



Bay of Plenty Regional Council

Koapeo Canal Remediation

CLG Monthly Update Report

September 2018

Executive summary

Dredging of contaminated sediment into containment site one (CS1) continued throughout September 2018.

Kopeopeo Canal from SH30/Kope Drain Road to the Orini/Kopeopeo confluence is isolated using the flood control structures (FCS) to ensure only monitored and controlled water discharges from, or flows into, the project area.

During September 2018, the following analytical sampling was undertaken and reported:

Canal Sediment Validation

Dredging of Section 5 of the Kopeopeo Canal continued, along with further sediment validation sampling within this section. The Total PCDD/F I-TEQ Upperbound results from 14 samples were between 36 and 220 pg/g with 10 of the results being above the remedial target of 60 pg/g. Due to the number of results that were above the validation criterion, statistical assessment (using the 95% UCL) of the data will not be conducted until the subsequent dredging and revalidation process has been undertaken.

Canal Discharge Water

Canal water was sampled and tested for dioxins at FCS-East (MP8) and the compliance point (MP10) on 30 and 31 August 2018 to confirm that the dioxin levels in discharge water were within the consented discharge limits. The analytical results were received in September and the three samples collected by BOPRC returned Total PCDD/F I-TEQ Upperbound results of between 4.87 pg/L and 6.85 pg/L. These results are below the NZ Drinking Water Standards of 30 pg/L and below the recently modified discharge criterion of 11 pg/L agreed upon by the project team, consent authority, and IM.

Trial Site Clean Up

Validation sampling was undertaken across the trial site area to confirm that the clean-up had been successful. Four samples were sent for analytical testing and returned Total PCDD/F I-TEQ Upperbound results of 20 pg/g. These results are all at the lowest level achievable with this laboratory limit of detection and well below the remedial target of 60 pg/g.

CS1 Groundwater

Dioxin in groundwater sampling was undertaken at CS1 during September. Groundwater Total PCDD/F I-TEQ Upperbound results ranged between 4.2 and 5.62 pg/L. The CS1 results are all below the adopted Tier 1 trigger level criterion for Total PCDD/F I-TEQ Upperbound outlined in the EMVP of 13.4 pg/L.

The following report is based upon the observations and commentary by the Independent Monitor Field Observer (Matt James) with support from the Independent Monitor (Andrew Kohlrusch). This report is subject to, and must be read in conjunction with, the limitations set out in Section 1.3 and the assumptions and qualifications contained throughout the Report.

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1. Introduction

1.1 Introduction

The Kopeopeo Canal is situated on the outskirts of Whakatane, in the Bay of Plenty, New Zealand. The Kopeopeo Canal Remediation Project is a joint venture between Bay of Plenty Regional Council (BOPRC) and central government (MfE) in an effort to restore the canals ability to transfer water and to remediate dioxin contamination caused by historic discharges from an adjacent sawmill. The project area is 5.1 km in length between the Kopeopeo and Orini canal confluence and the intersection of State Highway 30 (SH30) and Kope Drain Road (Appendix A).

The Independent Monitor (Andrew Kohlrusch) and Independent Monitor Field Observer (Matt James) provide independent feedback, assistance, and monitoring to the project management team, contractors working on site, and community through the Community Liaison Group (CLG). The objective of this relationship is to continue to build trust between the Whakatane community and the project team, provide independent feedback to the community, and allow the project team to access the extensive technical experience of the IM.

This report is part of the requirements outlined in the Bay of Plenty Regional Council Resource Consent 67173-AP Condition 6 – Independent Monitor.

1.2 Purpose

The purpose of the Community Liaison Group (CLG) Monthly Update Report (September 2018) is to provide an independent summary of the progress of the Kopeopeo Canal Remediation Project. The CLG Monthly Update Report (September 2018) is commissioned by Bay of Plenty Regional Council for distribution to the CLG and Whakatane community.

1.3 Limitations

This report has been prepared by GHD for Bay of Plenty Regional Council (BOPRC) and may only be used and relied on by Bay of Plenty Regional Council for the purpose agreed between GHD and Bay of Plenty Regional Council as set out in Section 1.2 of this report.

GHD otherwise disclaims responsibility to any person other than Bay of Plenty Regional Council arising in connection with this report. GHD also excludes implied warranties and conditions, to the extent legally permissible.

GHD has prepared this report on the basis of information provided by Bay of Plenty Regional Council and others who provided information to GHD (including Government authorities), which GHD has not independently verified or checked beyond the agreed scope of work. GHD does not accept liability in connection with such unverified information, including errors and omissions in the report which were caused by errors or omissions in that information.

The opinions, conclusions and any recommendations in this report are based on conditions encountered and information reviewed at the date of preparation of the report. GHD has no responsibility or obligation to update this report to account for events or changes occurring subsequent to the date that the report was prepared.

The IM and IM field observer are not providing commentary or observations on matters related to project team (or subcontractor) health and safety as part of the IM role for the Kopeopeo Canal Remediation Project.

2. Project Progress

2.1 CS1

The following summarises the project events at CS1 during September 2018 (Refer to photographs in Table 1: Photograph Progress Log):

- Geobags were rolled out in preparation for receiving sediment (Photograph 1).
- Oversized material that spilled from a broken bulk bag was placed into an IBC before being lifted into the containment cell (Photograph 2).
- Sediment spilled within the containment cell (Photograph 3 & 11).
- A large overflow bin for oversized material was installed at CS1 (Photograph 10). The objective of this installation was to provide relief when large slugs of oversized material arrive at the water treatment plant.
- Sediment transfer pipelines out to the geobags were placed on planks to ensure smooth flow and reduce wear and tear on the pipes (Photograph 12). This is designed to minimise leakage from the pipes and extend the operating life of equipment.
- A site shutdown was issued by ESL on Monday 17 September to address:
 - Site clean up
 - Staff wellbeing
 - Maintenance
 - Equipment installation
 - Environmental protection and compliance
- As part of the shutdown in mid-September, cleaning of CS1 began using high pressure hoses and brooms (Photograph 15). The entire floor of the cell had been covered with 1 to 10 cm of sediment and a staged approach to cleaning the entire cell is underway.
- The floor of the CS1 cell is nearly entirely covered with 1 to 10 cm of fine sediment. This is being kept inundated with water to avoid airborne dispersal of dioxin-contaminated sediments. This material will be washed down and added to the bags upon the closure of the cell.

2.2 CS3

The following summarises the events at CS3 during September 2018 (Refer to photographs in Table 1: Photograph Progress Log):

- The CS3 cell is being flooded with rainwater to minimise risk of wind damage to the HDPE liner.

The following summarises the project events across the wider project area during September 2018 (Refer to photographs in Table 1: Photograph Progress Log):

- Sheet pile installed within the canal to allow the construction of a culvert beneath Shaw Road into the new residential subdivision (Photograph 4). To allow this construction to occur the sediment transfer pipeline was floated past this area (Photograph 6).
- Warning signs installed on the walkway past CS3 (Photograph 5).
- Reverse flow blankets were checked by the IM as part of an inspection along the stopbank opposite Kope Canal Road (Photograph 7).

- The Gateway Drive outfall culvert was reshaped and armoured (Photograph 8 & 9).
- The two booster pumps set up along the sediment transfer pipeline were placed upon HDPE liners to ensure that any possibly leakage would drain back into the canal (Photograph 13).
- Sediment sampling was completed by the IM to confirm the information being obtained from analytical validation (Photograph 14). The sampling results are presented in Section 5.1.
- The dredge head was changed in an effort to rely more on suction than cutting of the sediment. This is in an effort to prevent mixing of target and non-target material along with minimising the turbidity generated during dredging.
- The trial site area was removed and the stopbank returned to its original condition (Photographs 16 to 19).
- Canal sediment validation was undertaken by Golder Associates Limited (GAL) in Section 5.
- The dredge continued removing sediment from Section 5.
- Resurfacing of Kope Canal Road was completed.
- Brendon Love (BOPRC) & Matt James (GHD) completed sediment thickness investigation ahead of the dredge in Section 5 to help create a new base layer for the dredge to work too.
- Prior to dredging in Section 5 (Refer to the Site Plan in Appendix A), a weed cutter boat working in tandem with a long reach excavator removed weed from the canal in the lower (eastern) half of Section 5 (Photograph 22).
- Both FCS were used to manage optimal canal water levels for dredging and consent requirements. Where possible, both FCS were kept open to allow for water flow through the project area in an effort to lower canal levels to the west of the project area.
- Vehicle and machinery movements along the true left bank of the canal from the Paroa Road Bridge to the SH30 Bridge have damaged vegetative cover and exposed the soil of the stopbank. Provided the ground remains damp, this area will be remediated using ballage as soon as machinery access is no longer required.
- On-going discussion between project team, consent authority and IM to manage turbidity releases from the project area. Turbidity releases are being monitored through a combination of manual water sampling and live turbidity measurements.

Table 1: Photograph Progress Log

Photograph	Event
 A wide-angle photograph showing a large containment cell under construction. The cell is lined with dark, heavy-duty geotextile material. Several workers in white protective suits are visible, rolling out the material across a muddy area. In the background, there are some buildings and trees under a cloudy sky.	<p>Photograph 1: Rolling out geobags.</p>
 A photograph showing a large number of white, oversized geobags filled with dark material. The bags are arranged in rows on a grassy area. Some bags have yellow markings. A metal IBC (Intermediate Bulk Container) is visible, containing some of the material. The background shows a fence and some trees.	<p>Photograph 2: Oversized material cleaned up into an IBC before being lifted into the containment cell.</p>
 A close-up photograph of the containment cell's interior. The dark geotextile lining is visible, and there is a significant amount of brown, silty sediment spilled on the surface. Several hoses and pipes are lying on the ground, some connected to the cell's structure.	<p>Photograph 3: Sediment spilled within the containment cell.</p>

Photograph

Event



Photograph 4: Sheet pile installed for thrusting of a culvert under Shaw Road.



Photograph 5: Warning signs on walkway past CS3.



Photograph 6: Sediment transfer pipeline is floated past the newly installed temporary sheet pile.

Photograph	Event
	<p>Photograph 7: Reverse flow blankets on the culverts adjacent to Gateway Drive.</p>
	<p>Photograph 8: Lateral spreading adjacent to the newly armoured culvert outfall near Gateway Drive.</p>
	<p>Photograph 9: Reshaped and newly armoured culvert near Gateway Drive.</p>

Photograph

Event



Photograph 10: New oversized material overflow bin set up.



Photograph 11: Sediment spilled within the containment cell.



Photograph 12: Sediment transfer pipelines laid on wooden planks to reduce wear on the pipes.

Photograph

Event



Photograph 13: Boost pump set up with HDPE liner to ensure any leakages return to the canal.



Photograph 14: Sediment sampling on the pontoon.



Photograph 15: Cleaning of the containment cell CS1 begins.

Photograph	Event
	<p>Photograph 16: Start of the trial site clean-up with removal of the fences and ground cover.</p>
	<p>Photograph 17: Bioremediation team cutting open the geobags in the trial site to check on tree and fungal growth.</p>
	<p>Photograph 18: Roots of the trees that have been growing in the geobags at the trial site.</p>

Photograph	Event
	<p>Photograph 19: Trial site clean up complete.</p>
	<p>Photograph 20: Bunded area built adjacent to Kope Canal Road by WDC.</p>
	<p>Photograph 21: Unidentified waste material dumped into the bunded area adjacent to Kope Canal Road.</p>

Photograph

Event



Photograph 22: Weed removal ahead of the barge.



Photograph 23: FCS-East releasing water from the project area.

3. Community Liaison Group Update

3.1 Community Concerns

No CLG meeting was undertaken during September 2018.

The project complaints register for September 2018 was reviewed by the IM. Further detail is presented in Section 4.11.

4. IM Inspection Summary

This section outlines the observations made during the site inspections undertaken by the IM field observer during September 2018.

4.1 Vegetation Clearing, Fauna, Topsoil Management and Rehabilitation & Visual Amenity

4.1.1 Project Area

The Kopeopeo Canal Pre-Remediation Eel Monitoring Results report was finalised in September 2018. The report outlined the following details:

- Eel tissue sampling locations
- Eel tissue sampling methodology
- Eel tissue sampling analytical results
- Interpretation of results with respect to human health

The results confirmed the health risk posed by consumption of eels within the remediation zone and also provided more evidence as to the potential health risks posed by eels further upstream of the remediation zone. Based upon a conservative application of eel consumption rates in New Zealand (7.3 kg/person/month), it is possible that consuming eels from upstream of the remediation zone in the Kopeopeo Canal could lead to an intake of dioxin that exceeds New Zealand Ministry for Health Interim Maximum Monthly Intake guideline of 30 pg TEQ/kg of body weight. Pending landowner approval, BOPRC will install warning signs between FCS-East and Powdrell Road informing people that they should not remove eels from the canal.

Topsoil had been disturbed along the true left bank of the canal between Paroa Road and SH30. This area is being monitored and vegetation appears to be growing well. The area directly adjacent to the booster pump may need to have grass seed applied once the pump is removed.

Trees were cut back and removed on the true left stopbank adjacent to Kope Canal Road.

4.1.2 CS1

Odour from the sediments at the CS1 treatment plant has been noted. Odour neutralisers are available if required and will be placed around the water treatment plant should odours be detected outside the CS1 boundary.

4.1.3 CS3

CS3 is secured and no activity took place in September 2018 on this site.

4.2 Drainage, Sediment & Water Management

4.2.1 Project Area

Flood control structures at the eastern and western ends of the KCRP area are used to maintain optimal water levels for dredging and consent requirements. Turbidity monitoring is intended to record that turbidity in the Orini/Kopeopeo confluence is no greater than 20% above background. During September, no discharges of water occurred with turbidity levels greater than 20% above background as measured at MP1, west of FCS-West. Compliance was determined using the turbidity monitoring network and no dioxin in water sampling was required.

The methodology for dioxin in water sampling is outlined below and is used when the project team requires information additional to what the turbidity monitoring network can provide.

An agreement was reached between the project team, consent authority and IM that due to the limitations with the turbidity monitoring network in certain situations, predominantly during periods of high turbidity inflow from sources outside the project area, a dioxin in discharge water target should be adopted. The adopted target of 11 pg/L was based upon the Opus International Consultants Limited *Kopeopeo Canal Remediation – Memo regarding Filtrate Discharge* report dated 09 June 2016 that stated that the no observed effect concentration (NOEC) for dioxin was between 11 pg/L and 38 pg/L. The NOEC is the concentration of a contaminant at which no adverse effects were observed within the control animals. Consent Condition 12.3 also provides 11 pg/L as the long-term discharge limit for the filtrate leaving the containment sites after the control structures have been removed. The intended use of this limit is similar to the current discharge from the control structures, and as such, the criterion is likely to be suitable for this use.

The flood control structures are checked daily and the side culverts of the canal are checked weekly. These checks are reported as part of the Flood Management Situation Report prepared by the deputy project manager on a daily basis as part of the requirements outlined in the Bay of Plenty Regional Council Resource Consent 67173-AP Condition 7 – Flood Management. The Flood Management Situation Report is emailed to the following parties:

- BOPRC flood managers and consent authority
- Whakatane District Council
- Kopeopeo Canal Remediation Project site managers and site engineers
- Kopeopeo Canal Remediation Project administrator and contractors
- IM field observer
- BOPRC compliance officer

Real time turbidity monitoring equipment is operational within the Kopeopeo and Orini canals and within the sump at CS1.

A culvert outfall opposite Kope Canal Road was reshaped and armoured.

4.2.2 CS1

Rainfall is collected in CS1 and discharged to the canal as part of the sediment dewatering process. CS1 is kept in a semi-flooded state when the dredge is not operating to ensure that the area is covered in water and dust cannot be generated.

Sediment has been spilled in the containment cell multiple times over the last eight months and on each occasion, the IM and project team have both requested that this material be cleaned up. While it is not a dust risk due to the cell being kept flooded, there is a risk that sediment-laden water could be released from the cell into the Kopeopeo Canal. During September, a site shutdown allowed ESL and NZPGS to begin cleaning the cell and improving the general site housekeeping. The cell is being cleaned using pressure jets and brooms with the material being recirculated into the geobags and contained. This is good progress, but given the volume of sediment spilled in the cell, it will be required on an ongoing basis.

4.2.3 CS3

Rainfall is collected in CS3 and discharged when necessary into the Kopeopeo Canal.

4.3 Dust Management

4.3.1 CS1

No nuisance-dust monitoring is being undertaken at CS1 as no dust generating activities are taking place. Three rounds of dioxin ambient air monitoring have been completed as per Bay of Plenty Regional Council Resource Consent 67173-AP Condition 39 – Dioxin & Air Quality Monitoring. The dioxin in air results ranged between 5.89 and 12.4 fg/m³ (corrected to 0 °C, 101.3 kPa) I-TEQ Upperbound. All three samples were below the consented limit of 30 fg/ m³ (corrected to 0 °C, 101.3 kPa) I-TEQ Upperbound.

4.3.2 CS3

No nuisance-dust monitoring is being undertaken at CS3 as no dust generating activities are taking place.

4.4 Waste Management and Hazardous Material

4.4.1 CS1

Rubbish is being collected within the site office and removed off site.

Oversized material coming off the water treatment plant as part of the sediment dredging process is being stored on site in one-tonne bulk bags. These bags are then crane lifted into the containment cell. Approximately 751 bulk bags have been filled with oversized material to 30 September 2018.

A new large skip has been added to the oversized material process to better manage large inflows of material that had previously overwhelmed the smaller bulk bags (Photograph 10 in Table 1: Photograph Progress Log). This skip bin provides a contained overflow area that is easier to clean than the bunded area surrounding the water treatment plant.

4.4.2 CS3

Rubbish is collected and removed off site.

4.5 Trial Site Clean Up

During September 2018, the trial site where the dredging methodology was first tested was decommissioned and removed. The area was returned to its previous condition as part of the stopbank and validated as having not been impacted by dioxin. The sediment contained within the trial site was deposited back into the canal for the dredge to remove and all potentially contaminated plastic and geobag material was transported to CS1 for containment within the cell. The validation results are presented in Section 5.2.

4.6 Heritage

During September there were no artefacts identified by the Cultural Monitor or archaeologist as Koiwi or Taonga. Small bone fragments are being bagged and reported as they come across the screens on the water treatment plant. The Cultural Monitor or her representative is notified of all dredging activity to allow monitoring of the oversized material.

The Cultural Monitor has also presented a draft version of a non-urgent discovery protocol designed to deal with small animal bones in the most practical manner. This protocol was prepared in consultation with Te Rūnanga o Ngāti Awa representatives and BOPRC and is intended to assist the Cultural Monitor in dealing with Koiwi or Taonga. This protocol is in

addition to the requirements outlined in Bay of Plenty Regional Council Resource Consent 67173-AP Condition 32.1.

4.7 Fire Prevention and Response

No issues pertaining to fires were reported during September 2018.

4.8 Weed & Dieback Management

A weed cutter boat working in conjunction with an excavator was employed to remove weeds from the first half of Section 5 ahead of the dredge operation. This involves the cutter boat cutting the weeds off above the canal base. The weed is checked for sediment and then placed on the canal bank. This weed has not been tested for dioxin, however, previous dioxin testing of weed removed from the canal (CLG Update Report (April 2018)) has shown that it is unlikely to present a risk to humans, animals, or the environment. The potential for odour issues to occur as the weed dries or rots has been identified and will be monitored.

4.9 Worker Wellbeing

There were no worker injuries recorded during September 2018.

Fatigue has been a concern raised by the IM and community members over the last eight months, largely due to the strenuous nature of the work and the long hours for the dredging contractors.

To mitigate fatigue risks within the team, the rotating week-off roster system continues to be implemented.

4.10 Community Interest

A staircase has been erected on the public access path at the northern end of CS3 to assist public access to the Whakatane River stopbank. Warning signs have also been installed to notify members of the public that it is not safe to ride motorbikes on the path.

A shoulder closure is now in effect along the southern side of Shaw Road between the SH30 Bridge and the gate at the start of Kope Canal Road. Parking within this area is limited to a single vehicle. Supplementary parking is available in front of the stopbank gate and in the designated carpark adjacent to the site office on the neighbouring subdivision.

Temporary sheet pile was installed within the Kopeopeo Canal adjacent to Shaw Road as part of the installation for a culvert beneath the road.

A bunded area was created by WDC adjacent to Kope Canal Road and is being used for dewatering of liquid sludge. This is not associated with the KCRP.

4.11 Complaints Register

The project complaints register for September 2018 was reviewed by the IM and no complaints were received.

4.12 Compliance Auditing

No Bay of Plenty Regional Council compliance audits were undertaken in September 2018.

5. Monitoring and Validation

The validation and sampling strategy is outlined in the Environmental Monitoring and Validation Plan (EMVP) submitted as a requirement under Bay of Plenty Regional Council Resource Consent 67173-AP Condition 4.5.

5.1 Canal Sediment

The Bay of Plenty Regional Council Resource Consent 67173-AP Condition 25.4 states that “The remediation zone within the Kopeopeo Canal shall be deemed as being remediated when the 95% Upper Confidence Limit (‘UCL’) for dioxin concentration is determined to be at or below 60 pg I-TEQ-g using the validation methodology set out in the Environmental Monitoring and Validation Plan required by condition 4.5”. The technical definition of a 95% UCL is “a number that one can be 95% confident that the true mean (average) concentration of the population is below that value”.

During September 2018, 14 validation samples were taken from behind the dredge within Section 5 (See Validation Plan in Appendix B). The Total PCDD/F I-TEQ Upperbound results were between 36 and 220 pg/g. Of the 14 samples analysed, 10 of were between 85 and 220 pg/g, triggering the need for redredging in these areas in accordance with the EMVP.

The IM field observer and BOPRC deputy project manager collected one sample (KC058.5) in an area where hydrographic surveying indicated there was material remaining. This returned a Total PCDD/F I-TEQ Upperbound result of 150 pg/g.

Due to the number of samples that had dioxin concentrations in excess of the validation target, the 95% UCL will not be calculated until the subsequent redredging and revalidation process has been undertaken.

5.2 Trial Site Validation

Validation sampling was undertaken across the trial site area to confirm that the clean-up had been successful. Four samples were sent for analytical testing and all returned Total PCDD/F I-TEQ Upperbound results of 20 pg/g (See Trial Site Validation Plan in Appendix C).

These results were all at the lowest value achievable with this laboratory limit of detection and well below the remedial target of 60 pg/g.

5.3 Canal Water

Canal water was sampled for dioxins at FCS-East (MP8) and the compliance point (MP10) on 30 and 31 August 2018 to confirm that dioxin levels in discharge water were acceptable (See Site Plan in Appendix A for sample locations). The analytical results were received in September and the three samples collected by BOPRC returned Total PCDD/F I-TEQ Upperbound results of between 4.87 pg/L at MP10 and 6.85 pg/L at MP8. These results are below the NZ Drinking Water Standards of 30 pg/L and below the adopted criteria of 11 pg/L.

5.4 Groundwater

Golder Associates completed groundwater sampling of the five wells surrounding CS1 on 24 and 25 September 2018 (See Site Plan in Appendix A for well locations). Groundwater Total PCDD/F I-TEQ Upperbound results across the five samples ranged between 4.2 and 5.62 pg/L.

The CS1 results were all below the adopted Tier 1 trigger level criterion for Total PCDD/F I-TEQ Upperbound outlined in the EMVP of 13.4 pg/L.

6. Consent Monitoring Summary

The following consent monitoring summary is intended as a high level summary of consent compliance from the IM as per BOPRC Resource Consent 67173-AP Condition 6.3 (b). This summary is intended to provide the CLG with visibility and assurance that consent compliance is being achieved. The summary only lists conditions that are relevant at the time of writing this report. This summary is not intended to prove compliance with the BOPRC Resource Consent to a consent authority.

Table 2: Consent Monitoring Summary Table

Condition ¹	Description	Compliance	Details
6.1 – 6.3	Independent Monitor	Yes	Continued on site monitoring and reporting.
7.1 – 7.5	Flood Management	Yes	Flood management undertaken in accordance with FMP.
9.1 – 9.5	Erosion and Sediment Controls for Land Outside Canal	Yes	Compliant within KCRP.
10.1 – 10.2	Erosion and Sediment Controls – Canal Works and Discharges to Water	Yes	Some slumping of the canal banks throughout Section 4 has been noted after heavy rain events.
11.1 – 11.3	Site Access & Traffic Management	Yes	A shoulder closure has been put in place on Shaw Road due to the sediment transfer pipeline running along the road edge. WCL also have various traffic management plans in place to manage traffic around the construction of the new residential subdivision off Shaw Road.
12.2	Discharges from the Containment Sites (Filtrate and Stormwater)	Yes	Stormwater and filtrate are being released back into the Kopeopeo Canal. Live turbidity monitoring is recording that these releases have minimal sediment loads and no discharges are released above 30 NTU. This is not a consent requirement while the FCS are in place.

¹ Bay of Plenty Regional Council Resource Consent 67173-AP (12 May 2017).

Condition ¹	Description	Compliance	Details
13.1 – 13.3	Water Quality Monitoring in the Kopeopeo Canal Outside the Remediation Zone	Yes	Real time turbidity monitoring shows that turbidity in the Orini/Kopeopeo confluence was at times greater than 20% above background. This turbidity-laden discharge was analysed for dioxin and shown to be below adopted acceptable limits.
15.1	Kopeopeo Canal Vegetation Disturbance	Yes	Soil has been disturbed along the true left stopbank between Paroa Road and SH30 by vehicles accessing this area during dredging. This area will be monitored for vegetation growth and if required, covered with straw to promote revegetation.
17.1 & 17.5	Kopeopeo Canal Control Structures	Yes	FCS operating appropriately and mobile pumping stations are established in accordance with the FMP. FCS-West has been opened as much as possible to allow water to move through the project area.
19.1	Excavation of Sediment - Removal Methodology	Yes	The extraction of sediment from the Kopeopeo Canal is being undertaken in general accordance with the methods in the variation application and the Dredging Management Plan.
20.1	Containment Sites - Sediment Disposal	Yes	The sediment extracted from the Kopeopeo Canal is being transported and deposited at the containment sites in general accordance with the variation application and the Dredging Management Plan.
21.1	Containment Sites - Stormwater	Yes	Stormwater is being appropriately managed.
22.1 – 22.3	Cleaning of Machinery, Structures and Debris	Yes	Equipment is being appropriately cleaned.
25.1	Validation Sampling – Kopeopeo Canal	Yes	Validation sampling being undertaken as quickly as is practical.
25.2	Validation Sampling – Kopeopeo Canal	Yes	1 in 20 sediment samples are split and analysed at two different laboratories for the purpose of quality assurance.
25.5	Validation Sampling – Kopeopeo Canal	Yes	Control structures in place.

Condition ¹	Description	Compliance	Details
26.1 – 26.4	Communication – Community Liaison Group	Yes	CLG being adequately informed of project activities.
27.1 – 27.2	Complaints Register	Yes	Complaints register reviewed (Section 4.11).
28.1 – 28.5	Spill Prevention & Response	Yes	No spills have occurred outside the containment cell.
29.1	Hazardous Substances	Yes	No spills of hazardous substances.
30.1	Signage	Yes	Appropriate signage is in place along the length of the sediment transfer pipeline. Signs are in place identifying CS3 is closed to public access and directing the public towards alternative walking access along the eastern boundary of CS3. Signage on the walking access also informs the public that the path is not designed to be used by motorcycles.
31.1 – 31.2	Archaeological Sites	Yes	No Koiwi or Taonga have been discovered.
32.1 – 32.2	Cultural Monitor	Yes	The Cultural Monitor or an appropriately trained representative is on site to provide oversight during the dredging.
33.1	Hours of Work	Yes	Consented hours are 7 am to 6 pm. The consent states 7.30 am; however, permission was gained from the consent authority to start at 7 am.
34.1	Access for Monitoring	Yes	Access has been provided to BOPRC at their request. A BOPRC Compliance Audit was undertaken on 31 August 2018.
35.1 – 35.6	Water Metering & Reporting – Taking Water	NA	The consent authority stated, “this consent condition is void for the current methodology and BOPRC acknowledges that it is not needed to be complied with”.
36.2	Groundwater Monitoring & Responses	Yes	Groundwater monitoring undertaken as described in the GMP.

Condition ¹	Description	Compliance	Details
36.4	Groundwater Monitoring & Responses	Yes	Bi-monthly (every 2 months) groundwater level monitoring is being undertaken at CS1.
36.5	Groundwater Monitoring & Responses	Yes	Background groundwater monitoring is complete for both CS1 and CS3.
36.6 – 36.7	Groundwater Monitoring & Responses	Yes	Groundwater quality monitoring to be undertaken quarterly.
38.1 – 38.2	Air Quality – General	Yes	Air quality undertaken in accordance with the EMVP.
39.1 – 39.6	Dioxin & Air Quality Monitoring	Yes	Ambient air monitoring complete at CS1 with results received to date being below consent limits.
40.1 – 40.7	Dust Management	Yes	Dust is being appropriately managed.
41.1	Dust Monitoring	Yes	Dust is being appropriately monitored using visual means.
42.1 – 42.3	Remedial Action for Dust Emissions at the Containment Sites	Yes	No dust emissions have been identified.
43.1 – 43.4	Odour Management & Monitoring	Yes	Slight odour identified within CS1, but no odour identified outside the site boundary.
44.1 – 44.3	Soil Quality & Monitoring	Yes	Baseline soil sampling undertaken at CS3.
45.1 – 45.3	Aquatic Species	Yes	Suitable fish removal undertaken within the KCRP area.
46.1	Saltmarsh	Yes	Water levels within the canal are not being artificially held above 0.2 m RL (Moturiki Datum).

7. Conclusion

In September 2018, dredging of Section 5 of the Kopeopeo Canal continued, with subsequent sediment validation sampling. The Total PCDD/F I-TEQ Upperbound results from 14 samples were between 36 and 220 pg/g with 10 of the results being in excess of the remedial target of 60 pg/g (See Validation Plan in Appendix B). Due to the extensive validation failures, the 95% UCL will not be calculated until the subsequent redredging and revalidation process has been undertaken.

Canal water was sampled in late August to confirm that dioxin levels in discharge water were acceptable. The analytical results were received in September and the three samples collected by BOPRC returned Total PCDD/F I-TEQ Upperbound results below the NZ Drinking Water Standards of 30 pg/L and below the adopted criteria of 11 pg/L (See Site Plan in Appendix A for sample locations).

Validation sampling was undertaken across the trial site area to confirm that the clean-up had been successful (See Trial Site Validation Plan in Appendix C). Four samples were sent for analytical testing and returned Total PCDD/F I-TEQ Upperbound results of 20 pg/g. These results are all at the lowest value achievable with this laboratory limit of detection and well below the remedial target of 60 pg/g.

Dioxin in groundwater sampling was undertaken at CS1 during September (See Site Plan in Appendix A for well locations). Groundwater Total PCDD/F I-TEQ Upperbound results for the five samples ranged between 4.2 and 5.62 pg/L. The CS1 results are all below the adopted Tier 1 trigger level criteria for Total PCDD/F I-TEQ Upperbound outlined in the EMVP of 13.4 pg/L.

The consent monitoring summary provides a high-level indicative check of compliance with BOPRC Resource Consent 67173-AP.

Appendices

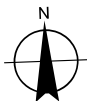
Appendix A – Site Plan



Canal sections

Section 1
Section 2
Section 3
Section 4

Paper Size A4
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 Map Projection: Transverse Mercator
 Horizontal Datum: NZGD 2000
 Grid: NZGD 2000 New Zealand Transverse Mercator



LEGEND

Perimeter drain sample location	FCS West
Monitoring well location	Water treatment plant
Turbidity monitoring point	Topsoil stockpile
CS1	Property boundary

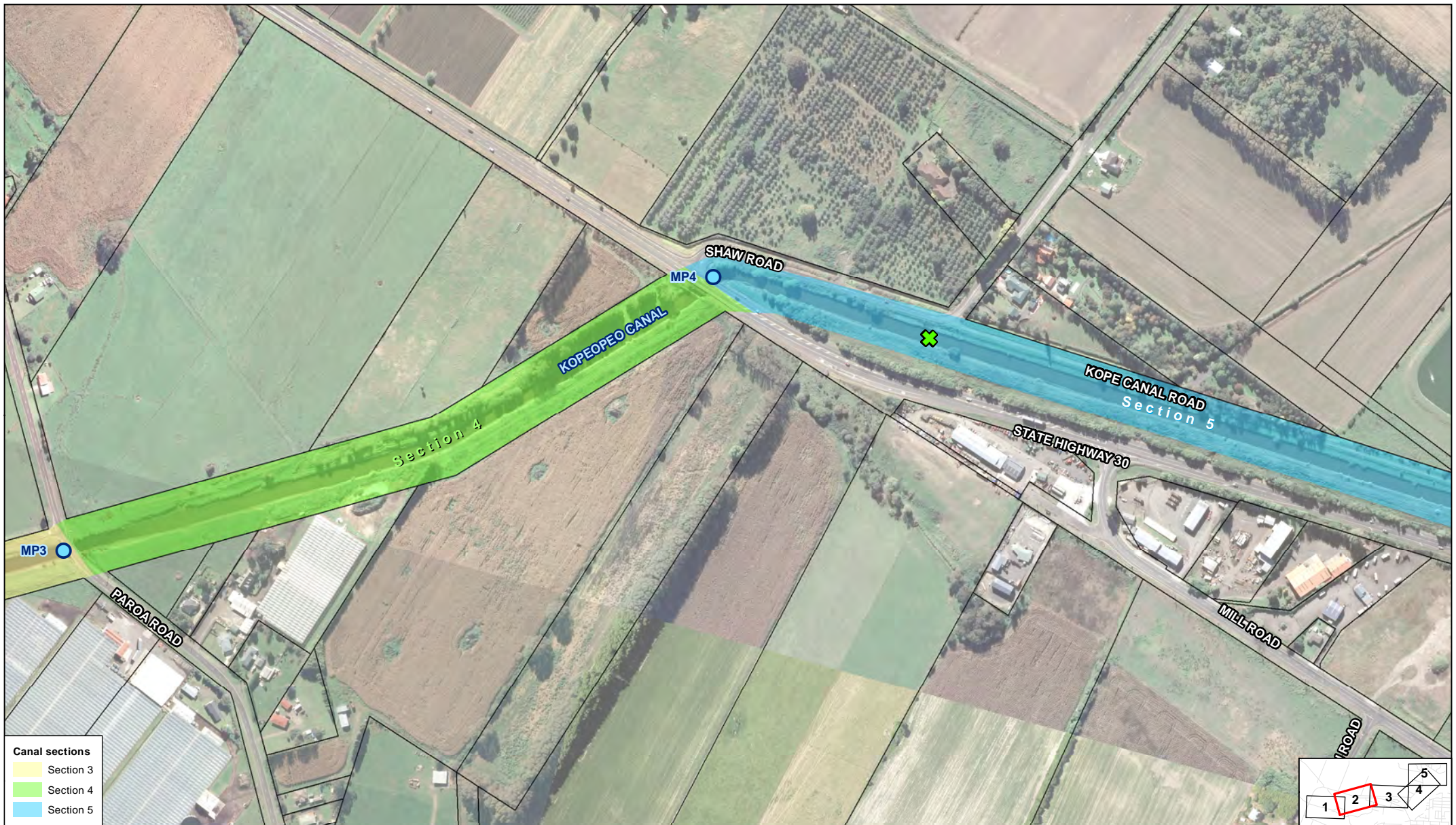


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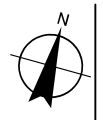
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 Date 29 Oct 2018

Site Plan

Figure 1



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 Map Projection: Transverse Mercator
 Horizontal Datum: NZGD 2000
 Grid: NZGD 2000 New Zealand Transverse Mercator



LEGEND
 ● Turbidity monitoring point
 ✕ Current dredge location
 □ Property boundary



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Site Plan

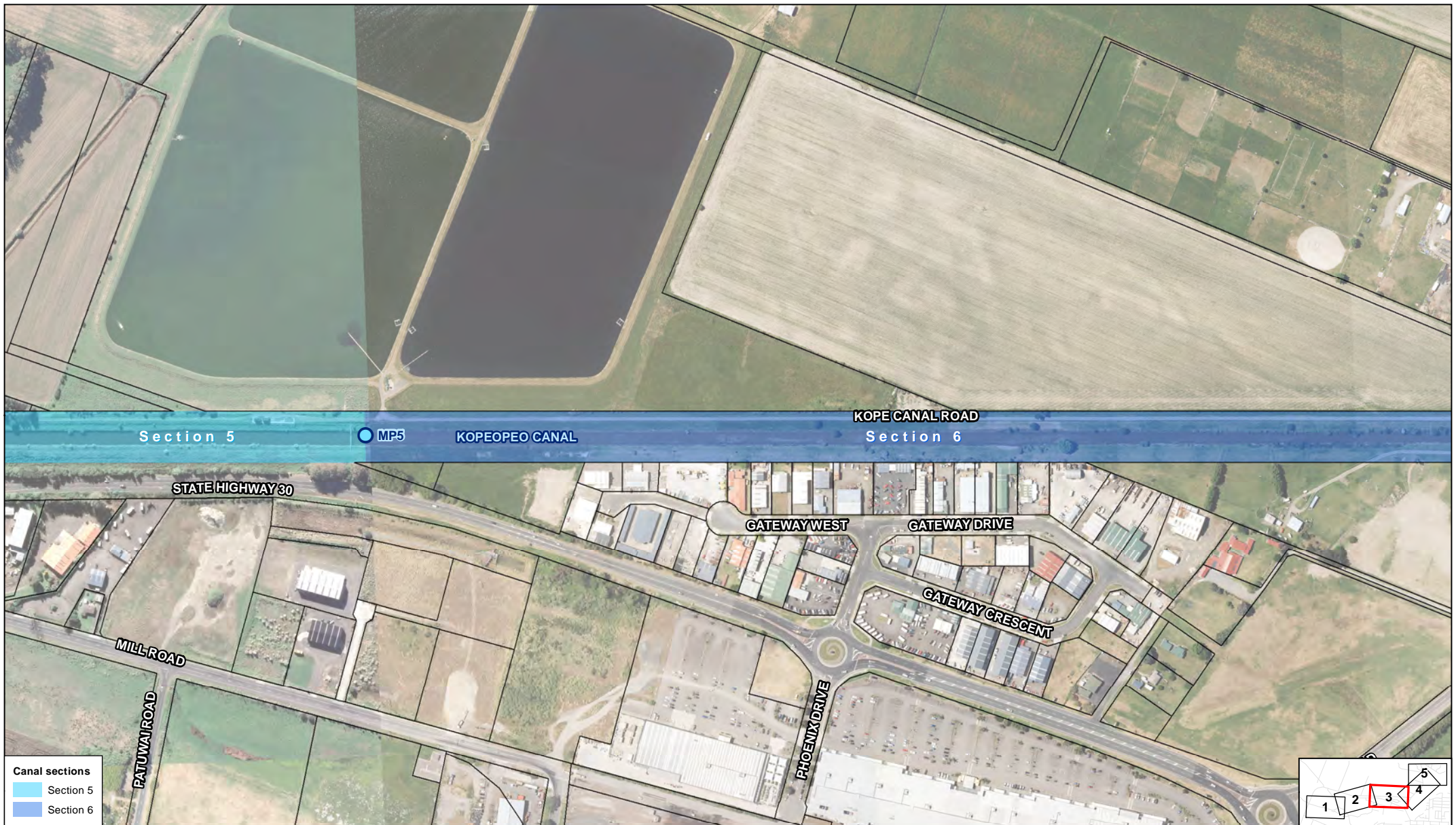
Figure 2

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Paper Size A4
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 Metres
 Map Projection: Transverse Mercator
 Horizontal Datum: NZGD 2000
 Grid: NZGD 2000 New Zealand Transverse Mercator

LEGEND

- Turbidity monitoring point
- Property boundary



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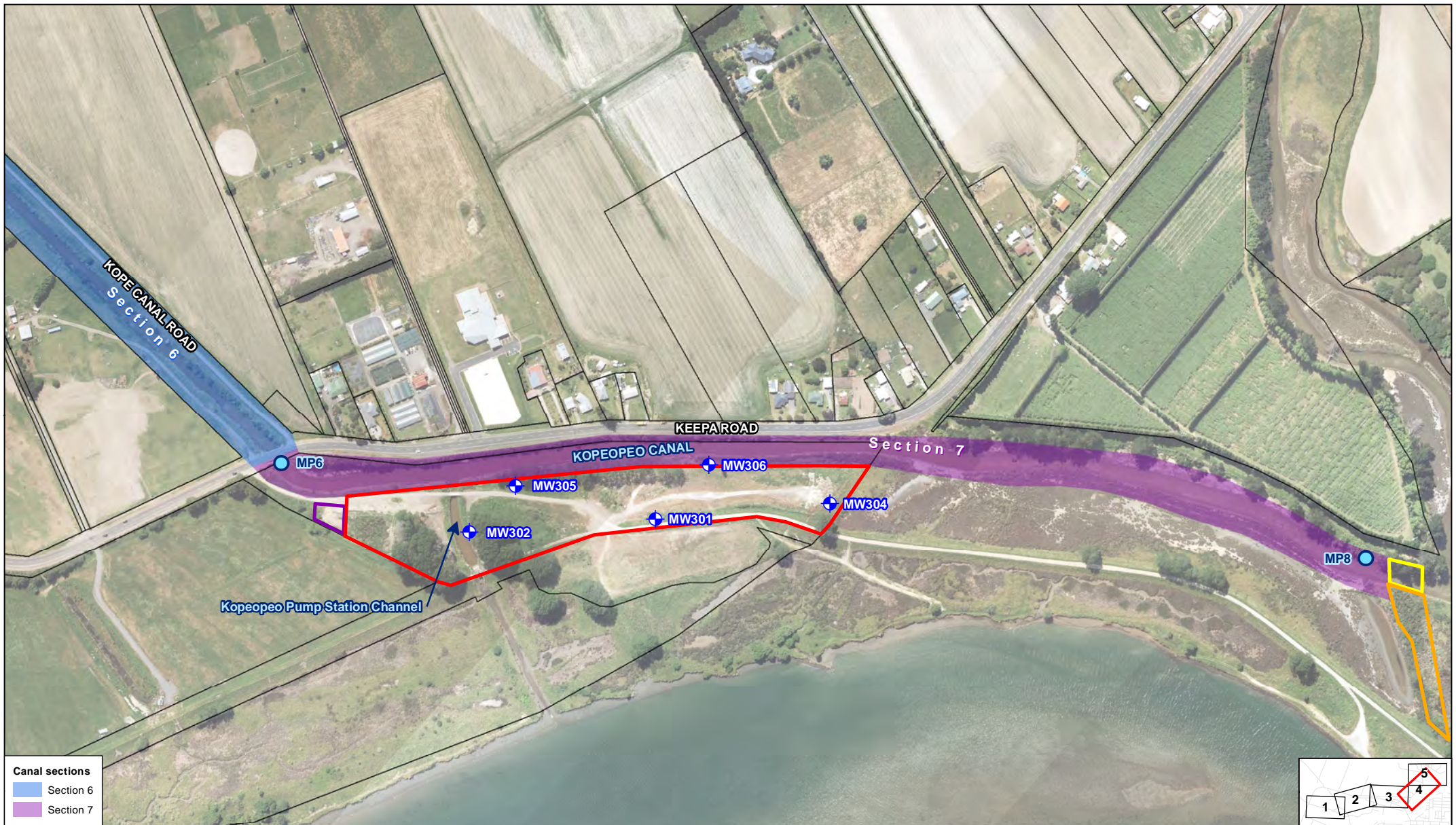
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Site Plan

Figure 3

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 Metres
 Map Projection: Transverse Mercator
 Horizontal Datum: NZGD 2000
 Grid: NZGD 2000 New Zealand Transverse Mercator



LEGEND

- Monitoring well location
- Turbidity monitoring point
- CS3
- FCS East
- Access road built to enable control structure construction
- Property boundary
- Public car park



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Site Plan

Figure 4



Paper Size A4
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 Metres
 Map Projection: Transverse Mercator
 Horizontal Datum: NZGD 2000
 Grid: NZGD 2000 New Zealand Transverse Mercator



LEGEND
 ● Compliance Turbidity monitoring point
 ● Turbidity monitoring point
 ■ Access road built to enable control structure construction
 ■ FCS East
 □ Property boundary



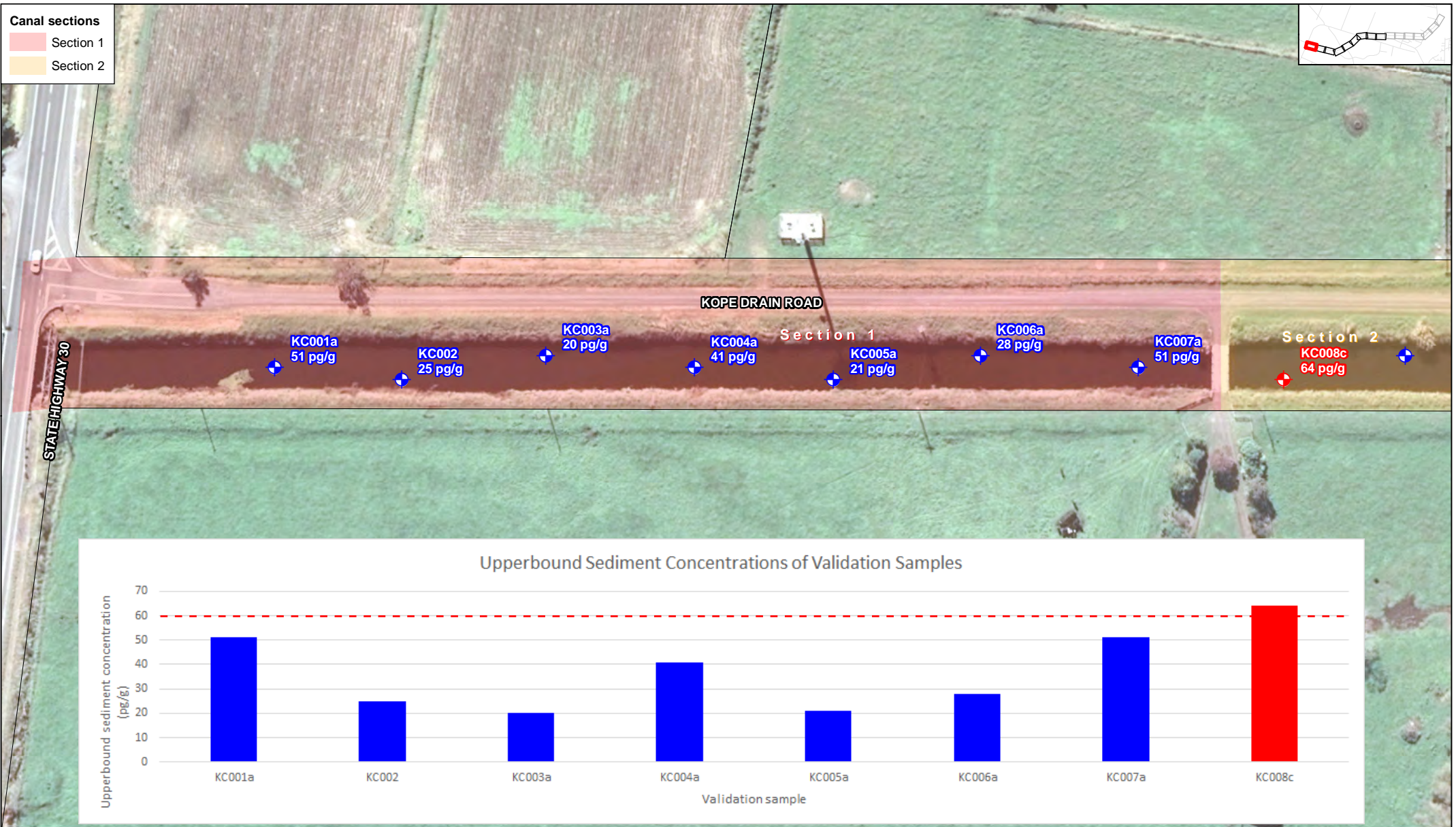
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Site Plan

Figure 5

Appendix B – Canal Sediment Validation Locations



Paper Size A4

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Metres

Map Projection: Transverse Mercator
Horizontal Datum: NZGD 2000
Grid: NZGD 2000 New Zealand Transverse Mercator



LEGEND

- Validation samples (upperbound sediment concentration < 60 pg/g)
- Validation samples (upperbound sediment concentration > 60 pg/g)

Property boundary

Canal Sediment Validation 95% UCL of 36.41 pg/g
Remedial target = 60 pg/g



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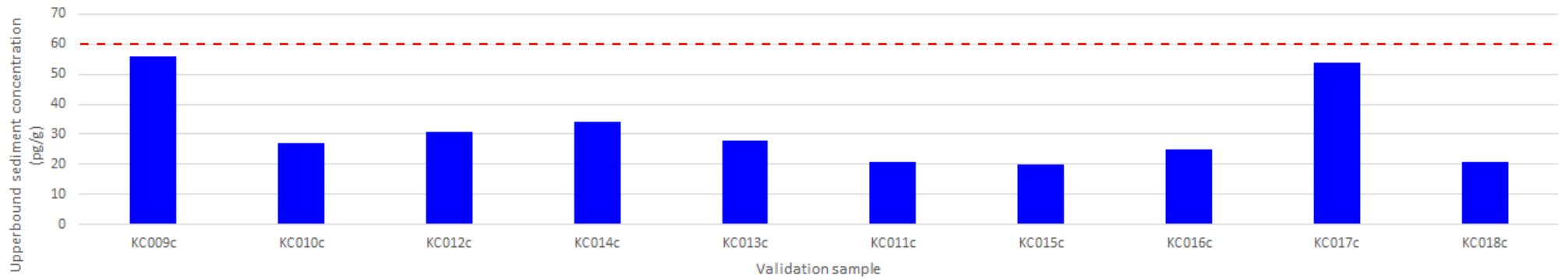
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Validation Samples

Figure 1





Upperbound Sediment Concentrations of Validation Samples



Paper Size A4
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 Metres
 Map Projection: Transverse Mercator
 Horizontal Datum: NZGD 2000
 Grid: NZGD 2000 New Zealand Transverse Mercator



LEGEND
 Validation samples (upperbound sediment concentration < 60 pg/g)

 Property boundary

Canal Sediment Validation 95% UCL of 36.41 pg/g
 Remedial target = 60 pg/g

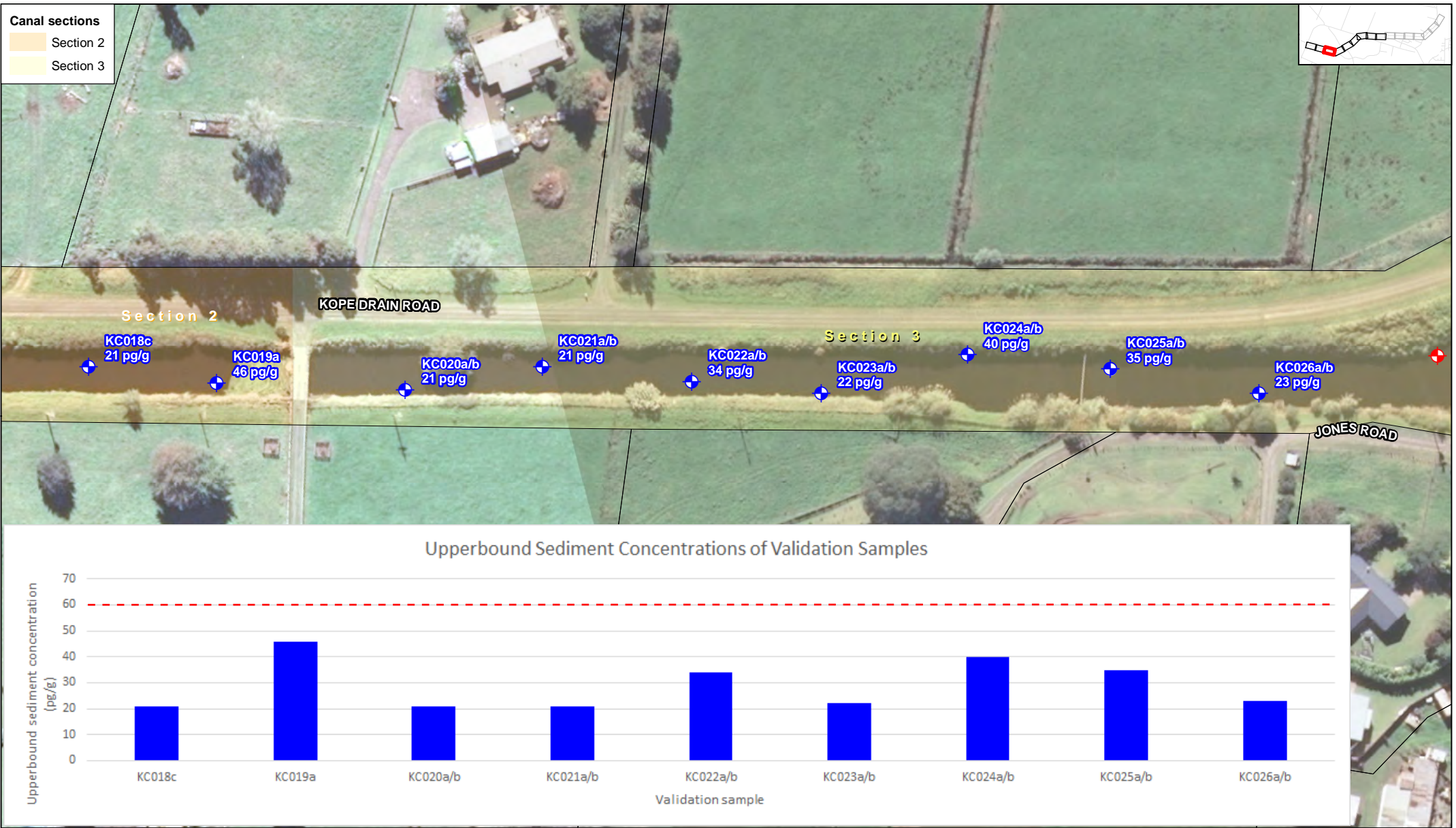


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Validation Samples

Figure 2



Paper Size A4
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 Map Projection: Transverse Mercator
 Horizontal Datum: NZGD 2000
 Grid: NZGD 2000 New Zealand Transverse Mercator



LEGEND

- Validation samples (upperbound sediment concentration < 60 pg/g)
- Validation samples (upperbound sediment concentration > 60 pg/g)

Property boundary

Canal Sediment Validation 95% UCL of 36.41 pg/g
 Remedial target = 60 pg/g

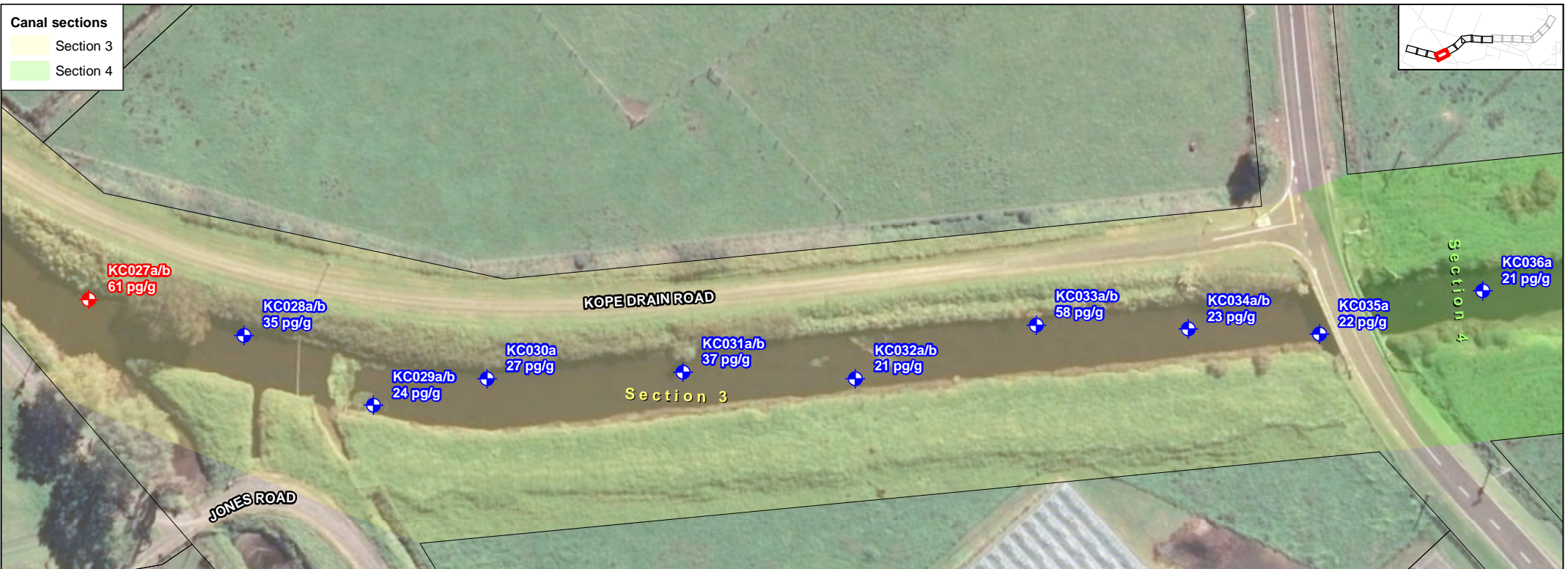


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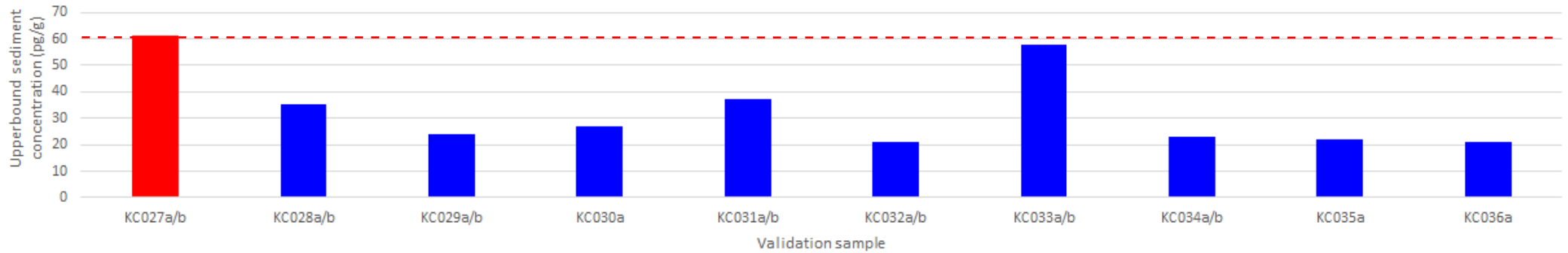
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Validation Samples

Figure 3



Upperbound Sediment Concentrations of Validation Samples



Paper Size A4
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 Metres
 Map Projection: Transverse Mercator
 Horizontal Datum: NZGD 2000
 Grid: NZGD 2000 New Zealand Transverse Mercator



LEGEND

- Validation samples (upperbound sediment concentration < 60 pg/g)
- Validation samples (upperbound sediment concentration > 60 pg/g)

Property boundary

Canal Sediment Validation 95% UCL of 36.41 pg/g
 Remedial target = 60 pg/g



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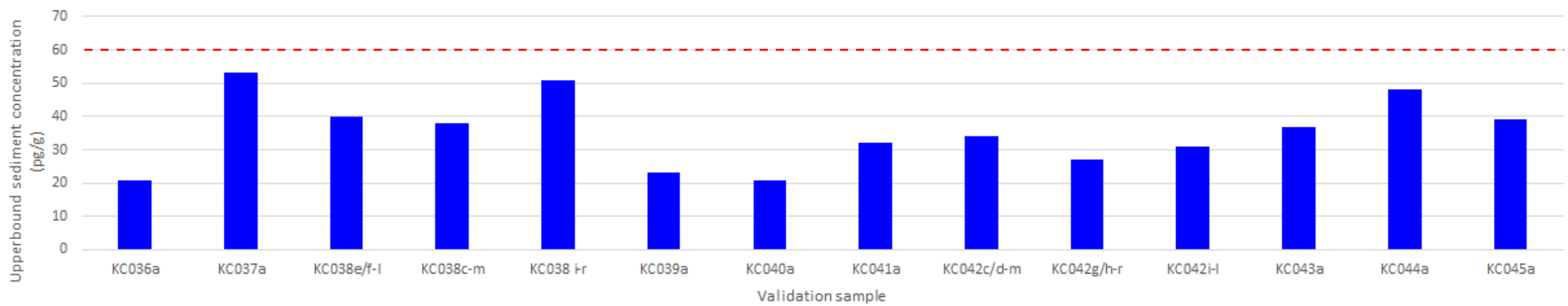
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Validation Samples

Figure 4



Upperbound Sediment Concentrations of Validation Samples



Paper Size A4
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 Metres
 Map Projection: Transverse Mercator
 Horizontal Datum: NZGD 2000
 Grid: NZGD 2000 New Zealand Transverse Mercator



LEGEND

- Validation samples (upperbound sediment concentration < 60 pg/g)
- Superseded historic validation samples prior to redredge

Property boundary

Canal Sediment Validation 95% UCL of 36.41 pg/g
 Remedial target = 60 pg/g



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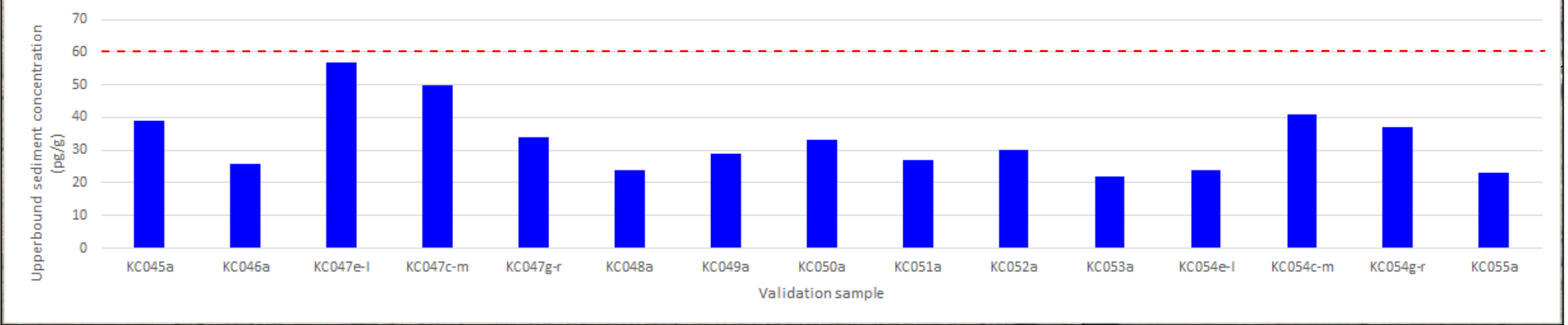
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Validation Samples

Figure 5



Upperbound Sediment Concentrations of Validation Samples



Paper Size A4
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 Metres
 Map Projection: Transverse Mercator
 Horizontal Datum: NZGD 2000
 Grid: NZGD 2000 New Zealand Transverse Mercator



LEGEND
◆ Validation samples (upperbound sediment concentration < 60 pg/g)
◆ Superseded historic validation samples prior to redredge

Property boundary

Canal Sediment Validation 95% UCL of 36.41 pg/g
 Remedial target = 60 pg/g

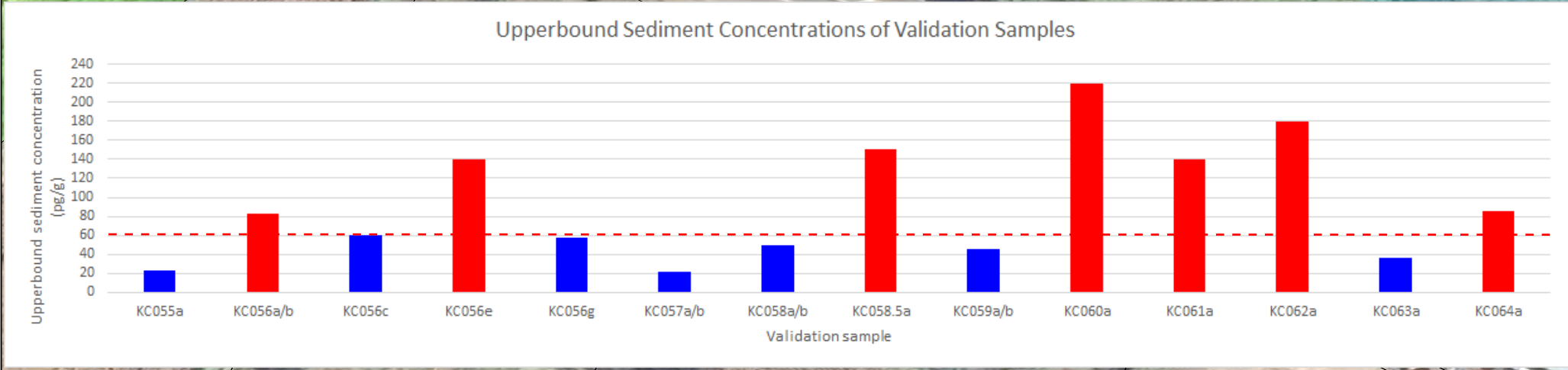
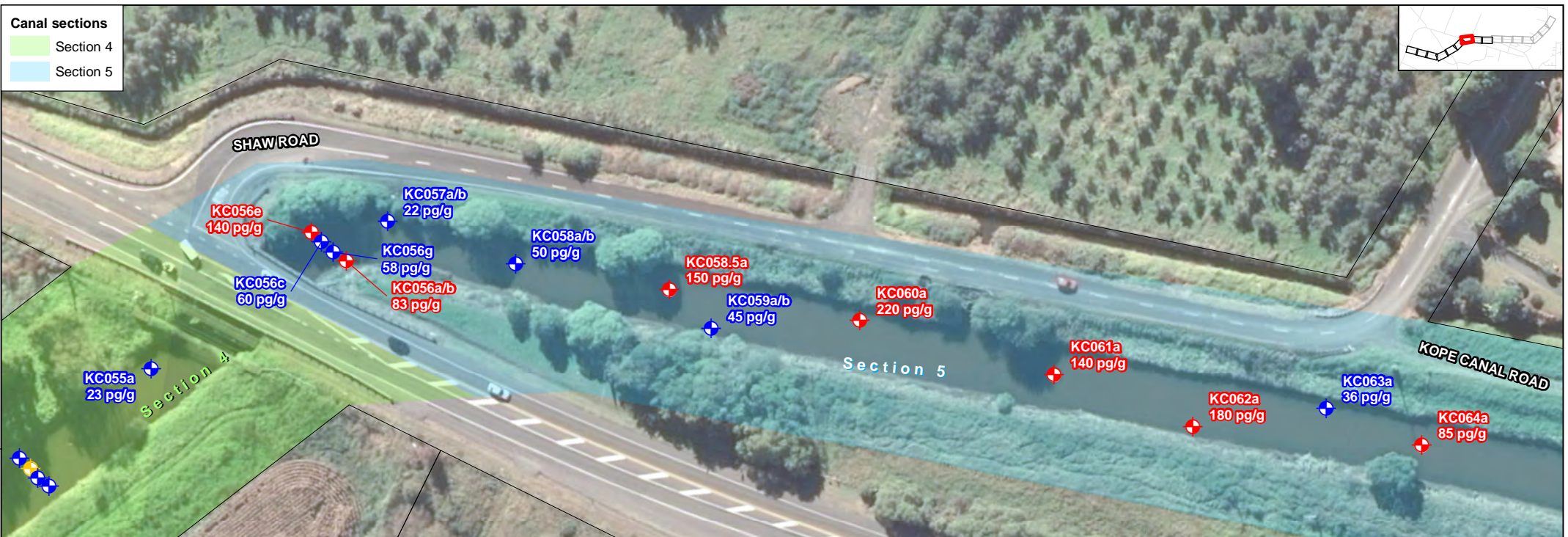


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Validation Samples

Figure 6



Paper Size A4
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 Metres
 Map Projection: Transverse Mercator
 Horizontal Datum: NZGD 2000
 Grid: NZGD 2000 New Zealand Transverse Mercator



LEGEND

- Validation samples (upperbound sediment concentration < 60 pg/g)
- Validation samples (upperbound sediment concentration > 60 pg/g)
- Superseded historic validation samples prior to redredge

Property boundary

Canal Sediment Validation 95% UCL of 36.41 pg/g
 Remedial target = 60 pg/g

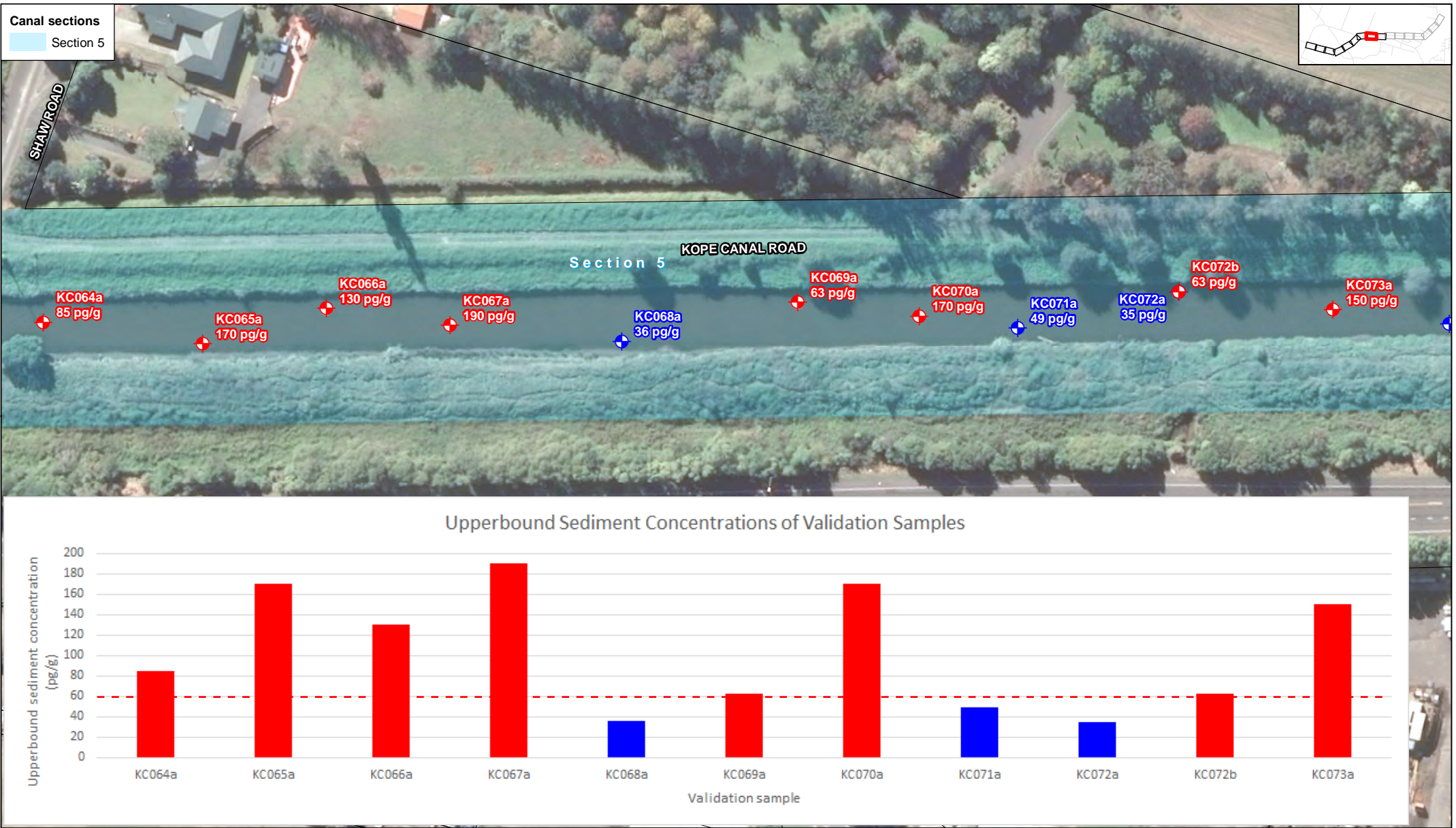


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Validation Samples

Figure 7



Paper Size A4
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Metres
Map Projection: Transverse Mercator
Horizontal Datum: NZGD 2000
Grid: NZGD 2000 New Zealand Transverse Mercator



LEGEND
 Validation samples (upperbound sediment concentration < 60 pg/g)
 Validation samples (upperbound sediment concentration > 60 pg/g)

Property boundary

Canal Sediment Validation 95% UCL of 36.41 pg/g
Remedial target = 60 pg/g

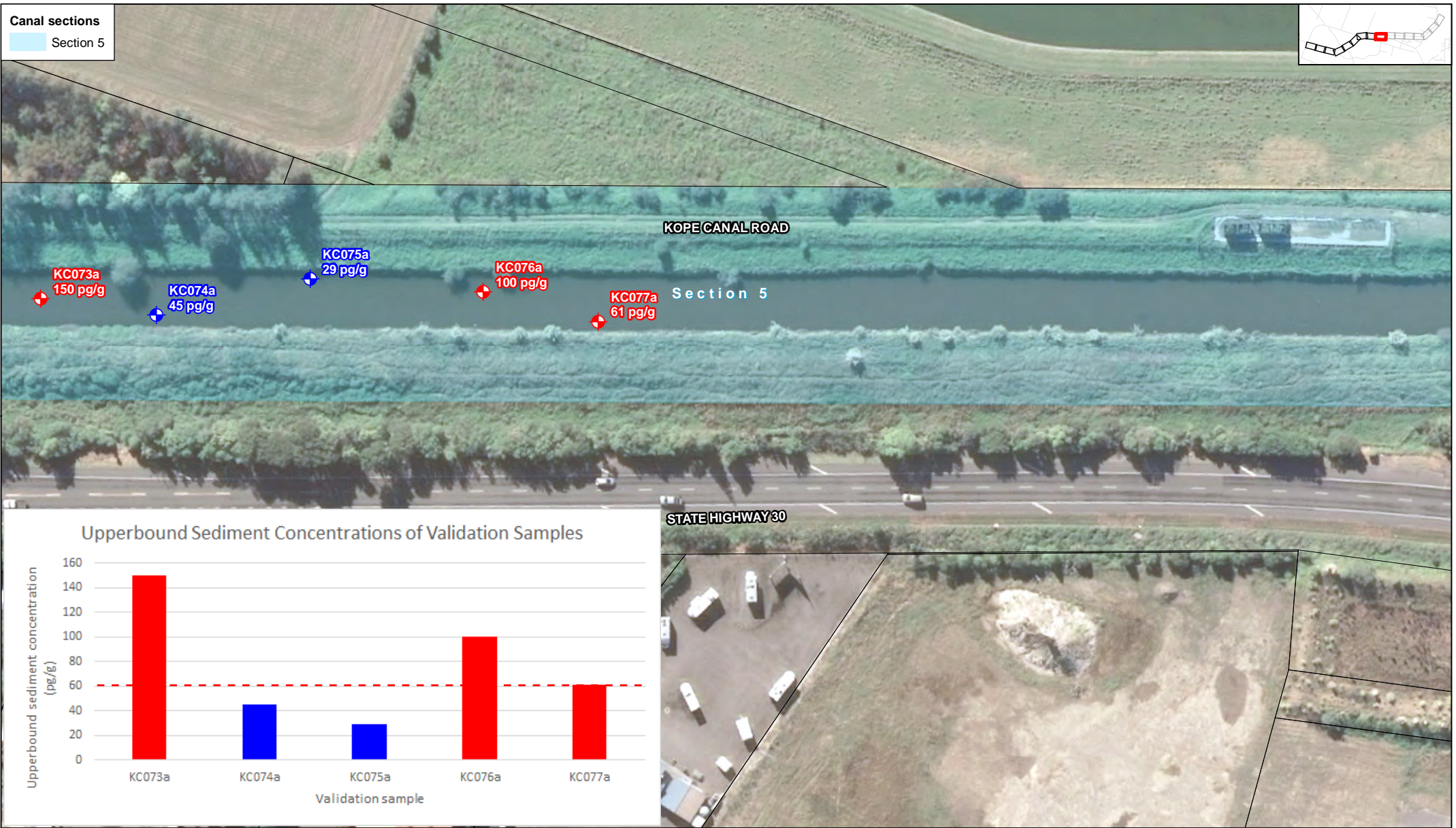


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Validation Samples

Figure 8



Paper Size A4
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Metres
Map Projection: Transverse Mercator
Horizontal Datum: NZGD 2000
Grid: NZGD 2000 New Zealand Transverse Mercator



LEGEND
 Validation samples (upperbound sediment concentration < 60 pg/g)
 Validation samples (upperbound sediment concentration > 60 pg/g)

Property boundary

Canal Sediment Validation 95% UCL of 36.41 pg/g
Remedial target = 60 pg/g



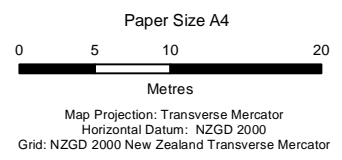
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Validation Samples

Figure 9

Appendix C – Trial Site Validation Plan



- LEGEND
- Validation sample
 - Validation sample - not analysed
 - Property boundary



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Trial Site Clean-Up Validation Plan **Figure**

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Document Status

Revision	Author	Reviewer		Approved for Issue		
		Name	Signature	Name	Signature	Date
1.0	M. James	A. Kohlrusch		A. Kohlrusch		7/11/18

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