dunedin are undertaken in a manner that does not put the safety of people or property at risk and that minimises adverse effects on the environment.

Policy 17.3.9

Control earthworks in Dunedin according to their location and scale.

Objective 11.2.1

Manage the port resources to sustain their future potential use.

Policy 11.3.1

Recognise and provide for the use of land and facilities to enable ports to serve the City and the region.

6.2 Proposed Dunedin City Plan (2GP)

The following objectives and policies of the 2GP are considered to be relevant to the proposed activity:

Objective 30.2.3

Earthworks necessary for permitted or approved land use and development are enabled, while avoiding, or adequately mitigating, any adverse effects on: a. visual amenity and character; b. the stability of land, buildings, and structures; and c. surrounding properties.

Policy 30.2.3.1

Require earthworks, and associated retaining structures, to be designed and located to avoid adverse effects on the stability of land, buildings, and structures by: (a). being set back an adequate distance from property boundaries, buildings, structures and cliffs; and (b). using a batter gradient that will be stable over time.

Policy 30.2.3.2

Require earthworks and any associated retaining structures to be designed and located to minimise adverse effects on surrounding sites and the wider area, including by: (a). limiting the scale of earthworks that are provided for as a permitted activity; and (b). requiring earthworks to avoid sediment run-off, including onto any property, or into any stormwater pipes, drains, channels or soakage systems.

Policy 30.2.3.3

Only allow earthworks that exceed the scale thresholds (earthworks - large scale) and any associated retaining structures, where all of the following effects will be avoided or, if avoidance is not possible, adequately mitigated: (a). adverse effects on visual amenity and character; (b). adverse effects on the amenity of surrounding properties, including from changes to drainage patterns; and c. adverse effects on the stability of land, buildings, and structures.

6.3 Evaluation

The proposed earthworks will be undertaken in a manner that ensures that the safety of people and property are not put at risk and that adverse effects on the environment are minimised. Specifically, the Construction Programme, Construction Management Plan, Traffic Management Plan, and mitigation outlined in this AEE will ensure that the safety and efficiency of the road network is not jeopardised and that noise and sediment emissions are controlled. Furthermore, the earthworks have been designed to ensure that they do not affect the stability of adjoining properties or structures.

The proposed works are required to improve the stability of the hillside and in doing so ensure that Port operations and public safety are not compromised by future slips. In addition, the Port has a responsibility to stabilise the slope due to problems with earlier works. The granting of consent will therefore allow Port Otago to fulfil this responsibility.

Overall, it is considered that the proposed earthworks are consistent with the objectives and policies contained in both the Operative Dunedin City District Plan and the 2GP.

7. Consultation

Port Otago Ltd has consulted with the following parties in relation to this proposal:

- Kai Tahu Ki Otago (KTKO);
- Kiwi Rail;
- Chalmers Community Board;
- Port Environment Committee; and
- Dunedin City Council transportation team.

The following comments and feedback has been provided by those consulted:

- KTKO have considered the application and do not oppose the proposed works. KTKO have recommended that an accidental discovery protocol is implemented, and that appropriate environmental management procedures are followed such that the discharges to air and water are appropriately managed.
- KiwiRail do not have any issues with the proposal – they are supportive of the improvements the works will make to public safety and are satisfied that there will be adequate separation distance (and fence protection) between the earthworks and the rail tracks to prevent material entering the track area.
- Chalmers Community Board has noted that their main areas of interest and/or concern are maintaining access to Back Beach during the works, management of traffic and visual amenity once the work is completed. The Board has reviewed a draft application document, including the AEE, and is satisfied these matters have been appropriately addressed as part of the proposal. Port Otago attended the Chalmers Community Board meeting on 9 March 2016 to provide an update on project progress, and answer any further questions from members. Their main areas of interest (maintenance of access to Back Beach, traffic management and visual amenity) were discussed at that meeting, with a clear message of support for the proposal in terms of its positive outcome for the community once completed. There was a desire to see the consent and works advanced sooner rather than later...
- Port Otago gave a detailed presentation to the Port Environment Liaison Committee at their meeting on 4 May 2015. A copy of the 2015 presentation was sent to all members with meeting minutes, and members asked for any feedback, none of which has been received to date. A further update on the project was provided at the 18 February 2016 committee meeting.
- Dunedin City Council transportation team are generally supportive of the proposed works and its associated traffic safety benefits for road users and pedestrians. DCC transportation have noted that their main areas of interest and/or concern are haulage routes for the removal of excavated material (which should avoid Constitution and Scotia Streets), and general traffic management during construction – including that a Traffic Management Plan should be prepared in compliance with the requirements of the NZTA Code of Practice for Temporary Traffic Management prior to work proceeding, and that any road closures should be of short duration (special dispensation from the DCC Traffic Management Coordinator may be required for longer closures). Port Otago are continuing to liaise with the DCC transportation team regarding appropriate traffic management measures.

As outlined in Section 5 above, it is considered that the proposed activity can be managed in a manner that ensures any adverse effects will be avoided, remedied or mitigated. Adverse effects associated with sediment/dust discharges to air and water can be contained within the site boundary such that any under adverse effects are insignificant. With respect to adverse effects associated with amenity and traffic, it is considered that while there may be some short term effects on the immediate surrounding environment, these effects will be minor. Accordingly, no further consultation is considered necessary.

8. Part 2 Resource Management Act 1991

The purpose of the Resource Management Act 1991 is to promote the sustainable management of natural and physical resources.

In the Act, sustainable management means managing the use, development and protection of natural and physical resources in a way, or at a rate, which enables people and communities to provide for their social, economic and cultural wellbeing and for their health and safety while:

(a) Sustaining the potential of natural and physical resources (excluding minerals) to meet the reasonably foreseeable needs of future generations; and

(b) Safeguarding the life-supporting capacity of air, water, soil and ecosystems; and

(c) Avoiding, remedying or mitigating any adverse effects of activities on the environment.

The proposal will enable the applicant to stabilise the hillside in a manner that ensures that any adverse effects associated with amenity, traffic and sediment are appropriately mitigated. The location of the proposed works has been designed to ensure that adequate and appropriate slope stability is achieved and as such is considered to be an efficient and effective use of the land resource.

On balance it is considered that the activity is consistent with the enabling philosophy of the Act, and that it will sustain the potential of natural and physical resources to meet the reasonably foreseeable needs of future generations. The activity provides for the health and safety of the community by rectifying the current shared use situation on Peninsula Beach Road. It also protects the heritage values of Flagstaff Hill by preventing any further land subsidence. Finally, adverse effects will be appropriately avoided, remedied or mitigated through an environmental management plan approach.

As such, it is considered that the proposal is consistent with the purpose and principles of the RMA.

9. Proposed Mitigation

Conditions in relation to the following mitigation are anticipated as part of this consent:

- A copy of the Construction Programme will be submitted to Council prior to the works commencing.
- A Traffic Management Plan will be prepared prior to the commencement of the works. This will be as detailed in NZTA, Code of Practice for Temporary Traffic Management (CoPTTM).
- A Construction Management Plan shall be prepared prior to the commencement of works and made available to the consent authority two weeks prior to works commencing. At a minimum, this shall address erosion, sediment and dust control, and blasting if required as part of the construction methodology. The plan shall detail controls and procedures to address specific construction environmental issues, and it shall detail the management responsibilities of individual personnel.
- The works will be managed to ensure compliance with the Construction Noise Standard NZS 6803:1999.
- Any blasting shall comply with the relevant provisions of NZS 6803:1999.
- Upon completion of the works, planting will be undertaken in accordance with the Landscape Development and Management Plan Appendix D.
- The applicant will adopt an Accidental Discovery Protocol in the event that human remains or cultural artefacts are unearthed during the proposed works.
- The contractor will obtain a Utility Clearance from relevant utility providers prior to the earthworks commencing.
- The works shall be certified by a chartered professional engineer upon completion.

10. Notification

Section 95A(2) requires that a consent authority must publicly notify an application if it decides that the activity will have or is likely to have adverse effects on the environment that are more than minor, if the applicant requests public notification of the application, or if a rule or national environmental standard requires public notification of the application.

The assessment of environmental effects in Section 5 concludes that the adverse effects on the environment are no more than minor. The applicant does not request public notification of the application, and no rule or national environmental standard requires public notification of the application. As such, public notification of this application is not required.

Section 95B relates to limited notification of consent application and (in summary) directs that where notification of an application for resource consent is not required under Section 95A, the consent authority must give limited notification of the application on any affected persons (as determined under Sections 95E and 95F). As described in Section 7, Port Otago has consulted with a number of stakeholders who have an interest in or may be impacted by the proposed earthworks. Feedback from those consulted has generally been supportive of the proposal and its future benefits. The matters of concern as raised by those consulted have been appropriately addressed as part of the proposal, or are able to be appropriately managed through conditions of consent (refer section 9). There are no other persons directly affected by the works.

Overall, no notification is deemed necessary for the proposed earthworks at Flagstaff Hill and the application can be processed without notification.

11. Conclusion

In conclusion, the proposed development is considered to promote sustainable management of natural and physical resources while avoiding, remedying or mitigating any effects on the environment. In addition:

- The proposal will result in no more than minor adverse effects on the environment;
- The proposed activity is generally consistent with the objectives and policies of the Dunedin City District Plan; and
- The proposal has significant positive effects by improving public safety and protecting the community from natural hazards associated with further land subsidence or slip.

12. Scope and Limitations

This report has been prepared for the benefit of Port Otago Ltd. No liability is accepted by this company or any employee or sub-consultant of this company with respect to its use by any other person.

This disclaimer shall apply notwithstanding that the report may be made available to other persons for an application for permission or approval or to fulfil a legal requirement.

Appendix A – Certificate of Title

COMPUTER FREEHOLD REGISTER
UNDER LAND TRANSFER ACT 1952

Search Copy

R.W. Muir
Registrar-General
of Land

Identifier	**OT18D/7**
Land Registration District	**Otago**
Date Issued	17 February 1998

Prior References

OT13A/402	OT14C/731	OT1C/607
OT1C/738	OT226/214	OT347/90
OT387/236	OT4C/275	OT4C/968
OT5B/975	OT7C/657	OT7C/658
OTB2/1353		

Estate	Fee Simple
Area	3924 square metres more or less
Legal Description	Lot 3 Deposited Plan 26574

Proprietors

Port Otago Limited

Interests

The land formerly contained in CT OT4C/275 is subject to Section 59 Land Act 1948

8940793.2 Mortgage to ANZ National Bank Limited - 14.12.2011 at 12:29 pm

COMPUTER FREEHOLD REGISTER
UNDER LAND TRANSFER ACT 1952

Search Copy

R.W. Muir
Registrar-General
of Land

Identifier	**OT18D/6**
Land Registration District	**Otago**
Date Issued	17 February 1998

Prior References

OT13A/402	OT14C/731	OT18A/1110
OT1C/738	OT226/214	OT347/90
OT387/236	OT411/72	OT44/194
OT4B/461	OT4C/275	OT4C/968
OT5B/975	OT7C/658	OTB2/1353

Estate	Fee Simple
Area	8207 square metres more or less
Legal Description	Lot 2 Deposited Plan 26574

Proprietors

Port Otago Limited

Interests

The land formerly contained in CT OT4C/275 is subject to Section 59 Land Act 1948

X13329 Building Line Restriction affecting land formerly contained in CTs OTB2/1353 and OT347/90 - 28.5.1951 at 2.40 pm

8940793.2 Mortgage to ANZ National Bank Limited - 14.12.2011 at 12:29 pm

COMPUTER FREEHOLD REGISTER
UNDER LAND TRANSFER ACT 1952

Search Copy

R.W. Muir
Registrar-General
of Land

Identifier	**OT18D/5**
Land Registration District	**Otago**
Date Issued	17 February 1998

Prior References

OT13D/870	OT14C/731	OT1C/607
OT1C/738	OT226/214	OT347/90
OT387/236	OT4C/275	OT4C/968
OT5B/975	OT6C/299	OT6C/300
OT6C/301	OT6C/303	OT6C/304
OT7C/657	OT7C/658	OTB2/1353

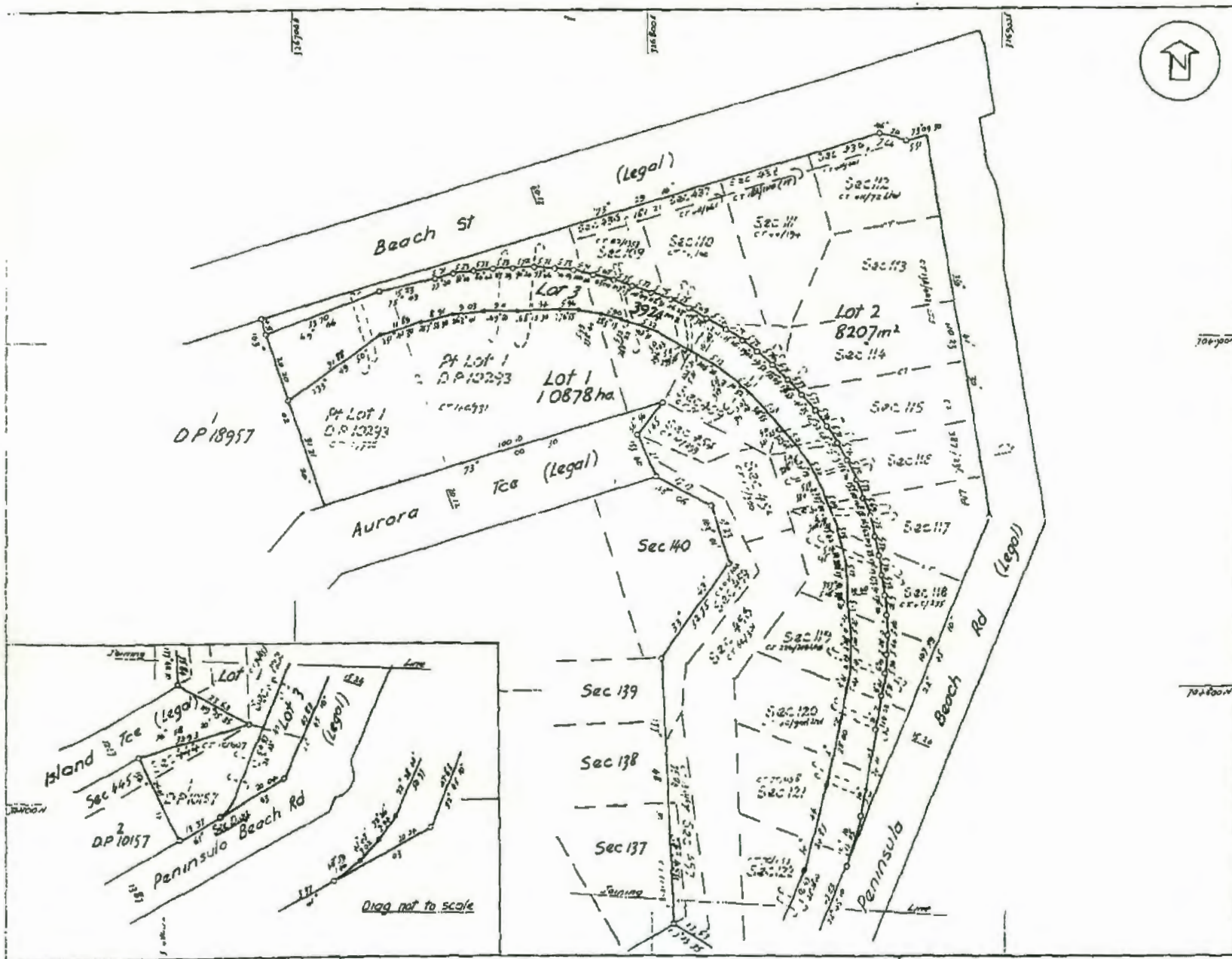
Estate	Fee Simple
Area	1.0878 hectares more or less
Legal Description	Lot 1 Deposited Plan 26574

Proprietors
Port Otago Limited

Interests

The land formerly contained in CT OT4C/275 is subject to Section 59 Land Act 1948

8940793.2 Mortgage to ANZ National Bank Limited - 14.12.2011 at 12:29 pm



Approvals

Director

Director

Regd Owner

Approved pursuant to Sec 229 of the Resource Management Act 1991 on the 25th day of September 1997

(No conditions imposed)

The Common Seal of the Dunedin City Council is affixed hereto in the presence of

Mayor

Admin Manager

Pursuant to Sec 224(c) of the Resource Management Act 1991 I hereby certify that all the conditions of the subdivision consent have been complied with to the satisfaction of the Dunedin City Council

Dated the 25th day September 1996

Authorised Officer

Note

All C/T are in the name of Port Otago Ltd

Total Area 2.3009 ha

Comprised in

I [illegible] Buchanan

Registered Surveyor and holder of an annual practising certificate who does not as a registered surveyor pursuant to section 26 of the Survey Act 1986 hereby certify that this plan has been made from surveys executed by me or under my directions that such plan and survey are correct and have been made in accordance with the Survey Regulations 1972 or any requirements made in substitution thereof

Dated at Dunedin this 26th day of May 1997 Signature

Accepted Correct

Approved as to Survey

31/12/97

Deputy Chief Surveyor

Deposited this 17th day of Feb 1998

District Land Registrar

20/10/97

DP 26574

970670

LAND DISTRICT Otago

Survey Blk. & Dist Town of Port Chalmers

NZMS 267 Sheet L44 Record Map No

Lots 1-3 being subdn of Pts Lot 1 DP 10293, Lot 1 DP 10157 Secs 109-122, Secs 436-439, Secs 454-459 & Secs 409 & 644

TERRITORIAL AUTHORITY Dunedin City

Surveyed by R W Buchanan

Scale 1 750

Date May 1997

Appendix B – Opus Report

OPUS

Flagstaff Hill
Proposed Cut Design

North East Slope

Flagstaff Hill
Proposed Cut Design
North East Slope

Prepared By
James Grindley
Engineering Geologist

Reviewed By
Ian Walsh
Technical Services Manager

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Facsimile: +64 3 474 8995

Date: 8/2/2010
Reference: 6CWP03.35 036DD
Report No: 1302
Status: Final

Limitation of Liability

This report has been prepared for the benefit of Port Otago Limited in relation to this specific commission. Opus International Consultants Ltd accepts no liability with respect to its use by any other party or for any other purpose.

The interpretation and professional advice presented herein is based on the factual information available at the time of compilation. In the event of further information becoming available the interpretation and professional advice should be subject to review.

Contents

1 Introduction

There have been ongoing stability issues with the north-eastern slopes of Flagstaff Hill. In September 1999 there was a significant slip at Flagstaff Hill. As part of the remediation works the slip material was removed and the slope reshaped using a single slope at the base and bench in the upper part of the slope.

At the time it was recognised that there was residual risk at the southern end of these works. It was a judgment call as to how far to extend the earthworks and Port Otago decided to stop the earthworks at their present extent.

Figure 1 – Present View of Flagstaff Hill

There have been some continuing problems associated with the low level of stability on the southern edge of the existing earthworks. As part of the ongoing management of this rock slope, Opus International Consultants Limited (Opus) has been commissioned by Port Otago Limited (Port Otago) to look at increasing the stability of the southern end of these works.

This commission includes analysing the failure and designing a suitably stable slope. Draft specifications have also been produced to highlight areas where more information is required.

2 Geology

This slope consists of Dolerite overlain by Port Chalmers Breccia. The sequence is associated with the first main eruptive sequence of the Dunedin Volcano. Cross cutting relationships show that the Dolerite was emplaced prior to the eruption of the breccia and at least some of the breccia was placed on an eroded surface in the Dolerite (Richard et al, 2003).

The Dolerite is probably the eroded remnant of a former plug intruded into the Port Chalmers vent. This is a hard medium to fine grained rock that contains many discontinuities. Across the site these appears to be relatively consistent.

The Port Chalmers Breccia is carbonate cemented breccia that consists of unsorted fragments of volcanics and minor schist (Allen, 1973). It is a vent filling material. The high energy environment it was deposited means there may be some differentiation between exposures. At this site it is massive; however, this changes in other areas around Port Chalmers.

3 Stability Analysis

Overall stability of the slope is determined through the dolerite. In order for large failures to occur the failure plain must extend into the dolerite. If the dolerite is stable then failures will be small localised events in the breccia.

It was decided to concentrate on the stability of the dolerite because it controls the overall stability of the slope. There is no infrastructure directly above the slope so small failures in the breccia are of less concern.

Because of the substance strength and the many discontinuities in the dolerite this material will fail as a structurally controlled rock mass. The stability was assessed using the kinematic feasibility and probability method.

The kinematic assessment included the potential for planar, wedge, and toppling failure. The strength of the discontinuities was assumed to consist of a phi of 35° and a cohesion of 0 kPa. Failure in the breccia was not considered during the global stability. The assessment was carried out with the assumption that if failure in the dolerite was not probable or feasible then catastrophic failure of the slope would not occur.

The assessment showed that overall wedge failure limits the slope design. This is due to the combination of possible wedges and the slope orientation. Wedge failures create limits the southern slopes (eastern facing slopes). As the slope transitions north into north eastern facing slope wedge failure starts to become a problem. There are number of potential wedges and this limits the stable angle that these slopes can be cut.

Although wedge failures tend to limit the slope there are some potential planar failures as well. These occur in the middle of the slope and limit the angle this section of slope can be cut at. Toppling by comparison poses no problem along this section. The slopes are not steep enough to generate toppling failures.

As stated above the upper breccia was not considered during the assessment of the overall stability, however, the stability was assessed to check the local stability. Because the breccia is massive it was assumed the breccia would fail in a circular fashion more like a soil.

The assessment of the breccia was carried out using limit equilibrium methods. The performance was based on back analyses of the current benches. We consider that the level of performance of the existing benches can be achieved.

4 Proposed Cut Slope

The drawings for the proposed earthworks form part of the draft specification. This is attached in appendix 1.

The actual slope design is divided into two parts, based on the two different materials in the slope. The design is similar to the existing works to enable the new slope to be tied into the existing ground.

The dolerite will be cut as a single slope. This will be cut at 40° along the north eastern section to tie in with the existing slope. As the cut move south, to the east facing slopes the slope will be reduced to 35°.

The upper breccia will be benched the same as the previous works with a 5m wide bench and now more than 6m vertically separating benches.

A total volume of ~45000m^3 of material will be removed from this slope. This will need to be transported to disposal sites. The slopes are then to be grassed and the benches vegetated to provide stability and match in with the existing slope.

5 Draft Specification

The draft specification has been completed and is attached in appendix 1. The process to create the draft specification has highlighted key area where further information is required for these works to advance. These areas are:

- Conformation of disposal sites
- Details of consent conditions

The disposal sites are important as they determine how far the material has to be transported and what level of possession the contractor will be given during the contract. The final use of the disposal site is also important. This effects how much work is required at each disposal site. Clearly a disposal site where the material is just to be dumped requires less work than an engineered fill that is to have a building constructed on it.

When selecting the proposed disposal site, the final use should be kept in mind. This will dictate things like:

- The quantity of site preparation required
- The required level of quality control including records, testing, compaction control, and site supervision
- The final shaping and surfacing of the disposal site.

The Resource Consent also forms a key component. The Resource Consent will stipulate a number of conditions that will influence the works. It will include environmental management and may also extend to include which roads can be used for carting material.

6 Summary and Further Work

A stability analysis was carried out on Flagstaff Hill to determine what is required to increase the stability of the north eastern slopes. Drawings and a draft specification have been produced detailing the works to be carried out to achieve this slope.

Based on the draft specification there are two key points that are required to finalised these works. The disposal sites need to be identified and confirmed as this has a significant effect on how far the material is to be carted and what will be required to place the fill.

Also of key consideration is the Resource Consent. This will stipulate a number of environmental conditions that will have to be adhered to during the contract. This may go as far to specify roads that trucks may use to cart material.

As well as these key considerations to finalise the specification, some minor points also need to be addressed. These points need some input from Port Otago before they are finalised and are detailed in table 1 below.

Points to Finalise Specification	Details
Planting Plan	Our understanding is that this will follow along the lines of the existing vegetation
Stormwater System	Ownership needs to be confirmed so details and permission can be gained to discharge cut off drain.
Catch Fence	Following completion of the earthworks a catch fence is to be installed along the base of slope to protect pedestrians from slope fretting. This has been assumed to be along the lines of the existing catch fence, steel posts with cables, chain link mesh, and gabions salvaged from the existing fence. Port Otago needs to confirm they are happy with this.
Railway Line	When, how often, and the period that this line is used needs to be indentified for the purposes of traffic management.

Table 1 – Minor points requiring input t finalise specification

7 References

Richard C. P., Copper A. F., Woodhead J. D., and Cartwright I. 2003: Phonolitic Diatremes within the Dunedin Volcano, South Island, New Zealand. Journal of Petrology, 44 (11), 2053 – 2080.

Allen J. M. 1973: Port Chalmers Breccia and Adjacent Early Flows of the Dunedin Volcanic Complex at Port Chalmers. New Zealand Journal of Geology and Geophysics, 17 (1), 209 – 223.

Walsh G.W. 2000: Port Otago Limited – Flagstaff Hill Instability – Updated Geotechnical Assessment. Report prepared by Opus International Consultants Limited for Port Otago Limited. Report No 776.

Opus 2006: Flagstaff Hill Slip Remediation. Files and contract documents associated with the remediation of Flagstaff Hill. Project No 6CWP00.88.

8 Appendix 1 – Draft Specification

6 Project Specification

6 Table of Contents

6 Table of Contents

6 General

6 GENERAL

6.1 Scope of Contract

6.1.1 Location and Site of Works

The works are located at Flagstaff Hill, Port Chalmers and offsite disposal locations.

6.1.2 Extent of Contract

The contract includes:

- Excavation of slip scarps / benching
- Landscaping and surface draining
- Pavement and traffic services repair
- Incidental Works

6.2 Drawings

The following drawings are included in appendix A and form part of this specification.

Construction Drawings: 7/616/4 sheets 1 to 11

6.3 Standard Specifications

6.3.1 Abbreviations, Standards and Codes of Practice

The following abbreviations are used in this specification when referring to standards, standard specifications and codes of practice:

TNZ: Standard Specification of Transit New Zealand. (Now New Zealand Transport Agency)

NRB: Standard of the National Roads Board (now New Zealand Transport Agency).

NZS: Standard Specification of the Standards Association of New Zealand.

Unless otherwise stipulated, reference to a standard specification refers to the edition, including amendments, current at the time of tendering.

6 General

In the event of any ambiguity or contradiction between this specification and any of the standard specifications, this specification will take precedence. In any case it shall be the Contractor's responsibility to bring any ambiguity or contradiction to the Engineer's notice for a decision.

6.4 Construction Methodology and Programme

Due to the high risk nature of these works the Contractors methodology and program submitted at the time of tender will form an important aspect of the tender evaluation. Within 14 days of acceptance of the tender the Contractor shall confirm the methodology proposed during the tender. If there are any changes to the methodology then these changes must be approved by the Engineer.

At this time, as detailed in Clause 5.10 of NZS 3910:2003, the Contractor shall confirm the construction program submitted as part of the tender and forward to the Engineer in the form of a bar chart showing the critical path.

The construction programme shall include the following features:

a) Activities shall be shown on a per week basis
b) Every non-working week or part thereof shall be blocked out
c) The earliest start and earliest finish dates shall be indicated for each activity
d) All constraints and deadlines in terms of the contract shall be shown
e) Show the dates when traffic flow will be reduced to single lane.

The construction programme required under this clause, when approved by the Engineer, shall form the basic programme for the work; any deviation from it shall first be advised to the Engineer.

The construction programme must allow for the following:

- Work on sites is permitted during daylight hours only – for safety
- Other limits will apply – these are dependent on consent conditions, which are unavailable at this time.

6.5 Extension of Time for Adverse Weather or Climatic Conditions

Extension of time for adverse weather or climatic conditions is detailed in the Special Conditions of Contract.

6.6 Inspection by the Engineer

Inspection of the works by the Engineer or his representatives will be undertaken only during normal working hours, i.e., 8.00 am to 5.00 pm, Mondays to Fridays.

Accordingly, work, which cannot be inspected in terms of its compliance with the drawings and specification after its completion, shall not be undertaken outside these hours except with the prior written approval of the Engineer.

6.7 Commencement of Contract, Initial site meeting and Possession of the site

The Contractor shall notify the Engineer in writing at least seven (7) days in advance of his intention to start work on the contract.

Not more than five days and not less than two days prior to commencement of work at any site the Contractor shall arrange for and inspect the site with the Engineer to confirm the extent of the work required. At this meeting, opportunity will be given to discuss the following detail:

- The Drawings and Specifications
- The Contractors Construction Program
- The Contractors Proposed Construction Methods
- The Contractors Requirements for Establishment
- The Contractors Plans for Safety Management
-

Possession of the site is detailed in the special conditions of contract.

Lincoln needs to clarify. Is the contractor to have sole possession of the Flagstaff Hill site? Disposal sites also need to be confirmed to determine the possession requirements here.

6.8 Site Meetings and Inspections and Site Supervision

The Contractor and his site representative shall attend regular site meetings conducted by the Engineer. The Engineer will prepare and distribute minutes of these meetings. The Engineer will determine the time and venue of such meetings.

Routine inspections will be carried out on completion of key design elements. The Contractor shall give advance notice in writing to the Engineer or his site representative of work to be inspected.

In that notice the elements to be inspected and the date and the time that the work will be completed and available for inspection shall be stipulated. The notice shall be delivered to the Engineer or his site representative at least 48 hours before the time that the work is nominated as being available for inspection or as agreed between the Contractor and the Engineer.

Should the work not be ready to be inspected within one hour of the time nominated in the notice or agreed by the Contractor and the Engineer, the Engineer or his site representative's and assistant's time and vehicle travel time shall be paid as inspection

costs to the Principal by the Contractor for any delay beyond one hour, or for any revisits to the site as a consequence of the delay or rework.

6.9 Reporting

By 9.00 am of the second working day of each calendar month, a detailed monthly report for the previous month shall be supplied to the Engineer.

The specific format of this report shall be agreed between the Contractor and the Engineer at the first contract meeting.

The report shall include the following items:

a) The agreed programme of work for the month.
b) The outputs achieved for the month and contract to date:
c) The items of work completed.
d) The amount of work completed.
e) The location and expenditure of the work.
f) The expenditure claimed under the item numbers in the Schedule of Quantities.
g) All reporting information required as described in the technical specification.
h) A detailed report of defects observed to facilities within the responsibility of the Contractor.
i) A report on any damage to facilities within the responsibility of the Contractor.

Failure by the Contractor to supply a detailed monthly report as detailed above shall result in the Contractor being charged inspection costs as defined in Clause 6.8 above.

6 General

6.10 Quality Assurance Requirements

Quality Assurance Requirements are dependent upon the disposal sites. These are not available at this time.

The level of quality assurance is much less for a straight dump site that for an engineering fill that will be used for another purpose following completion.

Depending upon the site we need to think about:

- Compaction control
- Testing
- Records
- Site Supervision

6.11 Health and Safety Management Plan

The Contractor is to note their obligations to their employees, sub Contractors and other Contractors under the Health and Safety in Employment Act 1992.

The Contractor shall comply with the Health and Safety in Employment Act 1992, Conditions of Contract to NZS 3910:2003, HSE Compliance Notice, the Health and Safety and Employment Amendment Act 2002 and the Health and Safety in Employment Regulations 1995. The Contractor is required to notify the Department of Labour of certain activities on site as required by the Health and Safety in Employment Regulations.

The Contractor is to draw this notice to the attention of their employees, Sub Contractors and other Contractors and implement the necessary safety measures and procedures as set out below, throughout the duration of the contract works.

The Contractor shall prepare a site-specific Health and Safety Management Plan, which shall include, but not be limited to:

- Contractor's safety policy;
- Contractor's safety training procedures;
- Site safety management organisation;
- Site safety personnel;
- Procedure for identifying and assessing hazards;
- Procedure for recording of accidents;

6 General

- Procedure for dealing with emergencies that may arise while employees are at work;
- Procedure for monitoring health and safety performance; and
- Procedure for monitoring the health of employees where they are exposed to hazards.

The Health and Safety Management Plan shall list all known hazards (including those identified below and any others identified by the Contractor) and the measures taken or to be taken to eliminate or minimise them. It is also to provide for a procedure for identifying and reporting on new hazards by the Contractor's staff to the Contractor and the Engineer.

The Contractor shall ensure that hazards are made safe for the general public.

The known significant hazards on the site include, but are not limited to:

- Vehicular traffic;
- Construction plant and machinery;
- Underground and overhead services;
- Noise;
- Steep, slippery or uneven terrain;
- Working at heights, climbing on slippery or wet benches;
- Embankments and/or excavations;
- Rockfalls / slope instability
- Drains, stream or other waterways;
- Dust;
- Weather.

The above shall not limit the Contractor's responsibilities under the Health and Safety Act.

6 General

The Contractor shall submit his written Health and Safety Management Plan within two weeks of Possession of Site and prior to any contract works commencing on-site. A copy of the Health and Safety Management Plan shall be maintained on site at all times, updated as necessary, and made available to the Engineer upon request.

In the monthly contract progress report the Contractor shall provide a written safety report recording any accidents, preventative actions, inspections undertaken, and any other general safety matters occurring during the month.

6.12 Accident Reports

The Contractor shall report to the Engineer within 24 hours, or as soon as practicable, any accident that occurs within the project length during the period of physical works contract. The Contractor shall also report any accident associated with the project where there is a possibility or allegation of Consultant or Contractor-initiated actions being associated with the accident.

If requested, the Consultant shall prepare, as an additional service, a detailed accident report showing photos, description of events, probable causes and other relevant comments. This report shall be provided within 48 hours of a Client request.

6.13 Statutory Authorities

The following statutory authorities have jurisdiction over the work within this contract:

- Dunedin City Council
- Otago Regional Council
- Department of Labour

The Contractor shall ensure that all bylaws and regulations of these authorities are complied with.

Should, as a result of new legislation, any of the above authorities be replaced by new national or regional authorities, the bylaws and regulation of the new authority will apply.

6.14 Statements to the Media

The Contractor shall not make statements to the media regarding policy, construction or maintenance of the works, road conditions or contractual matters. All enquiries are to be directed to the Engineer.

6.15 Public Utilities

The Contractor's attention is drawn to Clause 5.13 of NZS 3910:2003.

6 General

It will be the Contractor's responsibility to undertake the initial liaison with utility authorities to determine the presence and position of services and to arrange with them for their relocation.

As far as reasonably possible, known existing public services have been identified below that may be affected by the contract works but no guarantee is given that all existing services have been located or that their locations are accurately shown.

It will be the Contractor's responsibility to undertake the initial liaison with utility authorities to determine the presence and position of services and to arrange with them for their relocation.

The Contractor shall not carry out relocation works themselves but shall ensure that the appropriate service authority is engaged to do so. However, no service authority shall be permitted to commence relocation works until the Contractor has been advised by the Engineer that an agreement on price has been reached.

The Contractor shall allow for any delay or interruption to their construction programme necessitated by the relocation of any such services.

6.15.1 Known Public utilities and contact details

Service	Authority Name	Contact Number
Phone	Telecom	0800 822 003
Power	Aurora Energy	0800 433 582
Street Lighting	Dunedin City Council	03 477 4000
Survey Marks	LINZ	04 498 3835

6.15.2 Private Services

Any existing services, such as drainage and domestic water supplies located within the work site shall be protected and maintained in full working order by the Contractor throughout the duration of this contract.

6 General

6.16 Survey and Setting Out

It is the Contractors responsibility to set out and control the work. It will be the Contractors responsibility to do all setting out of the works from the information supplied on the drawings.

The set out of control pegs shall be located sufficiently clear of the related work to allow full construction without obstruction.

The rates supplied by the Tenderer in the Schedule of Quantities shall be deemed to include for survey and setting out.

6.17 As Built Drawings

The Contractor shall supply to the Engineer information on all variances to the construction drawings or specifications to enable as-built drawings to be completed. This information shall be provided on a set of drawings provided to the Contractor for this specific purpose.

6.18 Resurfacing

Where damage is identified following completion of the earthworks the road pavement surface and footpath shall be repaired. Specific repair techniques will be subject to the Engineers approval.

6.19 Completion

Unless otherwise stated all work shall be either:

- Completed in accordance with the requirements of the contract documents or,
- Where the method is not specified, completed in accordance with accepted industry practice.

END OF SECTION 6

7 Earthworks

7 EARTHWORKS

7.1 Scope

This Section sets out the requirements for the construction of the earthworks at the site.

The Contractor shall remove all material as per the cut lines set out in the drawings. The earthworks are being undertaken to increase the stability of the slope. All earthworks shall be undertaken in a manner that takes into account the possibility activating a slide. If the material is to be displaced by explosives or other indirect means, access to the catch site and fly rock shall be appropriately controlled.

All earthworks shall be completed in accordance with the TNZ F/1 Specification (F/1) except that Clause 8 of F/1 shall not apply to this contract. No provision is made to allow for varying production rate associated with ripping and varying insitu material type.

Additional rates are allowed for blasting, however, blasting must be approved by the engineer and the contractor must demonstrate to the engineer that the material cannot be productively ripped.

The Contractor shall note the provisions of testing and the hold points required as set out in the Appendix C - Quality Control, Testing and Frequency of Material Testing.

7.2 Clearing

In addition to the requirements of Clause 3 of F/1 site clearance shall also include the following works:

- Clearing at the nominated disposal sites.

7.3 Removal of Topsoil to Stockpile

Further to Clause 4 of F/1, topsoil shall be removed from within the limits of the earthworks to a suitable stockpile clear of the immediate work site.

7.4 Benching

The Contractor shall excavate in situ material from the vicinity of the slope to create a stable benched batter shown on the drawings or otherwise directed by the Engineer. This operation shall be under the control of a qualified quarry manager.

Bench height shall not exceed 6m and bench widths shall not be less than 4m unless otherwise approved.

The debris shall be transported to the disposal site nominated as otherwise approved by the Engineer.

7.5 Blasting

Where explosives or percussion rock breaches are proposed, construction techniques shall be adopted to avoid back blast or other damage to the remaining rock.

The Contractor must submit to the Engineer a blasting plan, general blast design, quality plan, health and safety plan, material specification and method statement for acceptance at least 7 days before any material is removed from the excavation.

The method statement must include:

- name of person responsible for the blast who will be on site during the blast
- blast design
- programme
- sequencing
- methods of controlling and handling explosives
- details of blast procedure
- drilling pattern
- charge type and weight
- volume of rock to be removed for each blast
- details of delays, stemming, and down hole loading configurations
- methods of controlling fly rock

The personal used for carrying out the blasting must be those named and approved in the tender document and must be on site at all times when blasting is being carried out. Substitutes for those personal named and approved in the tender document will not be accepted without written notification from the Engineer. Delay in process substitute requests will be at the Contractors own expense and will not constitute extensions of time.

7.6 Construction Traffic

During construction, the Contractor shall ensure that all heavy construction loading should be avoided to minimise the damage to existing pavements outside of the construction site. It is the Contractors responsibility to adopt proper construction methods in order to avoid such situations.

The DCC may stipulate requirements as part of the consent conditions.

As specified in 6.18 where damage occurs within the construction site, damaged surfaces shall be repaired using a method approved by the engineer.

7 Earthworks

7.7 Cut Off Drain

The Contractor shall construct a Cut Off Drain around the top of the woks. This drain shall be set back by six meters from the edge of the bench to remove water from the slope. The drain shall be excavated to a minimum depth of 1.0m wide and evenly graded.

The excavated drain shall be lined with filter fabric bidim A39 (or similar approved) have 150mm diameter perforated HDPE pipe laid along the invert and then backfilled with drainage aggregate complying with that specified in TNZ F/6 clause 2.2.

Ownership of stormwater system needs to be confirmed. Once stormwater ownership is confirmed system details can be sorted to size pipe for discharge clear of slope and sump.

7.8 Classification of Material for Payment

Material will be classified in accordance with TNZ F/1: 1997. Additional rates will be included for ripping and blasting where it is required.

7.9 Transport to Disposal

The Contractor shall transport to disposal all excavated material to nominated locations from the site.

Dump sites are not available at this time. The final use of the site will determine the necessary:

- Site Preparation
- Compaction
- Shaping
- Surface treatment

7.10 Disposal areas and Private Property

The principle will arrange access to and consent for all offsite disposal locations. Disposal locations are located in appendix B. The Contractor may submit further or alternative disposal sites to the Engineer for approval, and the Contractor shall be responsible for access agreements and consents for all such site.

The Contractor is to manage all offsite disposal areas.

7 Earthworks

The Contractor shall make his own arrangements with any landowner in respect of use of private property outside the defined limits of the contract works and the disposal sites nominated by the Engineer, and he shall be completely responsible for any damage or compensation claims for compensation arising from such use.

The Contractor should satisfy himself that his disposaling operation complies with the requirements of the Resource Consent. Requirements will be set out in the Resource Consent that it not available at this time.

Before the expiry of the maintenance period the Contractor shall submit a letter from any property owner concerned certifying that all claims for compensation for damage due to the Contractor's operation have been discharged to the owner's satisfaction.

END OF SECTION 7

8 Traffic Management

8 TRAFFIC MANAGEMENT

8.1 General

Because of the location and site constraints, traffic management forms an important part of these works. It is critical to the public safety. The tenders shall submit a suitable draft traffic management plan as part of the tender. Following acceptance of the tender the contractor shall finalise the traffic management plan.

Where the works are undertaken within public roads not isolated from public access, it is most important that the safety and convenience of the road user be adequately considered and provided for by the Contractor at all times.

The Contractor shall complete the Contract Works in a manner that allows the safe and convenient passage of both pedestrian and vehicular traffic through the Site at all times that the designated detour is not fully functioning.

The Traffic Management Plan should be prepared as detailed in TNZ G/1 and in addition provide details of:

a) Persons responsible for implementing the plan
b) Provisions for the regular reviewing of the effectiveness and adequacy of the Contractors Plan and for implementing any changes needed to the plan.

Traffic management shall be carried out in accordance with TNZ G/1, the handbook for Temporary Traffic Control and Safety at Road works Sites.

8.2 Establishment and working area

Establishment shall include erection of signs, establishment of plant and materials on site, and siting of buildings. All buildings and storage areas shall be suitably clear of the works and shall not interfere with adjacent land owners.

All site establishments shall be kept in a tidy state throughout the contract. A proliferation of buildings, storage areas and temporary tracks will not be permitted.

The Contractor shall at all times have available signs and equipment, including safety cones and warning lamps to meet all of the specialised requirements of Traffic and Safety management.

Disestablishment of the site involves the removal of all plant, temporary works and signs and surplus material. All rubbish of any kind shall be removed form the site. The clean up shall be to the satisfaction of the Engineer.

8 Traffic Management

The Contractor shall also supply formal responses from all adjacent landowners where there has been temporary occupation of adjacent land. These responses will be used as evidence that there are no outstanding claims for compensation by the landowner against the Contractor for any agreement that has been previously negotiated.

8.3 Condition and Maintenance

All signs and delineation shall be in good operable condition appropriately painted and maintained.

Barricade or barrier rails shall be black/white chevron painted and reflectorised.

Whilst in use the surfaces providing the visual impact to road user shall be kept clean at all times. To meet this need regular washing shall be required and the Contractor shall have readily available at the site, efficient means of carrying out the washing/cleaning.

Existing permanent signs shall not be removed without the agreement of the Engineer.

8.4 Securing in Place

Signs and equipment shall be securely pinned, ballasted, braced, or stayed in position in such a way that displacement by wind or the draft effect from passing traffic does not occur.

Sandbags shall be used for ballasting signs. Ballasting shall not be placed on top of barricades or barrier railing.

For safety reasons the use of steel standards or metal stakes shall not be acceptable for securing the signs and equipment in position.

8.5 Delineation and Safety Zone

The slope where the works are to be carried out currently has a low factor of safety. As such there is potential for failures to occur. The public must be protected from rockfall and slips al all times.

A fence has been constructed along part of the site using shipping containers chained together to form a continuous fence. During the construction works this should be maintained and extended where required.

The Contractor may propose other solutions; however, these must be approved by the Engineer.

8 Traffic Management

8.6 Traffic Control

Control of traffic is required for the safety and the convenience of the road user and to allow the Contractor to proceed with his operation in a safe and efficient manner.

The potential for confusion to the road user will be minimised by traffic control providing clear assistance and direction whenever required.

8.6.1 Personal and equipment

Alert, intelligent, courteous and fully trained personal shall be employed as Traffic Controllers.

Traffic controllers shall effectively coordinate traffic flow and ensure safe and convenient passage through the whole of the works for Road Users.

To be readily identifiable the Road Users, Controllers shall wear clean, appropriate high visibility safety apparel at all times

Traffic controllers shall carry out the traffic control using stop / go paddles unless an alternative method is approved by the Engineer. They shall at all times be positioned in clear view of traffic adjacent to the point at which traffic is expected to stop.

Controllers shall be in clear view of each together or shall otherwise maintain continuous contact via radio telephone.

8.6.2 Implementation of traffic control

Traffic Controller Personal shall be employed to control traffic when circumstances exist as follows:

c) When traffic is confined to a single lane
d) When it is necessary to slow traffic down for its own safety or to protect work and site personnel and/or work progress
e) When traffic must be stopped
f) When plant is crossing the path of the traffic flow or operating within any part of the traffic way being used in conjunction with traffic.

8.6.3 Traffic Delay

Delay shall be kept to an absolute minimum if traffic was delayed for more than 10 minutes, the duration and circumstance shall be recorded and submitted to the Engineer.

Should the Contractor under special, unusual and planned circumstances require to have a longer delay than 10 minutes or the road closed, written approval of the Engineer shall be required.

8 Traffic Management

8.6.4 Night Traffic Control

If the full carriage way is not reopened at night then traffic lights shall be used to control the site. This system must allow for trains running through the site at night.

END OF SECTION 8

9 Environmental Management

9 ENVIRONMENTAL MANAGEMENT

9.1 General

Environmental management shall be carried out in accordance with the Resource Consent Conditions. Resource Consent conditions are attached in appendix D.

Resource Consent is unavailable at this time so conditions are not known.

Where details are not outlined in the Resource Consent, environmental management practices outlined in this specification shall be used. In the event of any ambiguity or contradiction between Resource Consent Conditions and environmental practices set out in this specification, the resource consent conditions will take precedence.

9.2 Control of Noise

The Contractor shall carry out work in accordance with the Health and Safety Act 1992 and the Resource Management Act. The Contractor shall also co-operate with the appropriate Local Authority's Environmental Health Officers.

9.3 Control of Dust

The Contractor shall take all necessary measures to prevent unrealistic quantities of dust and dust nuisances to adjacent properties, pedestrians and road traffic. Allowance shall be made for any method the Contractor may wish to employ, subject to the approval of the Engineer. Should a dust nuisance be created and the Contractor's remedial measures are insufficient in the opinion of the Engineer, then work in the affected areas shall cease until the Contractor has taken effective measures.

9.4 Stormwater Control

The Contractor is also responsible for all surface stormwater and sub surface water control throughout the construction process. The Contractor shall take whatever practical steps are required to mitigate all erosion and water damage during construction work.

9.5 Sedimentation Control

The Contractor shall take all necessary measures to minimise sedimentation into adjacent waterways. It is anticipated that this will include keeping the erosion to a minimum, attention to run off paths and where necessary control the sedimentation which does occur this method such as silt fences.

9 Environmental Management

9.6 Erosion Control

The Contractor shall execute the Contract Works such that no erosion results from their operations, to either existing ground or newly constructed features.

In all cases where erosion occurs the Contractor shall immediately reinstate and protect the affected area(s). In accordance with Section 2 of the Project Specification this type of work shall be deemed re-work. All costs associated with this work shall be borne by the Contractor.

END OF SECTION 9

10 Catch Fence

10 CATCH FENCE

10.1 Scope

This section sets out the requirement for a catch fence to be installed at the base of the slope.

Following completion of the earthworks a rockfall catch fence will be installed at the base of the slope.

Lincoln to confirm fence. The idea is to retain any material that frets off the slope because we are pushing pedestrians back to the base of the slope. Fence will be similar to what is presently there. Lightweight steel posts, 3 wires and chain link mesh. Single gabions should also be salvaged from existing fence to put along base of slope.

END OF SECTION 10

11 Landscaping and Fencing

11 LANDSCAPING AND FENCING

11.1 Scope

This Section sets outs the Landscaping and fencing requirements for this project.

11.2 Hydroseeding

Following completion of earthworks operation any disturbed ground beyond the modified slope edge shall be top soiled and grassed. Topsoil shall be re-spread for grassing in a layer nominally 150mm thick prior to seeding.

Grassing of top soiled areas shall be in accordance with Clause 15 of TNZ F/1 (clause 15.3 of TNZ F/1 shall not apply).

The steep batters shall be hydroseeded using a seed and fertiliser mix appropriate for the terrain and area. The Contractor shall submit details of their intended hydroseeding mix and application rate, including seed mix (species and percentage ratio), mulch (type and ratio) and fertiliser (mix and ration), for approval by the Engineer.

Hydroseeding shall be carried out by an experienced Contractor. The Contractor shall supply a suitable seed and fertiliser mix with their tender

Mulch and adhesive shall be of sufficient quantity to ensure the seed mix sticks to all batter slopes and provides protection until germination occurs and the roots take hold.

Only certified seed shall be used. A copy of the seed certification shall be provided to the Engineer after mix approval and prior to commencing hydroseeding.

A grass strike of 50% shall be achieved. The areas shall be watered as required throughout the contract (including the maintenance period) to ensure the strike rate is achieved.

The Contractor must satisfy himself that the types of seed are obtainable and that it will produce a satisfactory strike of grass cover.

11.3 Planting

Planting of shrubs shall be undertaken on the benches to help stabilise the slope. Topsoil shall be delivered to the site and spread along the benches in a nominally 300mm thick layer prior to planting.

Shrubs shall be selected base on the landscape plan in appendices E to tie in with existing planting on benches.

11 Landscaping and Fencing

A landscape plan still needs to be specified, as per the existing benches because they have performed well.

The Contractor shall remain responsible for all planting until growth has been established. Any new planting that has not shown positive signs of growth within three months shall be replaced at the Contractors expense.

11.4 General Fencing

All fencing removed during the construction process is to be replaced or repaired.

New fences shall be constructed entirely of new materials and shall comprise the same materials as the fence that was removed. Any fence must be built to the standard of the existing fence.

Any repairs made shall be of a standard that the overall fence structure is not compromises and is of the same strength as before.

END OF SECTION 11

12 Unscheduled Work

12 UNSCHEDULED WORK

12.1 Scope

This Section sets out the requirements for the completion of Unscheduled Works. Unscheduled Works shall be carried out as instructed by the Engineer when there are no other appropriate Schedule Items.

12.2 Response Times

The Contractor shall complete all work required by this Section by the date agreed with the Engineer.

12.3 Priced Proposals

Where requested by the Engineer, the Contractor shall submit priced proposals to complete works for which there is no applicable Schedule Item or where the extent of the proposed work means that the rates in the Schedule of Prices are not applicable.

The priced proposals shall comprise:

- a description of works proposed to be completed detailing the extent and quantities of work required
- the proposed date of completion
- a fixed price quote to complete the works
- a break down of the above price if requested by the Engineer including all plant quantities and rates, materials & services quantities and rates, and labour quantities and rates, used to prepare the priced proposal.

On acceptance of the Contractor's proposal the work shall be incorporated into the current Programme.

12.4 Completion

Unless otherwise specified all work shall be either:

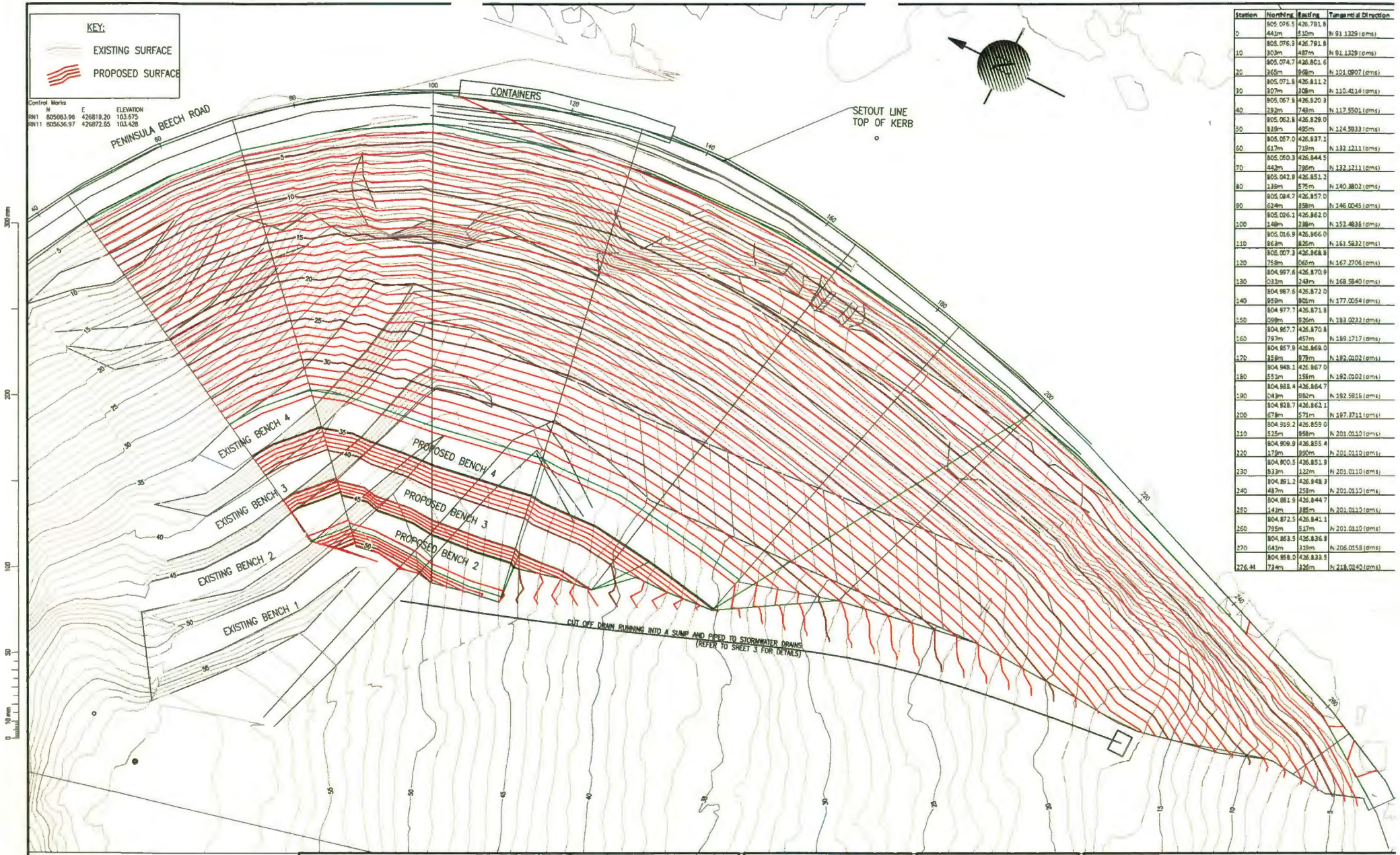
- completed in accordance with the requirements of the Contract Documents or
- where the method is not specified, completed in accordance with accepted industry practices

12 Unscheduled Work

END OF SECTION 12

12 Appendices

Appendix A – Construction Drawings



Station	Northing	Easting	Tangential Direction
	805 076.5	426 781.8	
0	443m	510m	N 91 1329 (dms)
	805 076.3	426 791.8	
10	303m	487m	N 91 1329 (dms)
	805 074.7	426 801.6	
20	365m	968m	N 101 0907 (dms)
	805 071.8	426 811.2	
30	307m	308m	N 110 4114 (dms)
	805 067.9	426 820.3	
40	292m	748m	N 117 5501 (dms)
	805 062.8	426 829.0	
50	339m	495m	N 124 5933 (dms)
	805 057.0	426 837.1	
60	617m	719m	N 132 1211 (dms)
	805 050.3	426 844.5	
70	442m	786m	N 132 1211 (dms)
	805 042.9	426 851.2	
80	139m	575m	N 140 3802 (dms)
	805 034.7	426 857.0	
90	624m	358m	N 146 0045 (dms)
	805 026.1	426 862.0	
100	148m	288m	N 152 4836 (dms)
	805 016.9	426 866.0	
110	863m	826m	N 161 5832 (dms)
	805 007.3	426 868.8	
120	758m	065m	N 167 2706 (dms)
	804 997.6	426 870.9	
130	033m	248m	N 168 5840 (dms)
	804 987.6	426 872.0	
140	959m	801m	N 177 0054 (dms)
	804 977.7	426 871.8	
150	098m	826m	N 183 0232 (dms)
	804 967.7	426 870.8	
160	797m	457m	N 189 1717 (dms)
	804 957.9	426 869.0	
170	359m	879m	N 192 0102 (dms)
	804 948.1	426 867.0	
180	553m	158m	N 192 0102 (dms)
	804 938.4	426 864.7	
190	043m	982m	N 192 5916 (dms)
	804 928.7	426 862.1	
200	678m	571m	N 197 3711 (dms)
	804 919.2	426 859.0	
210	525m	958m	N 201 0110 (dms)
	804 909.9	426 855.4	
220	479m	890m	N 201 0110 (dms)
	804 900.5	426 851.9	
230	833m	122m	N 201 0110 (dms)
	804 891.2	426 848.3	
240	487m	258m	N 201 0110 (dms)
	804 881.9	426 844.7	
250	143m	285m	N 201 0110 (dms)
	804 872.5	426 841.1	
260	795m	517m	N 201 0110 (dms)
	804 863.5	426 836.8	
270	643m	339m	N 206 0158 (dms)
	804 858.0	426 833.5	
276.44	734m	326m	N 218 0240 (dms)

AMENDMENT	APP'D	DATE

	BY	CHECKED	DATE
DESIGN	J.Grindley	M.Hanz	05/09
DRAWN	J.Elder	J.Grindley	08/09
APPROVED			

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Flag Staff Hill
Proposed Works

Plan

STATUS	FILE
Tender	6CWP03.35

SCALE	PLOT DATE	FEATURE IDENTIFIER	CODE	SHEET
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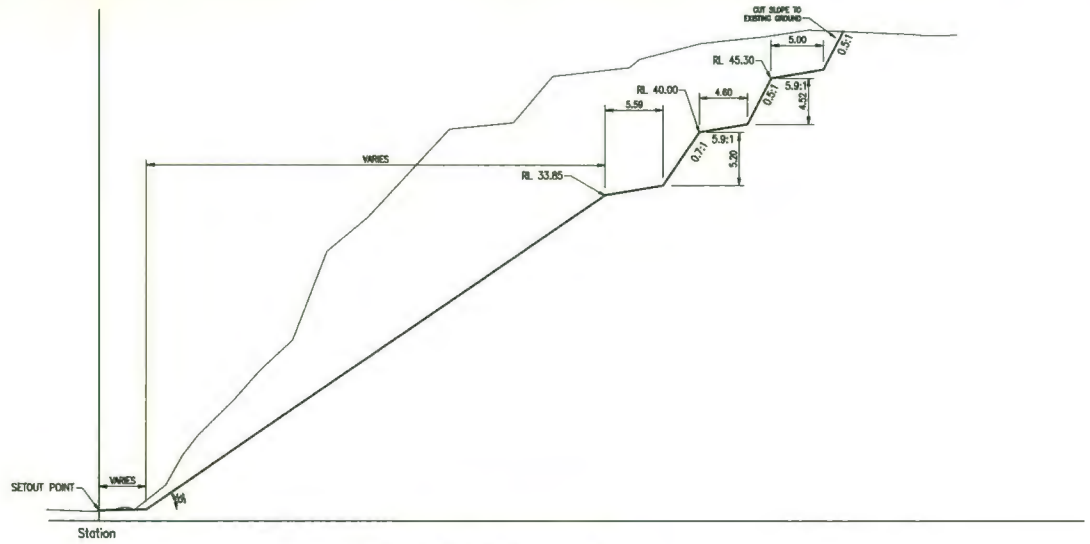

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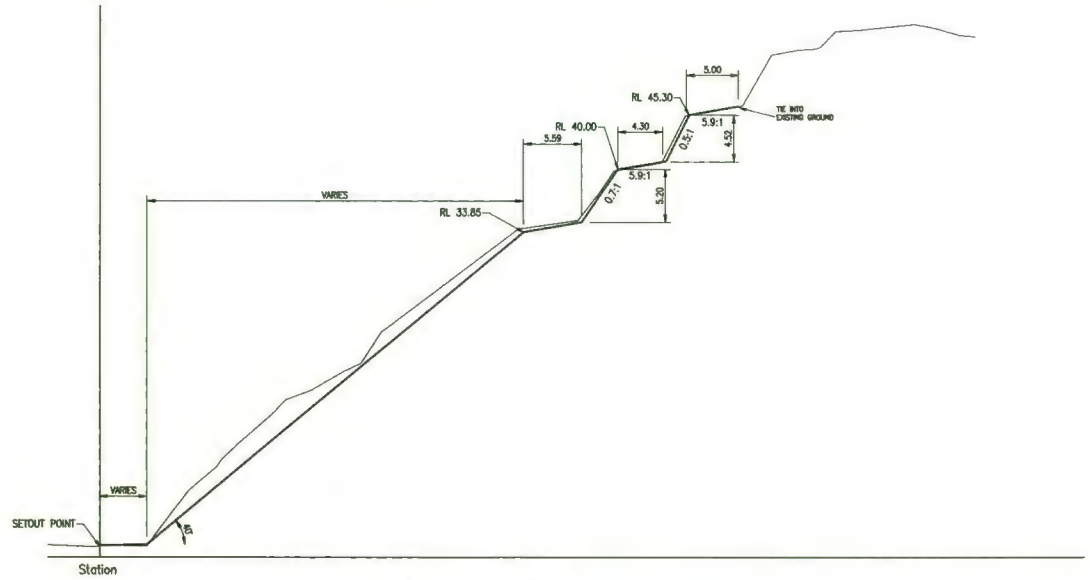

40° SECTION OF BANK CH:45m–71m

AMENDMENT	APP'D	DATE

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TYPICAL SECTIONS

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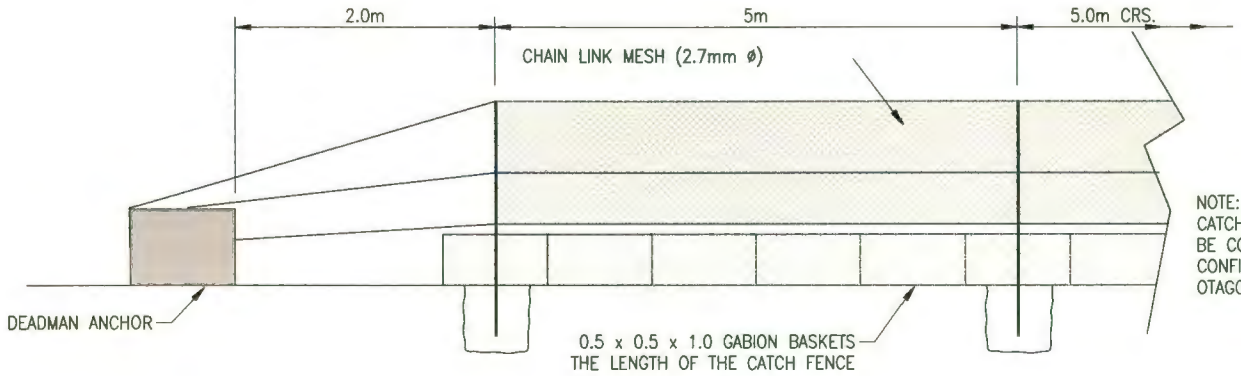
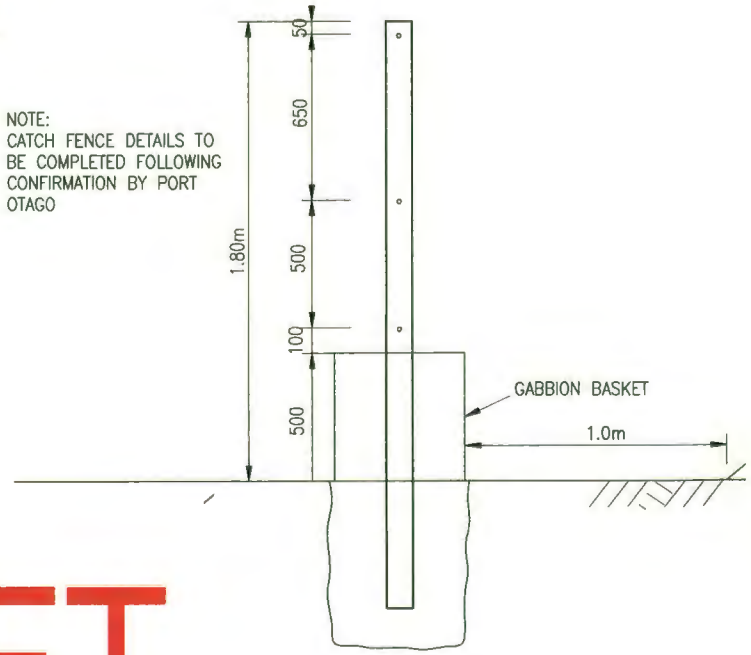


CATCH FENCE DETAILS
1:25 @A1

NOTE:
THE CATCH FENCE IS TO BEGIN AT STATION 25
AND CONTINUE TO STATION 270.

NOTE:
CATCH FENCE DETAILS TO
BE COMPLETED FOLLOWING
CONFIRMATION BY PORT
OTAGO



DRAFT

CATCH FENCE POST DETAILS
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AMENDMENT	APP'D	DATE

	BY	CHECKED	DATE
DESIGN	J.Grindley	M.Hanz	05/09
DRAWN	J.Elder	J.Grindley	08/09
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TYPICAL SECTIONS –CATCH FENCE

STATUS		FILE	
Tender		6CWP03.35	
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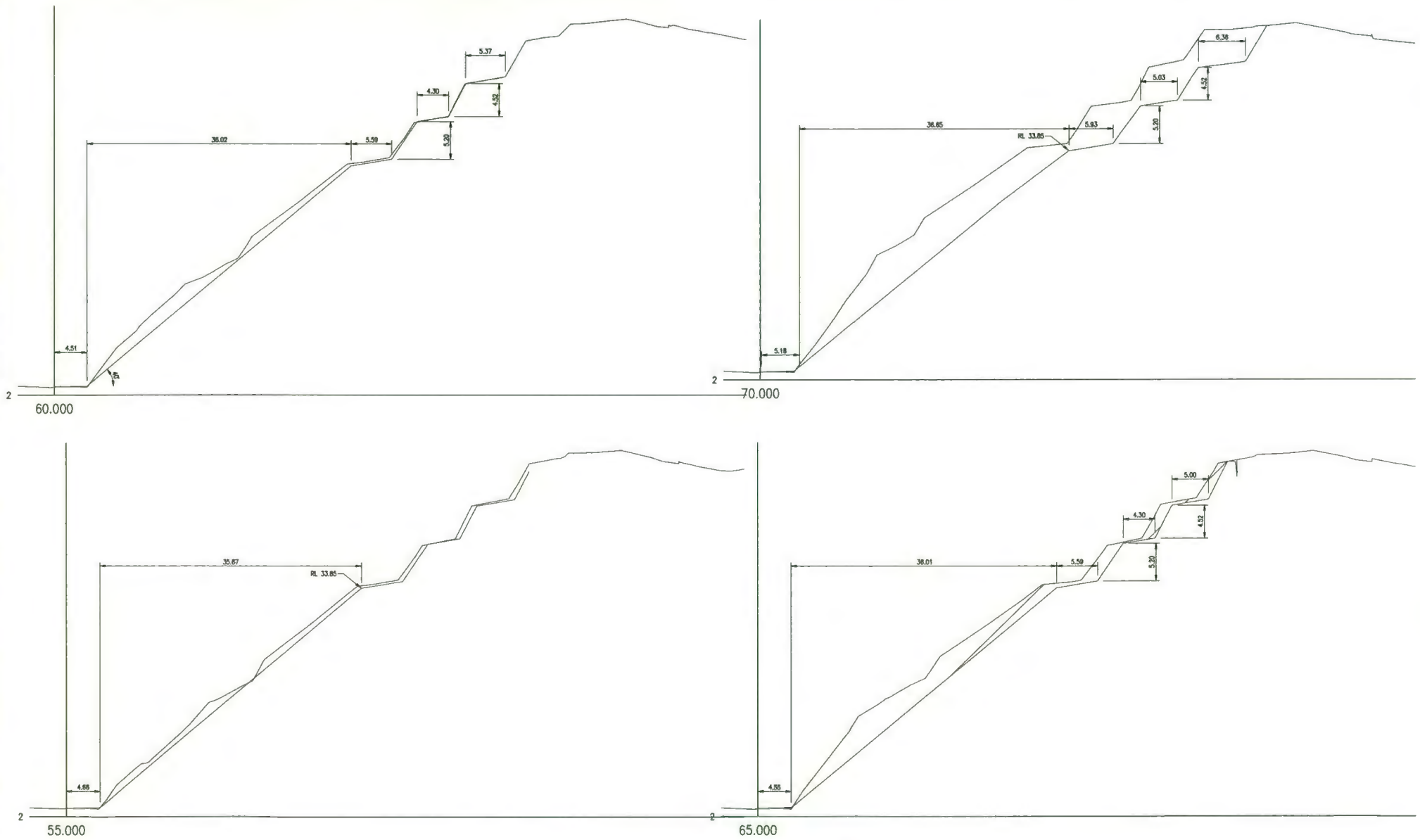

	BY	CHECKED	DATE
DESIGN	J.Grindley	M.Hanz	05/09
DRAWN	J.Elder	J.Grindley	06/09
APPROVED			

AMENDMENT | APP'D | DATE

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Flag Staff Hill
Proposed Works

Sections 1

STATUS		FILE	
Tender		6CWP03.35	
SCALE	PLOT DATE	FEATURE IDENTIFIER	CODE / SHEET
1:250@ A1	21/01/10 @ 11:43	7/616/4	7704 / 4

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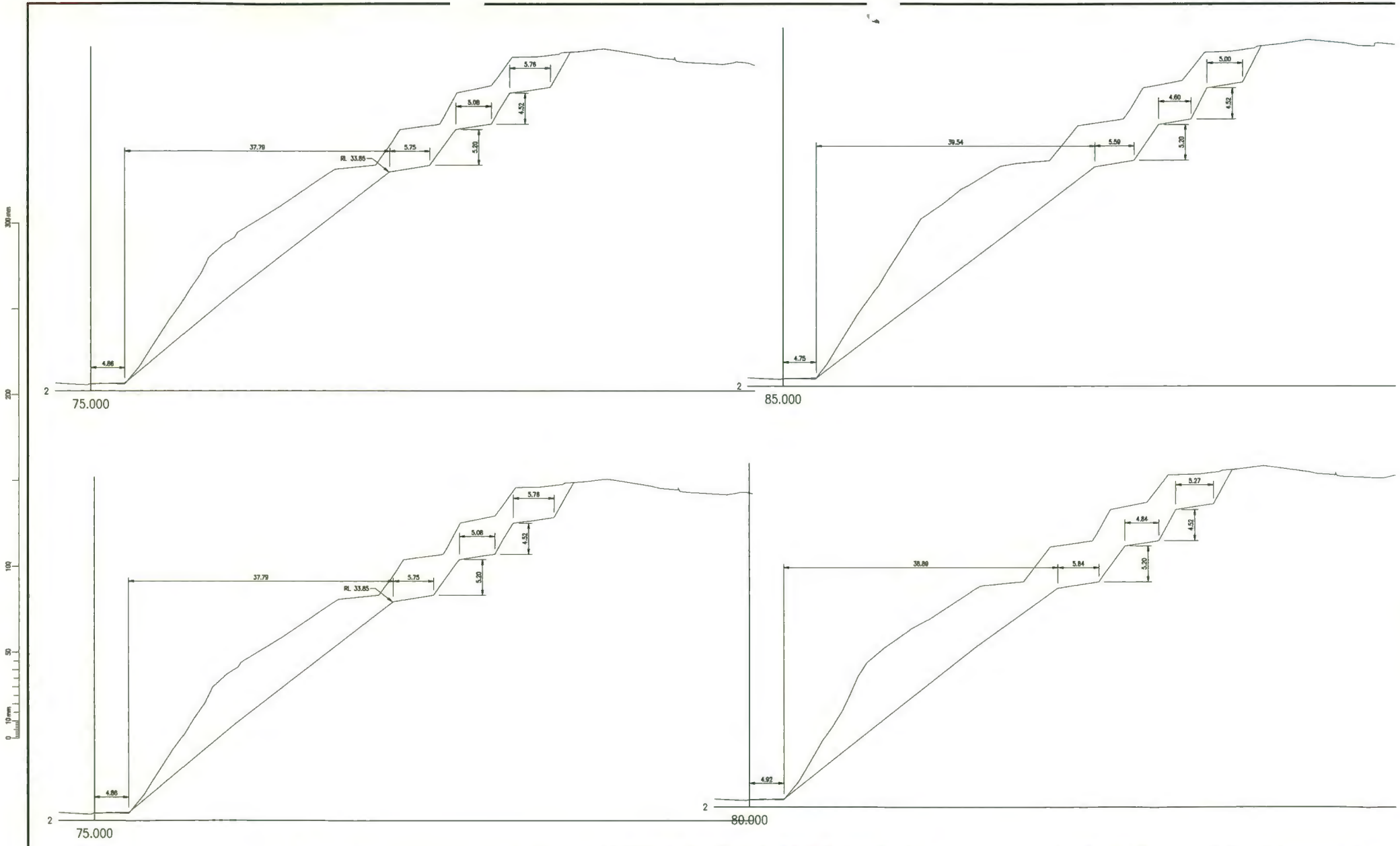

AMENDMENT	APP'D	DATE

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DRAWN	J.Elder	J.Grindley	08/09
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TITLE: Port Otago
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Proposed Works

Sections 2

STATUS	FILE
Tender	6CWP03.35

SCALE	PLOT DATE	FEATURE IDENTIFIER	CODE	SHEET
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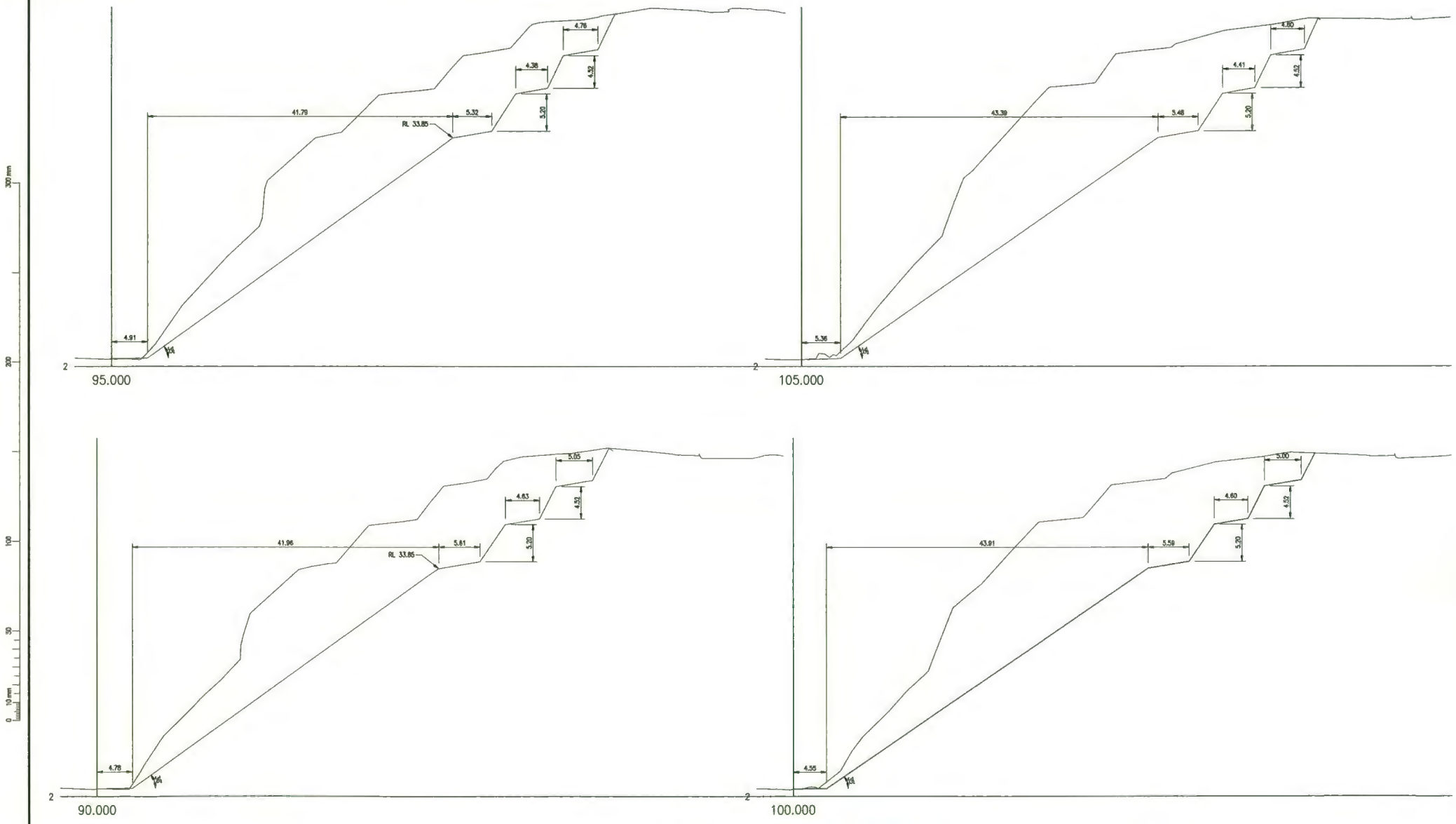

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TITLE: Port Otago
Flag Staff Hill
Proposed Works

Sections 3

STATUS		FILE	
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SCALE	PLOT DATE	FEATURE IDENTIFIER	CODE / SHEET
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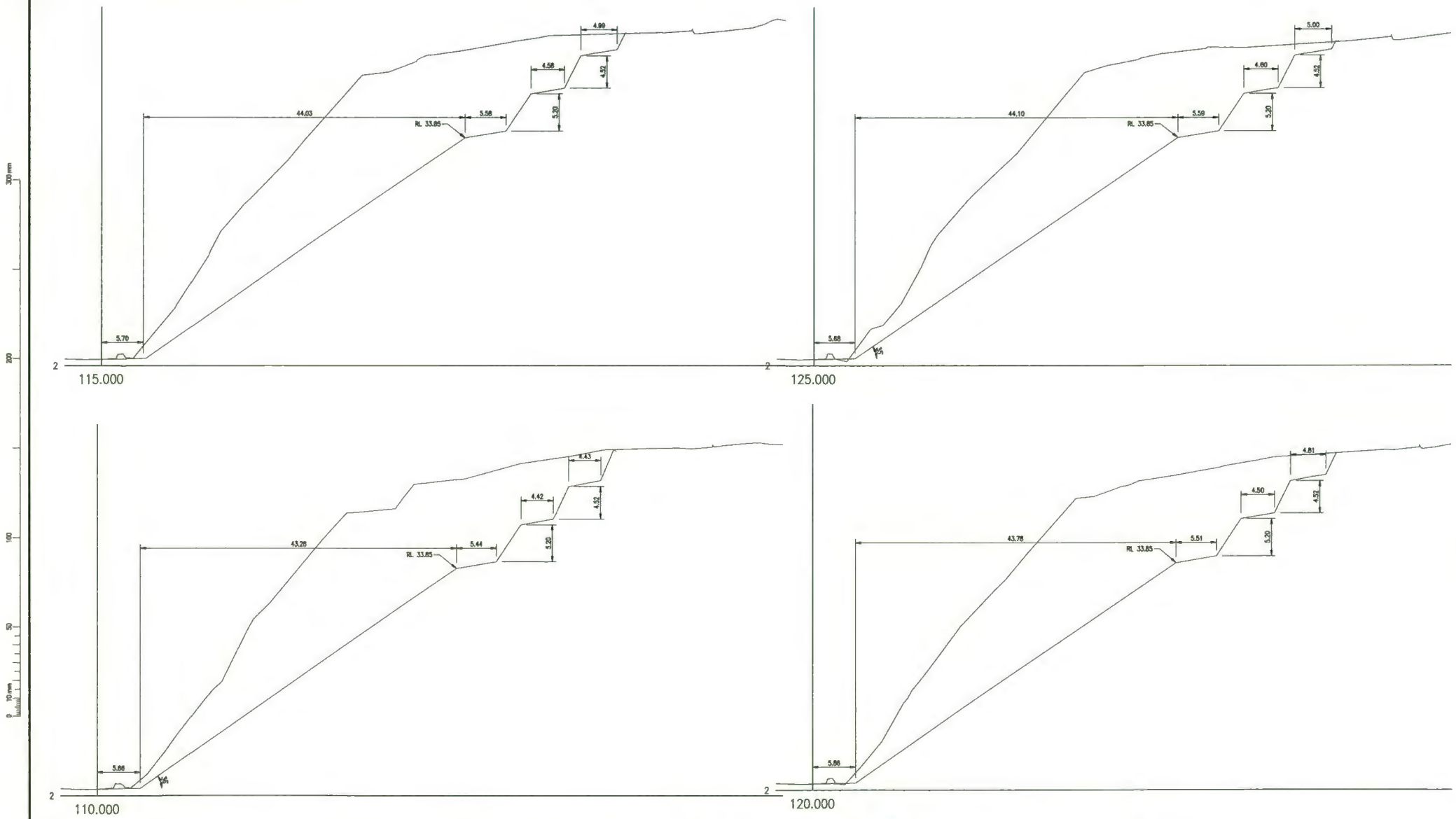

AMENDMENT	APP'D	DATE

	BY	CHECKED	DATE
DESIGN	J.Grindley	M.Hanz	05/09
DRAWN	J.Elder	J.Grindley	06/09
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Sections 4

STATUS		FILE	
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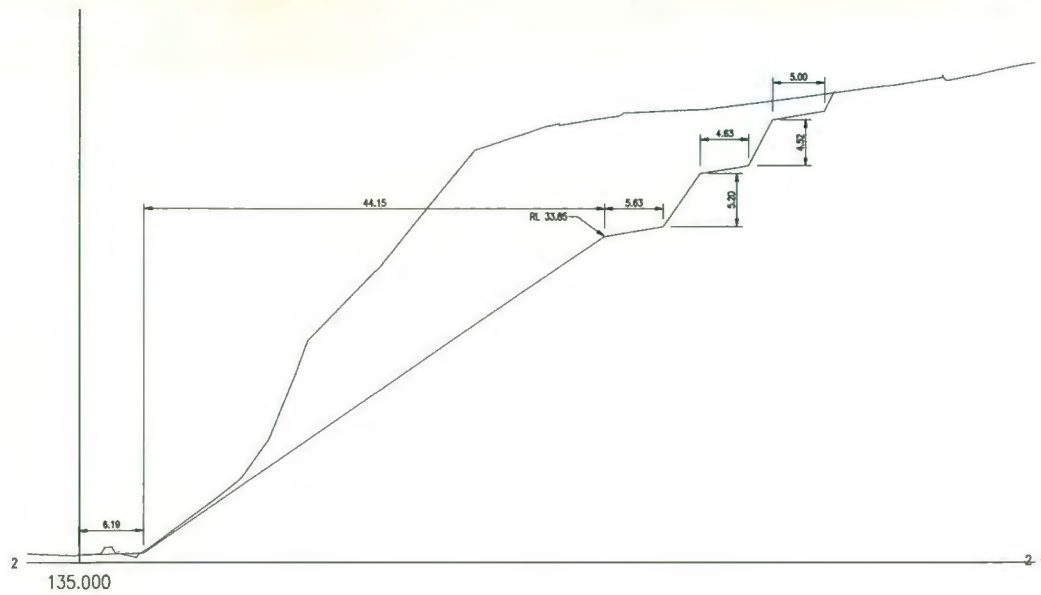

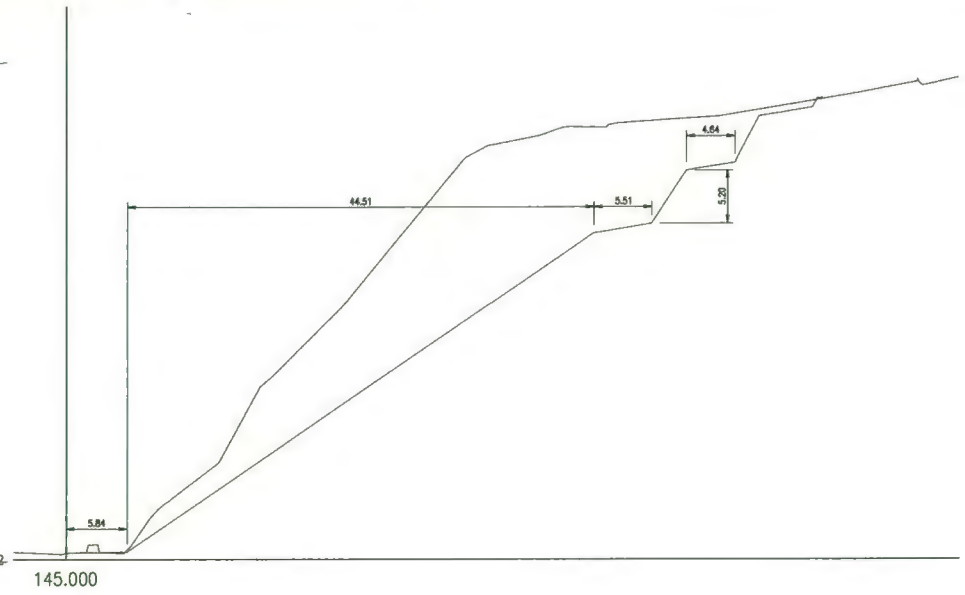

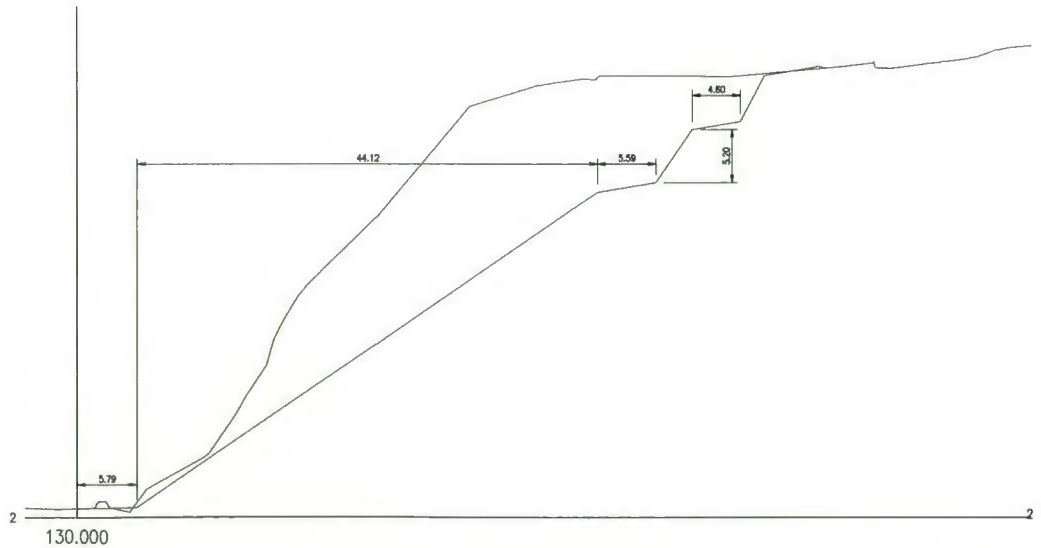

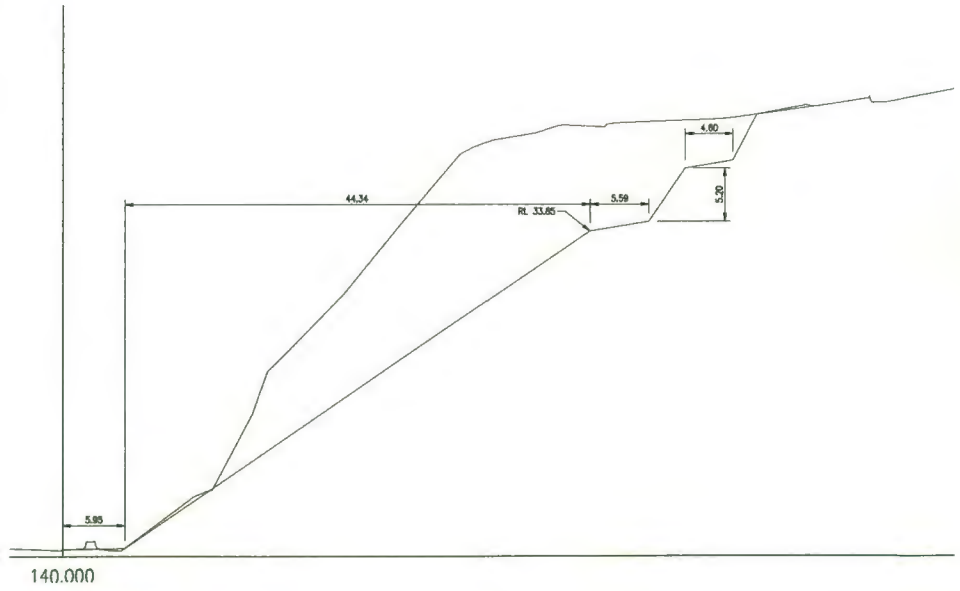

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DESIGN	J.Grindley	M.Hanz	05/09
DRAWN	J.Elder	J.Grindley	06/09
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Sections 5

STATUS	FILE			
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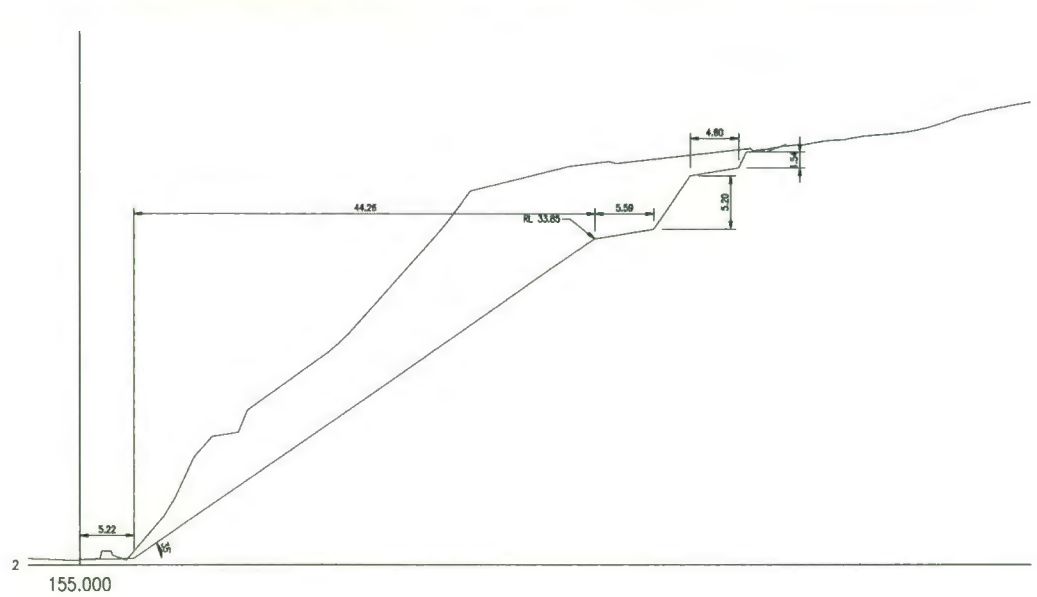

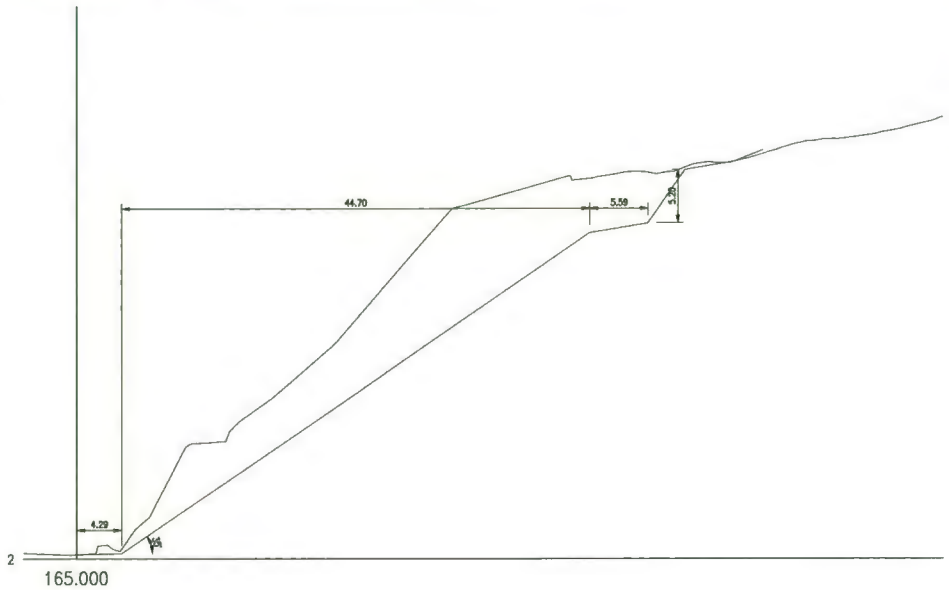

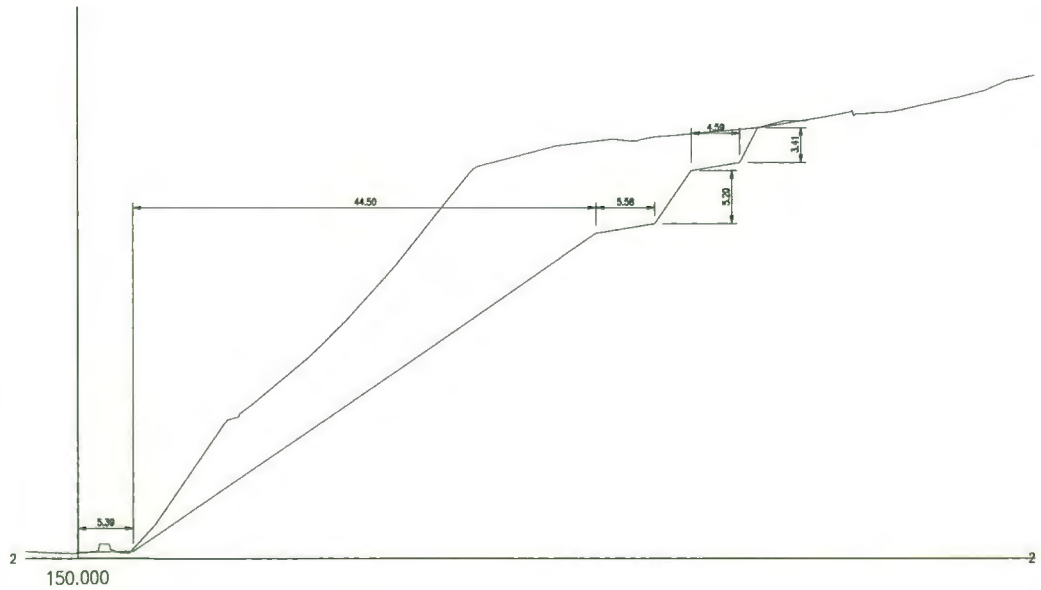

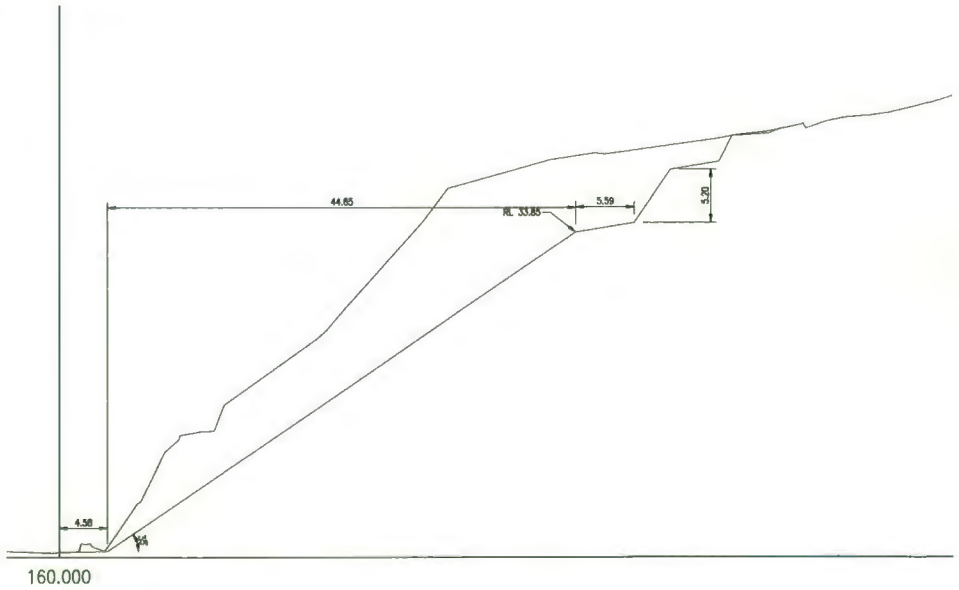

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Sections 6

STATUS	FILE	
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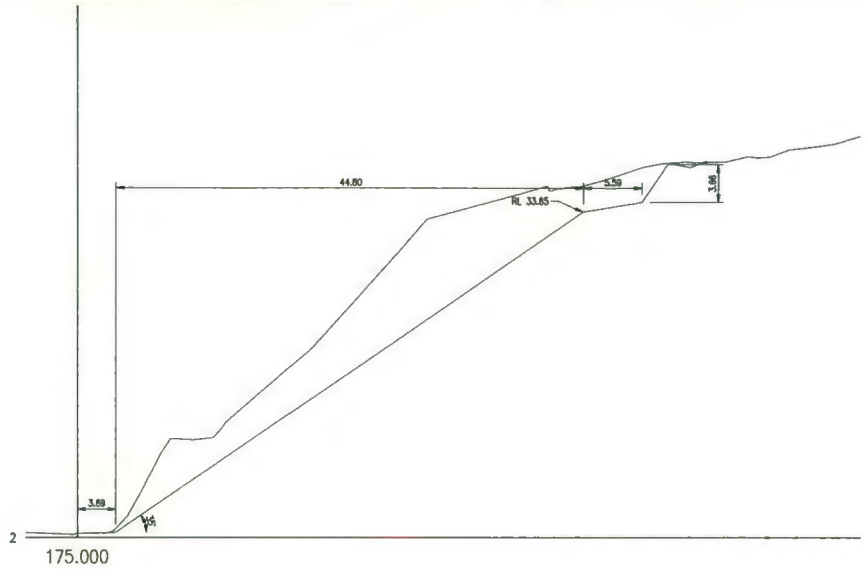

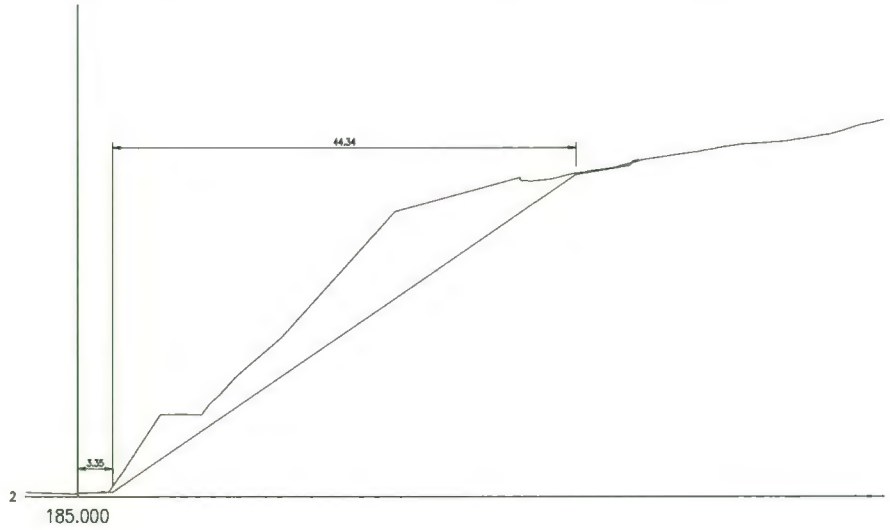

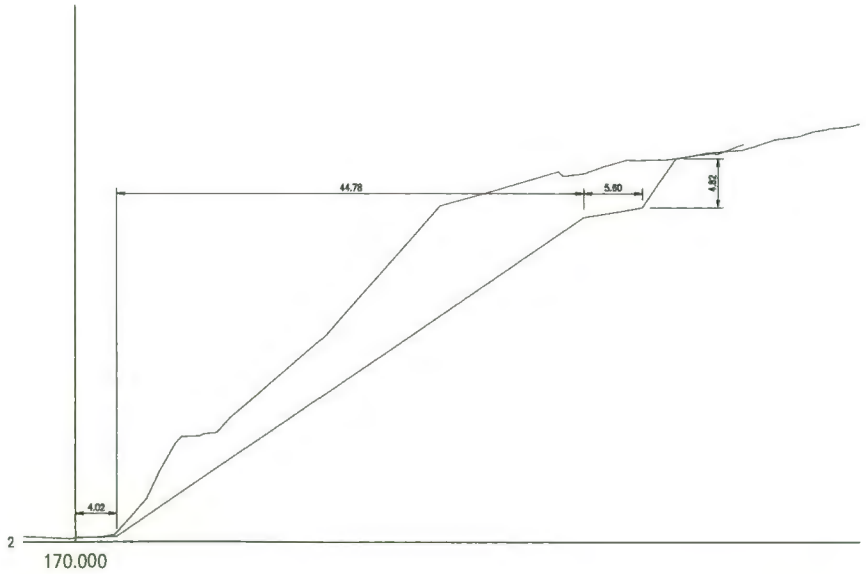

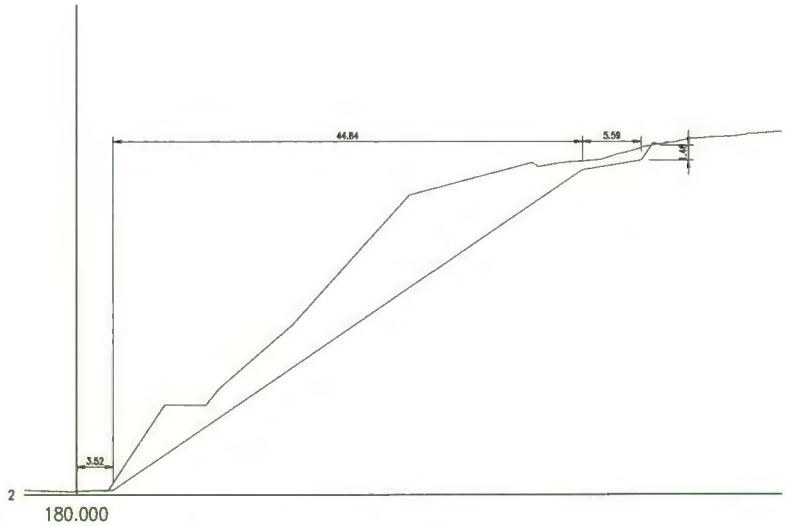

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Sections 7

STATUS	FILE
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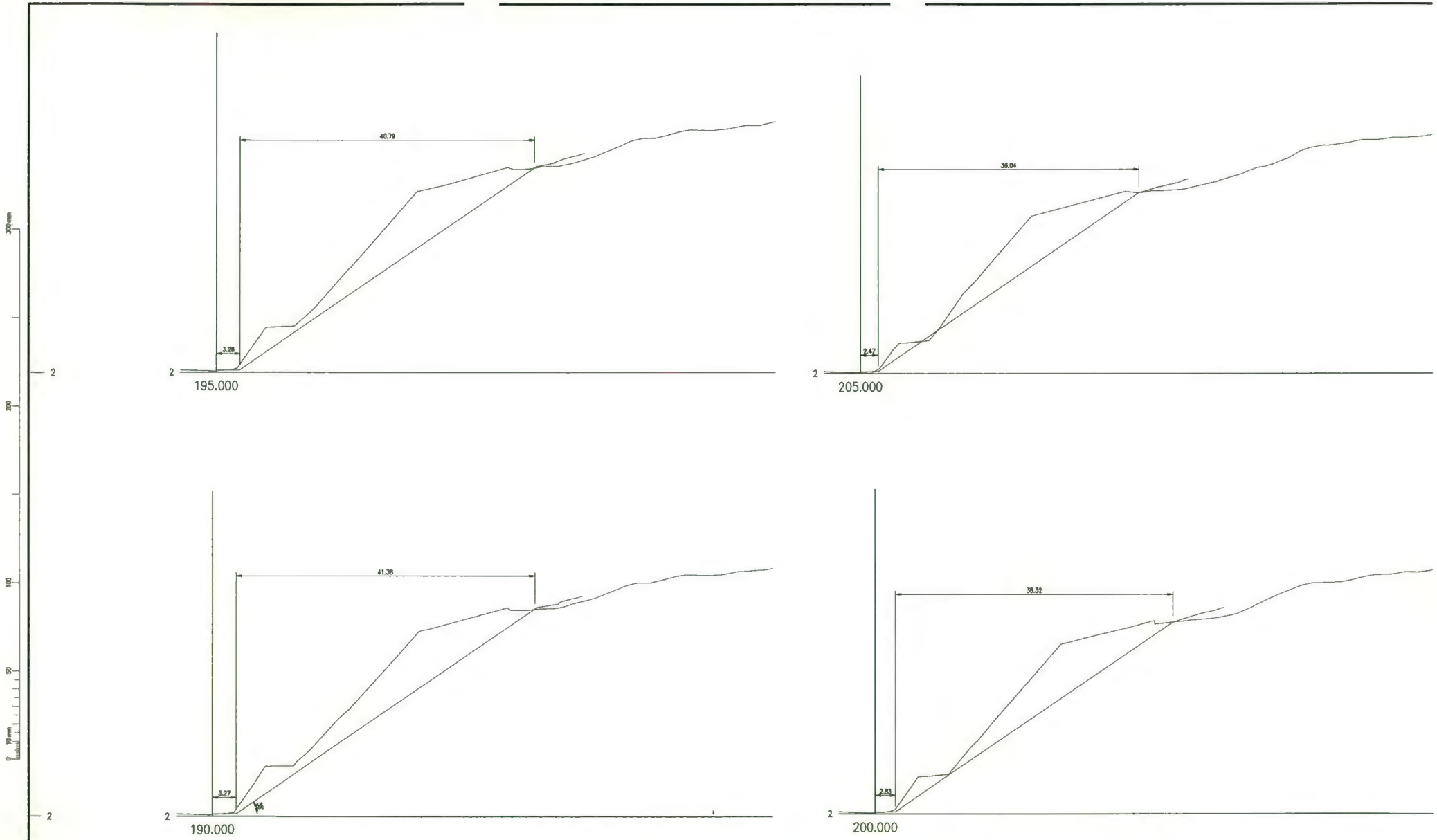

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Sections 8

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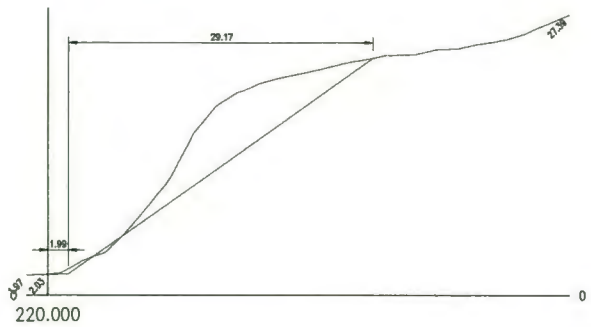

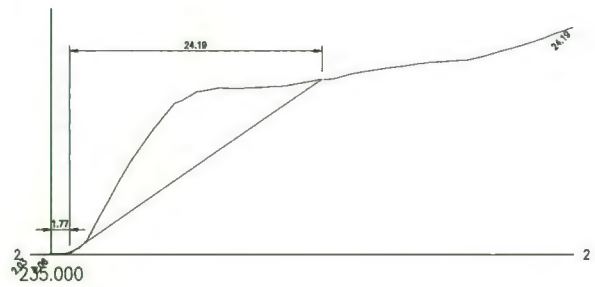

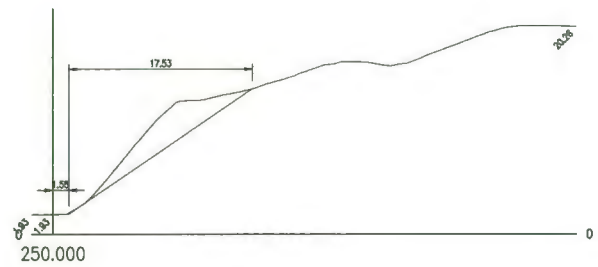

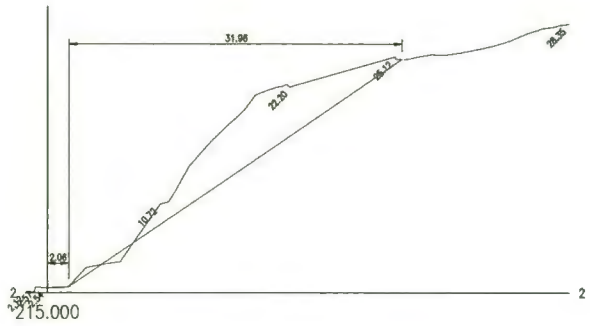

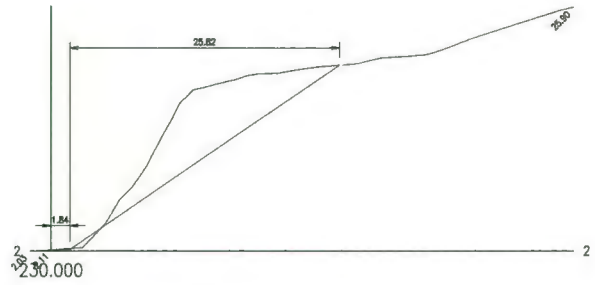

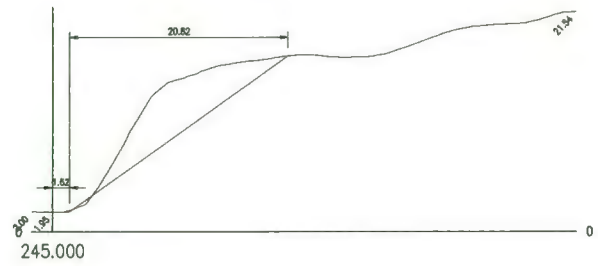

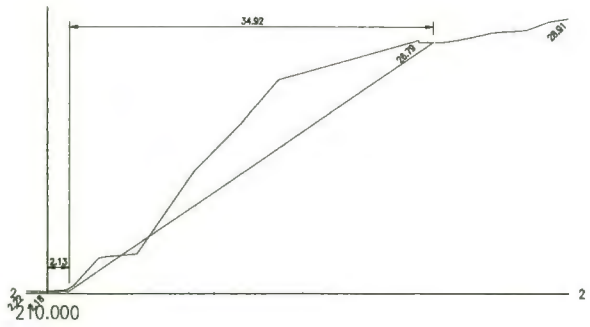

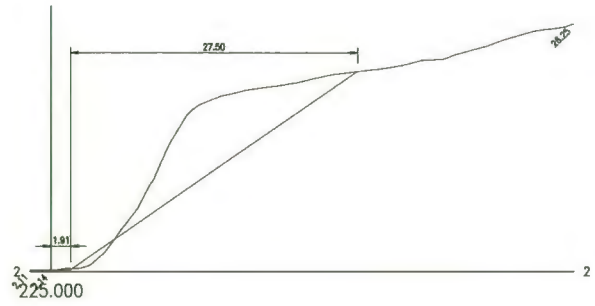

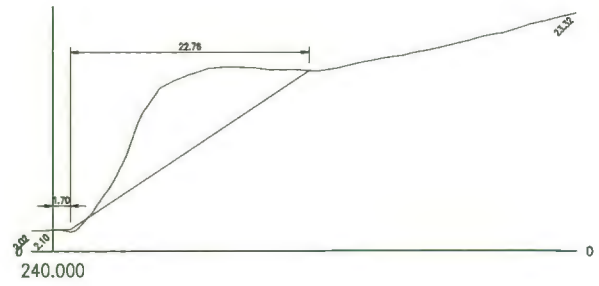

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DESIGN	J.Grindley	M.Hanz	05/09
DRAWN	J.Elder	J.Grindley	08/09
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Sections 9

STATUS	FILE	
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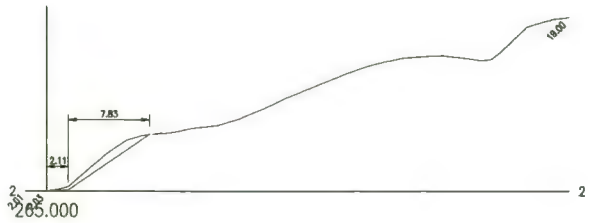

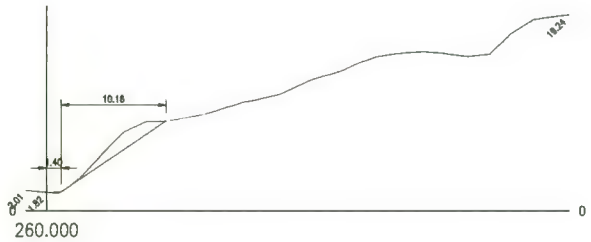

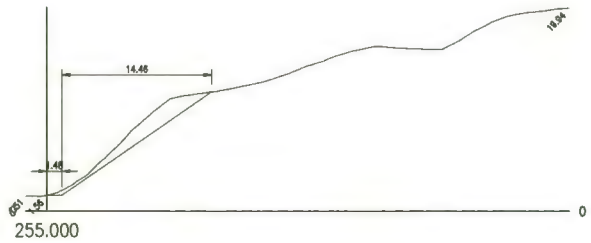

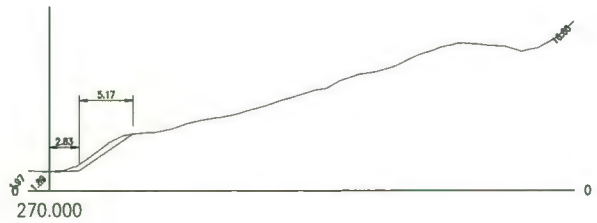

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DESIGN	J.Grindley	M.Hanz	05/09
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Sections 10

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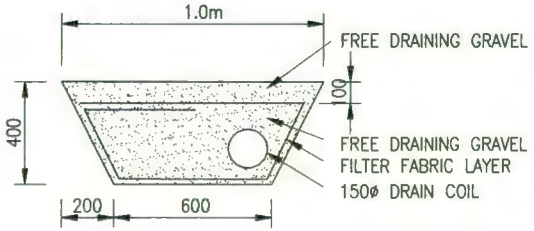

CUT OFF DRAIN DETAILS
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NOTE:
SUMP AND DISCHARGE DETAILES TO BE COMPLETED FOLLOWING CONFIRMATION OF STORM WATER DETAILS

	BY	CHECKED	DATE
DESIGN	J.Grindley	M.Hanz	05/09
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TYPICAL SECTIONS – DRAINAGE

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12 Appendices

Appendix B - Proposed Disposal Site

12 Appendices

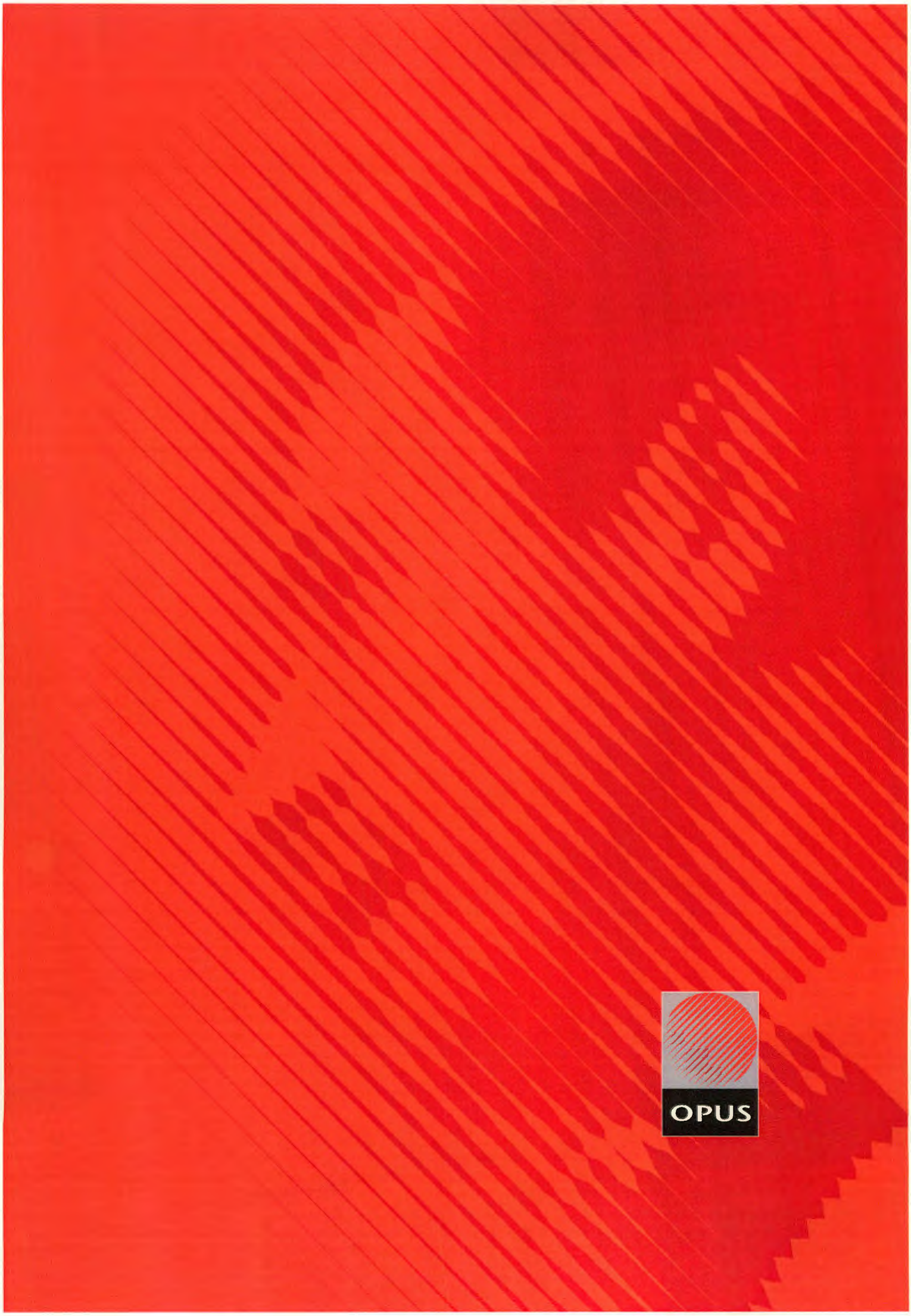
Appendix C – "Quality Control and Testing" and "Frequency of Material Testing"

12 Appendices

Appendix D – Resource Consent Conditions

12 Appendices

Appendix E – Landscape Plan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Appendix C – Assessment of Noise and Vibration Effects

MARSHALL DAY Acoustics

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PO Box 5811 Wellesley Street
Auckland 1141 New Zealand
T: +64 9 379 7822 F: +64 9 309 3540
www.marshallday.com

17 July 2014

Port Otago
PO Box 7
Port Chalmers
Dunedin 9050

Attention: Lincoln Coe

Dear Lincoln

FLAGSTAFF HILL STABILISATION

We have carried out an assessment of the likely noise and vibration effects of the proposal to re-shape the north-eastern slopes of Flagstaff Hill to increase the stability. We have based our assessment on the description of the work contained in the Opus Report "Flagstaff Hill – Proposed Cut Design, 2010".

There will be noise associated with earthmoving machinery such as diggers, backhoes, excavators, bulldozers and trucks. Not all of these might be used, but are typical of the type of machinery (and noise emission potential) likely to be used. We have assumed that the construction period would be longer than 20 weeks, and therefore the appropriate noise limits would be for "long term construction" in Table 2 of the Standard NZS 6803:1999 "*Acoustics – Construction Noise*". In essence this limits construction noise to no more than 70 dB L_{Aeq} between the hours of 7.30am to 6.00pm. Outside those hours the noise limits typically mean that no construction activity could take place.

We have considered the worst case of construction activity taking place at the closest approach of work to either, 11 Island Terrace, 2 Aurora Terrace or 17 Scotia Street, being the nearest properties not owned by Port Otago. Further we have assumed that the activity would have line-of-sight to the houses. Under these conditions we predict construction noise levels of less than 65 dB L_{Aeq} which would comfortably comply with the construction noise limits.

In practice most construction activity will take place below the line-of-sight from the houses, and be further away than the closest distance. Therefore, construction noise levels will usually be even less than 65 dB L_{Aeq}. Therefore, we predict that the activity can take place comfortably in accordance with the appropriate noise limits, provided that typical modern earthmoving machinery is used for the contract.

We have also considered the potential effects of vibration produced by construction activity. While construction can produce noticeable levels of vibration, it is short-term and limited in duration. It is usual to consider the potential for damage to structures, rather than considering just the detectability of the vibration. The German Standard DIN 4150-3: 1999 – 02 "*Structural Vibration – Part 3: Effects of Vibration on Structures*" is widely used in New Zealand to assess the effects of blasting vibration on buildings, and provides a table that gives guideline values for vibration velocity which depend on the type of structure and the frequency of vibration. For domestic dwellings a limit of 5mm/s between 1 and 10 Hz is recommended.

It is not certain that blasting will be required for this project, but if it were, the separation distance from blast site to dwelling would be 100 metres or more. At this distance it is possible to carry out blasting without exceeding the 5mm/s limit. Normally, trials would be carried out initially to determine the effect of ground conditions so that a correct mass of explosive can be determined. This mass is a function of the distance and the ground conditions. Based on our experience in quarries it is our opinion that blasting weights can be used that are effective while keeping vibration levels within the DIN limits.

We trust this information is satisfactory. If you have any further questions please do not hesitate to contact us.

Yours faithfully

MARSHALL DAY ACOUSTICS LTD

Keith Ballagh

Principal

Appendix D – Landscape Development and Management Plan

Flagstaff Hill Earthworks, Port Chalmers, Port Otago Ltd.

Landscape Development and Management Plan

19 December 2015

Prepared for Port Otago Ltd by :

MIKE MOORE
BSc, Dip LA, MRRP, ANZILA

LANDSCAPE ARCHITECT

Po box 5076, Dunedin

Tel (03)479 0833 . fax (03) 479 0834 . cell 0274 360 163

Email m.moore@clear.net.nz

Introduction

Port Otago Ltd have applied for resource consent to undertake earthworks to stabilise the northern and eastern face of Flagstaff Hill. This will involve benching the upper part of the hill and cutting back the slopes below to between 35 – 40 degrees.

This document presents a landscape development and management plan to mitigate the landscape and visual effects of the proposed works. It also provides a brief assessment of the scale of the landscape and visual effects. The planting proposal and specification has been prepared in collaboration with ecologist Dr Kelvin Lloyd of Wildland Consultants Ltd.

Landscape concept

The site includes the north and east facing slopes below Flagstaff Hill and above Peninsula Beach Road, Port Chalmers. The landform is a modified headland which has a reclaimed bench below, used for Port activities. The geology is volcanic from the first eruptive phase of the Dunedin volcano. The less stable slopes are largely devoid of vegetation cover but more stable areas have a cover of largely exotic species including Scotch broom (Cytisus scoparius), lupin (Lupinus arboreus), spur valerian (Centranthus ruber), cocksfoot (Dactylis glomerata) and gorse ((Ulex europaeus). Above and adjacent to the headland on the southern aspect, the slopes have been extensively planted – predominantly with native species, although many of these are not naturally present in Dunedin. Mature macrocarpa (Cupressus macrocarpa) are present at the top of the hill and are providing a seed source for the spread of young macrocarpa onto the slopes below.

The proposed works will result in the extension of three existing benches at the top of the slope and a 35 – 40 degree slope below this. It is proposed that topsoil is imported to the benches and that these are planted in locally appropriate indigenous species which are tolerant of dry coastal habitats and which typically occur in remnants of coastal forest

in the Dunedin area. Planting these ecologically appropriate species will have a positive effect on the indigenous biodiversity of the site.

Ideally, the slopes below the benches would also be planted in appropriate native species however, the substrate will be rocky and given the considerable scale of the area involved, it is intended that this area is hydroseeded and left thereafter to revegetate naturally. The somewhat friable nature of the Port Chalmers Breccia (as observed on the current slopes) is amenable to natural revegetation occurring and softening the visual impact of bare rocky surfaces.

The planting plan for the benches is illustrated in Figure 1 and the species to be used are listed in Tables 1 and 2 below. Three planting zones have been identified. These are bench edge, bench front and bench rear, as some of the suggested species are best planted near the edge of the bench where they can trail down the vertical slopes, or disperse seed to colonise the lower, sloping landform.

Appendix A is a table listing suitable plants for use in this area and planting percentages as recommended by Dr Kelvin Lloyd. This has been followed in preparing the plant lists below.

Planting Specification

1. Ensure that there is topsoil to a minimum depth of 400mm across all the areas to be planted. Topsoil shall be a fibrous loam of good structure with an organic content conducive to healthy plant growth. It shall be free of perennial weed species and any rocks, stones or other material of above 10mm in diameter.

2. Any weed growth present must be sprayed to kill with a non residual systemic herbicide such as glyphosate. This shall be applied within a time to allow proper translocation to take place before any planting is undertaken.

3. Minimum plant grades shall be Pb3 or similar.

4. All plants are to be healthy and vigorous specimens, true to type and free of pests, weeds and deformities. Unless agreed, no substitutes are acceptable.

5. Planting shall be carried out in late autumn to early winter when soil moisture is higher and in a manner which ensures that the plants can establish successfully and as quickly as possible, including watering as required. A slow release fertilizer tablet shall be placed beside the root ball of each plant to assist with early growth rate and survival.

6. Tree shelters around each plant are recommended.

7. All planted areas are to have woodchip mulch 100mm deep applied.

Planting Schedules

Area A : Bench Edge

Total approximate length: 335m

The species below are to be planted at maximum 1.0m spacings along all bench edges

Species	Common name	Quantity
Acaena novae-zelandiae	Bidibid	110
Disphyma australe	Native ice plant	110
Poa cita	Silver tussock	110

Area B : Bench front zone

Total approximate area : 420 m2

The species below are to be planted at approximately 1.25m spacings within the bench front zone

Species	Common name	Quantity
Cordyline australis	Cabage tree	50
Austroderia richardii	Toetoe	100
Coprosma propinqua	Mingimingi	17
Kunzea robusta	Kanuka	7
Coprosma crassifolia		17
Myoporum laetum	Ngaio	85
Sophora microphylla	Kowhai	27
Griselinia littoralis	Broadleaf	24
Pittosporum tenuifolium	Kohuhu	10

Area C : Bench rear zone

Total approximate area : 410 m2

The species below are to be planted at approximately 1.25m spacings within the bench rear zone

Species	Common name	Quantity
Cordyline australis	Cabage tree	27
Austroderia richardii	Toetoe	5
Psuedopanax ferox	Fierce lancewood	3
Plagianthus regius	Lowland ribbonwood	13
Coprosma propinqua	Mingimingi	13
Coprosma virescens		3
Melicytus ramiflorus	Mahoe	5
Prumnopitys taxifolia	Matai	2
Kunzea robusta	Kanuka	13
Hoheria angustifolia	Narrow-leaved lacebark	13
Coprosma crassifolia		13
Myoprum laetum	Ngaio	66

Sophora microphylla	Kowhai	3
Griselinia littoralis	Broadleaf	27
Myrsine australis	Mapou	5
Pittosporum tenuifolium	Kohuhu	53
Podocarpus totara	Totara	2

Maintenance Specification

An establishment maintenance period of 24 months is recommended.

During the first week after planting daily inspections are recommended to detect and respond to any unforeseen problems such as browse by pest animals.

Inspections should be carried out in November and February for the first two years and released from competition with weeds if necessary at these times. Woody weed control may also be required. Plants that die or fail to thrive are to be replaced. Maintenance of the woodchip mulch at approximately 100mm depth should also be carried out.

Beyond the establishment maintenance period, maintenance tasks will involve ongoing weeding and / or spraying as required. It is expected that maintenance requirements will decrease over time as the plants grow and cover the ground.

Landscape and Visual Effects

The headland is already modified, having been cut back previously, and benched at the top of the hill. Despite this, it retains a moderate degree of natural landscape character due to its profile generally reflecting those of natural headlands around the Otago Harbour, and the successful and effective revegetation of the existing benches. Natural revegetation (albeit largely weedy) has also softened its appearance.

The proposed earthworks will result in a less natural (flatter) profile and will result in the loss of a significant amount of vegetation cover. This will give rise to adverse short -

medium term natural character and visual effects from surrounding viewpoints within the lower harbour area such as those illustrated in Figures 2 and 3 attached. The proposed bench planting will progressively provide effective mitigation that will help to reduce the scale of the earthworks at the highest, most visible part of the headland. The planting includes a high proportion of fast growing species that will quickly soften and screen the benched faces. In my estimation, the planting will have a significant mitigating impact after approximately 5 years which will progressively increase over time. Softening of the visual effect of bare rock below the level of the benches will take longer but as has happened since the last time this headland was cut back, natural revegetation will occur, and probably more quickly than previously, given the flatter slope gradient.

The adverse natural landscape character and visual effects on the headland must be considered within the context of the surrounding port – which is a highly modified environment. This context reduces their significance in my opinion. Considering the history of modification, the port setting and the mitigation planting proposed, I assess the adverse natural landscape character and visual effects as significant initially, reducing to moderate in the medium term (5 – 15 years - as the bench plantings establish and grow, and as natural softening of the lower slopes occurs), and reducing to minor in the long term.

Mike Moore
Landscape Architect

Table 1: List of vascular plant species suitable for planting on bench landforms at Flagstaff Hill, Port Chalmers.

Species	Common Name	Plant Type	Rear of Bench	Bench Edge	Proportion at Rear of Bench	Proportion at Edge of Bench	Notes
Cordyline australis	Tī kōuka; cabbage tree	Tree	●	●	10	15	Fast growth, exposure tolerant
Austroderia richardii	Toetoe	Grass	●	●	2	30	Fast growth, exposure tolerant, seeds will colonise lower slopes
Pseudopanax ferox	Fierce lancewood	Tree	●		1		Moderate growth
Plagianthus regius	Lowland ribbonwood	Tree	●		5		Fast growth on deep soils
Coprosma propinqua	Mingimingi	Shrub	●	●	5	5	Hardy shrub
Coprosma virescens		Shrub	●		1		Hardy shrub
Melicytus ramiflorus	Māhoe	Tree	●		2		Fast growth, requires shelter
Prumnopitys taxifolia	Matai	Tree	●		0.5		Slow growth, tall tree
Kunzea robusta	Kānuka	Tree	●	●	5	2	Moderate growth
Hoheria angustifolia	Narrow-leaved lacebark	Tree	●		5		Moderate growth
Coprosma crassifolia		Shrub	●	●	5	5	Hardy shrub
Myoporum laetum	Ngaio	Tree	●	●	25	25	Fast growth, exposure tolerant
Sophora microphylla	Kōwhai	Tree	●	●	1	8	Moderate growth, valuable bird food source
Griselinia littoralis	Broadleaf	Tree	●	●	10	7	Moderate growth
Acaena novae-zelandiae	Bidibid	Dicot herb		●		Every metre along edge	Fast growth, trailing
Disphyma australe	Native ice plant	Dicot herb		●		Every metre along edge	Moderate growth, trailing
Poa cita	Silver tussock	Grass		●		Every metre along edge	Fast growth, exposure tolerant, seeds will colonise lower slopes
Myrsine australis	Māpou	Tree	●		2		Slow growth
Pittosporum tenuifolium	Kōhūhū	Tree	●	●	20	3	Fast growth, exposure tolerant
Podocarpus totara	Tōtara	Tree	●		0.5		Moderate growth, tall tree

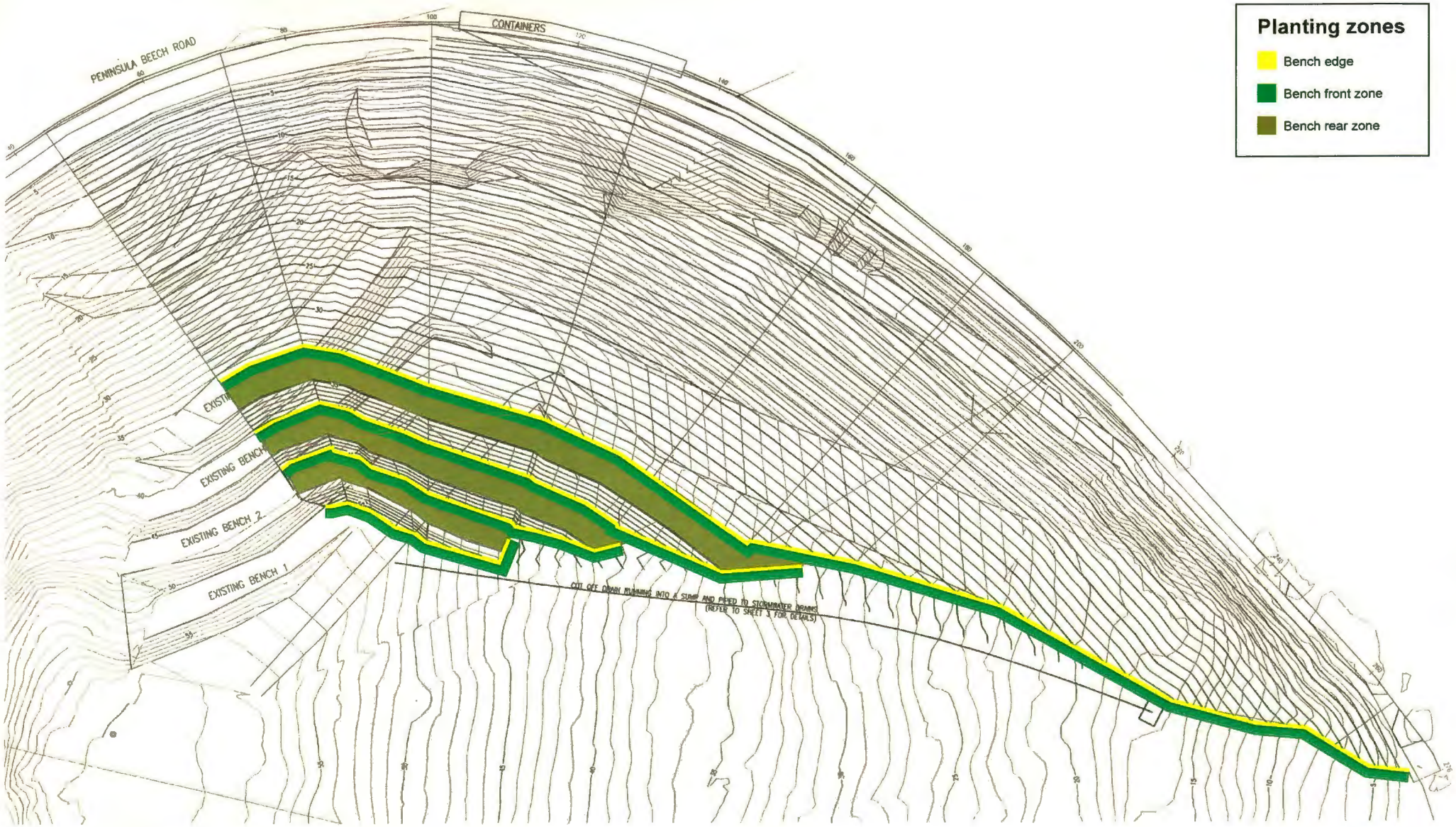

Figure 1 : Flagstaff Hill, Port Chalmers – Proposed Earthworks Landscape Mitigation Plan

Scale 1:500 (A3)

Figure 2 : View toward the site from Harwood, Otago Peninsula

Figure 3 : View toward the site from Aramoana Road

GHD

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