7th October 2026 Maven REF: 180010

Environmental Protection Agency
Private Bag 63002
Wellington 6140, New Zealand

FTAA-2608-1286

Background

This memo has been prepared for the Environmental Protection Agency (EPA) for the Request for Further Information (RFI) received on 30th September 2026. The request was raised as part of the mandatory consultation the EPA undertook with the Department of Conservation.

The RFI has requested details regarding the type, dimensions, design, placement, water flows, and operating regime of the structure and any associated fish facility for the proposed in-stream structures and channel diversion arrangement for construction of the Mangaheka Stream.

Response

The temporary diversion detail included with the application has been revised and detailed further to include details for the proposed temporary in-stream structures and channel diversion arrangements associated with the construction of the Mangaheka Stream. These are the only activities subject to the Complex Freshwater Fisheries regulations and which the proposal has sought approvals for through the Substantive Application.

A temporary channel diversion will be constructed alongside the final proposed alignment of the Mangaheka Stream. The proposed diversion will be constructed as an open channel system. No piped diversions or temporary culverts are proposed as part of the temporary diversion. The channel will be constructed in-site and lined with Enviroforce geotextile. The Stream will be constructed in three (3) phases per the Stream Works Management Plan. Water from the stream between the existing watercourse and diversion channel will be dammed via an earth embankment to stage the interface between the three construction phases. The diversion channel has been designed to convey flows up to the 20-Year ARI storm event.

There are two permanent culverts proposed to be installed within the Mangaheka Stream corridor. These culverts are not subject to the Freshwater Fisheries approvals, however these permanent culverts have been indicatively sized based on the hydraulic flood model prepared with Te Miro Water. Detailed design of the culverts will be carried out prior to construction and submitted to District and Regional Council for Engineering Plan approval and vested in future.

Specifically,

- De-watering and fish relocation methodology is provided in Volume B, Appendix O (Appendix F – Stream Works Management Plan) and Volume B, Appendix V (Fish Management Plan).
- Detailed design, dimensions and sizing of the Temporary Channel Diversion is provided via **Appendix A.**

    - Positioning for horizontal and vertical tie-ins are provided via DWG C231 & C233
    - Methodology is provided via DWG C232
    - Dimensions and cross-sectional detail are provided via DWG C234
- Calculations on for the 20-Year ARI flow & Diversion Hydraulics are provided via **Appendix B.**

Prepared by,

Kevin Yip
Maven Associates Ltd
[redacted]

Approved by,



Ryan Wyllie
Maven Associates Ltd
[redacted]

APPENDIX A: TEMPORAY DIVERSION – DETAILED DESIGN

SRP 5
BASE SIZE: 16.05m x 48.15m
BASE RL: 26.50m
TOTAL VOL: 1500m3
DEPTH 1.5m

CONTRIBUTING CATCHMENTS
P2-1 TO P2-5

SRP 6
BASE SIZE: 16.05m x 48.15m
BASE RL: 24.05m
TOTAL VOL: 1500m3
DEPTH 1.5m

CONTRIBUTING CATCHMENTS
P2-6 TO P2-10

SRP 8
BASE SIZE: 16.05m x 48.15m
BASE RL: 28.50m
TOTAL VOL: 1500m3
DEPTH 1.5m

CONTRIBUTING CATCHMENTS
P3 - 7 TO P3 - 8

SRP 7
BASE SIZE: 16.05m x 48.15m
BASE RL: 26.50m
TOTAL VOL: 1500m3
DEPTH 1.5m

CONTRIBUTING CATCHMENTS
P3 - 1 TO P3 - 6

SRP 2A
BASE SIZE: 11.91m x 35.75m
BASE RL: 24.90m
TOTAL VOL: 900m3
DEPTH 1.5m

CONTRIBUTING CATCHMENTS
PS1-1

SRP 2
BASE SIZE: 16.05m x 48.15m
BASE RL: 24.05m
TOTAL VOL: 1500m3
DEPTH 1.5m

CONTRIBUTING CATCHMENTS
P1B-1 TO P1B-4, P1A8

SRP 3
BASE SIZE: 16.05m x 48.15m
BASE RL: 25.00m
TOTAL VOL: 1500m3
DEPTH 1.5m

CONTRIBUTING CATCHMENTS
P1A-7, P1B-7, PS2 - 1, P2-SW1
(STREAMWORKS)

SRP 1
BASE SIZE: 16.05m x 48.15m
BASE RL: 25.90m
TOTAL VOL: 1500m3
DEPTH 1.5m

CONTRIBUTING CATCHMENTS
P1A - 1 TO P1A - 3

SRP 4
BASE SIZE: 16.05m x 48.15m
BASE RL: 26.80m
TOTAL VOL: 1500m3
DEPTH 1.5m

CONTRIBUTING CATCHMENTS
P1A-4 TO P1A-6, PS3 - 1
(STREAMWORKS)

SRP 9
BASE SIZE: 16.05m x 48.15m
BASE RL: 26.90m
TOTAL VOL: 1500m3
DEPTH 1.5m

CONTRIBUTING CATCHMENTS
P4-1 TO P4 - 4

C231- SECTION A
C231-SECTION B
C231-SECTION C
C231-SECTION D

ONION ROAD
MATHERS ROAD
KOURA DRIVE (SH 39)
MANGAHARAKEKE DRIVE (SH 1C)
TE KOWHAI ROAD (SH39)

PR STABILISED ENTRANCEWAY
PR STABILISED ENTRANCEWAY
EX 1000mmØ SW
EX TWIN BARREL 1350mmØ SW
AREA TREATED AS SILT FENCE 1920m²

RESOURCE CONSENT

NOTES
1. ALL WORKS TO BE IN ACCORDANCE WITH WAIKATO DISTRICT COUNCIL/AWAA STANDARD DETAILS AND THE WAIKATO REGIONAL INFRASTRUCTURE TECHNICAL SPECIFICATION.
2. COORDINATES IN TERMS OF NZ GEODETIC DATUM MT EDEN 2000
3. LEVELS IN TERMS OF THE NEW ZEALAND VERTICAL DATUM 2016.
4. ORIGIN OF LEVELS = BP 3 SO 468570 (EMDK)
5. PUBLISHED RL=38.59, SOURCED FROM THE LINZ DIGITAL GEODETIC DATABASE.
6. BOUNDARIES ARE SUBJECT TO FINAL SURVEY.
7. IT IS THE CONTRACTOR'S RESPONSIBILITY TO LOCATE ALL SERVICES THAT MAY BE AFFECTED BY THEIR OPERATIONS.
8. THE CONTRACTOR SHALL COMPLY WITH ALL RELEVANT HEALTH AND SAFETY REQUIREMENTS.
9. THE CONTRACTOR SHALL OBTAIN ALL NECESSARY APPROVALS FROM UTILITY OPERATORS BEFORE COMMENCING WORK UNDER OR NEAR THEIR SERVICES.
10. SEDIMENT CONTROL SHALL BE INSTALLED AND OPERATIONAL BEFORE EARTHWORKS START ON-SITE IN ACCORDANCE WITH COUNCIL STANDARDS.
11. CONTRACTOR SHALL PROVIDE AS-BUILT OF WORKING SEDIMENT CONTROL DEVICES AND CONFIRMATION OF POND/DECANT VOLUMES TO ENGINEER.
12. SEDIMENT CONTROL TO COMPLY WITH TR2009/02 STANDARDS.

LEGEND
- EX BDY
- PROP BDY
- EX MAJOR CONTOUR
- EX MINOR CONTOUR
- EX CULVERT
- EX STREAM
- STREAM DEWATERING
- PR MAJOR CONTOUR
- PR MINOR CONTOUR
- PR STREAMWORKS EXT
- PR STREAM DIVERSION
- PR CLEANWATER
- PR DIRTYWATER
- PR SILT FENCE
- PR DECANT
- PR DECANT BAR
- PR SEDIMENT RETENTION POND
- PR MODIFIED STREAM

Ref	Revisions	By	Date
A	RESOURCE CONSENT	JD	08/2026

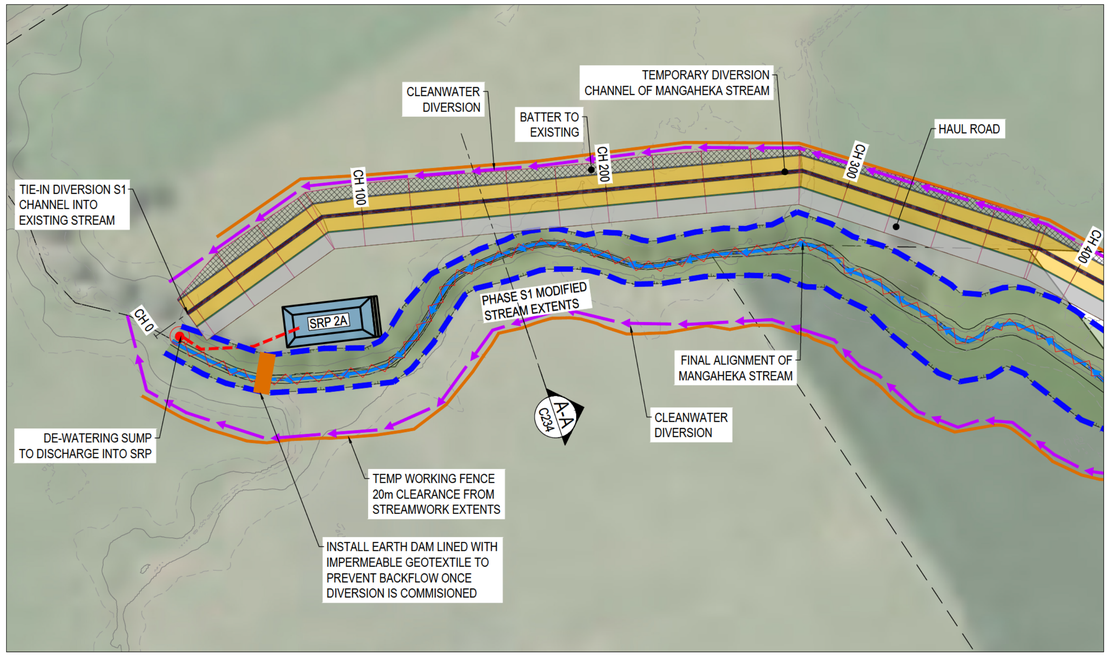
	By	Date
Survey	MAVEN	10/2025
Design	JD	08/2026
Drawn	JD	08/2026
Checked	RW	08/2026

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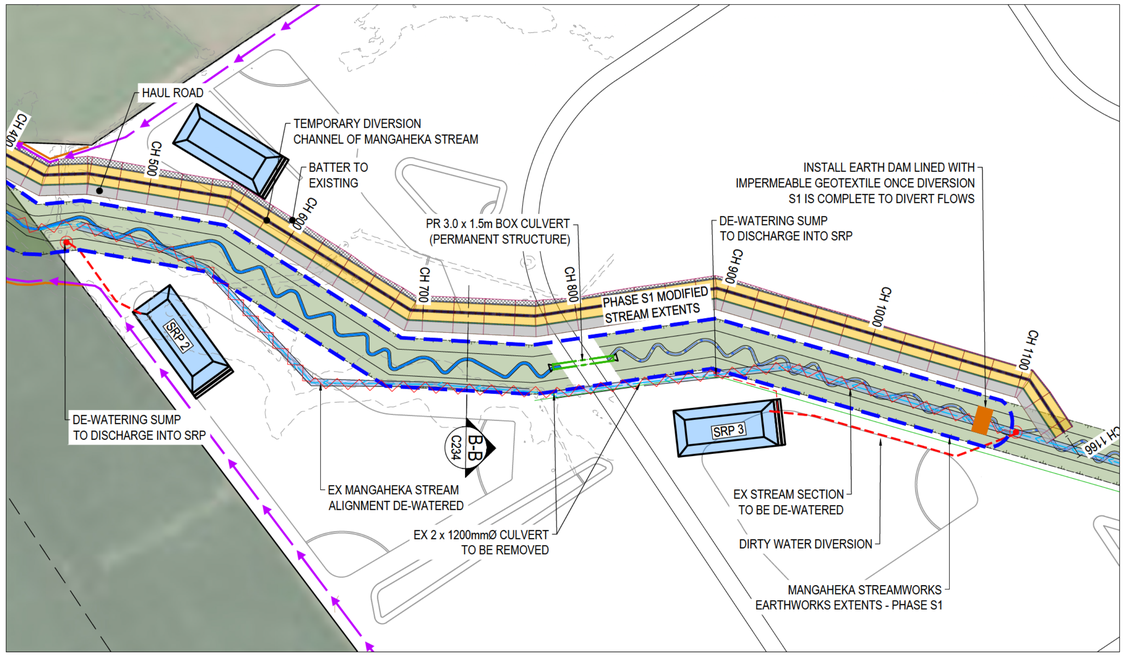
Project
PROPOSED INDUSTRIAL DEVELOPMENT AT TE KOWHAI EAST FOR TE KOWHAI EAST LIMITED PARTNERSHIP

Title
PROPOSED SEDIMENT EROSION CONTROL PLAN

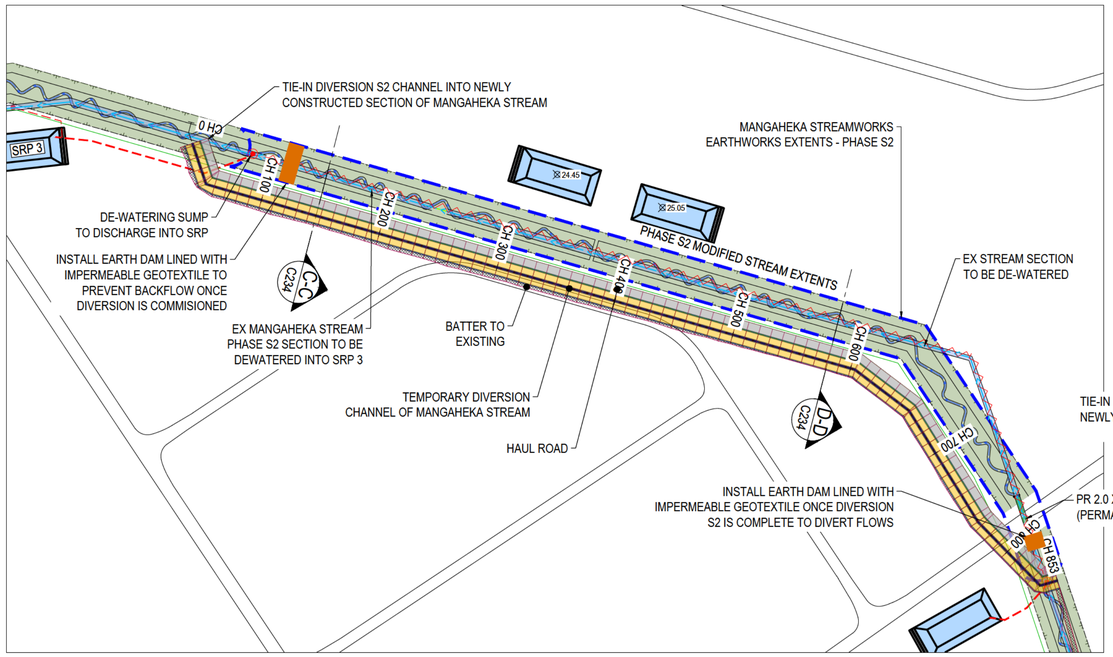
Project no.	180010
Scale	1:4000 @ A1
Cad file	180010-C230 ESCP.DWG
Drawing no.	C230 Rev. A



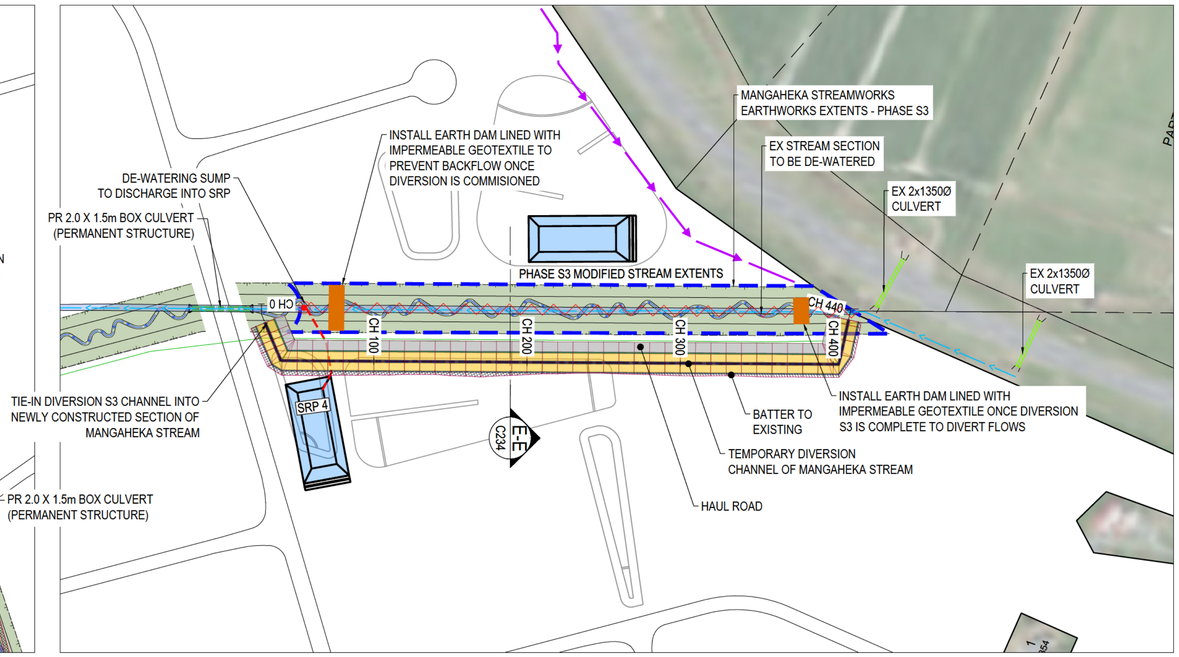
A C230 PHASE S1 - STREAM WORKS LOWERING/WIDENING (EXTERNAL)
SCALE 1:1250 @ A1



B C230 PHASE S1 - STREAM WORKS LOWERING/WIDENING (INTERNAL)
SCALE 1:2000 @ A1



C C230 PHASE S2 - STREAM WORKS LOWERING/WIDENING (INTERNAL)
SCALE 1:2500 @ A1



D C230 PHASE S3 - STREAM WORKS LOWERING/WIDENING (INTERNAL)
SCALE 1:2000 @ A1

RESOURCE CONSENT

NOTES
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12. SEDIMENT CONTROL TO COMPLY WITH TR2009/02 STANDARDS.

LEGEND
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- PROP BDY
- EX MAJOR CONTOUR
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- EX STREAM
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- PR MAJOR CONTOUR
- PR MINOR CONTOUR
- PR STREAMWORKS EXT
- PR STREAM DIVERSION
- PR CLEANWATER
- PR DIRTYWATER
- PR SILT FENCE
- PR DECANT
- PR DECANT BAR
- PR SEDIMENT RETENTION POND
- PR MODIFIED STREAM

Ref	Revisions	By	Date
A	RESOURCE CONSENT	SP	08/2026

	By	Date
Survey	MAVEN	10/2025
Design	JD	08/2026
Drawn	JD	08/2026
Checked	RW	08/2026

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Project
PROPOSED INDUSTRIAL DEVELOPMENT AT TE KOWHAI EAST FOR TE KOWHAI EAST LIMITED PARTNERSHIP

Title
PROPOSED STREAM DIVERSION EXTENTS PLAN

Project no.	180010
Scale	AS SHOWN @ A1
Cad file	180010-C230 ESCP (DIVERSION DETAILED).dwg
Drawing no.	C231 Rev A

1.0- TEMPORARY DIVERSION CHANNEL

- UNDERTAKE ALL IN-STREAM WORKS, INCLUDING FLOW CUT-OVER, DURING LOW-FLOW PERIODS; MONITOR FORECASTS AND CEASE AND SECURE WORKS AHEAD OF SIGNIFICANT RAINFALL.
- EXCAVATE TEMPORARY DIVERSION CHANNEL WITHIN THE NEW MANGAHEKA STREAM EXTENTS, SIZED FOR THE 20-YEAR ARI EVENT (PRE-DEVELOPMENT).
- CUT SECTIONS OUTSIDE THE CHANNEL TO LEVEL AND PERMANENTLY STABILISE (RIPARIAN PLANTING AS REQUIRED).
- LINE TEMPORARY DIVERSION CHANNEL AS REQUIRED BY TR2009/02.
- CONFIRM ALL SEDIMENT RETENTION PONDS AND ESC DEVICES ARE CONSTRUCTED, OPERATIONAL AND AS-BUILT CERTIFIED, AND CLEAN WATER FROM THE UPSTREAM CATCHMENT IS DIVERTED AROUND THE WORKS, BEFORE DIVERTING STREAM FLOWS.
- DIVERT FLOWS FROM MANGAHEKA STREAM, STARTING FROM DOWNSTREAM TO UPSTREAM.

2.0- MANGAHEKA STREAM WORKS

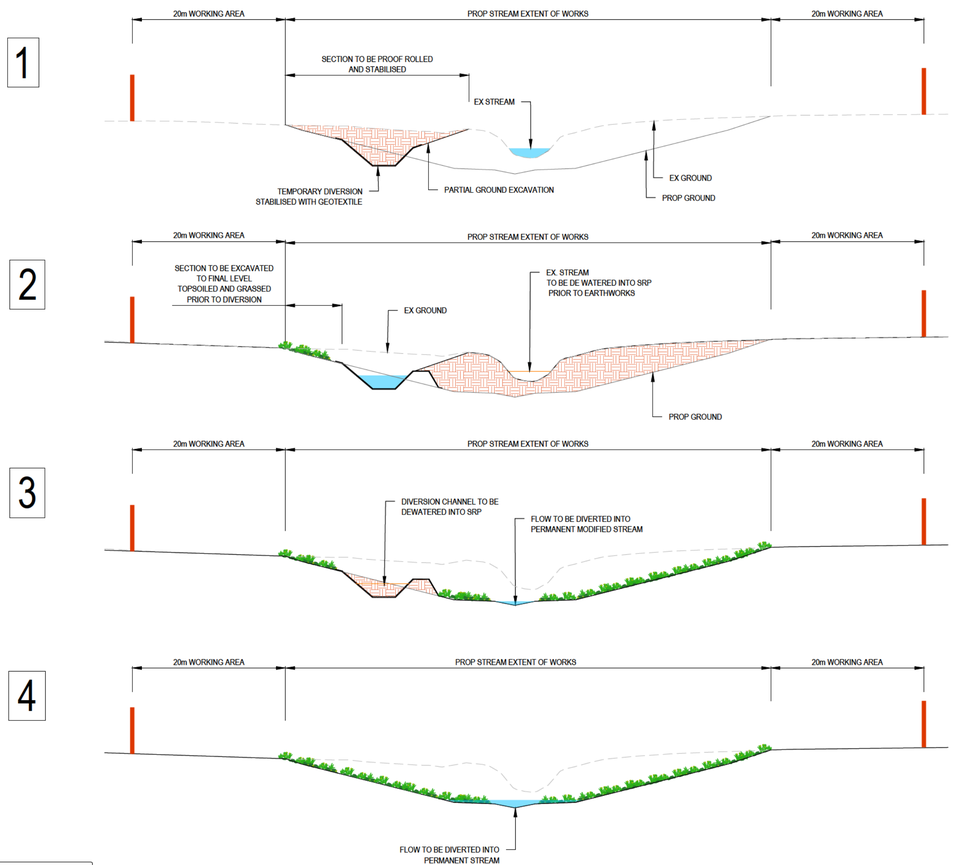
- UNDERTAKE FISH AND NATIVE FAUNA SALVAGE FROM THE ISOLATED REACH BEFORE DEWATERING, IN ACCORDANCE WITH CONSENT CONDITIONS.
- DEWATER ISOLATED SECTION OF EXISTING MANGAHEKA STREAM TO NEAREST SEDIMENT RETENTION POND.
- PUMP DEWATERING TO THE SRP VIA A SCREENED INTAKE, TREAT WITH FLOCCULANT IF TURBID, AND DISCHARGE TO A STABILISED, NON-EROSIVE OUTLET.
- COMPLETE BULK EXCAVATION AND STABILISATION OF THE PROPOSED STREAM MODIFICATION; FORM TEMPORARY BUND ADJACENT TO DIVERSION CHANNEL.
- COMPLETE TOPSOILING AND LANDSCAPING
- PROGRESSIVELY STABILISE ALL EXPOSED AND DISTURBED AREAS AS SOON AS PRACTICABLE, IN ACCORDANCE WITH TR2009/02.

3.0- DIVERSION FLOW CUT OVER

- DEWATER DIVERSION FLOW INTO SEDIMENT RETENTION POND
- CHANGE OVER FLOWS INTO PERMANENT STREAM ALIGNMENT
- INSTALL ESC CONTROLS (SILT SOCKS) ALONG THE STABILISED SECTIONS.
- FILL DIVERSION CHANNEL WITH BUNDING MATERIAL
- STABILISE THE REINSTATED DIVERSION CHANNEL FOOTPRINT ON COMPLETION OF FILLING.
- COMPLETE FINAL TOPSOILING AND LANDSCAPING

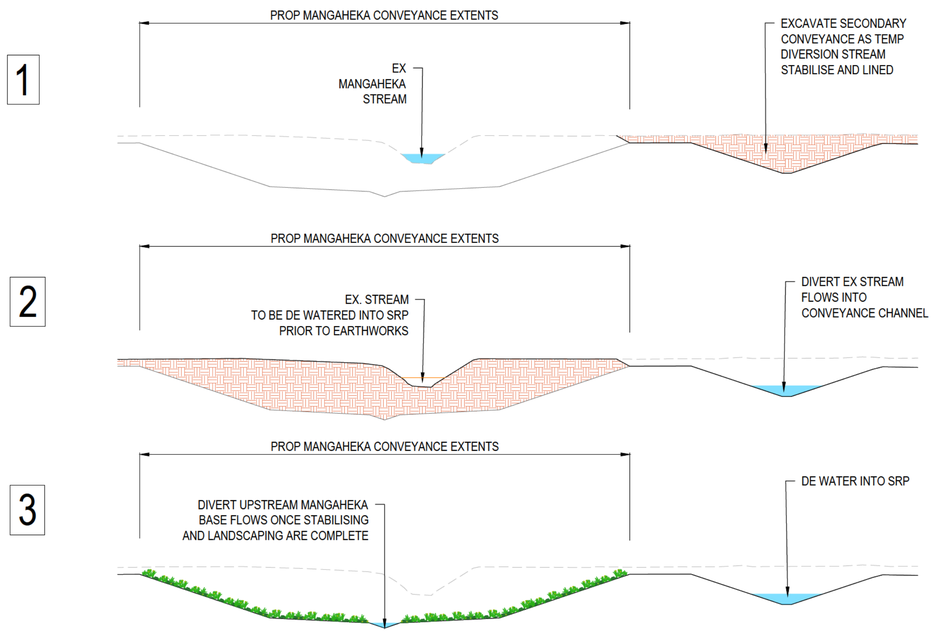
PHASE S1 STREAM WORKS SEQUENCE (IN STREAM DIVERSION)

SCALE 1:150 @ A1



PHASE S2 - S3 STREAM WORKS SEQUENCE

SCALE 1:150 @ A1



RESOURCE CONSENT

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LEGEND

- EX GROUND LEVEL
- PR FINAL GROUND LEVEL
- PARTIAL GROUND LEVEL
- EXCAVATION AREA

Ref	Revisions	By	Date
A	RESOURCE CONSENT	JD	08/2026

	By	Date
Survey	MAVEN	10/2025
Design	JD	08/2026
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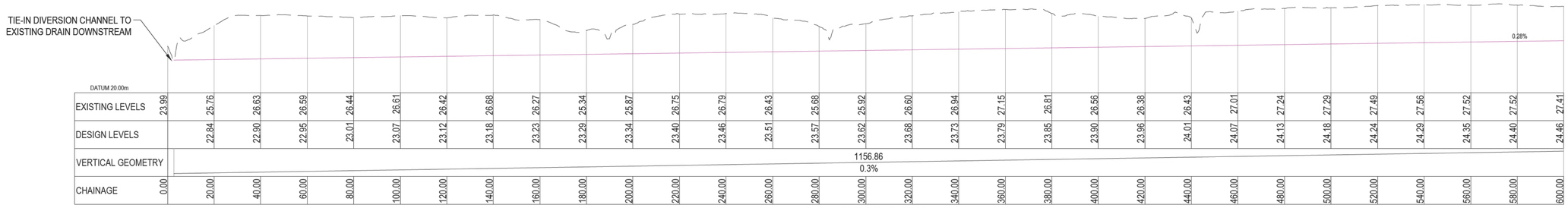
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Project
PROPOSED INDUSTRIAL DEVELOPMENT AT TE KOWHAI EAST FOR TE KOWHAI EAST LIMITED PARTNERSHIP

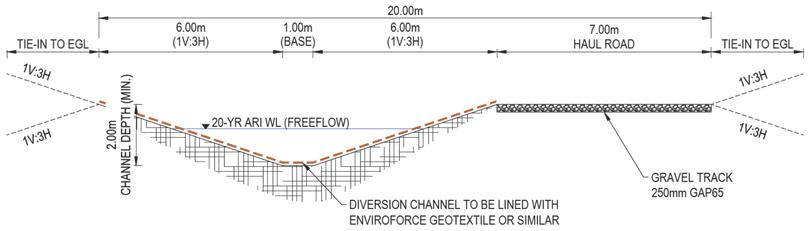
Title
PROPOSED STREAM DIVERSION METHODOLOGY PLAN

Project no.	180010
Scale	AS SHOWN @ A1
Cad file	180010-C230 ESCP (DIVERSION DETAILED).DWG
Drawing no.	C232 Rev. B

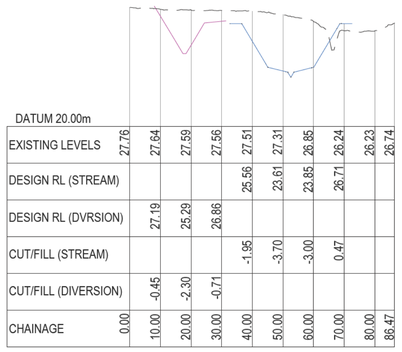
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TIE-IN DIVERSION CHANNEL TO EXISTING DRAIN DOWNSTREAM
0.28%

| | | |

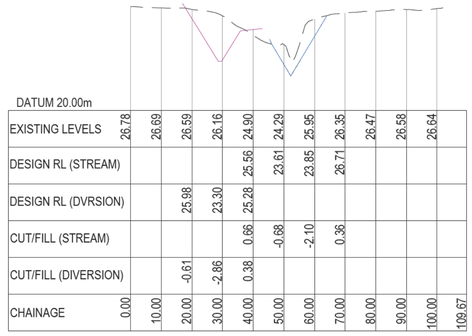


PHASE S1 TYPICAL SECTION (CHANNEL DIVERSION)



DATUM 20.00m											
EXISTING LEVELS	27.76	27.64	27.59	27.56	27.51	27.31	26.85	26.24	26.23	26.74	
DESIGN RL (STREAM)					25.56	23.61	23.85	26.71			
DESIGN RL (DVRSION)		27.19	25.29	26.86							
CUT/FILL (STREAM)					-1.95	-3.70	-3.00	0.47			
CUT/FILL (DIVERSION)		-0.45	-2.30	-0.71							
CHAINAGE	0.00	10.00	20.00	30.00	40.00	50.00	60.00	70.00	80.00	86.47	

CROSS-SECTION A-A
SCALE: HORI 1:1000 VERT 1:200



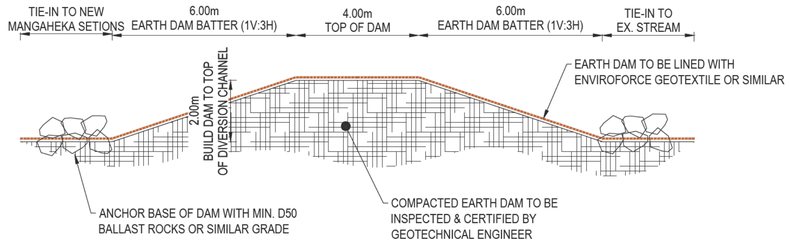
DATUM 20.00m												
EXISTING LEVELS	26.78	26.69	26.59	26.16	24.90	24.29	25.95	26.35	26.47	26.58	26.64	
DESIGN RL (STREAM)					25.56	23.61	23.85	26.71				
DESIGN RL (DVRSION)			25.98	23.30	25.28							
CUT/FILL (STREAM)					0.66	-0.68	-2.10	0.36				
CUT/FILL (DIVERSION)			-0.61	-2.86	0.38							
CHAINAGE	0.00	10.00	20.00	30.00	40.00	50.00	60.00	70.00	80.00	90.00	100.00	109.67

CROSS-SECTION B-B
SCALE: HORI 1:1000 VERT 1:200

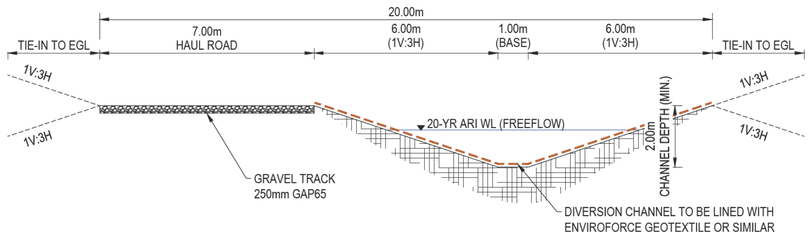
PHASE S1 DETAILED SECTIONS

NOTES

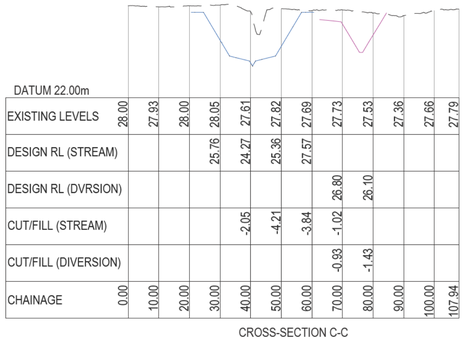
1. EARTH DAM DETAIL PROVIDED BELOW IS ONLY APPLICABLE WITHIN THE NEWLY RECONSTRUCTED MANGAHEKA STREAM CORRIDOR.
2. EARTH DAMS REQUIRED WITHIN THE EXISTING MANGEHEKA STREAM IS VARIABLE BASED ON THE EXISTING STREAM CROSS-SECTION AND SHALL BE CONSTRUCTED TO THE EXISTING TOP OF BANK. CONSTRUCTION OF ANY EARTH DAM WITHIN THE EXISTING MANGAHEKA STREAM MUST BE CERTIFIED AND COORDINATED WITH THE CIVIL ENGINEER, GEOTECHNICAL ENGINEER AND ECOLOGIST.



EARTH DAM DETAIL (CHANNEL DIVERSION)

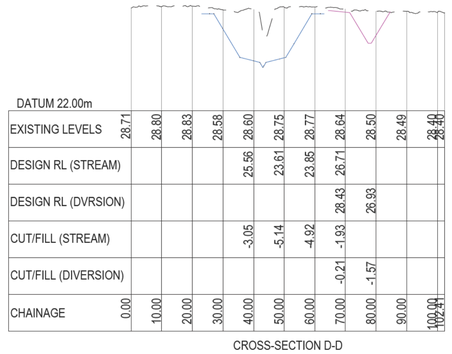


PHASE S2 & S3 TYPICAL SECTION (CHANNEL DIVERSION)



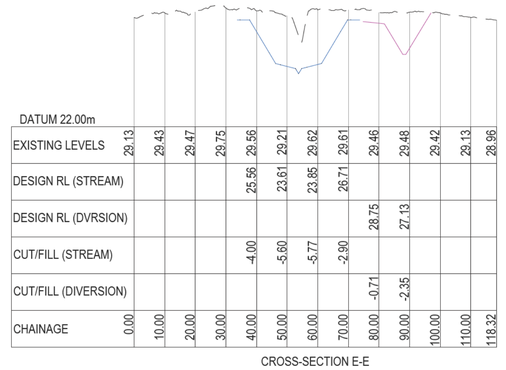
DATUM 22.00m												
EXISTING LEVELS	28.00	27.93	28.00	28.05	27.61	27.82	27.69	27.73	27.53	27.36	27.66	27.79
DESIGN RL (STREAM)				25.76	24.27	25.36	27.57					
DESIGN RL (DVRSION)								26.80	26.10			
CUT/FILL (STREAM)					-2.05	-4.21	-3.84	-1.02				
CUT/FILL (DIVERSION)								-0.93	-1.43			
CHAINAGE	0.00	10.00	20.00	30.00	40.00	50.00	60.00	70.00	80.00	90.00	100.00	107.94

CROSS-SECTION C-C
SCALE: HORI 1:1000 VERT 1:200



DATUM 22.00m												
EXISTING LEVELS	28.71	28.80	28.83	28.58	28.60	28.75	28.77	28.64	28.50	28.49	28.40	28.40
DESIGN RL (STREAM)					25.56	23.61	23.85	26.71				
DESIGN RL (DVRSION)								28.43	26.93			
CUT/FILL (STREAM)					-3.05	-5.14	-4.92	-1.93				
CUT/FILL (DIVERSION)								-0.21	-1.57			
CHAINAGE	0.00	10.00	20.00	30.00	40.00	50.00	60.00	70.00	80.00	90.00	100.00	102.44

CROSS-SECTION D-D
SCALE: HORI 1:1000 VERT 1:200



DATUM 22.00m												
EXISTING LEVELS	29.13	29.43	29.47	29.75	29.56	29.21	29.62	29.61	29.46	29.48	29.42	29.13	28.96
DESIGN RL (STREAM)					25.56	23.61	23.85	26.71					
DESIGN RL (DVRSION)									28.75	27.13			
CUT/FILL (STREAM)					-4.00	-5.60	-5.77	-2.90					
CUT/FILL (DIVERSION)									-0.71	-2.35			
CHAINAGE	0.00	10.00	20.00	30.00	40.00	50.00	60.00	70.00	80.00	90.00	100.00	110.00	118.32

CROSS-SECTION E-E
SCALE: HORI 1:1000 VERT 1:200

PHASE S2 & S3 DETAILED SECTIONS

RESOURCE CONSENT

NOTES

1. ALL WORKS TO BE IN ACCORDANCE WITH WAIKATO DISTRICT COUNCIL/IAWAI STANDARD DETAILS AND THE WAIKATO REGIONAL INFRASTRUCTURE TECHNICAL SPECIFICATION.
2. COORDINATES IN TERMS OF NZ GEODETIC DATUM MT EDEN 2000
3. LEVELS IN TERMS OF THE NEW ZEALAND VERTICAL DATUM 2016.
4. ORIGIN OF LEVELS = BP 3 SO 468570 (EMDK)
5. PUBLISHED RL=38.59, SOURCED FROM THE LINZ DIGITAL GEODETIC DATABASE.
6. BOUNDARIES ARE SUBJECT TO FINAL SURVEY.
7. IT IS THE CONTRACTOR'S RESPONSIBILITY TO LOCATE ALL SERVICES THAT MAY BE AFFECTED BY THEIR OPERATIONS.
8. THE CONTRACTOR SHALL COMPLY WITH ALL RELEVANT HEALTH AND SAFETY REQUIREMENTS.
9. THE CONTRACTOR SHALL OBTAIN ALL NECESSARY APPROVALS FROM UTILITY OPERATORS BEFORE COMMENCING WORK UNDER OR NEAR THEIR SERVICES.
10. SEDIMENT CONTROL SHALL BE INSTALLED AND OPERATIONAL BEFORE EARTHWORKS START ON-SITE IN ACCORDANCE WITH COUNCIL STANDARDS.
11. CONTRACTOR SHALL PROVIDE AS-BUILT OF WORKING SEDIMENT CONTROL DEVICES AND CONFIRMATION OF POND/DECANT VOLUMES TO ENGINEER.
12. SEDIMENT CONTROL TO COMPLY WITH TR2009/02 STANDARDS.

LEGEND

- EX GROUND LEVEL
- PR FINAL GROUND LEVEL
- TEMPORARY DIVERSION INVERT

Ref	Revisions	By	Date
A	RESOURCE CONSENT	KY	10/2026

	By	Date
Survey	MAVEN	10/2025
Design	JD	08/2026
Drawn	JD	08/2026
Checked	RW	08/2026

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Project
PROPOSED INDUSTRIAL DEVELOPMENT AT TE KOWHAI EAST FOR TE KOWHAI EAST LIMITED PARTNERSHIP

Title
PROPOSED STREAM DIVERSION CROSS-SECTIONS

Project no.	180010
Scale	AS SHOWN @ A1
Cad file	180010-C230 ESCP (DIVERSION DETAILED).DWG
Drawing no.	C234
Rev.	A

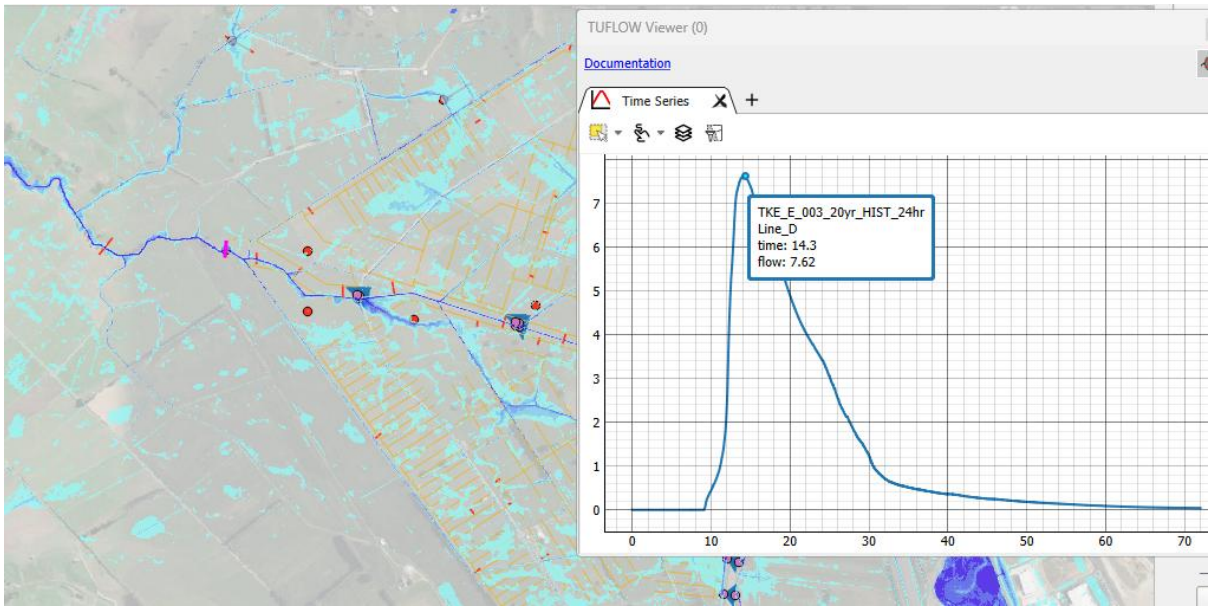
PLOT: 180010-C230 ESCP (DIVERSION DETAILED).dwg

APPENDIX B: HYDROLOGY & CHANNEL ANALYSIS

Design Flow

20-Year ARI Flow has been modelled using TUFLOW modelling software and includes inflows from upstream catchments within Hamilton City. The model uses the same boundaries analysed in the Te Miro Water hydraulic flood model.

The corresponding peak 20-Year ARI peak flow where it leaves the site boundary is reported to be 7.62m^3/s.



Channel Design

1m Base Trapezoidal Channel with 1V:3H Side Batters, 2m Deep, 13m Total Width

Channel designed via Manning's Equation

