



# Bay of Plenty Regional Council

## Koapeopeo Canal Remediation

### CLG Monthly Update Report

March 2019

# Executive summary

Dredging of Section 6 continued in March 2019 with the sediment being pumped to CS3.

Of the consent conditions in Bay of Plenty Regional Council Resource Consent 67173-AP that were checked by the IM field observer, the consent holder appears to be compliant with all conditions.

The community (near Gateway Drive) complaint received regarding excessive noise is being investigated.

A robbery occurred at CS3 during late March with equipment and tools being stolen. Police are investigating the incident.

Two spills of water containing contaminated sediment occurred adjacent to the water treatment plant in CS3 and were contained and cleaned appropriately.

Flood management continued throughout March with no significant rainfall events triggering the need for flood management.

April will see continued progress dredging through Section 6 along with continued work to tidy and clean CS1, ongoing bioremediation preparation and commencement of activities associated with closing the cell.

During March 2019, the following analytical sampling was undertaken and/or reported:

## ***Canal Sediment Validation***

Eleven validation samples were collected from behind the dredge within Section 6 (See Figure 10 and 11 in the Validation Plan in Appendix B). The Total PCDD/F (dioxin) I-TEQ Upperbound results ranged from 21 and 990 pg/g. Of the 11 samples analysed, three dioxin results of 120, 190, and 990 pg/g triggered the need for redredging in accordance with the EMVP. The remaining samples had dioxin results between 21 and 51 pg/g, which is below the remedial target. The 95% UCL was calculated as being 40.19 pg/g for the approximately 3200 m length of the canal chemically validated as at 31 March 2019 (excluding the three dioxin results over 120 pg/g).

## ***CS3 Groundwater***

Groundwater sampling was undertaken at CS3 (See well locations on Figure 4 in the Site Plan in Appendix A) by Golder Associates (GAL) on 27 February 2019. The Total PCDD/F (dioxin) I-TEQ Upperbound results were between 3.74 and 5.76 pg/L.

The results were all below the adopted Tier 1 trigger level of 13.4 pg/L for Total PCDD/F (dioxin) I-TEQ Upperbound outlined in the EMVP. The dioxin results also showed no obvious change since the July 2018 CS3 groundwater sampling round in which dioxin concentrations between 4.11 and 8.88 pg/L were recorded.

## ***CS1 Perimeter Drain Sampling***

Sediment sampling was undertaken within the perimeter drains at CS1 (See well locations on Figure 1 in the Site Plan in Appendix A) by GAL on 27 February 2019. Three samples were sent to the laboratory where they were combined into one composite sample that was then analysed for dioxin. The Total PCDD/F (dioxin) I-TEQ Upperbound result was 20 pg/g. 20 pg/g is the laboratory limit of reporting for this analytical suite.

### **CS1 Groundwater**

Groundwater sampling was undertaken at CS1 as part of the consent conditions by GAL on 27 and 28 March 2018. The Total PCDD/F (dioxin) I-TEQ Upperbound results were between 3.07 and 3.85 pg/L.

The results were all below the adopted Tier 1 trigger level of (13.4 pg/L) for Total PCDD/F (dioxin) I-TEQ Upperbound outlined in the EMVP. The dioxin results also showed no obvious change since the December 2018 CS1 groundwater sampling round in which dioxin concentrations between 4.39 and 5.41 pg/L were recorded.

### **CS1 Geobags**

The initial round of post dredging Geobag dioxin sampling was undertaken by HAIL Environmental Ltd in February 2019. Samples were taken through the access ports in the Geobags. Many of the Geobags contained large volumes of sand that had settled out directly around the ports leading to samples that contained predominantly sand. It was inferred that the fine sediment travels further in the water column and settles out between the ports. Analytical testing recorded Total PCDD/F (dioxin) I-TEQ Upperbound results between 28 and 480 pg/g.

A second round of post dredging Geobag dioxin sampling undertaken by BOPRC on 11 March 2019 focused on the areas between the access ports. This sampling event was conducted to better understand the distribution of dioxin within the eleven Geobags that contain higher volumes of sand. The Total PCDD/F (dioxin) I-TEQ Upperbound results were between 47 and 160 pg/g and were consistently higher than the previous sampling undertaken through the access ports on these bags. This confirmed the hypothesis that the more contaminated fine grained material had settled out between the access ports in the bags that contained large volumes of sand.

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 (Ministry for the Environment (MfE)) in an effort to restore the canal's 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 this Community Liaison Group (CLG) Monthly Update Report (March 2019) is to provide an independent summary of the progress of the Kopeopeo Canal Remediation Project. The CLG Monthly Update Report (March 2019) 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 March 2019 (Refer to photographs in Table 1: Photograph Progress Log):

- Bioremediation is underway at CS1 with the bioremediation team continuing to add fungal inoculant to the Geobags. Further baseline dioxin sampling of some of the Geobags was completed (Photograph 6 and 7).
- Tidying of CS1 is still progressing and once completed, the site will be handed back to BOPRC for final closure (Photograph 10 and 11).
- The CS1 perimeter drain sample results were reported.
- CS1 groundwater sampling was undertaken.
- A small volume of spilt sediment is sitting within the containment cell at CS1 (Photograph 2); however cleaning has been progressing (Photographs 1 and 3). From early March, the containment cell has been covered in water to minimise the risk of dust generation (Photograph 12).
- Groundwater sampling of the wells around CS1 has been undertaken by GAL.

### 2.2 CS3

The following summarises the events at CS3 during March 2019 (Refer to photographs in Table 1: Photograph Progress Log):

- Dredging and pumping of contaminated sediment to Geobags continued. The Geobags are dewatering very well with clear, low turbidity water leaving the Geobags (Photograph 9 and 15).
- There was a robbery from the containers at CS3 in late March.
- Bird and animal bones continue to be found in the screened material and the discovery protocol is managed by the Cultural Monitor.
- CS3 groundwater sample results were reported.
- There were spills of canal water containing sediment outside the water treatment area bund (Photograph 5). Sediment that accumulated in these areas was scraped using an excavator and placed into oversized bulk bags for placement into a containment cell (Photograph 8).
- Two boost pumps are operating along Kope Canal Road to move sediment to CS3 (Photograph 13).

### 2.3 Project Area

The following summarises the project events across the wider project area during March 2019 (Refer to photographs in Table 1: Photograph Progress Log):

- Noise monitoring is being undertaken around the project area, especially adjacent to the boost pumps.
- The second round of canal sediment validation was undertaken by Golder Associates Limited (GAL) on 27 March 2019 in Section 6 (Photograph 14).
- The Paroa Road boost pump is not operating and is awaiting removal.

- Both flood control structures (FCS) were used to manage optimal canal water levels for dredging and consent requirements (Photograph 4).
- 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
	<p>Photograph 1: Clean up at CS1 with wheelbarrows being used to transport sediment to the sump where it can be pumped into the Geobags.</p>
	<p>Photograph 2: Sediment in the base of the containment cell at CS1.</p>
	<p>Photograph 3: Waiotahi Contractors cleaning up the sediment in the base of CS1. Water is being used to ensure dust is not generated as the sediment is disturbed.</p>

Photograph

Event



Photograph 4: FCS-East closed to maintain optimal water levels.



Photograph 5: A spill of potentially contaminated water outside the bunded water treatment area.



Photograph 6: Bioremediation team sampling within the Geobags at CS1. This core shows exclusively target material in the Geobag at this location.

Photograph

Event



Photograph 7: Bioremediation team sampling within the Geobags at CS1.



Photograph 8: Excavator scraping down the area of the spill within CS3. This material is then placed into oversized bulk bags and stored within the containment cell.



Photograph 9: Geobags within CS3 dewatering. The water coming out of the Geobags has very low turbidity and is released back into the canal.

Photograph

Event



Photograph 10: CS1 awaiting further tidying before closure.



Photograph 11: Equipment in the carpark adjacent to CS1 awaiting removal.



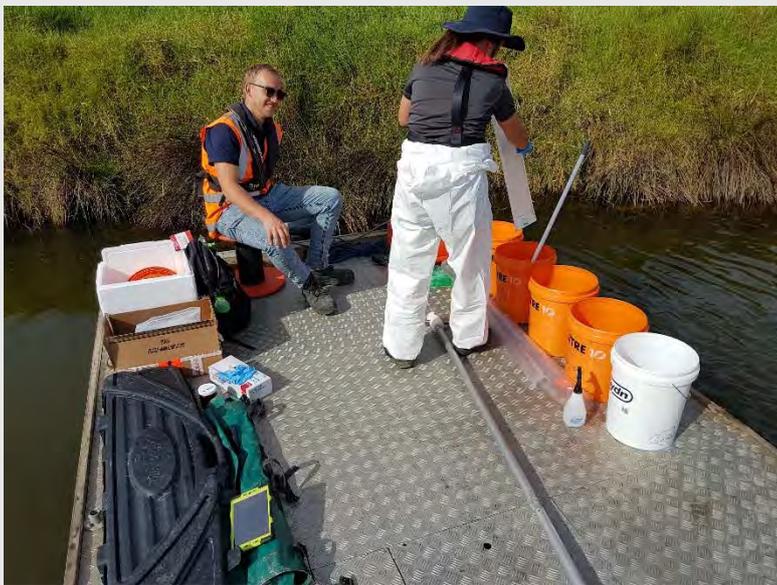
Photograph 12: CS1 flooded with rainwater.

Photograph

Event



Photograph 13: Boost pump operating adjacent to Gateway Drive properties. This pump is the source of the noise complaint.



Photograph 14: GAL undertaking validation sampling in Section 6.



Photograph 15: Geobags dewatering at CS3. The water is clear with very low turbidity as the sediment remains trapped in the Geobags.

## 3. Community Liaison Group Update

### 3.1 Community Concerns

There was no CLG meeting held in March 2019. The next CLG meeting is scheduled for 14 May 2019.

The project complaints register for March 2019 was reviewed by the IM. Further detail is provided 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 March 2019.

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

#### 4.1.1 Project Area

Virgin quarry rock has been placed on the Kopeopeo Canal stopbank opposite Kope Canal Road. This material is forming a stable working platform for one of the boost pumps and will be shaped and compacted once the pump is no longer required.

Tree and shrub removal is planned for the stopbanks along Section 6. This is to allow the barge more room to work and remove the weight of vegetation from the stopbank to increase stability.

#### 4.1.2 CS1

CS1 is currently undergoing the final stages of bioremediation preparation including the loading of wood pellet into the Geobags, and the addition of fungal and bacteria inoculant. Topsoil capping will then be placed over the Geobags and trees will be planted.

#### 4.1.3 CS3

Odour from the sediments at the CS3 treatment plant has been noted in close proximity to the equipment, but not beyond the site boundary. Odour neutralisers are available if required and will be placed around the water treatment plant should odours be detected outside the CS3 boundary.

### 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. Due to the need to maintain a constant water level to dredge effectively, both flood control structures (FCS) were largely left closed during March.

The flood control structures are checked daily and the side culverts of the canal are checked weekly. These checks are documented 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 sumps at CS1 & CS3.

#### 4.2.2 CS1

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. At the beginning of March 2019, rain filled up the containment cell and covered the sediment with water. This has ensured that the sediment is wet and as such complies with relevant conditions of Bay of Plenty Regional Council Resource Consent 67173-AP. The clean-up process is ongoing. However, with the sediment being kept wet, the dust generation risk is mitigated.

#### 4.2.3 CS3

Rainfall collected in CS3 is discharged as part of the Geobag dewatering process into the Kopeopeo Canal.

On two occasions during March 2019, water containing contaminated sediment spilled outside the bunded, water treatment plant area. These spills were caused by pipes disconnecting. The areas of the spills were marked and then an excavator was used to scrape down the material that accumulated in the area(s) of the spill and place it into bulk bags. These bags are then stored within the containment cell.

### 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.

#### 4.3.2 CS3

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

#### 4.3.3 Project Area

Nuisance dust monitoring is being undertaken adjacent to Kope Canal Road following multiple dust complaints from members of the community during February 2019. The complaints are associated with nuisance dust from non-project vehicles travelling along Kope Canal Road. A temporary speed limit is also being enforced by the project team in this area and contractor has been asked to keep vehicle movements to a minimum. This road is also used by vehicles that are not associated with the KCRP, and as such, enforcing these measures can be a challenge.

The dust monitoring during March showed no dust levels during work hours in exceedance of the consented construction dust limit (70 ug/m<sup>3</sup>).

### 4.4 Waste Management and Hazardous Material

#### 4.4.1 CS1

Rubbish is collected and removed off site.

Oversized material bulk bags are currently sitting outside the bunded area at CS1 awaiting a crane lift into the containment cell. The area beneath these bulk bags will also require validation to confirm that contaminated material has not leaked from the bags during storage.

#### 4.4.2 CS3

Rubbish is collected 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 lifted into the containment cell.

Approximately 1300 bulk bags have been filled with oversized material from along the entire canal length dredged to 31 March 2019. Approximately 1000 of these bulk bags are stored at CS1.

### 4.5 Heritage

During March there were no artefacts identified by the Cultural Monitor or archaeologist as Koiwi or Taonga. Small bones are being bagged and reported as they come across the screens on the water treatment plant or are found on the barge. 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.

### 4.6 Fire Prevention and Response

No issues pertaining to fires were reported during March 2019.

### 4.7 Weed & Dieback Management

Weed removal was not needed during March 2019, as the area being dredged did not have a significant build-up of weed. Tree removal began in Section 6 during late March and will continue into April 2019.

### 4.8 Worker Wellbeing

There were some minor first aid cuts and scrapes recorded in March 2019.

Fatigue has been a concern raised by the IM and community members over the last 12 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.

### 4.9 Community Interest

The pedestrian track around the outside of CS3 is being maintained. The project team asks that community members please do not ride motorbikes along the track or up the stairs as it is a health and safety risk.

There was a robbery at CS3 during the night in late March. Equipment and power tools was stolen and police are investigating. The project team would appreciate any information about this event.

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.

## 4.10 Noise

The water treatment plant at CS3 operates using mains power compared to the diesel generator that was used at CS1. The operation at CS3 is significantly quieter.

Noise complaints have been received from a member of the public in relation to the boost pump operating near Gateway Drive. The complaint is outlined in Section 4.11 and an investigation is underway. If the noise is found to be in excess of construction noise levels, noise reduction will be required.

## 4.11 Complaints Register

The project complaints register for March 2019 was reviewed by the IM and the following complaint and action was recorded:

Date	Complaint	Action
17/03/19	A member of the public submitted a complaint about the noise coming from the boost pump situated near Gateway Drive, adjacent to the Kopeopeo Canal.	Project team asked ESL for noise monitoring results. If the results are in excess of the construction noise guideline levels, noise reduction will be needed.

## 4.12 Compliance Auditing

A Bay of Plenty Regional Council compliance audit (Inspection Number: 291669) was undertaken on 1 March 2019. The audit recorded that all consent conditions were met and the following comments and recommendations were made:

- The Kopeopeo Canal is currently discoloured, but the compliance officer is satisfied that this is not a direct result of the dredging. This is likely due to warm temperatures during the late summer period and is consistent with what has been seen previously within the canal.
- The compliance officer asked for the bunded area around the water treatment plant at CS3 to be extended to include the digger and be obvious as to where the boundary was situated.
- The compliance officer requested that the cleaning of CS1 be completed as soon as possible to remove this potential dust source.

## 4.13 Bioremediation

Initial dioxin sampling was undertaken within the Geobags in February 2019 (See Section 5.5) once the dredging operation had moved to CS3. Samples were collected via access ports in the Geobags. As large volumes of sand were encountered, the bioremediation team raised concerns in a meeting on 27 February 2019 that it was possible that finer sediment was sitting in the areas between the Geobag ports, while the heavier sands settled out close to the ports.

A second round of dioxin sampling was undertaken on 11 March 2019 (See Section 5.5) between the Geobag ports to confirm this hypothesis. This sampling encountered predominantly target material in the sample cores and this was confirmed by laboratory analysis.

These two rounds of sampling partially characterised the dioxin levels within the Geobags at the conclusion of dredging into CS1 and provided baseline data from the three most contaminated Geobags (Geobags 28, 29, and 30) for the long-term monitoring plan. The Geobags selected (28, 29, 30) were filled immediately prior to the change to dredging to CS3, and as such were

filled with sediment from a more contaminated area (closer to the contaminant source) than the rest of the Geobags in CS1. These Geobags will undergo long term monitoring and once they have reached the remedial target, it is very likely that the less contaminated Geobags will also have achieved the remedial target.

A final wood pellet layer and further bacteria inoculum is required in approximately 11 of the Geobags in CS1. The introduction of these materials will be undertaken during April 2019.

## 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 March 2019, 11 validation samples were taken from behind the dredge within Section 6 (See Validation Plan in Appendix B). The Total PCDD/F (dioxin) I-TEQ Upperbound results were between 21 and 990 pg/g. Of the 11 samples analysed, three dioxin results of 120, 190, and 990 pg/g triggered the need for redredging in accordance with the EMVP. The remaining samples had dioxin results of between 21 and 51 pg/g, which is below the remedial target.

The 95% UCL was calculated as being 40.19 pg/g for the approximately 3200 m length of the canal chemically validated as at 31 March 2019.

### 5.2 CS3 Groundwater

Groundwater sampling was undertaken by GAL at CS3 on 27 February 2019. Five samples were collected from the five monitoring wells installed around the containment cell (See Site Plan in Appendix A for well locations). The Total PCDD/F (dioxin) I-TEQ Upperbound results were between 3.74 and 5.76 pg/L.

The results were all below the adopted Tier 1 trigger level of 13.4 pg/L for Total PCDD/F (dioxin) I-TEQ Upperbound outlined in the EMVP. The dioxin results also showed no obvious change since the July 2018 CS3 groundwater sampling round in which dioxin concentrations between 4.11 and 8.88 pg/L were recorded.

### 5.3 CS1 Groundwater

Groundwater sampling was undertaken as part of the consent conditions by GAL at CS1 on 27 & 28 March 2019. Five samples were collected from the five monitoring wells installed around the containment cell (See Site Plan in Appendix A for well locations). The Total PCDD/F (dioxin) I-TEQ Upperbound results were between 3.07 and 3.85 pg/L.

The results were all below the adopted Tier 1 trigger level of 13.4 pg/L for Total PCDD/F (dioxin) I-TEQ Upperbound outlined in the EMVP. The dioxin results also showed no obvious change since the December 2018 CS1 groundwater sampling round in which dioxin concentrations between 4.39 and 5.41 pg/L were recorded.

### 5.4 CS1 Perimeter Drain

Sediment sampling within the perimeter drains at CS1 was undertaken by GAL on 27 February 2019. Three samples were sent to the laboratory where they were combined into one composite sample that was then analysed for dioxin. The Total PCDD/F (dioxin) I-TEQ Upperbound result was 20 pg/g. 20 pg/g is the laboratory limit of reporting for this analytical suite.

## 5.5 CS1 Geobags

The initial round of post dredging Geobag dioxin sampling was undertaken by HAIL Environmental Ltd in February 2019. Samples were taken through the access ports in the Geobags. Many of the Geobags contained large volumes of sand that had settled out directly around the ports leading to samples that contained predominantly sand. It was inferred that the fine sediment travels further in the water column and settles out between the ports. Analytical testing recorded Total PCDD/F (dioxin) I-TEQ Upperbound results between 28 and 480 pg/g.

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## 6. Consent Monitoring Summary

The following 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 as a consent authority.

Table 2: Consent Monitoring Summary Table

Condition <sup>1</sup>	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	There does not appear to be any significant erosion of the canal banks.
11.1 – 11.3	Site Access & Traffic Management	Yes	Signage has been placed at the exit of CS3 to remind project traffic of the pedestrian and cycle traffic risk. The project team has also asked all project traffic using Kope Canal Road to travel slowly enough as to not generate any dust.
12.2	Discharges from the Containment Sites (Filtrate and Stormwater)	Yes	Stormwater and filtrate are being released back into the Kopeopeo Canal from CS3. Live turbidity monitoring is underway at both of the sumps at CS3 in an effort to check turbidity in discharge water meets this consent condition. This is not a consent requirement while the FCS are in place.

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

Condition <sup>1</sup>	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 water released from the KCRP area into the Orini/Kopeopeo confluence was no greater than 20% above background.
15.1	Kopeopeo Canal Vegetation Disturbance	Yes	Tree and shrub removal is underway for the stopbanks along Section 6.
17.1 & 17.5	Kopeopeo Canal Control Structures	Yes	FCS operating appropriately and mobile pumping stations are established in accordance with the FMP.
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 stored in CS1 to assist with dust suppression and stormwater is being released from CS3 as part of the dredging filtrate discharges.
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 is 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 are in place.

Condition <sup>1</sup>	Description	Compliance	Details
26.1 – 26.4	Communication – Community Liaison Group	Yes	CLG is 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	Water containing contaminated sediment was spilled outside the water treatment cell bund on two occasions during March 2019. Both spills were contained and remediated adequately.
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. Signage has also been installed at the exit of CS3 to warn project traffic of the risk of pedestrian and cycle traffic.
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	Working 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. The BOPRC consent allows the dredge to operate outside of these hours as long as the dredging operation complies with NZS 6803:1999 Acoustics – Construction Noise.
34.1	Access for Monitoring	Yes	Access has been provided to BOPRC at its request and a site inspection was undertaken on 1 March 2019.

Condition <sup>1</sup>	Description	Compliance	Details
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.
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	<p>Groundwater quality monitoring is to be undertaken quarterly for the first 12 months of sediment deposition.</p> <p>The latest round of groundwater quality monitoring for CS1 took place in March 2019. As the 12 months of groundwater monitoring undertaken to date at CS1 did not record any dioxin concentration greater than 30 pg/L (highest result is 9.53 pg/L), groundwater sampling can now continue at annual intervals for the remainder of the consent.</p> <p>Groundwater monitoring at CS3 on a quarterly basis began in February due to the deposition of the first sediment into the containment cell.</p>
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 being below consent limits.
40.1 – 40.7	Dust Management	Yes	The containment cell at CS1 contains a small volume of sediment that has been spilt over the last 12 months. This material is however beneath the water that is retained in the cell so it complies with these consent conditions.

Condition <sup>1</sup>	Description	Compliance	Details
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 CS3, 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

### ***Validation sampling***

In March 2019, dredging of Section 6 of the Kopeopeo Canal continued, with subsequent sediment validation sampling. Eleven validation samples were taken from behind the dredge within Section 6 (See Validation Plan in Appendix B). The Total PCDD/F (dioxin) I-TEQ Upperbound results were between 21 and 990 pg/g. Of the 11 samples analysed, three dioxin results of 120, 190, and 990 pg/g triggered the need for redredging in accordance with the EMVP. The remaining samples had dioxin results between 21 and 51 pg/g, which is below the remedial target. The 95% UCL was calculated as being 40.19 pg/g for the approximately 3200 m length of the canal chemically validated as at 31 March 2019.

### ***Groundwater sampling***

Groundwater sampling was undertaken by GAL at CS3 on 27 February 2019. All dioxin results were below the adopted Tier 1 trigger level of 13.4 pg/L for Total PCDD/F (dioxin) I-TEQ Upperbound outlined in the EMVP. The dioxin results also showed no obvious change since the July 2018 CS3 groundwater sampling round.

Groundwater sampling was undertaken as part of the consent conditions by GAL at CS1 on 27 & 28 March 2019. The Total PCDD/F (dioxin) I-TEQ Upperbound results were between 3.07 and 3.85 pg/L. The dioxin results also showed no obvious change since the December 2018 CS1 groundwater sampling round.

### ***Sediment sampling***

Sediment sampling within the perimeter drains at CS1 was undertaken by GAL on 27 February 2019. The Total PCDD/F (dioxin) I-TEQ Upperbound result was 20 pg/g. 20 pg/g is the laboratory limit of reporting for this analytical suite.

### ***Bioremediation sampling***

Two rounds of dioxin sampling have been undertaken within the Geobags at CS1 since the conclusion of discharging dredge materials to CS1. This data has assisted in characterising the dioxin levels within the Geobags and a detailed baseline has been undertaken on three Geobags (Geobags 28, 29, and 30) that will be used as the long term monitoring indicators of remedial progress. The three Geobags were selected because they have the highest levels of contamination of any of the Geobags in CS1, and as such, once they have reached the remedial target, it is very likely that the less contaminated Geobags will also have achieved the remedial target.

### ***Project matters***

Two spills of contaminated sediment occurred within CS3 adjacent to the water treatment plant, both of which were contained and cleaned appropriately.

Flood management continued throughout March with no significant rainfall events triggering the need for flood management. Cleaning and tidying of CS1 is ongoing and the cell is being kept in a flooded state to cover sediment that had been spilled during pumping.

The consent holder appeared to be compliant with all consent conditions checked by the IM field observer. This observation was corroborated by an audit by a BOPRC officer on 1 March 2019.

April will see dredging continue through Section 6 along with sustained work to tidy and clean CS1, continued preparation for bioremediation of the sediments in CS1 and commencement of preparing CS1 for closure.

# Appendices

# Appendix A – Site Plan



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



**LEGEND**

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



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 Kopeopeo Canal Remediation Project

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Site Plan

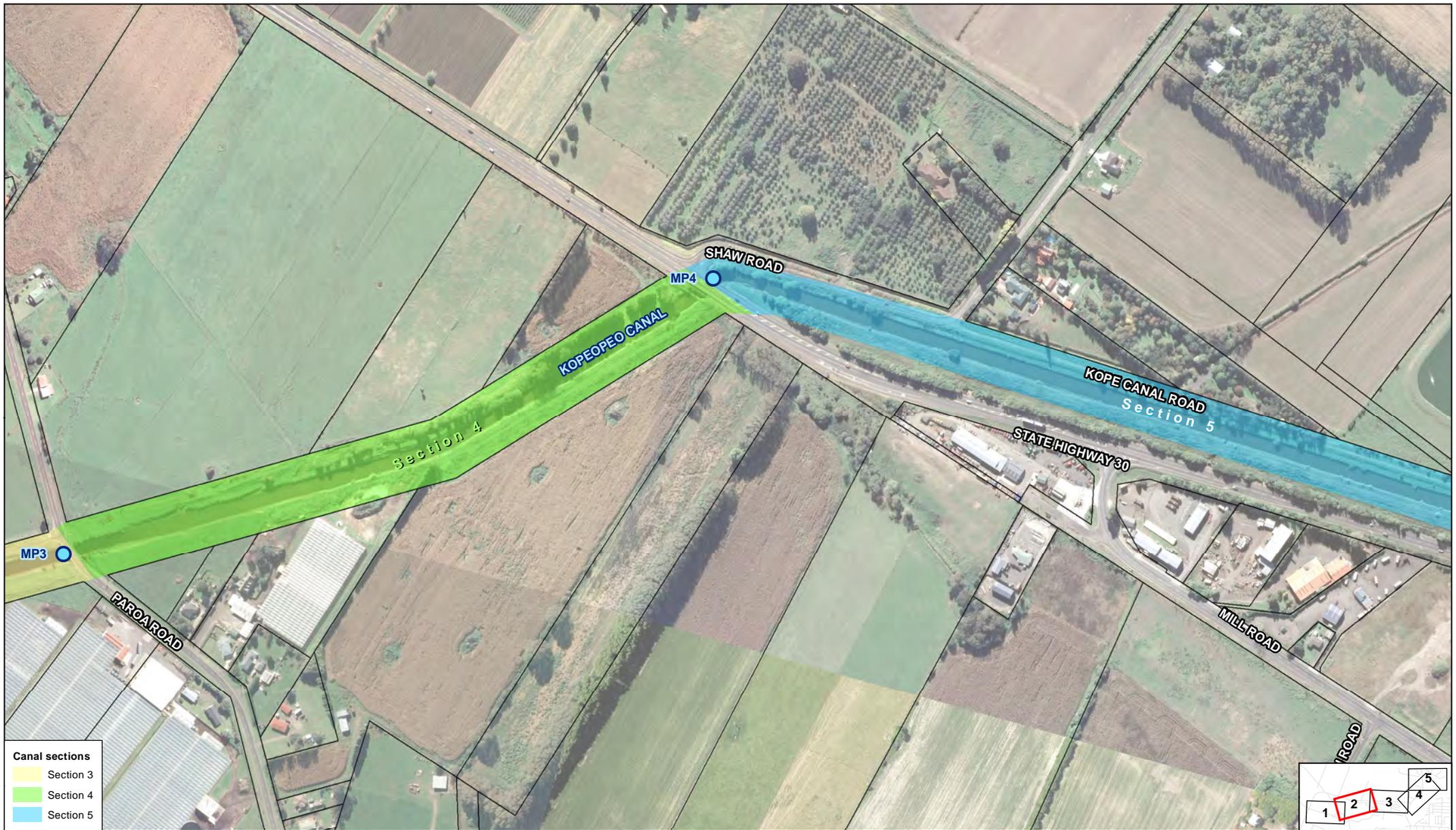
Figure 1

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LEGEND

- Turbidity monitoring point
- Property boundary



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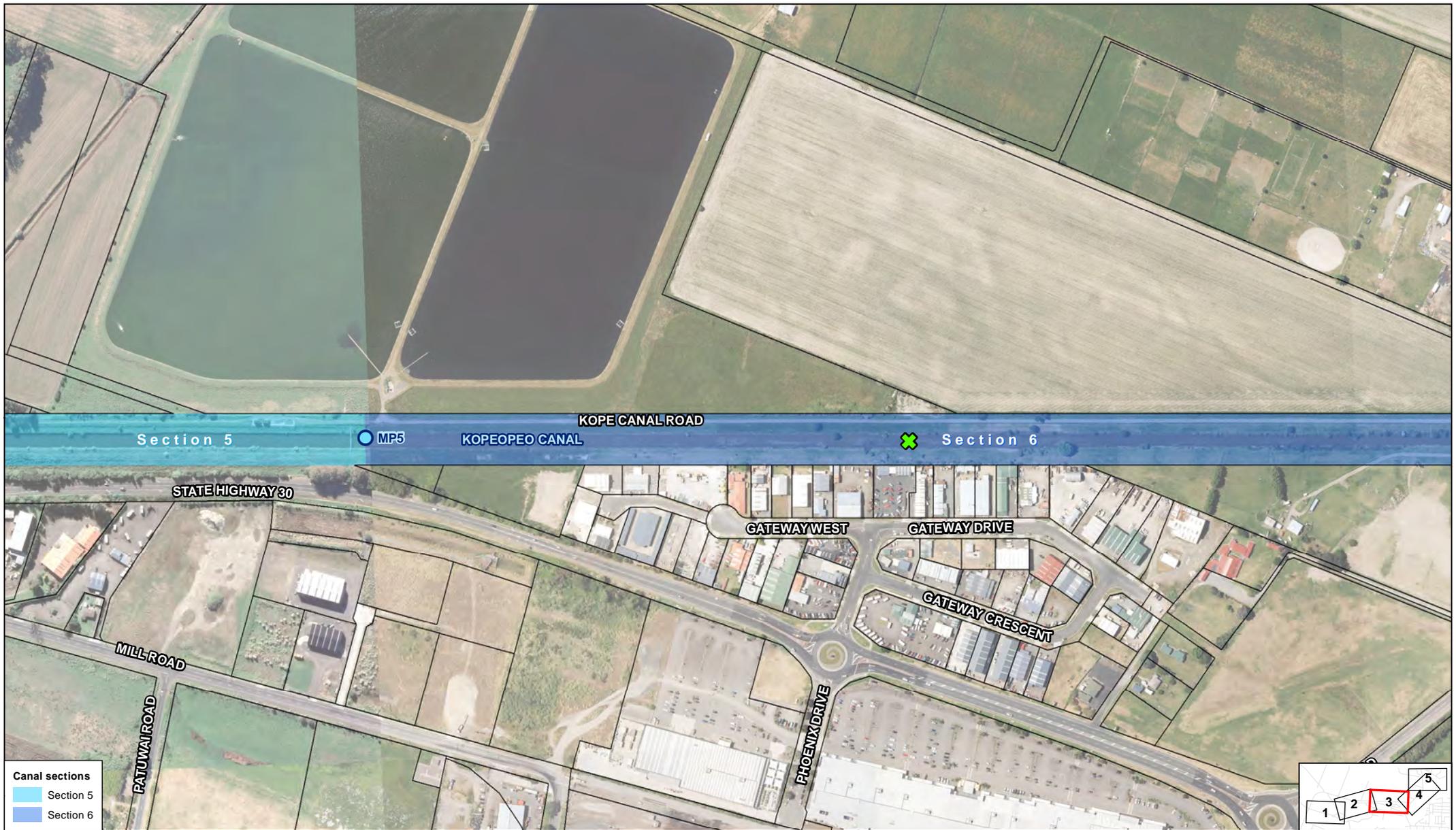
Figure 2

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

**LEGEND**  
 Turbidity monitoring point  
 Current dredge location  
 Property boundary

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**GHD**

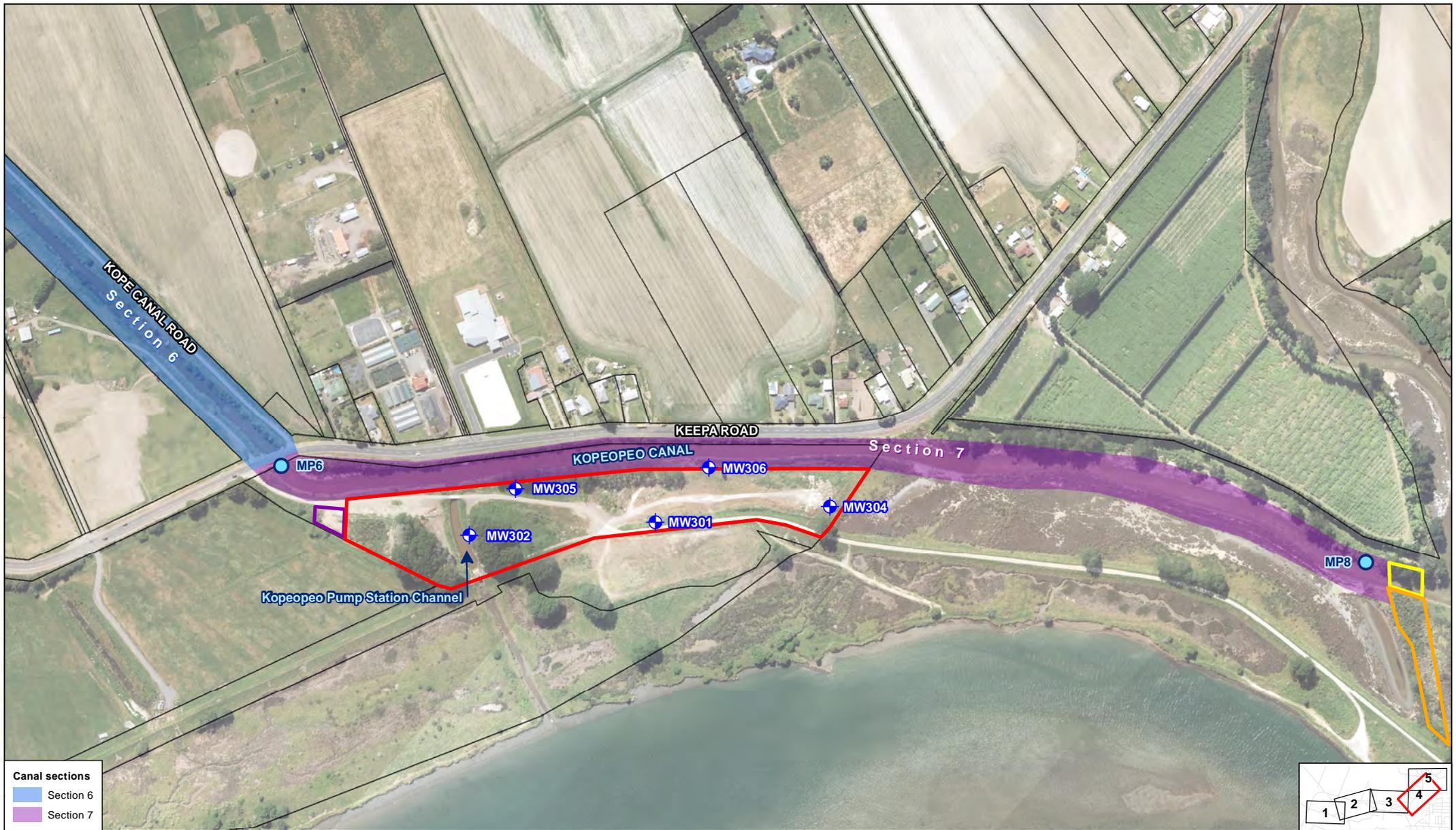
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Figure 3

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



**LEGEND**

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



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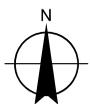
Site Plan

Figure 4



**Canal sections**  
 Section 7

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 Metres



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



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Site Plan

Figure 5

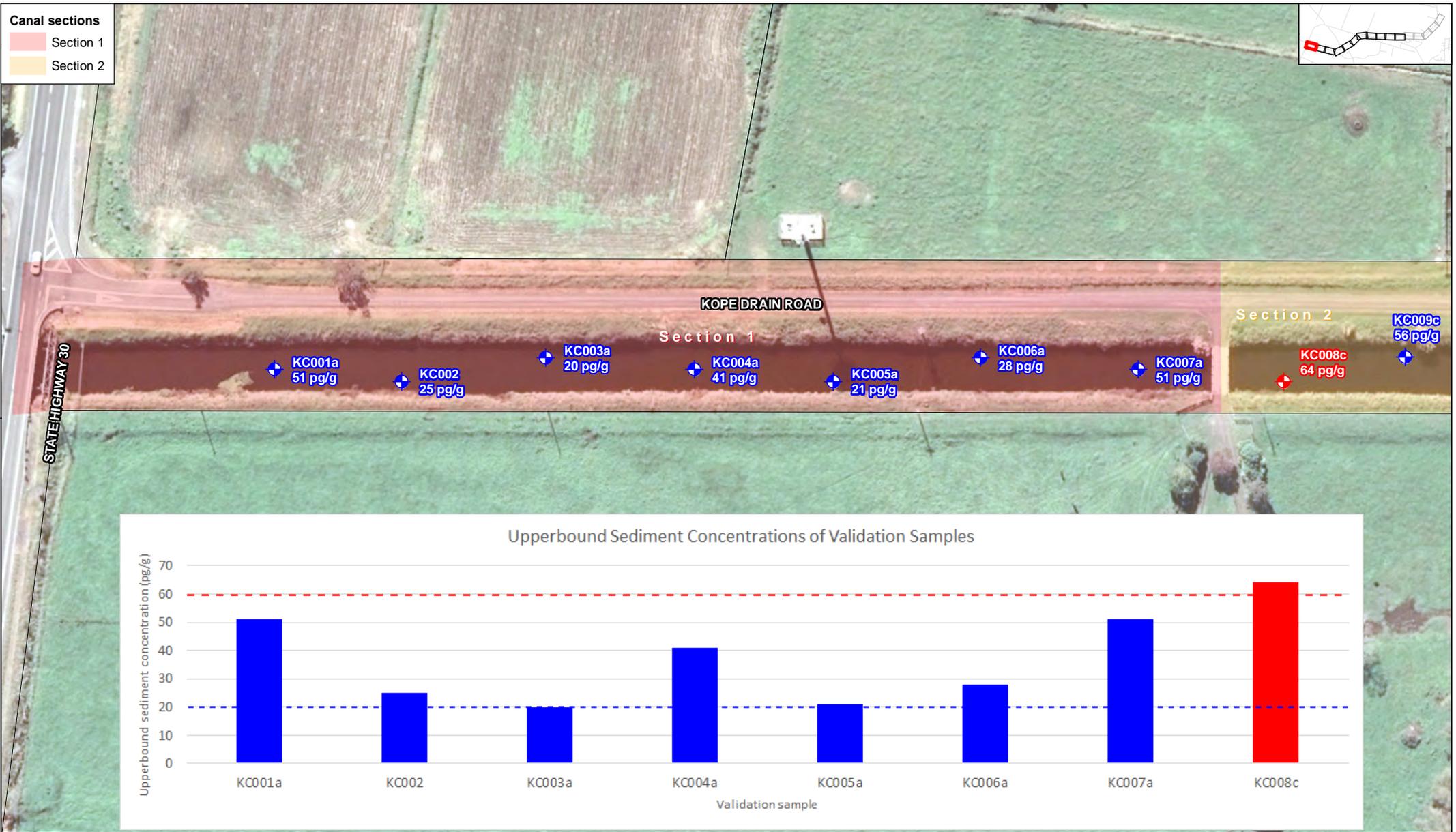
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# Appendix B – Canal Sediment Validation Locations



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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 40.19 pg/g  
Remedial target = 60 pg/g



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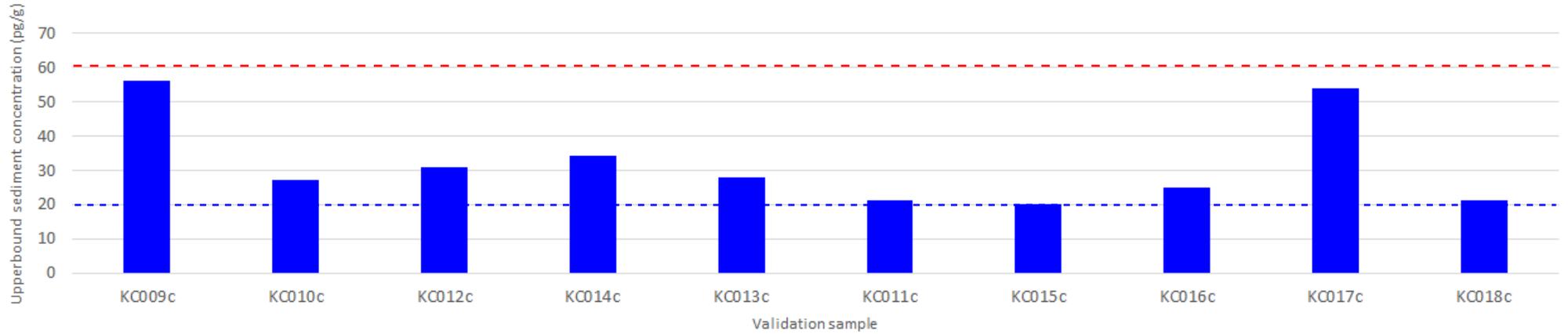
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Date 17 Apr 2019

Validation Samples

Figure 1



Upperbound Sediment Concentrations of Validation Samples



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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)

Property boundary

Canal Sediment Validation 95% UCL of 40.19 pg/g  
 Remedial target = 60 pg/g

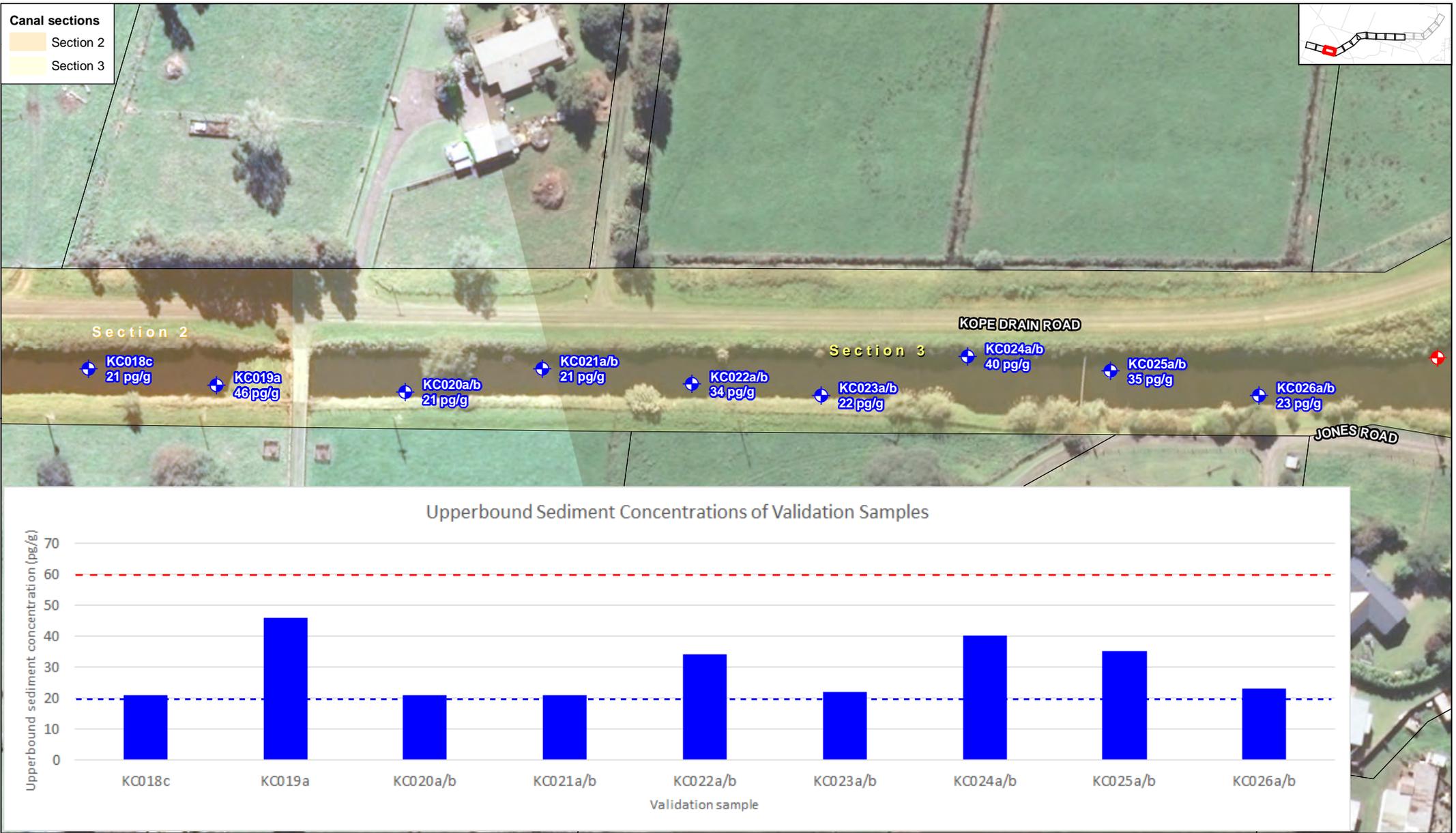


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Validation Samples

Figure 2



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 40.19 pg/g  
Remedial target = 60 pg/g



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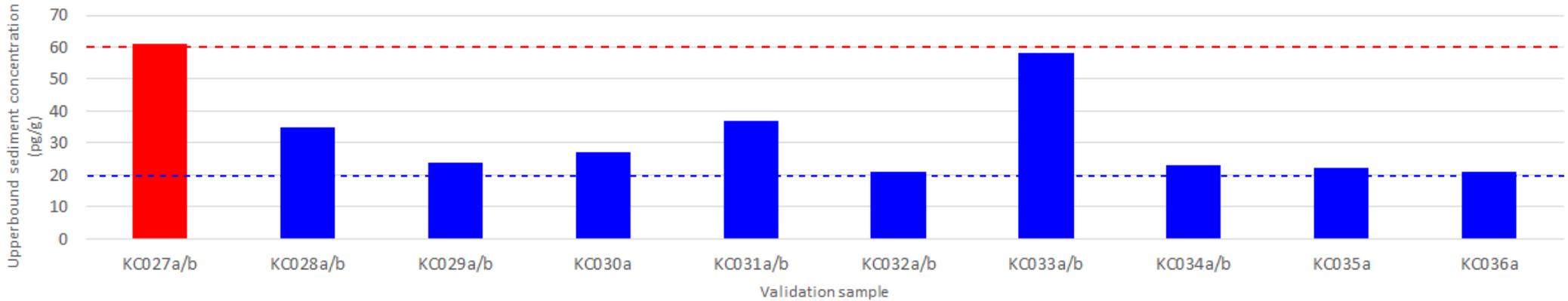
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Validation Samples

Figure 3



Upperbound Sediment Concentrations of Validation Samples



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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 40.19 pg/g  
 Remedial target = 60 pg/g



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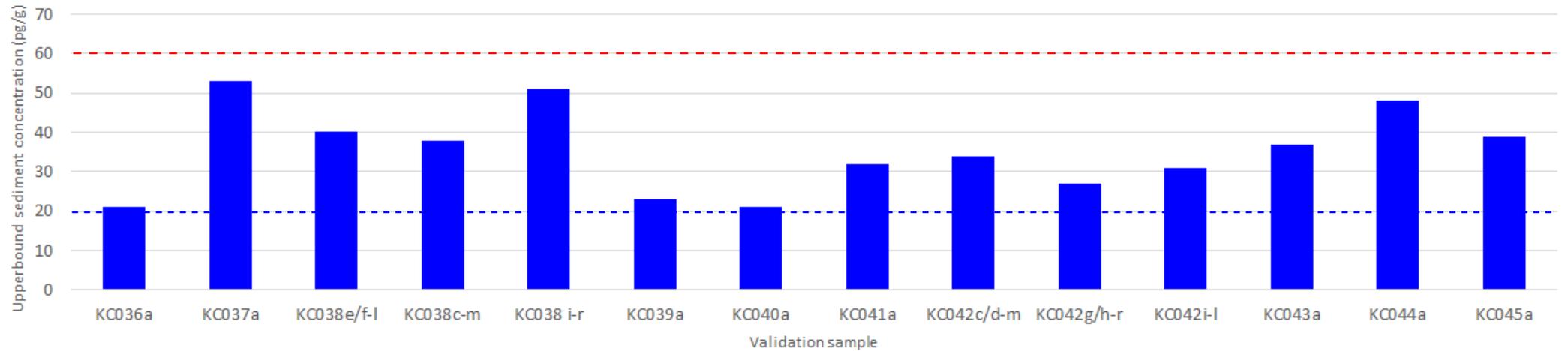
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Validation Samples

Figure 4



Upperbound Sediment Concentrations of Validation Samples



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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)
- Superseded historic validation samples prior to redredge

Property boundary

Canal Sediment Validation 95% UCL of 40.19 pg/g  
 Remedial target = 60 pg/g



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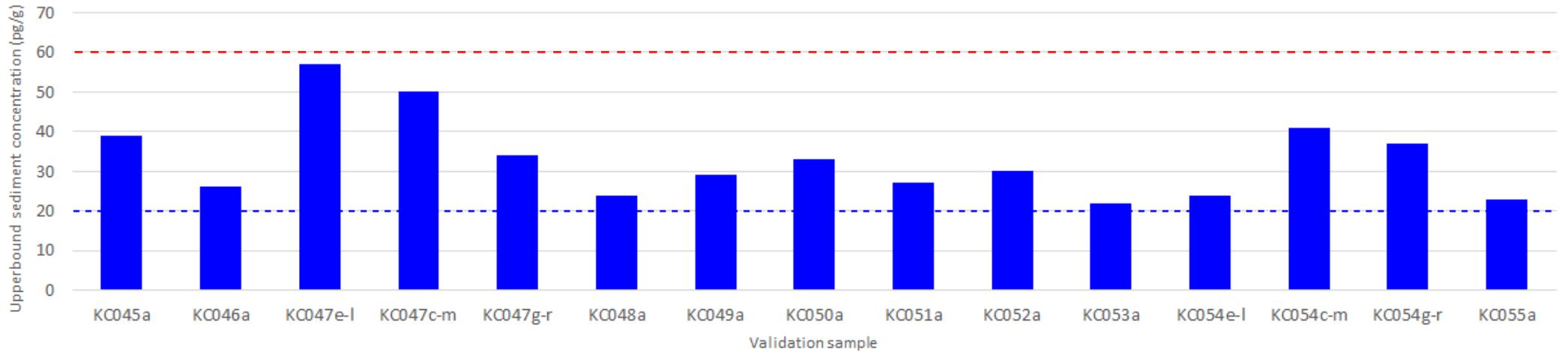
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Validation Samples

Figure 5



Upperbound Sediment Concentrations of Validation Samples



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 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 40.19 pg/g  
 Remedial target = 60 pg/g

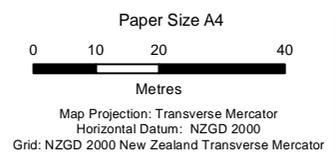
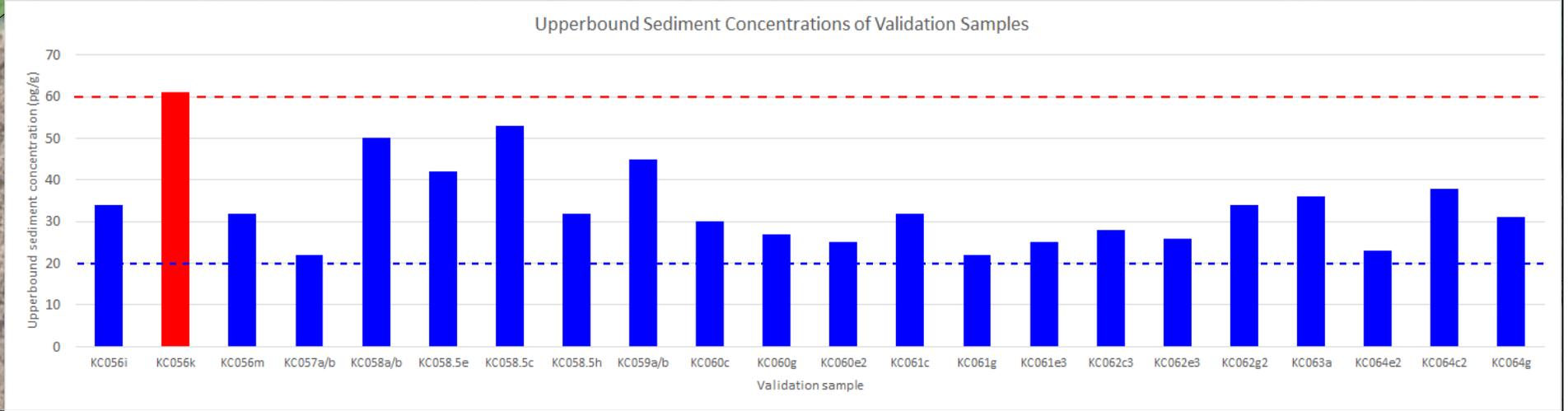


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 Date 17 Apr 2019

Validation Samples

Figure 6



- 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 40.19 pg/g  
Remedial target = 60 pg/g



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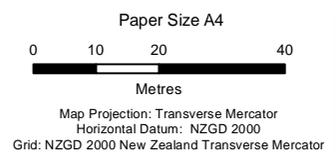
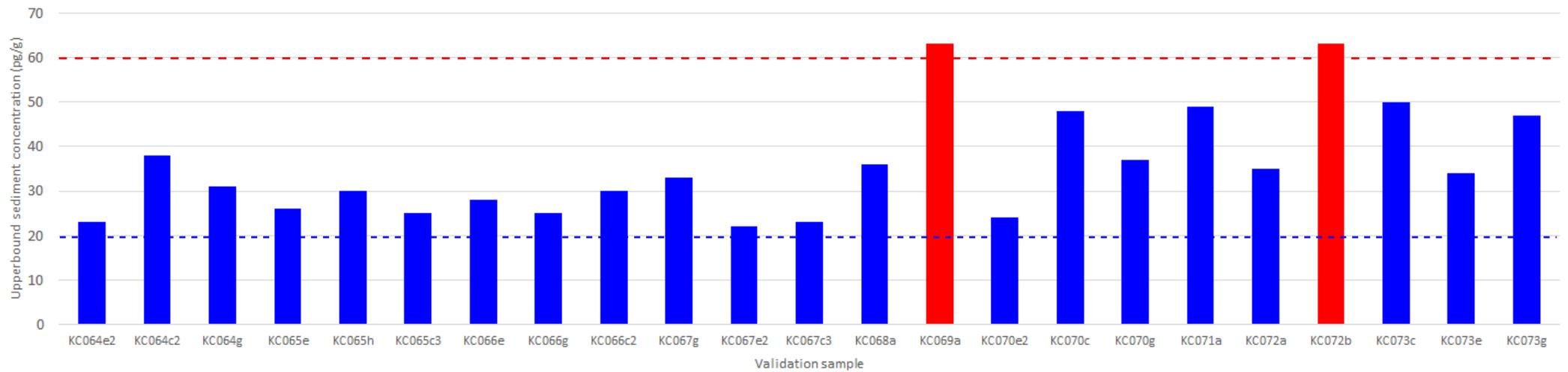
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Validation Samples

Figure 7



Upperbound Sediment Concentrations of Validation Samples



**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 40.19 pg/g  
Remedial target = 60 pg/g

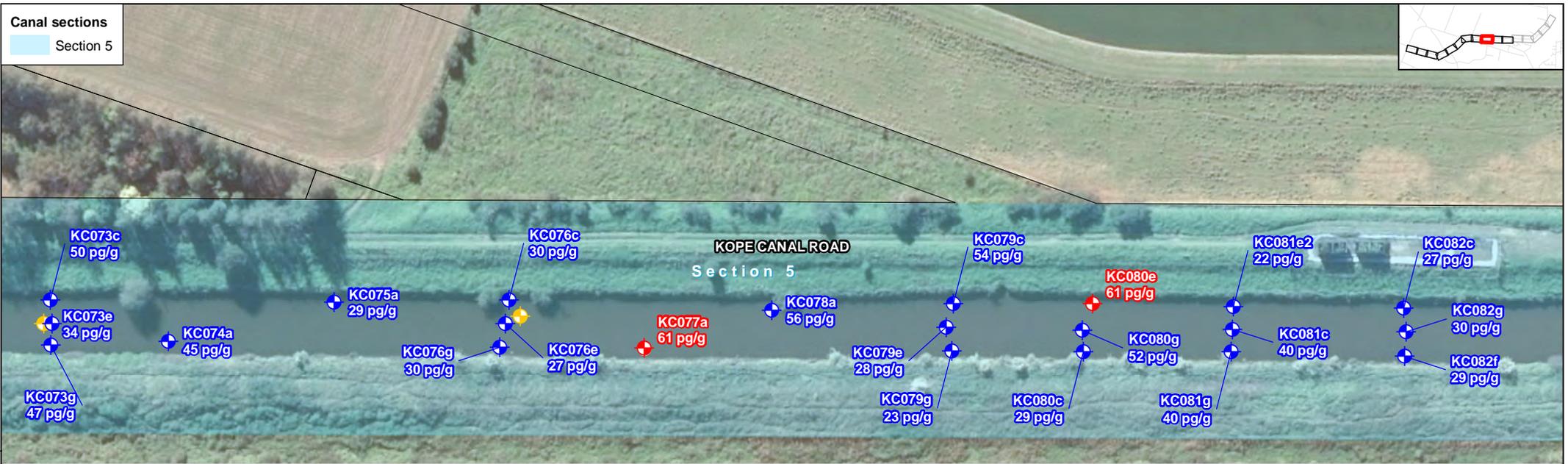


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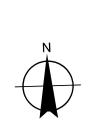
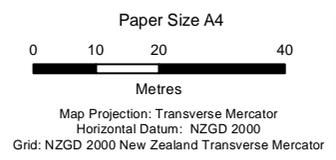
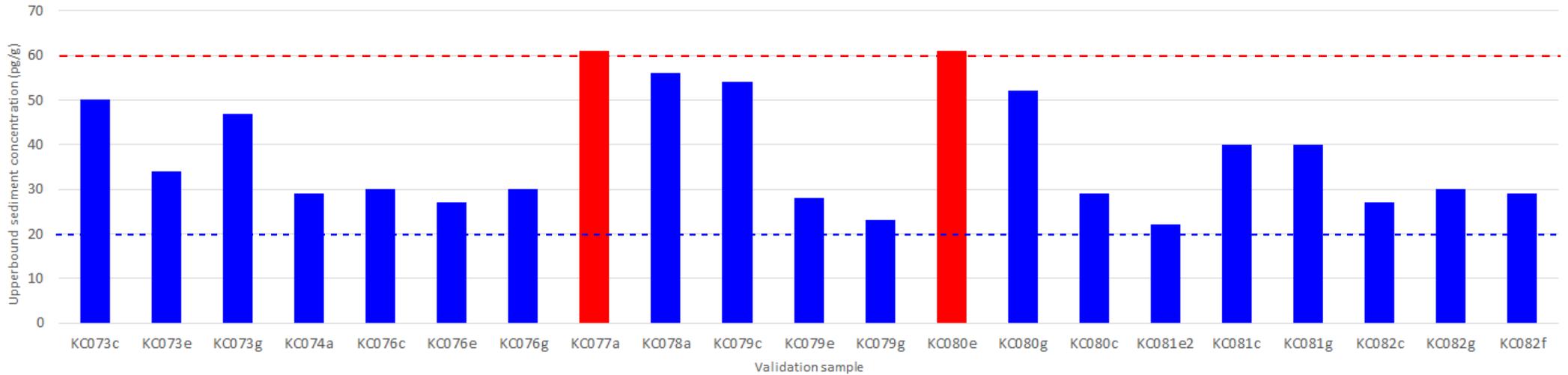
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Date 17 Apr 2019

Validation Samples

Figure 8



Upperbound Sediment Concentrations of Validation Samples



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

Property boundary

Canal Sediment Validation 95% UCL of 40.19 pg/g  
Remedial target = 60 pg/g

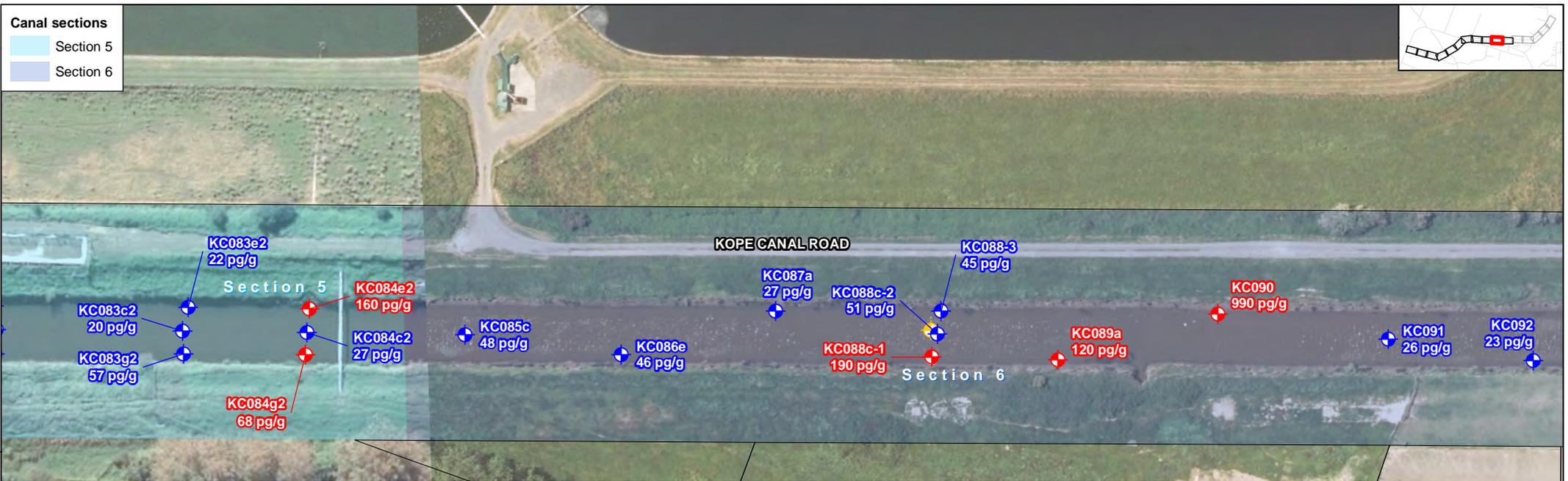


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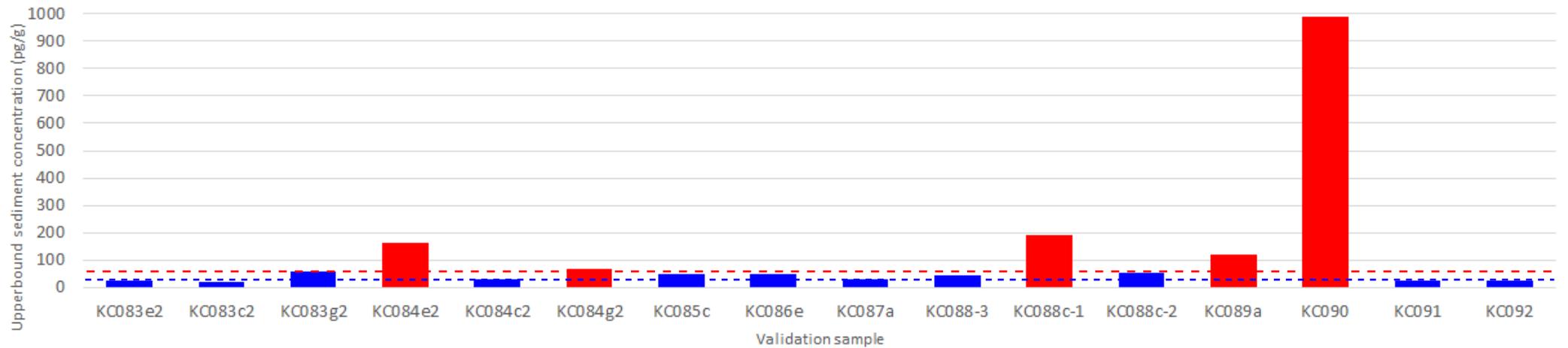
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Validation Samples

Figure 9



Upperbound Sediment Concentrations of Validation Samples



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 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 40.19 pg/g  
 Remedial target = 60 pg/g



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Validation Samples

Figure 10



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 40.19 pg/g  
Remedial target = 60 pg/g



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Validation Samples

Figure 11

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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		06/05/2019

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