



# Brookvale Green

## Source Water Protection Plan

*Construction-phase template for completion by SQEP hydrogeologist*

|                    |                                                             |
|--------------------|-------------------------------------------------------------|
| <b>Project</b>     | Brookvale Green, 174 and 176 Brookvale Road, Havelock North |
| <b>Applicant</b>   | Vermont Street Partners No. 4 Limited                       |
| <b>Prepared by</b> | Brydon Hughes                                               |
| <b>Version</b>     | Draft                                                       |
| <b>Date</b>        | 15 July 2026                                                |
| <b>Status</b>      | For review                                                  |

## Table of Contents

|                                                                               |    |
|-------------------------------------------------------------------------------|----|
| 1. Introduction.....                                                          | 4  |
| 2. Source-water context summary .....                                         | 5  |
| 3. Roles and responsibilities.....                                            | 6  |
| 4. High-risk source protection works .....                                    | 8  |
| 5. Construction risk register.....                                            | 9  |
| 6. Pre-construction requirements .....                                        | 11 |
| 7. Construction methodologies and controls .....                              | 12 |
| 8. Monitoring, inspection and verification .....                              | 16 |
| 9. Trigger-action-response plan .....                                         | 17 |
| 10. Well 4151 and HDC communication protocol .....                            | 18 |
| 12. Incident and emergency response .....                                     | 19 |
| 13. Completion, handover and post-construction close-out.....                 | 20 |
| 14. Appendices.....                                                           | 21 |
| Appendix A template: Construction source-pathway-receptor risk register ..... | 22 |
| Appendix B template: Source Protection Plan .....                             | 23 |
| Appendix C template: Trigger-action-response plan.....                        | 24 |
| Appendix D template: Pre-start / hold-point checklist .....                   | 25 |
| Background documents to be cross-referenced .....                             | 26 |

## Purpose of this Plan

This document has been prepared as a DRAFT Source Water Protection Plan (SWPP) for the substantive Brookvale Green application. It provides a high-level overview of the intended content and structure of the SWPP and includes template text, prompts and guidance notes to identify the matters that are to be completed by the appointed SQEP hydrogeologist prior to construction. These sections are deliberately retained in the draft plan to demonstrate the expected scope and content of the final SWPP. The final SWPP will remove or update the template text and will include contractor-specific methodologies, detailed design inputs, and site-specific response procedures.

## Document control

*[Complete this table as the document is developed. The final plan should identify the version certified for construction and any later amendments.]*

| Version  | Date         | Prepared by   | Reviewed by | Summary of changes |
|----------|--------------|---------------|-------------|--------------------|
| Draft    | 15 July 2026 | Brydon Hughes | [Insert]    | Initial Draft      |
| [Insert] | [Insert]     | [Insert]      | [Insert]    | [Insert]           |
| [Insert] | [Insert]     | [Insert]      | [Insert]    | [Insert]           |
| [Insert] | [Insert]     | [Insert]      | [Insert]    | [Insert]           |

## Template instructions

*[This table is intended to be completed by the SQEP hydrogeologist]*

| Item                    | SQEP hydrogeologist to complete                                                                                                                                                                                                                                |
|-------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Do include</b>       | Site procedures, construction controls, inspection and hold points, monitoring requirements, notification protocols, trigger-action-response steps, QA records, as-built certification requirements, and completion/handover requirements.                     |
| <b>Do not duplicate</b> | Detailed hydrogeological assessment, full risk justification, groundwater flow interpretation, travel-time assessment, aquifer vulnerability analysis, or residual effects conclusions. Summarise only where needed and cross-reference the assessment report. |
| <b>Primary audience</b> | Contractors, site supervisors, consent compliance officers, HBRC/HDC reviewers                                                                                                                                                                                 |

## Assessment report / management plan interface

[The following table outlines the technical basis for Management Plans applying to the Brookvale Green Development.]

| Item                                                              | SQEP hydrogeologist to complete                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|-------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Hydrogeological Assessment</b>                                 | The hydrogeological assessment documents the hydrogeological setting of the Brookvale Green development and identifies potential water quality risks to down-gradient receptors following the source-pathway-receptor model.                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Groundwater Protection Assessment</b>                          | The Groundwater Protection Assessment (GPA): <ul style="list-style-type: none"> <li>Assesses the risk that the construction activities on the Brookvale Green site could create, exacerbate or increase a source-water risk to groundwater quality</li> <li>Lists measures that will be implemented to avoid creating or increasing risk(s) to groundwater quality and the down-gradient drinking-water supplies (including Well 4151)</li> </ul>                                                                                                                                                |
| <b>Source-Water Protection Plan</b>                               | The Source Water Protection Plan translates Hydrogeological Assessment and GPA into construction methodologies, hold points, monitoring, inspection records, trigger-action-response actions, incident procedures and communication requirements including: <ul style="list-style-type: none"> <li>Requirements for supervision and inspection during construction</li> <li>Management controls to mitigate water quality risks</li> <li>Environmental monitoring and reporting</li> <li>Procedures for management of extreme events</li> <li>Notification and reporting requirements</li> </ul> |
| <b>CEMP / ESCP / Earthworks Management Plan</b>                   | The CEMP, ESCP and Earthworks Management Plan Manage general construction environmental controls, erosion and sediment controls, stabilisation, dust, traffic, site access and contractor management.                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Stormwater Management / O&amp;M Manual</b>                     | The Stormwater Management and O&M Manual address design and long-term operation/maintenance of stormwater infrastructure.                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Infrastructure Report / Engineering Approval documentation</b> | The Infrastructure Report and Engineering Approval documentation confirm engineering design requirements, including wastewater overflow controls, alarms, emergency storage and compliance with the HDC ECoP.                                                                                                                                                                                                                                                                                                                                                                                    |

## 1. Introduction

| Item                                                  | SQEP hydrogeologist to complete                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|-------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>1.1 Purpose of this Plan</b>                       | <p>The purpose of this Source Water Protection Plan is to identify, assess, and manage risks to groundwater quality which have the potential to adversely affect the Hastings District Council municipal water supply sourced from Well 4151 and any other relevant groundwater takes.</p> <p>The plan is intended to establish procedures, controls, monitoring and response actions to manage source-water protection risks during construction and long-term operation of infrastructure on the Brookvale Green development.</p>                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>1.2 Scope of this Plan</b>                         | <p>The scope of this plan applies to:</p> <ul style="list-style-type: none"> <li>• Construction activities undertaken on the Brookvale Green site which have the potential to increase water quality risks</li> <li>• Long-term maintenance and operation of infrastructure on the Brookvale Green site, where this relates to construction quality assurance, as-built certification, handover, and the transfer of relevant inspection and maintenance requirements to the long-term asset owner.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>1.3 Relationship to hydrogeological assessment</b> | <p>This plan is intended to give effect to the recommendations for Source Water Protection identified in the Hydrogeological Assessment and the Groundwater Protection Assessment, related to activities which may influence water quality risk including:</p> <ul style="list-style-type: none"> <li>• Disturbance of low permeability near-surface silt deposits.</li> <li>• Creation of preferential pathways for infiltration from the land surface.</li> <li>• Exposure or disturbance of permeable gravels.</li> <li>• Interception and/or disturbance of uncertified fill materials and organic soils.</li> <li>• Alteration to existing groundwater flow patterns.</li> <li>• Introduction of contaminants during construction (including spills and during extreme weather events).</li> <li>• Introduction of contaminants due to changes to the condition or function of infrastructure over time.</li> </ul> |
| <b>1.4 Relationship to other management plans</b>     | <p>This plan links to engineering design, operational procedures and management controls specified in the following documents prepared for the Brookvale Green Development:</p> <ul style="list-style-type: none"> <li>• Construction Management Plan (CMP)</li> <li>• Erosion and Sediment Control Plan (ESCP)</li> <li>• Earthworks Management Plan (EMP)</li> <li>• Stormwater Operation and Maintenance Manual</li> <li>• Chemical Treatment Management Plan</li> <li>• Engineering Approval Documentation</li> </ul> <p>This plan prevails where there is any inconsistency between documentation in relation to Source Water Protection.</p>                                                                                                                                                                                                                                                                       |
| <b>1.5 Exclusions</b>                                 | <p>This plan does not replace:</p> <ul style="list-style-type: none"> <li>• The Brookvale Green Hydrogeological Assessment</li> <li>• The Brookvale Green Groundwater Protection Assessment</li> <li>• Detailed Design Certification</li> <li>• Engineering Approvals</li> <li>• Any separate authorisation(s) required under resource consent conditions.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |

## 2. Source-water context summary

| Item                                                         | SQEP hydrogeologist to complete                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|--------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>2.1 Source protection context</b>                         | <p>The Brookvale Green site overlies a shallow, highly permeable aquifer. This aquifer is overlain by a layer of low permeability silt which reduces the potential for infiltration of contaminants from the land surface into underlying groundwater.</p> <p>The thickness of the silt layer varies across the Brookvale Green site, increasing the potential for contaminants generated during construction or operation of site infrastructure to infiltrate directly into groundwater, particularly where this layer is thin or has been disturbed by historical earthworks.</p> <p>Groundwater flow occurs in a north-westerly direction. This means any contaminants infiltrating to groundwater under the Brookvale Green site can be rapidly transmitted towards a HDC water supply well (4151) located along Brookvale Road. Any such contamination would significantly increase risks to potable water supply.</p> <p>Appropriate design and management of construction works on the Brookvale Green site is required to ensure the development does not affect groundwater quality down-gradient of the site.</p> |
| <b>2.2 Sensitive receptors</b>                               | <p>The primary receptor down-gradient of the Brookvale Green site is Well 4151 utilised by HDC for municipal supply. This well is located on road reserve adjacent to Brookvale Road, approximately 100 metres north of the site entrance.</p> <p>Well 4151 is screened between 15.2 and 20.0 metres below ground and authorised to pump at rates of up to 90 L/s.</p> <p>Work undertaken for the Havelock North Enquiry established a direct and rapid connection between groundwater under the Brookvale Green site and well 4151.</p> <p>Other wells down-gradient of the site which are utilised for potable supply will be identified and, if appropriate, incorporated into this plan prior to commencement of construction.</p>                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>2.3 Key source-water risk principles for construction</b> | <p>Key principles for managing source water risk include:</p> <ul style="list-style-type: none"> <li>• Avoiding creation of preferential pathways for infiltration through near-surface silt deposits</li> <li>• Avoiding exposure or disturbance of alluvial gravels to the extent practicable.</li> <li>• Supervision of construction activities to ensure infrastructure design and construction is appropriate for localised geological conditions</li> <li>• Ensuring permeability (either natural or engineered) is sufficiently low under engineered structures to limit direct infiltration of contaminants to groundwater</li> <li>• Managing open excavations to prevent entry of stormwater</li> <li>• Implementation of appropriate procedures to avoid accidental fuel or chemical spills during construction</li> <li>• Ensuring appropriate processes are in place to manage construction activities during extreme weather events</li> <li>• Providing notification of construction activities to down-gradient groundwater users</li> </ul>                                                                 |

### 3. Roles and responsibilities

| Discipline                              | SQEP hydrogeologist to complete                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|-----------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>3.1 Consent holder</b>               | <ul style="list-style-type: none"> <li>• Ensuring all activities comply with consent conditions</li> <li>• Overall responsibility for implementing this plan</li> <li>• Funding monitoring</li> <li>• Ensuring contractor compliance</li> <li>• Documentation of QA/QC and as-builts (as required)</li> <li>• Obtaining required sign-offs and provision of records to HBRC and HDC.</li> <li>• Ensuring appropriate processes are in place to maintain the condition and integrity of infrastructure over the long-term</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>3.2 SQEP Hydrogeologist</b>          | <ul style="list-style-type: none"> <li>• Input into preparation of the Groundwater Protection Assessment covering: <ul style="list-style-type: none"> <li>- Assumed ground conditions</li> <li>- Proposed permeability and/or liner specifications to manage seepage losses</li> <li>- Liner installation methodology</li> <li>- Wet-weather restrictions</li> <li>- Open excavations</li> <li>- Management of dewatering, unexpected ground conditions</li> <li>- Fuel and chemical storage</li> <li>- Concrete washout</li> <li>- Spill response</li> <li>- Hydrogeological monitoring requirements</li> </ul> </li> <li>• Pre-start briefings for contractors establishing overall objectives and requirements of this plan</li> <li>• Ongoing inspection and review of ground conditions encountered during construction including any groundwater or seepage encountered</li> <li>• Input to any modifications to engineering design or construction methodology required to manage water quality risk based on ground or hydrogeological conditions encountered</li> <li>• Confirmation that any modifications required to Detailed Design Plans appropriately address groundwater quality risks</li> <li>• Inspection and documentation to ensure composition and installation of liners/barriers is in accordance with requirements established in the Groundwater Protection Assessment</li> <li>• Review of groundwater inflow or seepage encounters</li> <li>• Implementation and review of environmental monitoring</li> <li>• Development and implementation of response actions</li> <li>• Documentation of changes to initial design in response to ground or hydrogeological conditions during construction</li> </ul> |
| <b>3.3 Contractor / site supervisor</b> | <ul style="list-style-type: none"> <li>• Site inductions</li> <li>• Compliance with consent requirements</li> <li>• Compliance with engineering specifications</li> <li>• Implementation of any changes to engineering design or construction methodology required to manage water quality risk</li> <li>• Inspection of works to ensure appropriate installation of liners/barriers</li> <li>• Spill response</li> <li>• Implementation of procedures to manage extreme climate events</li> <li>• Record keeping</li> <li>• Notification to consent holder of any changes to engineering design or construction methodologies</li> <li>• Communication with HDC and HBRC (Manager Compliance) including notification of any events which have the potential to increase water quality risk (including spills and extreme weather events)</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |

| Discipline                                     | SQEP hydrogeologist to complete                                                                                                                                                                                                                               |
|------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>3.4 Engineer / civil designer</b>           | <ul style="list-style-type: none"> <li>• Implementation of design details</li> <li>• Liner/barrier specifications</li> <li>• Wastewater controls</li> <li>• Stormwater device construction</li> <li>• QA testing</li> <li>• As-built documentation</li> </ul> |
| <b>3.5 HDC and HBRC communication contacts</b> | [Insert nominated contacts, including HDC Compliance Officers for Well 4151. Confirm notification pathways, escalation contacts and after-hours contacts]                                                                                                     |

## 4. High-risk source protection works

[Complete the sections below. Keep technical explanation brief and cross-reference the Hydrogeological and Source-Water Protection Assessment where detailed assessment is required.]

| Item                                         | SQEP hydrogeologist to complete                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|----------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>4.1 Definition of high-risk works</b>     | <p>High-risk works include activities with the potential to result in:</p> <ul style="list-style-type: none"> <li>• Disturbance of low permeability near-surface silt deposits.</li> <li>• Exposure or disturbance of permeable gravels</li> <li>• Creation preferential pathways for infiltration from the land surface.</li> <li>• Interception and/or disturbance of uncertified fill materials and organic soils.</li> <li>• Alteration existing groundwater flow patterns.</li> <li>• Introduction of contaminants during construction (including spills and during extreme weather events).</li> </ul>                                                                                                                                                                                                                                          |
| <b>4.2 Works covered</b>                     | <p>High-risk works include:</p> <ul style="list-style-type: none"> <li>• Channel re-alignment in Watercourse 1</li> <li>• Excavation of stormwater wetland</li> <li>• Construction of raingardens and stormwater detention areas</li> <li>• Drainage outfalls</li> <li>• Drainage and service trenches</li> <li>• Pump station works</li> <li>• Bore decommissioning</li> <li>• Dewatering</li> <li>• Road subgrade excavations</li> <li>• Encounter of unexpected ground conditions</li> </ul>                                                                                                                                                                                                                                                                                                                                                       |
| <b>4.3 Relative groundwater quality risk</b> | <p>The extent to which construction activities pose a risk to down-gradient groundwater quality will depend both on the nature of each specific activity (depth of excavation, extent of ground disturbance, potential contaminants, potential for scour/erosion etc) as well as the specific location on the site where the activity occurs (e.g., depth of surficial silt and underlying alluvium).</p> <p>Areas of elevated and high source water risk will require particular attention to ensure engineering design and construction management is appropriate for ground conditions. However, high risk construction activities elsewhere on site (e.g., stream re-alignment, wetland construction, wastewater pump station) will also require a similar level of supervision, management and engineering design.</p> <p>[Refer Appendix C]</p> |

## 5. Construction risk register

[To be further refined based on Groundwater Protection Assessment]

| Construction activity                                                        | Potential contaminant source                            | Potential pathway                            | Receptor                               | Required control                                                                                           | Monitoring / inspection trigger                                                                        | Response action                                                                                                                                                                                | Record required                                                                                                                                                        |
|------------------------------------------------------------------------------|---------------------------------------------------------|----------------------------------------------|----------------------------------------|------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Watercourse realignment excavation (including infilling of existing channel) | Drainage of stormwater and run-off from wider catchment | Seepage to groundwater                       | Aquifer Well 4151 Downstream catchment | Seepage control via natural or engineered liner<br>Backfill of existing channel                            | Ground conditions encountered during construction<br>Permeability testing of natural ground / backfill | Works notification to HDC Adequate natural or engineered liner<br>Liner specification (earth or engineered) if required<br>Appropriate selection and compaction of backfill (existing channel) | Inspection record<br>Documentation of testing<br>Documentation of liner installation (engineered)<br>Backfill composition and compaction (earth fill)<br>SQEP sign-off |
| Wetland excavation                                                           | Stormwater                                              | Seepage to groundwater                       | Aquifer Well 4151                      | Seepage control via natural or engineered liner                                                            | Ground conditions encountered during construction<br>Permeability testing of natural ground / backfill | Adequate natural or engineered liner to limit seepage<br>Liner specification (earth or engineered)                                                                                             | Inspection record<br>Documentation of testing<br>Documentation of liner installation<br>SQEP sign-off                                                                  |
| Raingarden excavation                                                        | Stormwater                                              | Seepage to groundwater                       | Aquifer Well 4151                      | Seepage control via natural or engineered liner                                                            | Ground conditions encountered during construction                                                      | Adequate natural or engineered liner to limit seepage                                                                                                                                          | Ground conditions<br>Documentation of liner installation<br>SQEP sign-off                                                                                              |
| Service and drainage trenching                                               | Stormwater                                              | Seepage to groundwater                       | Aquifer Well 4151                      | Seepage control via natural or engineered liner (if required)<br>Stormwater management during construction | Depth to alluvial gravels <0.4m below base of excavation                                               | Adequate natural or engineered liner to limit seepage                                                                                                                                          | Ground conditions<br>Documentation of trench plug or liner (if required)<br>Backfill record                                                                            |
| Uncertified fill                                                             | Stormwater                                              | Seepage to groundwater                       | Aquifer Well 4151                      | Removal of material                                                                                        | Documentation of extent and material composition                                                       | Replacement with suitable fill                                                                                                                                                                 | Inspection record<br>Documentation of testing<br>Replacement fill composition and compaction (earth fill)                                                              |
| Unexpected ground conditions                                                 | Stormwater or run-off                                   | Seepage to groundwater                       | Aquifer Well 4151                      |                                                                                                            | Ground conditions                                                                                      | Review of engineering design / construction methodology                                                                                                                                        | Inspection record<br>Documentation of changes to engineering design or construction methodology<br>SQEP sign-off                                                       |
| Open excavations                                                             | Stormwater                                              | Overland flow to excavations during rainfall | Aquifer Well 4151                      | Stormwater Management Plan                                                                                 | Significant rainfall (> 1 year AEP)                                                                    | Extreme weather response                                                                                                                                                                       | Inspection record                                                                                                                                                      |
| Dewatering                                                                   | Alteration of natural groundwater flow patterns         |                                              | Groundwater quality                    | Dewatering Management Plan                                                                                 |                                                                                                        |                                                                                                                                                                                                | SQEP sign-off                                                                                                                                                          |

| Construction activity                 | Potential contaminant source | Potential pathway                                    | Receptor                | Required control                                        | Monitoring / inspection trigger           | Response action                                                 | Record required                                            |
|---------------------------------------|------------------------------|------------------------------------------------------|-------------------------|---------------------------------------------------------|-------------------------------------------|-----------------------------------------------------------------|------------------------------------------------------------|
| Unexpected groundwater or seepage     | Perched groundwater          | Seepage via preferential pathway                     | Aquifer / surface water | Stop work and isolate pending SQEP review               | Visible seepage / groundwater encountered | Modifications to construction methodology or engineering design | Inspection record                                          |
| Extreme weather event                 | Stormwater, run-off          | Seepage via preferential pathway or open excavations | Aquifer Well 4151       | Stop work Implement Stormwater Management Plan controls | Rainfall exceeding 1-year AEP             | Monitoring during event                                         | Monitoring record                                          |
| Fuel / chemical storage and refueling | Fuel, oils, chemicals        | Spill to ground or stormwater                        | Aquifer / watercourses  | Spill response plan                                     | Spill Bund failure Site inspection        | Spill Response Plan Notification of HDC                         | Spill report Incident closeout including monitoring record |

## 6. Pre-construction requirements

| Item                                                          | SQEP hydrogeologist to complete                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|---------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>6.1 Pre-start source protection meeting</b>                | Pre-start meeting with the contractor, consent holder, SQEP hydrogeologist, civil engineer and relevant HBRC and HDC staff                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>6.2 Contractor induction</b>                               | Development of specific Source Water Protection induction content including: <ul style="list-style-type: none"> <li>• Requirements for Source Water Protection</li> <li>• High risk activities</li> <li>• Anticipated variation in ground conditions</li> <li>• Location of known fill areas</li> <li>• Prohibited discharges</li> <li>• Response to unanticipated ground conditions</li> <li>• Prohibited discharges</li> <li>• Stop-work triggers</li> <li>• Spill response</li> <li>• Relevant contacts</li> </ul>                                                                        |
| <b>6.3 Baseline site verification</b>                         | Documentation of pre-works condition including: <ul style="list-style-type: none"> <li>• Anticipated ground conditions</li> <li>• Existing drainage features (including previously filled sections)</li> <li>• Know fill areas</li> <li>• Areas of potentially contaminated land</li> <li>• Groundwater / seepage observations</li> <li>• Documentation of existing wells</li> </ul>                                                                                                                                                                                                         |
| <b>6.4 Groundwater Protection Assessment</b>                  | Preparation of a Groundwater Protection Assessment by a SQEP Hydrogeologist which: <ul style="list-style-type: none"> <li>• Assesses the risk that the proposed stream diversion, wetlands, outlet structures, service trenches and associated excavations could create, exacerbate or increase a source-water risk to groundwater quality or any downgradient drinking-water supply</li> <li>• Sets out the measures that will be implemented to avoid creating or increasing risk(s) to groundwater quality and the downgradient drinking-water supplies (including Well 4151).</li> </ul> |
| <b>6.5 Monitoring</b>                                         | Development of monitoring plan for inclusion in the Groundwater Protection Assessment including: <ul style="list-style-type: none"> <li>• Monitoring locations</li> <li>• Monitoring parameters and frequency</li> <li>• Baseline sampling</li> <li>• Triggers for remedial actions</li> <li>• Reporting</li> </ul>                                                                                                                                                                                                                                                                          |
| <b>6.6 Approvals and certifications required before works</b> | <ul style="list-style-type: none"> <li>• Certification must be obtained at least 20 days prior to the commencement of high risk works.</li> <li>• Certification may be obtained per stage.</li> <li>• Works shall not commence without certification.</li> <li>• Plans to be provided shall include: <ul style="list-style-type: none"> <li>- Detailed design plans</li> <li>- CEMP</li> <li>- EWMP</li> <li>- ESCP</li> <li>- ChTMP</li> <li>- SPMP</li> </ul> </li> </ul>                                                                                                                  |

## 7. Construction methodologies and controls

[Complete the sections below. Values in square brackets are to be confirmed the Groundwater Protection Assessment and certified detailed design]

| Item                                                    | SQEP hydrogeologist to complete                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|---------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>7.1 General excavation controls</b>                  | <p><u>Construction Methodology</u></p> <ul style="list-style-type: none"> <li>Detailed in the Construction Management Plan (CMP)</li> </ul> <p><u>[Controls]</u></p> <ul style="list-style-type: none"> <li>Monitoring of ground conditions</li> <li>Minimising disturbance of surficial silt layers</li> <li>Maintaining minimum thickness of silt overlying alluvial gravels at final grade</li> <li>Stop work controls for significant rainfall</li> <li>Avoidance of ponding during construction]</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>7.2 Watercourse realignment and channel works</b>    | <p><u>Construction Methodology</u></p> <ul style="list-style-type: none"> <li>Detailed in the Construction Management Plan (CMP)</li> </ul> <p><u>[Controls]</u></p> <ul style="list-style-type: none"> <li>Notification of HDC prior to commencement of works</li> <li>Supervision by suitably qualified geologist or geotechnical engineer</li> <li>Stop work controls during significant rainfall events</li> <li>Testing of subgrade to ensure a minimum thickness [ ] of intact silty clay material is maintained between the channel invert and underlying alluvial deposits.</li> <li>Formation of a low permeability liner (compacted earth fill or engineered membrane) where alluvial gravels are identified within [ ] of the channel invert.</li> <li>Compaction of earth fill material (where utilised)</li> <li>Testing to ensure permeability of earth fill liner does not exceed hydraulic conductivity of [ ] m/s (or is consistent with values derived from in-situ materials in existing channel)</li> <li>Completion of final channel to achieve uniform profile to avoid pooling</li> <li>Backfill and compaction of existing channel to achieve hydraulic conductivity of less than [ ] m/s (consistent with or less than values derived from in-situ materials in existing channel)]</li> </ul> |
| <b>7.3 Wetlands, raingardens and stormwater devices</b> | <p><u>Construction Methodology</u></p> <ul style="list-style-type: none"> <li>Detailed in the Construction Management Plan (CMP)</li> </ul> <p><u>[Controls]</u></p> <ul style="list-style-type: none"> <li>Notification of HDC prior to commencement of wetland works</li> <li>Supervision by suitably qualified geologist or geotechnical engineer</li> <li>Testing of subgrade to ensure a minimum thickness of [ ] mm of intact silty clay material is maintained between the invert and underlying alluvial deposits.</li> <li>Formation of a low permeability liner (compacted earth fill or engineered membrane) where alluvial gravels are identified within [ ] of the design invert.</li> <li>Compaction of earth fill material (where utilised)</li> <li>Testing to ensure permeability of earth fill liner does not exceed hydraulic conductivity of [ ] or is consistent with values derived from physical testing of in-situ materials]</li> </ul>                                                                                                                                                                                                                                                                                                                                                       |
| <b>7.4 Drainage works, outfalls and culverts</b>        | <p><u>Construction Methodology</u></p> <ul style="list-style-type: none"> <li>Detailed in the Construction Management Plan (CMP)</li> </ul> <p><u>[Controls]</u></p> <ul style="list-style-type: none"> <li>Supervision by suitably qualified geologist or geotechnical engineer</li> <li>Testing of subgrade to ensure a minimum thickness of [ ] of intact silty clay material is maintained between the invert and underlying alluvial deposits.</li> <li>Installation of appropriate liner materials (compacted earth fill or engineered) where alluvial materials present within [ ] of the drainage invert</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |

| Item                                                                      | SQEP hydrogeologist to complete                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|---------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                           | <ul style="list-style-type: none"> <li>• Trench plug to avoid preferential flow along drainage alignment</li> <li>• Documentation of as-built records]</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>7.5 Service trenches and utility installation</b>                      | <p><u>Construction Methodology</u></p> <ul style="list-style-type: none"> <li>• Detailed in the Construction Management Plan (CMP)</li> </ul> <p><u>[Controls</u></p> <ul style="list-style-type: none"> <li>• Supervision by suitably qualified geologist or geotechnical engineer</li> <li>• Testing of subgrade to ensure a minimum thickness of [ ] of intact silty clay material is maintained between the invert and underlying alluvial deposits.</li> <li>• Installation of appropriate liner materials (compacted earth fill or engineered) where alluvial materials present within [ ] of the trench invert</li> <li>• Trench plug to avoid preferential flow along trench alignment]</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>7.6 Wastewater pump station and wastewater infrastructure</b>          | <p><u>Construction Methodology</u></p> <ul style="list-style-type: none"> <li>• Detailed in the Construction Management Plan (CMP)</li> </ul> <p><u>[Controls</u></p> <ul style="list-style-type: none"> <li>• Supervision by suitably qualified geologist or geotechnical engineer</li> <li>• Testing of subgrade to ensure a minimum thickness of [ ] of intact silty clay material is maintained between the invert and underlying alluvial deposits.</li> <li>• Installation of appropriate liner materials (compacted earth fill or engineered) where alluvial materials present within [ ] of the design invert</li> <li>• Emergency storage/response]</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>7.7 Dewatering, seepage and groundwater encounters</b>                 | <p><u>Construction Methodology</u></p> <ul style="list-style-type: none"> <li>• Detailed in the Construction Management Plan (CMP)</li> <li>• Dewatering is not expected to be required during channel re-alignment, construction of wetlands and stormwater treatment devices, drainage works and excavation of service trenches.</li> <li>• Dewatering may be required during construction of wastewater pump station</li> <li>• Minor groundwater inflow/seepage may be encountered where construction intercepts alluvium overlying low permeability silt across central/eastern parts of the site</li> </ul> <p><u>[Controls</u></p> <ul style="list-style-type: none"> <li>• Stop work where groundwater inflow or seepage recorded</li> <li>• Containment of all seepage inflows within excavated area</li> <li>• Review of groundwater seepage or inflows by suitably qualified hydrogeologist</li> <li>• Notification to HBRC</li> <li>• Development of a methodology for managing any dewatering required by SQEP Hydrogeologist including dewatering method, rate, duration and discharge of pumpage (including any treatment required)</li> <li>• Review/revision of engineering design to ensure the presence of groundwater does not increase risks for seepage losses or to integrity of infrastructure]</li> </ul> |
| <b>7.8 Unexpected permeable gravels or loss of low-permeability cover</b> | <p><u>[Controls</u></p> <ul style="list-style-type: none"> <li>• Supervision by suitably qualified geologist or geotechnical engineer</li> <li>• Stop-work if permeable gravels, cavities, preferential pathways, organic fill, or compromised low-permeability material are encountered.</li> <li>• Review of construction methodology to limit exposure of permeable gravel</li> <li>• Refinement of engineering design to ensure appropriate low permeability material (earth fill or engineered) is incorporated into construction to minimise seepage losses]</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>7.9 Fuel, chemical storage, refuelling and concrete washout</b>        | <p><u>[Fuel and Chemical Storage</u></p> <ul style="list-style-type: none"> <li>• A Spill Management Plan (SMP) will be prepared by a SQEP, provided to HBRC before commencement and kept on site at all times</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |

| Item                                                        | SQEP hydrogeologist to complete                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|-------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                             | <ul style="list-style-type: none"> <li>• All fuels, oils, and hazardous chemicals will be stored in bunded, fully contained areas with a minimum capacity of 110% of the largest vessel or 25% of total stored volume</li> <li>• Storage areas will be located at least 20 m from surface water, stormwater inlets, drains, and open excavations</li> <li>• Containers will be clearly labelled, kept sealed when not in use, and inspected daily for leaks, corrosion, or damage</li> <li>• Only approved, double-skinned tanks will be utilised for fuel storage</li> <li>• Refueling will occur only in designated refueling zones with impermeable surfacing and spill containment</li> <li>• No refueling of mobile plant will occur outside designated zones unless operationally unavoidable. In such cases, a spill kit must be present and the operator trained in emergency response.</li> <li>• The Site Supervisor will undertake and document weekly inspections to verify bund integrity, container condition, spill kit readiness, and compliance with refueling procedures.</li> <li>• Any spill, regardless of size, will be contained immediately and initiate the Spill Management Plan.</li> <li>• All spills will be reported to the Site Supervisor and HDC]</li> </ul> <p><u>[Concrete Washout</u></p> <ul style="list-style-type: none"> <li>• Management of concrete washout will be included in the SMP</li> <li>• All concrete subcontractors will receive site-specific induction covering washout locations, procedures, and practices.</li> <li>• Concrete trucks, pumps, and equipment will not be washed out on bare ground or in any location where runoff could enter soil or stormwater systems</li> <li>• All concrete washout activities will occur only within designated washout areas constructed with impermeable liners and sufficient freeboard to contain washwater, slurry, and residual solids.</li> <li>• Washout facilities will be located at least 20 m from waterways, stormwater inlets, drains, and excavated areas]</li> </ul> |
| <b>7.10 Contaminated land and unexpected contamination</b>  | <p><u>[Controls</u></p> <ul style="list-style-type: none"> <li>• All known areas of uncertified fill or contaminated areas identified through site investigation will be mapped, fenced, and clearly marked prior to works commencing.</li> <li>• All personnel will receive induction training covering contamination risks and reporting procedures</li> <li>• If discolored soil, odors, staining, asbestos-containing material, buried waste, hydrocarbons or unusual debris are encountered, works will stop immediately within a minimum 10 m radius of the discovery</li> <li>• The Site Supervisor will be notified of any exposure of any uncertified fill or potentially contaminated ground</li> <li>• A SQEP will assess the material and advise on classification, required controls, and disposal pathways.</li> <li>• Sampling will be undertaken where necessary to determine contaminant concentrations and disposal requirements under the WasteMINZ guidelines</li> <li>• Work will not resume in the affected area until the SQEP confirms that risks are understood and appropriate controls are in place.</li> <li>• The HBRC will be notified within 24 hours of any unexpected contamination discovery</li> <li>• If the contamination poses a risk to human health the HDC will be notified immediately]</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>7.11 Wet-weather restrictions and stop-work triggers</b> | <p>Wet weather restrictions will apply to all site works when forecast or actual rainfall exceeds [ ]</p> <p><u>[Methodology</u></p> <ul style="list-style-type: none"> <li>• Monitoring of rainfall (forecast and actual) will be undertaken daily by the Site Supervisor using the HDC Havelock North Dams &amp; Stream Levels Monitoring</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |

| Item                                                  | SQEP hydrogeologist to complete                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|-------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                       | <p>Dashboard<br/> <a href="https://experience.arcgis.com/experience/9d9abb18800f4775910477ed590f30fd">https://experience.arcgis.com/experience/9d9abb18800f4775910477ed590f30fd</a>)</p> <ul style="list-style-type: none"> <li>• When forecast rainfall exceeds wet weather restriction threshold, all works will be reviewed to ensure appropriate stormwater protections are in place. To the extent practicable, all open excavations will be infilled or covered prior to rainfall events exceeding the restriction threshold and no new excavations will commence while forecast is in place.</li> <li>• All construction activities will be reviewed by the Site Manager during (to the extent practicable) and following rainfall events exceeding the wet weather restriction threshold</li> <li>• Recommencement of works will be authorised by the Site Supervisor</li> <li>• Any indications of stormwater infiltration to ground will be notified to the HDC and reviewed by the SQEP hydrogeologist]</li> </ul> |
| <b>7.12 Existing bores and bore decommissioning</b>   | <p><u>Methodology</u></p> <ul style="list-style-type: none"> <li>• Identification and documentation of all existing wells on site</li> <li>• Specifications for bore decommissioning prepared by SQEP Hydrogeologist</li> <li>• Decommissioning of all wells by a Licensed Drilling Contractor prior to commencement of earthworks</li> <li>• Supply of bore records to HBRC]</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>7.13 Liner, barrier and low permeability layer</b> | <p><u>Liner Specifications</u></p> <ul style="list-style-type: none"> <li>- Earth Fill [specification]</li> <li>- Engineered Liner [specification]</li> </ul> <p><u>Quality Assurance</u><br/> [QA testing, inspection hold points, acceptance criteria, photographic records, material certificates, compaction/permeability testing, and responsibilities]</p> <p><u>Installation Controls</u><br/> [Controls to avoid puncture, desiccation, rutting, scour, settlement, contamination or damage to liners/barriers before final covering or commissioning]</p> <p><u>Repair and non-conformance</u><br/> [Identification, reporting, repair, retesting and certification]</p> <p><u>As-built certification</u><br/> [As-built records and certification to be provided at completion, including plans, levels, liner/barrier extents, test results, photographs and SQEP sign-off]</p>                                                                                                                                    |

## 8. Monitoring, inspection and verification

| Item                                           | SQEP hydrogeologist to complete                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>9.1 Monitoring objectives</b>               | Monitoring objectives include ensuring: <ul style="list-style-type: none"> <li>• Establishing baseline conditions</li> <li>• Construction activities are undertaken in accordance with the CMP</li> <li>• Engineering design and construction methodologies are appropriate for localised ground conditions</li> <li>• Installation of liners and/or seepage barriers is undertaken in accordance with design/methodology requirements</li> <li>• Construction and long-term operation of the site do not result in adverse effects on groundwater quality</li> </ul> |
| <b>9.2 Monitoring locations</b>                | [Insert monitoring locations or reference a plan as agreed with HBRC. Include upgradient, works-area and downgradient/sentinel locations where applicable]                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>9.3 Monitoring parameters and frequency</b> | [Parameters, baseline monitoring, routine construction monitoring, rainfall/event-based monitoring and monitoring following incidents or unexpected conditions]                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>9.4 Inspection schedule</b>                 | [Provide inspection frequency and specific hold points for high-risk works, liner/barrier installation, dewatering, rainfall events and completion of key construction stages]                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>9.5 Records and reporting</b>               | [Identify required records, reporting frequency, recipients, storage location and timeframe for providing information to HBRC/HDC]                                                                                                                                                                                                                                                                                                                                                                                                                                    |

## 9. Trigger-action-response plan

| Item                                | SQEP hydrogeologist to complete                                                                                                                                                                                                                                                                                                                                                                      |
|-------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>10.1 Trigger framework</b>       | <p>[Framework to be further developed in the Groundwater Protection Assessment including:</p> <ul style="list-style-type: none"> <li>• Alert and action triggers</li> <li>• Unexpected ground conditions</li> <li>• Unauthorised fill/contaminated ground</li> <li>• Spills or Incidents</li> <li>• Rainfall observations/forecasts</li> <li>• Liner/barrier QA and condition monitoring]</li> </ul> |
| <b>10.2 Response actions</b>        | <p>[Framework to be further developed in the Groundwater Protection Assessment including:</p> <ul style="list-style-type: none"> <li>• Stop-work triggers</li> <li>• Containment</li> <li>• Monitoring/sampling</li> <li>• SQEP review</li> <li>• Remediation/repair</li> <li>• Notification</li> <li>• Criteria for recommencement of works]</li> </ul>                                             |
| <b>10.3 Recommencement criteria</b> | <p>[Define who can authorise works to restart and what evidence must be available before high-risk works continue.]</p>                                                                                                                                                                                                                                                                              |

## 10. Well 4151 and HDC communication protocol

| Item                                              | SQEP hydrogeologist to complete                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|---------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>11.1 Purpose of protocol</b>                   | [Management of communication with HDC Compliance Officers during high-risk works, storm events, monitoring exceedances or incidents]                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>11.2 Pre-notification of high-risk works</b>   | <p><b>High-risk works</b><br/>Notification 10-days prior to commencement of works including:</p> <ul style="list-style-type: none"> <li>• Channel re-alignment</li> <li>• Wetland construction</li> </ul> <p>Notification to HDC Compliance Officers prior to commencement will include proposed date of works commencement, nature and duration of proposed works</p> <p>Follow-up notification will provided following completion of works, including documentation of works undertaken and certification that works have been completed to required standard</p> |
| <b>11.3 Spills or Incidents</b>                   | Immediate notification of HDC Compliance Officers regarding any spill or other incident which poses an immediate risk to groundwater quality, including response(s) initiated to mitigate effects.                                                                                                                                                                                                                                                                                                                                                                  |
| <b>11.4 Monitoring notifications</b>              | Notification of any monitoring trigger level exceedances within 24-hours of exceedance being reported                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>11.5 Operational constraints for Well 4151</b> | [Insert any agreed temporary operational constraints, standby arrangements, or decision-making process agreed with HDC]                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>11.6 Contact and escalation matrix</b>         | [Insert normal-hours and after-hours contact details for HDC Compliance officers, HBRC compliance staff, consent holder, contractor and SQEP hydrogeologist]                                                                                                                                                                                                                                                                                                                                                                                                        |

## 12. Incident and emergency response

| Item                                         | SQEP hydrogeologist to complete                                                                                                                                                                     |
|----------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>12.1 Source-water incident definition</b> | [Define incidents, including spills, unauthorised discharge, contaminated water encounter, unexpected groundwater, liner damage, monitoring exceedance, wastewater overflow or loss of containment] |
| <b>12.2 Immediate response procedure</b>     | [Set out immediate steps, including stop work, isolate source, contain, protect drains/watercourses, notify site supervisor/SQEP, and begin records]                                                |
| <b>12.3 Notification requirements</b>        | [Set out who must be notified, by when, what information must be provided and follow-up reporting requirements]                                                                                     |
| <b>12.4 Corrective actions and close-out</b> | [Set out investigation, remediation, retesting, review of controls, approval to restart and incident close-out reporting]                                                                           |

### 13. Completion, handover and post-construction close-out

| Item                                          | SQEP hydrogeologist to complete                                                                                                                                                  |
|-----------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>13.1 Completion inspections</b>            | [Identify inspections required before high-risk source protection works are closed out]                                                                                          |
| <b>13.2 Completion report</b>                 | [Set out required content for a SQEP completion report, including compliance with this plan, monitoring results, incidents, non-conformances, repairs and certification records] |
| <b>13.3 Handover to long-term asset owner</b> | [Identify records to be handed over for permanent stormwater/wastewater/source-water protection assets, including inspection and maintenance requirements]                       |
| <b>13.4 Lessons learned / plan review</b>     | [Require review of the plan after significant incidents, material design changes, monitoring exceedances or completion of major stages]                                          |

## 14. Appendices

*[Complete the sections below. Keep technical explanation brief and cross-reference the Hydrogeological and Source-Water Protection Assessment where detailed assessment is required.]*

| Item                                                                  | Appendix                                                                                                                                                    |
|-----------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Appendix A: Construction source-pathway-receptor risk register</b> | [Insert completed risk register]                                                                                                                            |
| <b>Appendix B: Source protection controls plan</b>                    | [Insert plan showing high-risk works areas, monitoring locations, hold points, exclusion zones, sensitive receptors]                                        |
| <b>Appendix C: Monitoring schedule and TARP</b>                       | [Insert monitoring table and trigger-action-response plan]                                                                                                  |
| <b>Appendix D: Inspection and hold-point forms</b>                    | [Insert field forms for hydrogeologist inspections, liner/barrier QA, unexpected groundwater, unexpected gravels, dewatering and post-rainfall inspections] |
| <b>Appendix E: Well 4151 communication protocol</b>                   | [Insert final agreed protocol and contact matrix]                                                                                                           |
| <b>Appendix F: Liner/barrier specifications and QA records</b>        | Insert specifications, manufacturer information, test methods, certificates, repair procedures and as-built requirements.                                   |
| <b>Appendix G: Incident response forms</b>                            | Insert incident report template and close-out form.                                                                                                         |

## Appendix A template: Construction source-pathway-receptor risk register

[To be updated based on Groundwater Protection Assessment]

| Construction activity / area           | Potential source                                        | Potential pathway                            | Receptor                               | Required control                                                                                            | Monitoring / inspection trigger                                                                        | Response action                                                                                                                                                                             | Record required                                                                                                                                                    |
|----------------------------------------|---------------------------------------------------------|----------------------------------------------|----------------------------------------|-------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Watercourse realignment excavation     | Drainage of stormwater and run-off from wider catchment | Seepage to groundwater                       | Aquifer Well 4151 Downstream catchment | Seepage control via natural or engineered liner<br>Backfill of existing channel                             | Ground conditions encountered during construction<br>Permeability testing of natural ground / backfill | Works notification to HDC Adequate natural or engineered liner Liner specification (earth or engineered) if required<br>Appropriate selection and compaction of backfill (existing channel) | Inspection record<br>Documentation of testing<br>Documentation of liner installation (engineered)<br>Fill composition and compaction (earth fill)<br>SQEP sign-off |
| Wetland excavation                     | Stormwater                                              | Seepage to groundwater                       | Aquifer Well 4151                      | Seepage control via natural or engineered liner                                                             | Ground conditions encountered during construction                                                      | Adequate natural or engineered liner to limit seepage<br>Liner specification (earth or design (engineered))                                                                                 | Inspection record<br>Documentation of testing<br>Documentation of liner installation<br>SQEP sign-off                                                              |
| Raingarden excavation                  | Stormwater                                              | Seepage to groundwater                       | Aquifer Well 4151                      | Seepage control via natural or engineered liner                                                             | Ground conditions encountered during construction                                                      | Adequate natural or engineered liner to limit seepage                                                                                                                                       | Ground conditions<br>Documentation of liner installation<br>SQEP sign-off                                                                                          |
| Service trenching                      | Stormwater                                              | Seepage to groundwater                       | Aquifer Well 4151                      | Seepage control via stormwater management during construction and natural or engineered liner (if required) | Depth to alluvial gravels <0.5m below base of excavation                                               | Adequate natural or engineered liner to limit seepage                                                                                                                                       | Ground conditions<br>Documentation of trench plug or liner (if required)<br>Backfill record                                                                        |
| Open excavations                       | Stormwater                                              | Overland flow to excavations during rainfall | Aquifer Well 4151                      | Stormwater Management Plan                                                                                  | Significant rainfall (> 1 year AEP)                                                                    | Extreme weather response                                                                                                                                                                    | Inspection record                                                                                                                                                  |
| Unexpected groundwater or seepage      | Perched groundwater                                     | Seepage via preferential pathway             | Aquifer / surface water                | Stop work and isolate pending SQEP review                                                                   | Visible seepage / groundwater encountered                                                              | Modifications to construction methodology or engineering design                                                                                                                             | Inspection record                                                                                                                                                  |
| Fuel / chemical storage and refuelling | Fuel, oils, chemicals                                   | Spill to ground or stormwater                | Aquifer / watercourses                 | Spill response plan                                                                                         | Spill<br>Bund failure<br>Site inspection                                                               | Spill Response Plan<br>Notification of HDC                                                                                                                                                  | Spill report<br>Incident closeout including monitoring record                                                                                                      |



## **Appendix B template: Source Protection Plan**

*[To be added from Groundwater Protection Assessment]*

## Appendix C template: Trigger-action-response plan

*[To be completed based on the Groundwater Protection Assessment]*

| Trigger type                              | Alert trigger      | Action trigger                                                                          | Immediate action                                                | Notification | Additional monitoring / testing | Criteria to recommence works |
|-------------------------------------------|--------------------|-----------------------------------------------------------------------------------------|-----------------------------------------------------------------|--------------|---------------------------------|------------------------------|
| Rainfall / wet weather                    | [Insert threshold] | [Insert threshold]                                                                      | [Secure site / inspect controls]                                | [Insert]     | [Insert]                        | [Insert]                     |
| Groundwater level / seepage               | [Insert]           | [Groundwater/seepage encountered in high-risk excavation]                               | [Stop work / isolate area / SQEP review]                        | [Insert]     | [Insert]                        | [Insert]                     |
| Water quality                             | [Insert]           | [Insert exceedance]                                                                     | [Stop relevant works / sample / investigate]                    | [Insert]     | [Insert]                        | [Insert]                     |
| Unexpected gravels / preferential pathway | [Insert]           | [Permeable gravels or loss of low-permeability cover encountered]                       | [Stop work / protect exposed area / SQEP review]                | [Insert]     | [Insert]                        | [Insert]                     |
| Liner / barrier defect                    | [Insert]           | [Defect, puncture, failed QA or damage identified]                                      | [Protect area / repair / retest]                                | [Insert]     | [Insert]                        | [Insert]                     |
| Spill / contamination                     | [Insert]           | [Spill to ground/water or unexpected contamination]                                     | [Contain / isolate / notify / remediate]                        | [Insert]     | [Insert]                        | [Insert]                     |
| Well 4151 protocol                        | [Insert]           | [High-risk works, storm event, monitoring exceedance or incident requiring HDC contact] | [Notify HDC water-supply contact and implement agreed protocol] | [Insert]     | [Insert]                        | [Insert]                     |

## Appendix D template: Pre-start / hold-point checklist

| Checklist item                                                                                                           | Required before                   | Responsible person | Completed / evidence                            |
|--------------------------------------------------------------------------------------------------------------------------|-----------------------------------|--------------------|-------------------------------------------------|
| Updated Hydrogeological and Source-Water Protection Assessment reviewed and recommendations incorporated into this plan. | [Insert stage / activity]         | [Insert]           | [Insert]                                        |
| Certified source protection controls plan included.                                                                      | [Insert stage / activity]         | [Insert]           | [Insert]                                        |
| Monitoring locations established and baseline monitoring completed.                                                      | [Insert stage / activity]         | [Insert]           | [Insert]                                        |
| HDC/HBRC notification contacts confirmed, including Well 4151 contact pathway.                                           | [Insert stage / activity]         | [Insert]           | [Insert]                                        |
| Contractor induction completed and recorded.                                                                             | [Insert stage / activity]         | [Insert]           | [Insert]                                        |
| High-risk works and hydrogeologist hold points marked on construction drawings.                                          | [Insert stage / activity]         | [Insert]           | [Insert]                                        |
| Fuel, chemical and concrete washout controls established outside sensitive areas.                                        | [Insert stage / activity]         | [Insert]           | [Insert]                                        |
| Dewatering and unexpected groundwater procedure briefed to site team.                                                    | [Insert stage / activity]         | [Insert]           | [Insert]                                        |
| Unexpected contamination procedure briefed to site team.                                                                 | [Insert stage / activity]         | [Insert]           | [Insert]                                        |
| Liner/barrier QA procedure confirmed with engineer and contractor.                                                       | [Insert stage / activity]         | [Insert]           | [Insert]                                        |
| 10 working days notice provided to HBRC (Manager Compliance) before each stage of construction commences.                | [Insert stage] pre-commencement   | [Insert]           | [Insert confirmation / email record]            |
| Spill Management Plan (SMP) prepared by SQEP, provided to HBRC, and copy held on site.                                   | Before any construction commences | [Insert]           | [SMP document reference / HBRC acknowledgement] |
| Stormwater Monitoring Strategy (SMS) certified by HBRC at least 20 working days before relevant stage.                   | Before relevant stage             | [Insert]           | [SMS reference / HBRC certification]            |

## Background documents to be cross-referenced

*[Update this list to match the final lodgement package and condition numbering. Do not rely on this list as a complete set of consent documents.]*

- Updated Hydrogeological and Source-Water Protection Assessment, Land Water People, [insert date/version].
- Infrastructure Report, Maven Associates, [insert date/version].
- Stormwater Management Plan, Maven Associates, [insert date/version].
- Earthworks Management Plan, Maven Associates, [insert date/version].
- Construction Management Plan, Maven Associates, [insert date/version].
- Chemical Treatment Management Plan, Maven Associates, [insert date/version].
- Preliminary and Detailed Site Investigation / SMP or RAP, [insert author/date/version].
- Relevant resource consent conditions, including conditions relating to groundwater/source-water protection, stormwater devices, stream/wetland works, construction discharges and certification requirements.
- HBRC/HDC groundwater and source-water feedback memoranda, May and June 2026.