


## APPENDIX H – LANDSCAPE DESIGN



# SH16 HUAPAI TO WAIMAUKU - STAGE 1

## LANDSCAPE DESIGN

PREPARED FOR SAFE ROADS ALLIANCE | 17 JULY 2019 | FOR TENDER  
DESIGN PRACTICE - LANDSCAPE ARCHITECTURE



**Safe Roads**

# DESIGN PHILOSOPHY

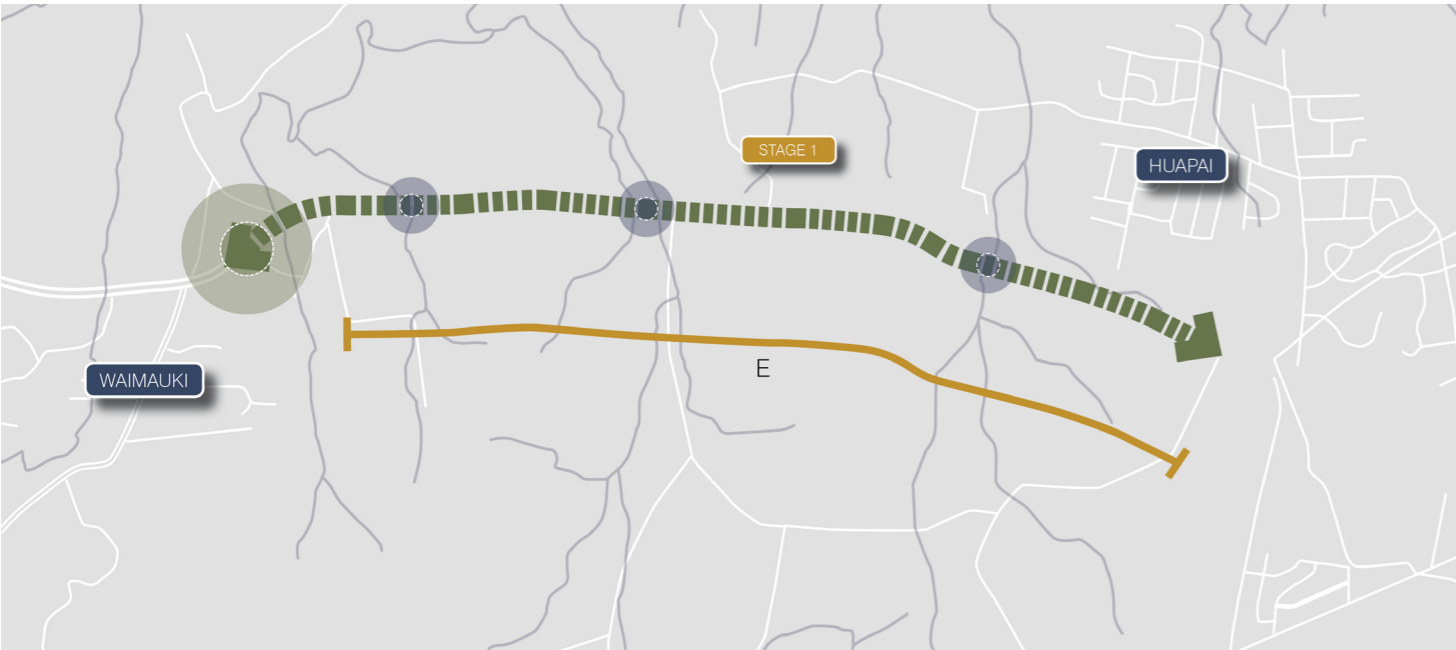
The Landscape Design Philosophy has been completed for the entire road corridor, this document relates to Stage 1 only. State Highway 16 is located within a fast-growing residential area with significant development emerging around the townships of Kumeu, Huapai and Waimauku. This road not only provides an opportunity to provide an enhanced and attractive corridor between Waimauku and Huapai, it will also provide a significant habitat and bird corridor for the wider area. The landscape design maximises these opportunities through creating a native green corridor. The planting responds to the character of the surrounding landscape, as it has been positioned adjacent to existing planting areas and in areas adjacent to stream boundaries. The project includes the integration of bridge and retaining walls into the surrounding landscape. The landscape design aims to reduce the prominence of these structures, as required, including strategic placement of planting, exploration of planted walls and / or design development that provides a pattern and design that is fitting with the rural character of the landscape.

The design approach to waterways will include native planting to enhance the existing vegetation pattern and ‘stitch’ the landscape treatment across the alignment, the landscape treatment is integrated with the stormwater to achieve water treatment and biodiversity outcomes. This approach provides legibility of valleys and integration with the existing vegetation patterns.

**The design approach is to improve the existing situation along the corridor.**

This is achieved through:

- the removal of existing exotic species and replacing them with eco-sourced native vegetation that is appropriate to the area
- new native planting will provide a linear corridor of new bird habitat (in the form of native forest patches) that will allow landing areas and food sources for birds as they move through the area
- riparian planting incorporated along the stream edges to enhance stream habitat
- the Foster Road intersection integrates a significant landscape area in conjunction with the stormwater improvement works. This area features a large area of high and low native embankment vegetation which will create a feature on the corridor



SH16 SAFE ROADS ALLIANCE

- Corridor tree replacement and stormwater planting
- Sections
- Stream/water course
- Town / entry feature
- Roundabout treatment
- Stream crossings

Cultural Integration:

The design response has been adapted to integrate the objectives of the local Iwi. Engagement has been carried out with the local runanga throughout the development of the landscape design. This has included discussions with:


- Kawerau a maki
- Ngati Whatua o Kaipara


Iwi have confirmed both the landscape plant palette as well as the approach for integrating artwork across the corridor. Through collaboration with the Iwi and the Agency an Iwi artist has been identified and commissioned to input into both the cladding for the timber retaining walls as well as a standalone art piece. These will be integrated into the corridor and will provide a cultural narrative and sense of place along the corridor.

# PLANTING PHILOSOPHY


The planting intent is to tie the highway landscape into the surrounding landscape through vegetation patterns and use of species that complement the rural character of the area. Around the stream crossings this will be a replicate of native vegetation patterns across the highway whilst rural areas will include hedgerows of trees over grass. The planting consists of endemic eco-sourced species from the Rodney Ecological District.

The following specific planting typologies have been adopted for the current design:

 Revegetation planting – planting predominantly on cut and fill slopes providing planting continuity along the alignment. Planting includes regionally specific mixed native species including colonising/ pioneering species and a selection of canopy tree species including Vitex lucens - Puriri, Alectryon excelsus - Titoki, Knightia excelsa - Rewarewa and Sophora tetraptera - Kowhai. Revegetation planting also consists of low and medium to high growing species with the low stature plants located where clear sightlines are to be maintained and higher planting set back from the road edge.

 Wetland/ riparian planting – planting includes a selection of wetland species for wetland swales and treatment swales. Planting selection is based on site conditions which includes in water, shallow water zone and riparian margin. The swale planting is proposed to assimilate with planting found at creek crossing points along the alignment.

Specimen trees – a selection of native evergreen tree species provide visual screening/ mitigation for some resident properties adjacent to the alignment. Tree species selection is based on fast growth rates, effectiveness and type of screening required, and species that are typically found in the surrounding landscape.

 Grass – grass treatment will occur on cut and fill slopes along the alignment. The slopes are designed to a mow-able grade of 4H:1V however the slope tolerance for mowing is yet to be finalised.

FOR TENDER

100mm

SCALE FOR VALIDATING SIZE OF A3 PLOT ONLY

0

SOFT LANDSCAPE



**HYDROSEEDDED GRASS (GRP)**  
REFER TO DETAIL 02, SR1003-01-VE-6230 AND SR1003-01-VE-6001-6011 FOR GENERAL ARRANGEMENT

PLANTING



**PLANT MIX 1 (WRP) - RIPARIAN PLANTING**  
REFER TO GENERAL ARRANGEMENT PLANS, DRAWING SR1003-01-VE-6001-6011 AND SR1003-01-VE-6220 - VE-6227 FOR PLANTING SCHEDULES



**PLANT MIX 2 (SWP) - SWALE PLANTING**  
REFER TO GENERAL ARRANGEMENT PLANS, DRAWING SR1003-01-VE-6001-6011 AND SR1003-01-VE-6220 - VE-6227 FOR PLANTING SCHEDULES



**PLANT MIX 3 (HRP) - HIGH NATIVE REVEGETATION**  
REFER TO GENERAL ARRANGEMENT PLANS, DRAWING SR1003-01-VE-6001-6011 AND SR1003-01-VE-6220 - VE-6227 FOR PLANTING SCHEDULES



**PLANT MIX 4 (LRP) - LOW NATIVE REVEGETATION**  
REFER TO GENERAL ARRANGEMENT PLANS, DRAWING SR1003-01-VE-6001-6011 AND SR1003-01-VE-6220 - VE-6227 FOR PLANTING SCHEDULES



**PLANT MIX 5 (TRP) - THRESHOLD TREATMENT PLANTING**  
REFER TO GENERAL ARRANGEMENT PLANS, DRAWING SR1003-01-VE-6001-6011 AND SR1003-01-VE-6220 - VE-6227 FOR PLANTING SCHEDULES

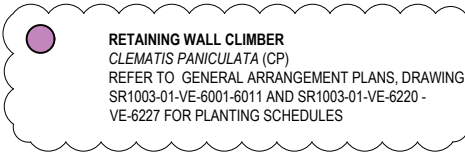
NATIVE SPECIMEN TREES



**CLUSTER OF TREES**  
REFER TO GENERAL ARRANGEMENT PLANS, DRAWING SR1003-01-VE-6001-6011 AND SR1003-01-VE-6220 - VE-6227 FOR PLANTING SCHEDULES



**RETAINING WALL GROUND COVER**  
*MUEHLENBECKIA AXILLARIS* (MA)  
REFER TO GENERAL ARRANGEMENT PLANS, DRAWING SR1003-01-VE-6001-6011 AND SR1003-01-VE-6220 - VE-6227 FOR PLANTING SCHEDULES



**RETAINING WALL CLIMBER**  
*CLEMATIS PANICULATA* (CP)  
REFER TO GENERAL ARRANGEMENT PLANS, DRAWING SR1003-01-VE-6001-6011 AND SR1003-01-VE-6220 - VE-6227 FOR PLANTING SCHEDULES

**IN PROGRESS**  
ARTWORK TREATMENT TO BE DETERMINED.

OTHER



**RETAINING WALL**  
REFER TO GEOTECHNICAL DRAWINGS VE-1201-1211



**NEW TL-4 WIRE ROPE BARRIER**  
REFER TO VE-1200 FOR GENERAL NOTES AND LEGEND



**NEW TL-4 W-SECTION BARRIER**  
REFER TO VE-1200 FOR GENERAL NOTES AND LEGEND



**NEW THRIE BEAM BARRIER**  
REFER TO VE-1200 FOR GENERAL NOTES AND LEGEND



**PROPERTY BOUNDARY**  
REFER TO VE-1200 FOR GENERAL NOTES AND LEGEND



**PROPERTY NUMBER**  
REFER TO VE-1200 FOR GENERAL NOTES AND LEGEND



**ROAD / RAIL DESIGNATION**  
REFER TO VE-1200 FOR GENERAL NOTES AND LEGEND



**CHAINAGE**  
REFER TO VE-1200 FOR GENERAL NOTES AND LEGEND



**ROUTE POSITION (RP)**  
REFER TO VE-1200 FOR GENERAL NOTES AND LEGEND



**PROPOSED LIGHTING DESIGN**  
REFER TO VE-1200 FOR GENERAL NOTES AND LEGEND



**DIRECTION OF STORMWATER FLOWS**  
REFER TO STORMWATER DRAWINGS AND VE-1200 FOR GENERAL NOTES AND LEGEND

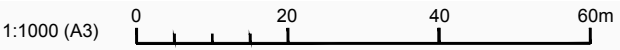
GENERAL NOTES:

- ALL WORKS SHALL BE UNDERTAKEN IN ACCORDANCE WITH THE LANDSCAPE SPECIFICATION.
- ALL DIMENSIONS AND LEVELS SHALL BE CONFIRMED ON SITE BY THE CONTRACTOR PRIOR TO UNDERTAKING WORKS
- THE CONTRACTOR SHALL IDENTIFY THE LOCATION OF ALL UNDERGROUND SERVICES ON SITE PRIOR TO UNDERTAKING DEMOLITION OR CONSTRUCTION WORKS.
- ALL SETOUT OF GARDEN BED EDGES INCLUDING CURVED SHAPES SHALL BE MARKED ON SITE BY THE CONTRACTOR AND THEN CONFIRMED WITH THE LANDSCAPE ARCHITECT PRIOR TO CONSTRUCTION.
- THE CONTRACTOR SHALL ENSURE SUITABLE DRAINAGE IS ACHIEVED IN TOPSOIL AND SUBSOIL LAYERS IN ALL PLANTING AND GRASS AREAS - TO ENSURE GOOD ESTABLISHMENT AND GROWTH. THIS SHALL INCLUDE REMEDIATION OF ALL COMPACTION TO SUBSOIL CREATED DURING THE DEMOLITION AND CONSTRUCTION PROCESS
- FOR SETOUT OF EMBANKMENTS AND PATHS REFER TO GEOMETRICS MODEL.
- SETOUT INFORMATION TO BE PROVIDED BY CIVIL ENGINEERS.
- TREES SHALL BE PLANTED NO LESS THAN THE FOLLOWING DISTANCES FROM UTILITY ELEMENTS
  - SW AND SEWERAGE PITS: 2m
  - SERVICE CROSSINGS: 2m
  - GAS MAINS AND STREET LIGHTS: 4m
  - LV & HV LINES 3 & 4m
- TOPSOIL DEPTHS (COMBINATION OF ONSITE REUSED AND IMPORTED TOPSOIL):
  - GRASSED AREAS = MIN 100mm
  - PLANTED AREAS = MIN 300mm
- GRASS MAINTENANCE:
  - ALL GRASS ON SLOPES SMALLER THAN 1:4 TO BE MOWN WITH MOWER TO MAINTAIN 20mm HEIGHT AS PER LANDSCAPE SPECIFICATION.
  - ALL GRASS ON SLOPES GREATER THAN 1:4 TO BE MAINTAINED MANUALLY BY HAND DRIVEN WEED TRIMMER AS APPROVED BY AGENCY AND KIWI RAIL.

WORK AROUND EXISTING TREES

- ALL CARE SHALL BE UNDERTAKEN WHEN WORKING AROUND EXISTING TREES - REFER TO LANDSCAPE SPECIFICATION FOR FURTHER DETAIL AND GUIDANCE.
- ALL CONSTRUCTION WORKS THAT TAKE PLACE WITHIN THE DRIP-LINE / ROOT ZONE AREAS OF ALL EXISTING TREES SHALL BE UNDERTAKEN IN CONSULTATION WITH A QUALIFIED CONTRACTOR APPOINTED ARBORIST, INCLUDING DIRECT ON-SITE SUPERVISION AS REQUIRED.

**FOR TENDER**  
NOT FOR CONSTRUCTION



0	FOR TENDER	ELC	JB	LDB	24.06.19
No.	Revision	By	Chk	Appd	Date

Original Scale (A3)	NA
Design	EC
Drawn	ELC
Design Checker	TA
Design Check	JB
28.09.18	28.09.18
24.06.19	24.06.19
24.06.19	24.06.19
Approved For Construction*	-
Date	-
* Refer to Revision 1 for Original Signature	



Project: SH16 - SAFETY IMPROVEMENTS  
STAGE 1  
HUAPAI TO WAIMAUKU

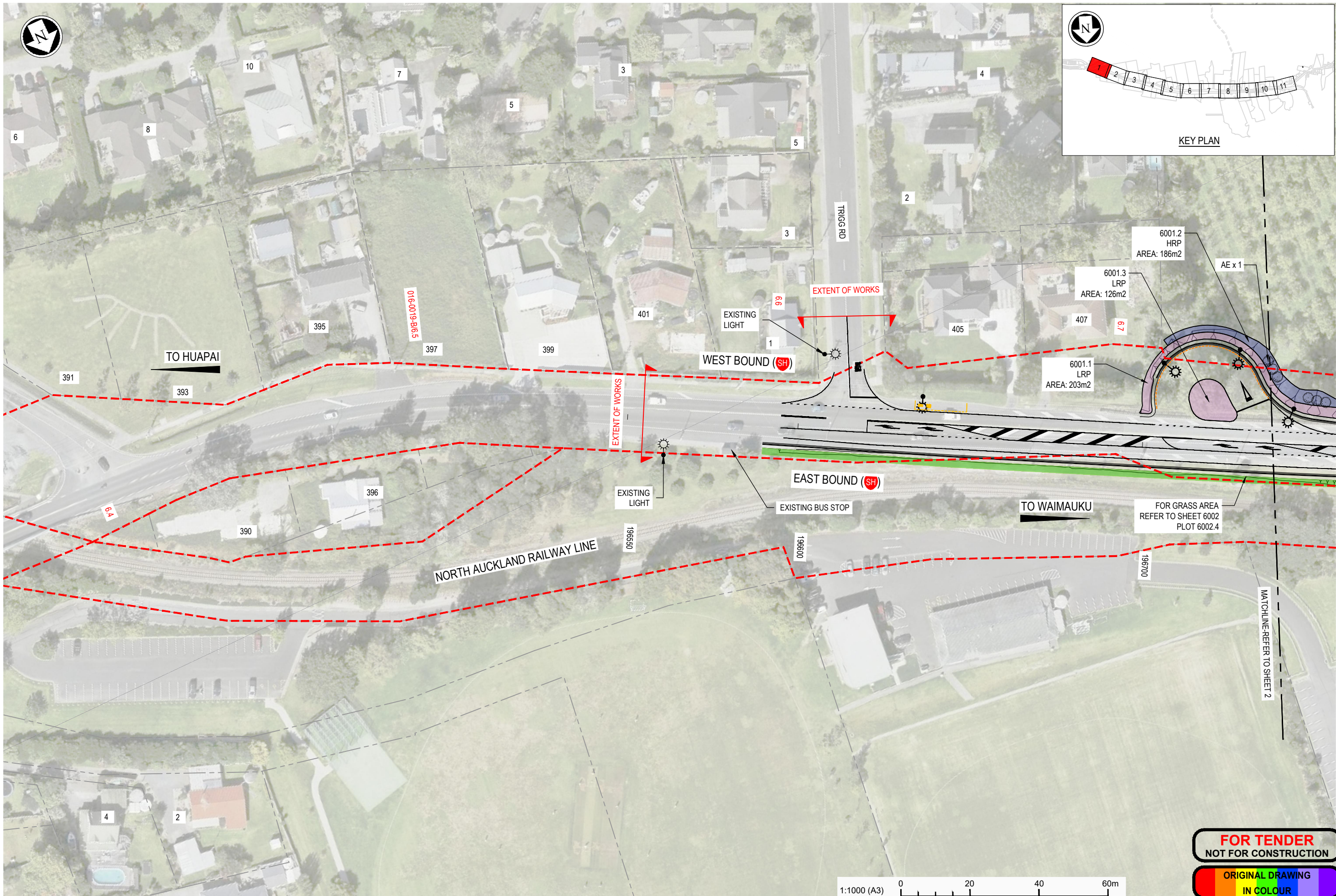
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KEY PLAN

Status:	<b>FOR TENDER</b>
Drawing No.	SR1003 - 01 - VE - 6000
Rev.	0

100mm

SCALE FOR VALIDATING SIZE OF A3 PLOT ONLY

0



**FOR TENDER**  
NOT FOR CONSTRUCTION

ORIGINAL DRAWING  
IN COLOUR

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No.	Revision	By	Chk	Appd	Date

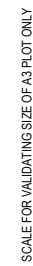
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	Design Check JB 24.06.19	Date -
* Refer to Revision 1 for Original Signature		



Project: SH16 - SAFETY IMPROVEMENTS  
STAGE 1  
HUAPAI TO WAIMAUKU

Title: LANDSCAPE PLAN  
SHEET 1 OF 11

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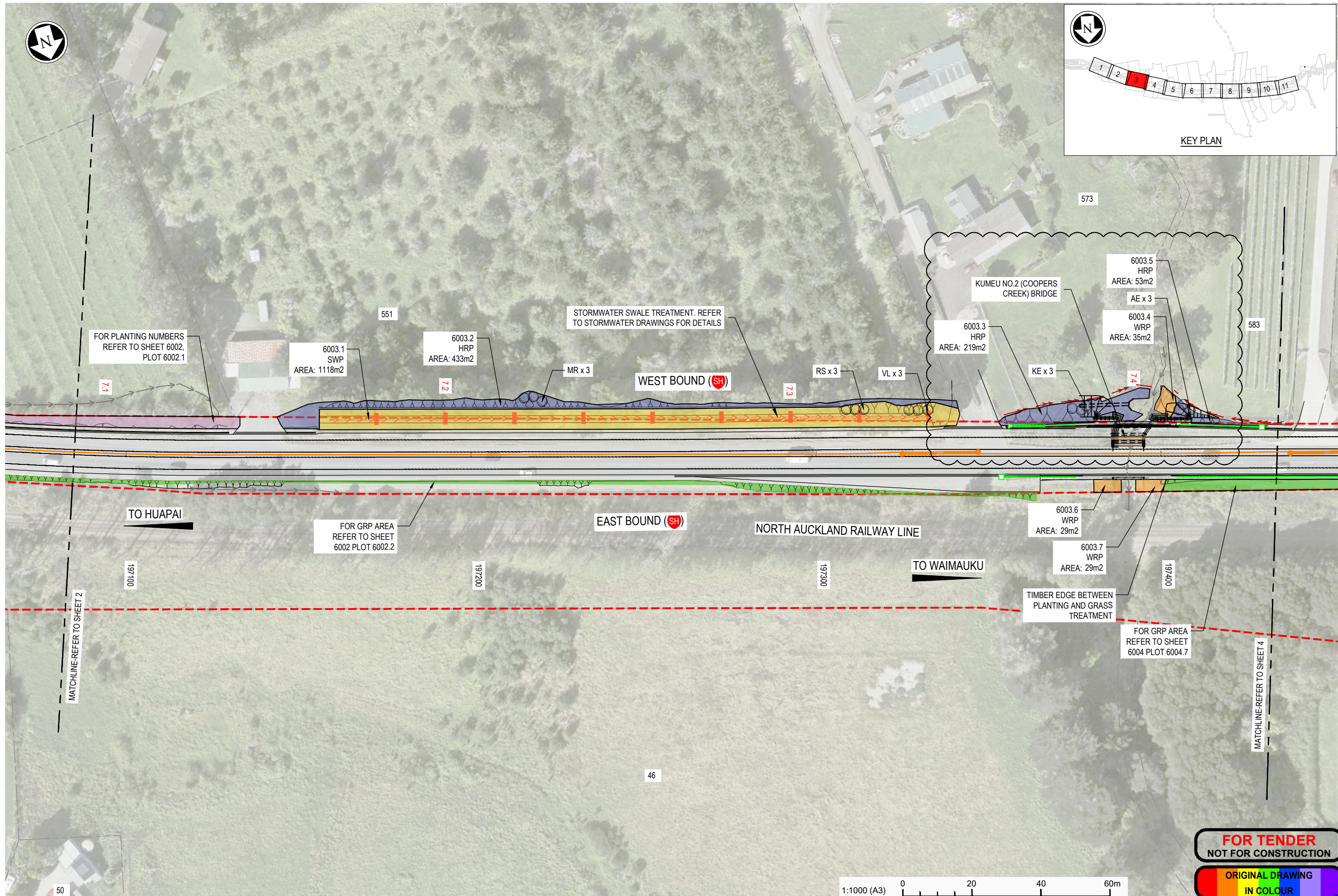
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100mm

SCALE FOR VALIDATING SIZE OF A3 PLOT ONLY

0



FOR PLANTING NUMBERS  
REFER TO SHEET 6002,  
PLOT 6002.1

6003.1  
SWP  
AREA: 1118m<sup>2</sup>

6003.2  
HRP  
AREA: 433m<sup>2</sup>

STORMWATER SWALE TREATMENT. REFER  
TO STORMWATER DRAWINGS FOR DETAILS

WEST BOUND (SH)

RS x 3

VL x 3

6003.3  
HRP  
AREA: 219m<sup>2</sup>

KUMEU NO.2 (COOPERS  
CREEK) BRIDGE

KE x 3

6003.5  
HRP  
AREA: 53m<sup>2</sup>

AE x 3

6003.4  
WRP  
AREA: 35m<sup>2</sup>

TO HUAPAI

FOR GRP AREA  
REFER TO SHEET  
6002 PLOT 6002.2

EAST BOUND (SH)

NORTH AUCKLAND RAILWAY LINE

TO WAIMAUKU

6003.6  
WRP  
AREA: 29m<sup>2</sup>

6003.7  
WRP  
AREA: 29m<sup>2</sup>

TIMBER EDGE BETWEEN  
PLANTING AND GRASS  
TREATMENT

FOR GRP AREA  
REFER TO SHEET  
6004 PLOT 6004.7

MATCHLINE-REFER TO SHEET 4

FOR TENDER

NOT FOR CONSTRUCTION

ORIGINAL DRAWING

IN COLOUR

0A	FOR TENDER (KUMEU NO.2 BRIDGE UPDATE)	VZ	CH	LDB	05.12.19
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		Design Checker	TA	24.06.19	
		Design Checker	JB	24.06.19	Date -
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WAKA KOTAHI

Safe Roads

Project: SH16 - SAFETY IMPROVEMENTS  
STAGE 1  
HUAPAI TO WAIMAUKU

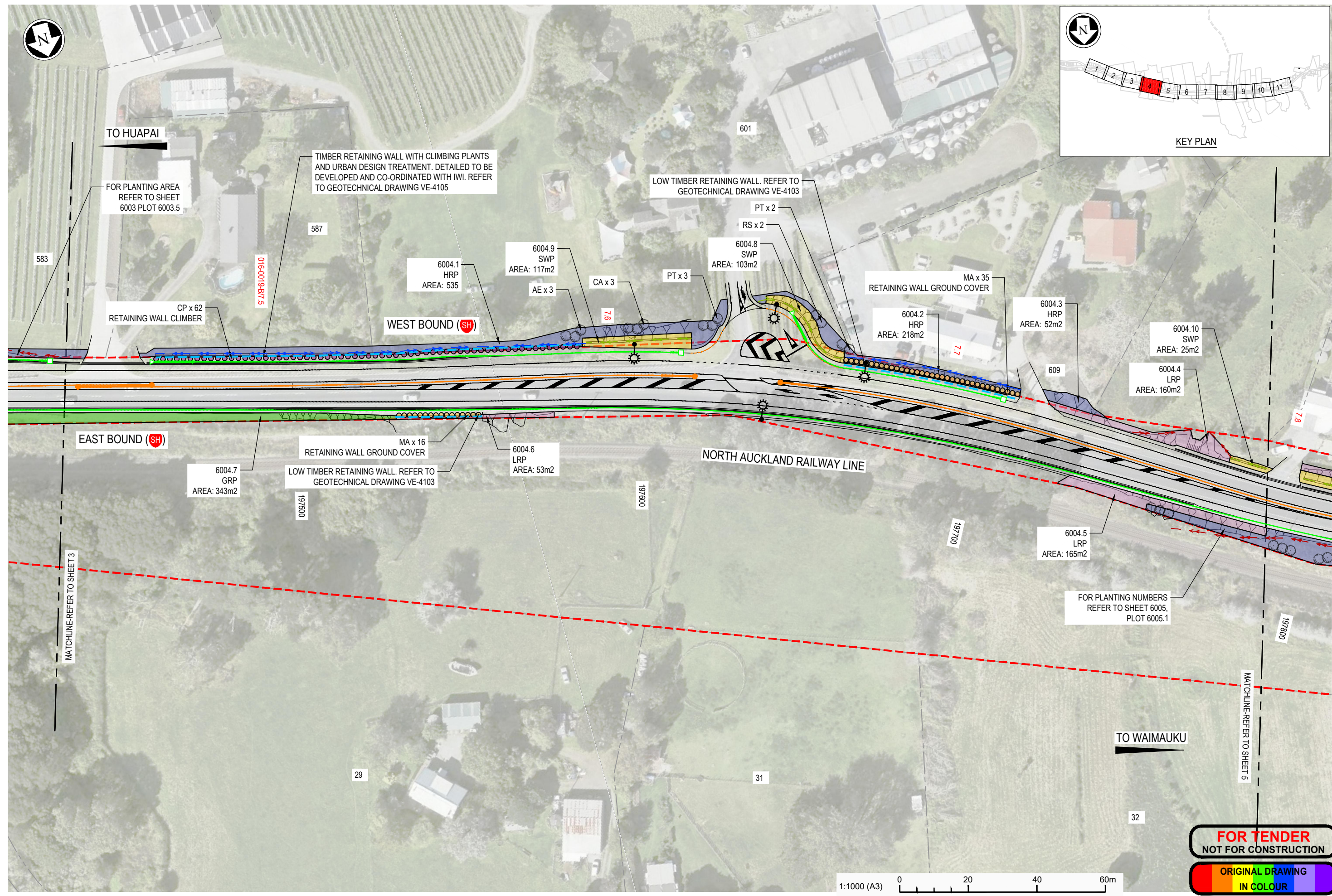
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SHEET 3 OF 11

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Rev.	0A

DO NOT SCALE

IF IN DOUBT ASK

100mm  
SCALE FOR VALIDATING SIZE OF A3 PLOT ONLY



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NOT FOR CONSTRUCTION

**ORIGINAL DRAWING**  
IN COLOUR

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No.	Revision	By	Chk	Appd	Date

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	Design Check	JB	24.06.19	-
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Project: SH16 - SAFETY IMPROVEMENTS  
STAGE 1  
HUAPAI TO WAIMAUKU

Title: LANDSCAPE PLAN  
SHEET 4 OF 11

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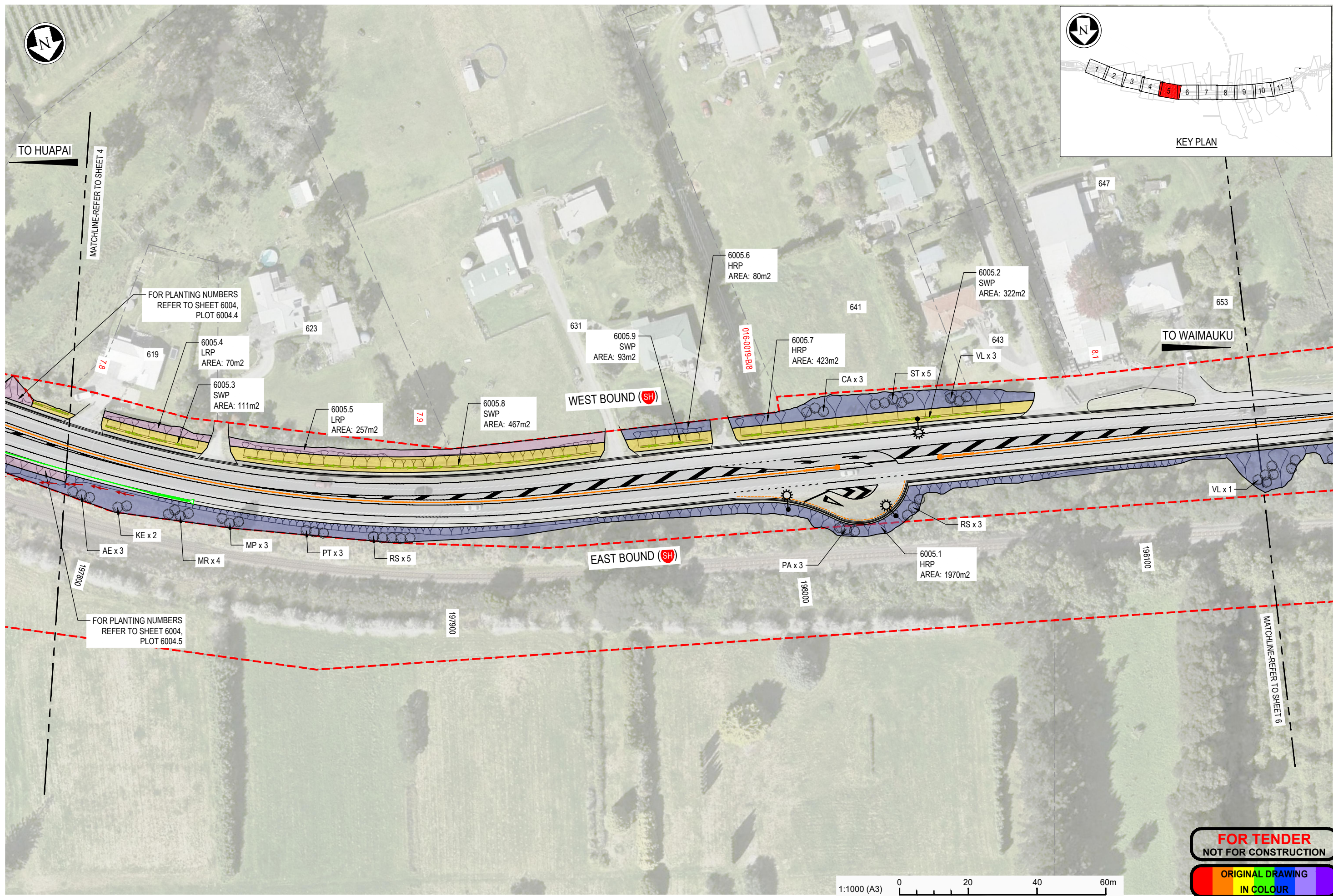
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100mm

SCALE FOR VALIDATING SIZE OF A3 PLOT ONLY

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**FOR TENDER**  
NOT FOR CONSTRUCTION

ORIGINAL DRAWING  
IN COLOUR

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No.	Revision	By	Chk	Appd	Date

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	Design Checker	JB	24.06.19	Date -
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Project: SH16 - SAFETY IMPROVEMENTS  
STAGE 1  
HUAPAI TO WAIMAUKU

Title: LANDSCAPE DESIGN  
SHEET 5 OF 11

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Rev.	0

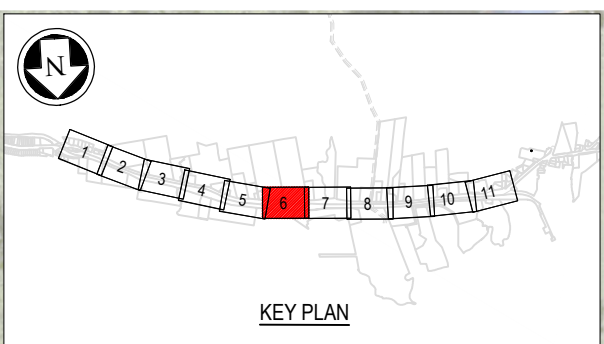
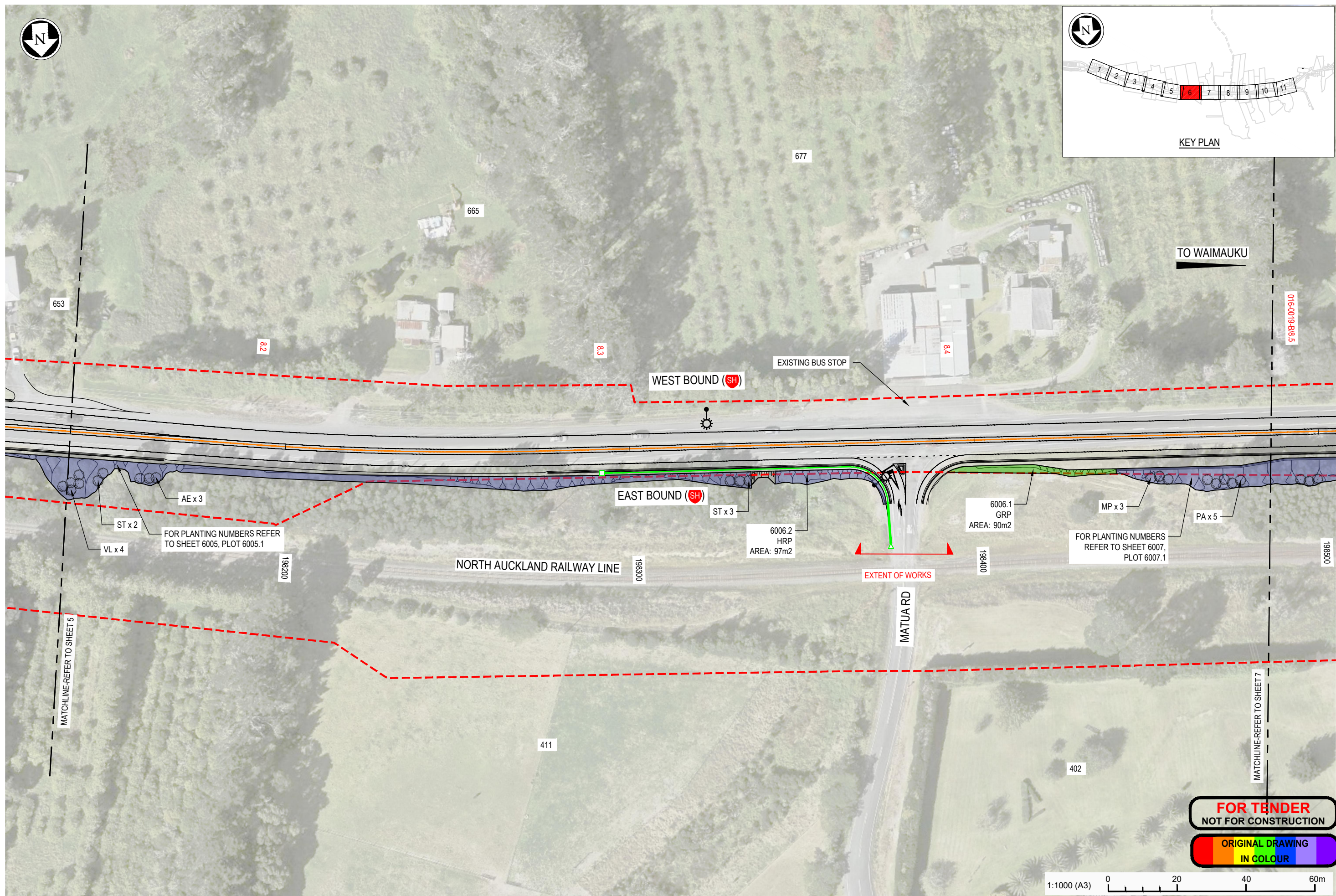
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IF IN DOUBT ASK

100mm

SCALE FOR VALIDATING SIZE OF A3 PLOT ONLY

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**FOR TENDER**  
NOT FOR CONSTRUCTION

**ORIGINAL DRAWING**  
IN COLOUR

1:1000 (A3) 0 20 40 60m

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No.	Revision	By	Chk	Appd	Date

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	Drawn ELC 23.03.18	
	Design Verifier TA 24.06.19	
	Design Check JB 24.06.19	Date -
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**Safe Roads**

Project: SH16 - SAFETY IMPROVEMENTS  
STAGE 1  
HUAPAI TO WAIMAUKU

Title: LANDSCAPE DESIGN  
SHEET 6 OF 11

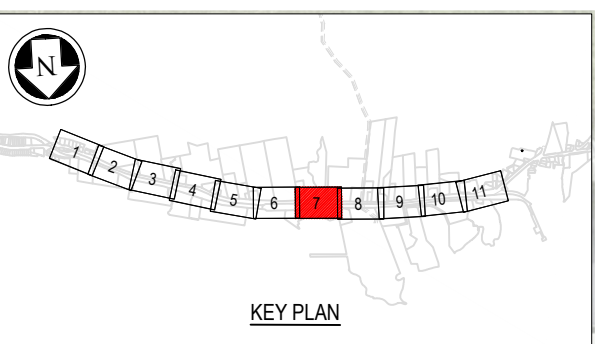
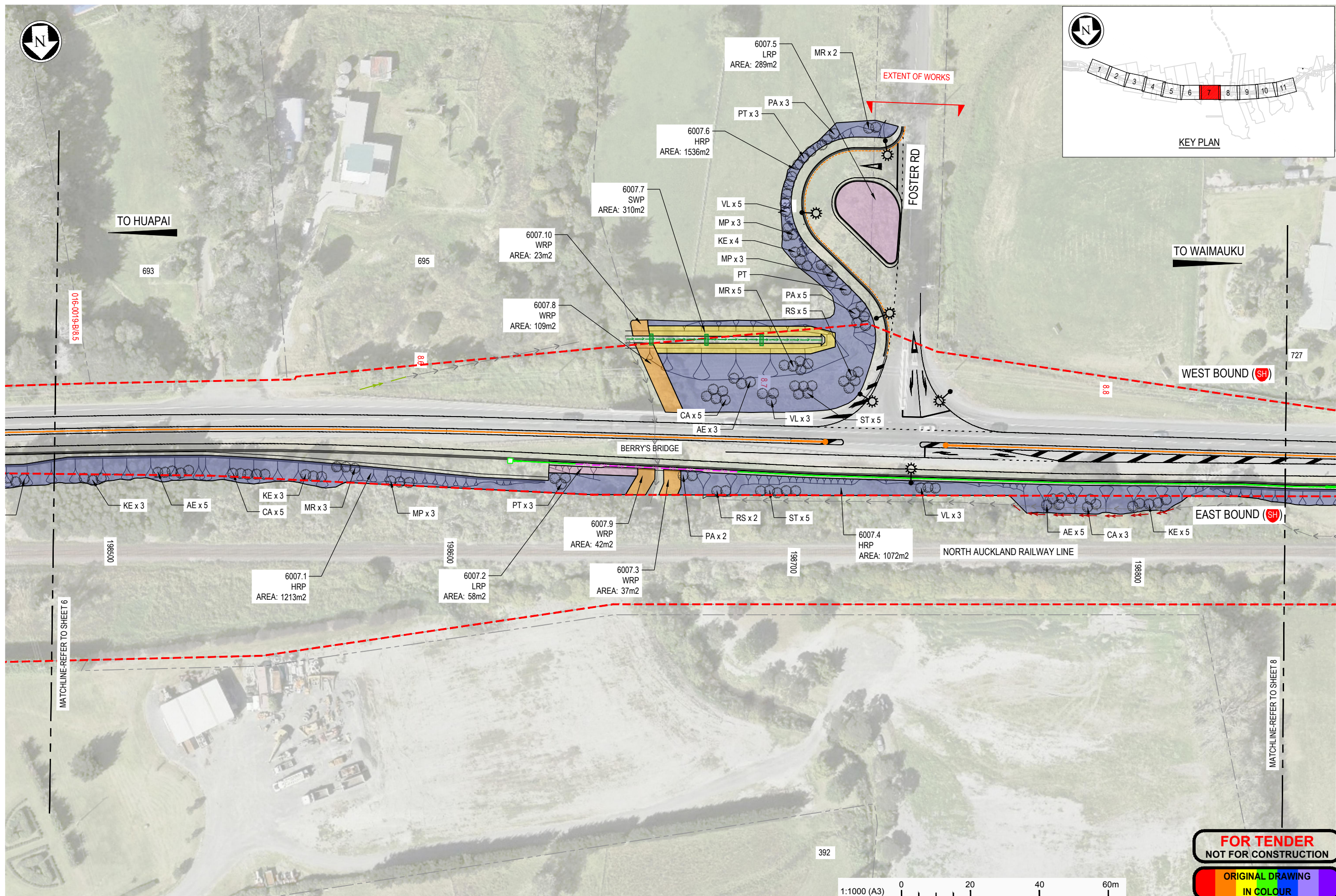
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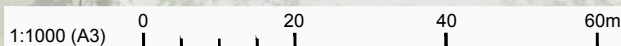
SCALE FOR VALIDATING SIZE OF A3 PLOT ONLY

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**FOR TENDER**  
**NOT FOR CONSTRUCTION**

**ORIGINAL DRAWING**  
**IN COLOUR**



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Project: SH16 - SAFETY IMPROVEMENTS  
STAGE 1  
HUAPAI TO WAIMAUKU

Title: LANDSCAPE DESIGN  
SHEET 7 OF 11

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Rev.	0

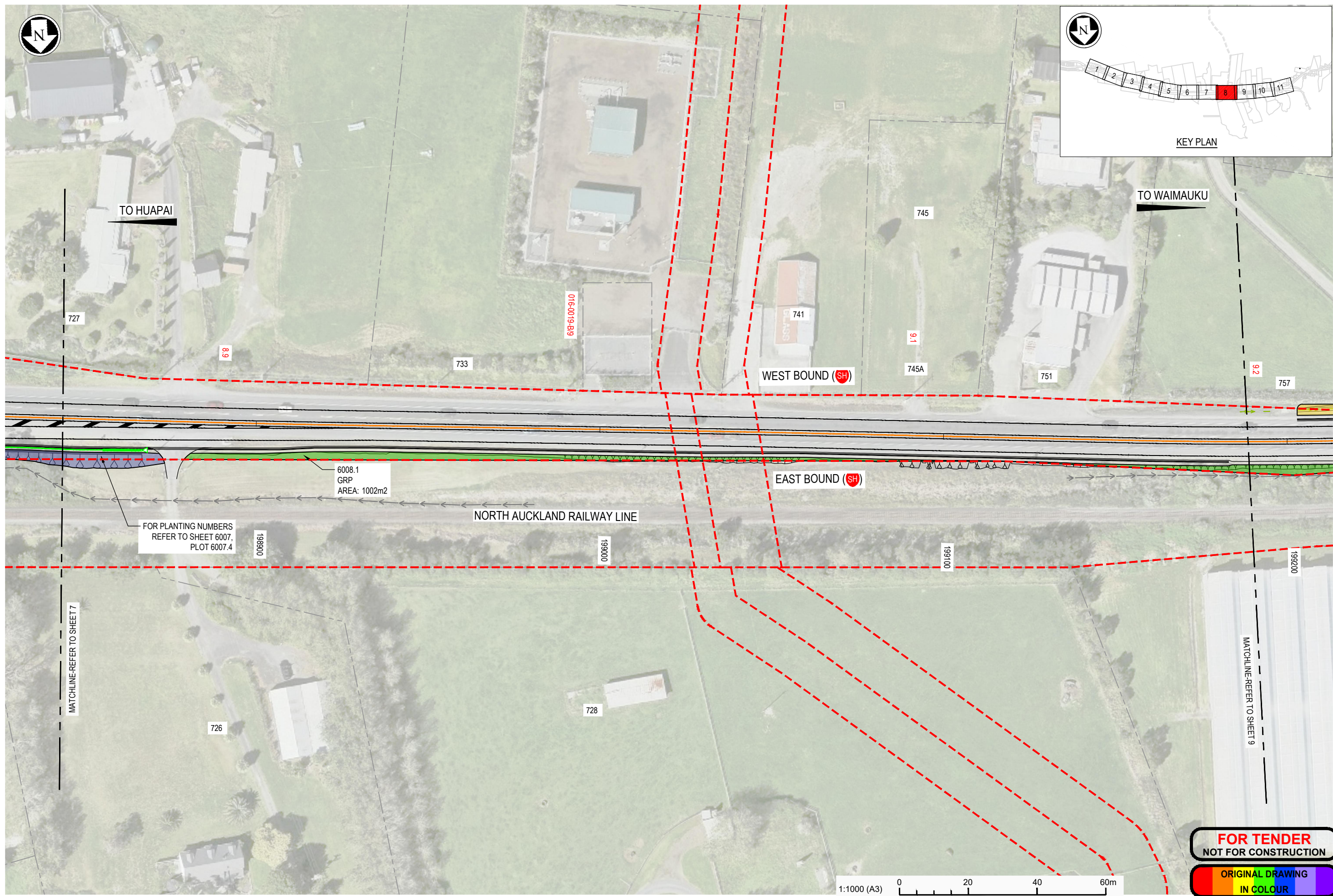
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IF IN DOUBT ASK

100mm

SCALE FOR VALIDATING SIZE OF A3 PLOT ONLY

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No.	Revision	By	Chk	Appd	Date

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	Drawn ELC 23.03.18	
	Design Verifier TA 24.06.19	
	Design Check JB 24.06.19	
		Date -
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**Safe Roads**

Project: SH16 - SAFETY IMPROVEMENTS  
STAGE 1  
HUAPAI TO WAIMAUKU

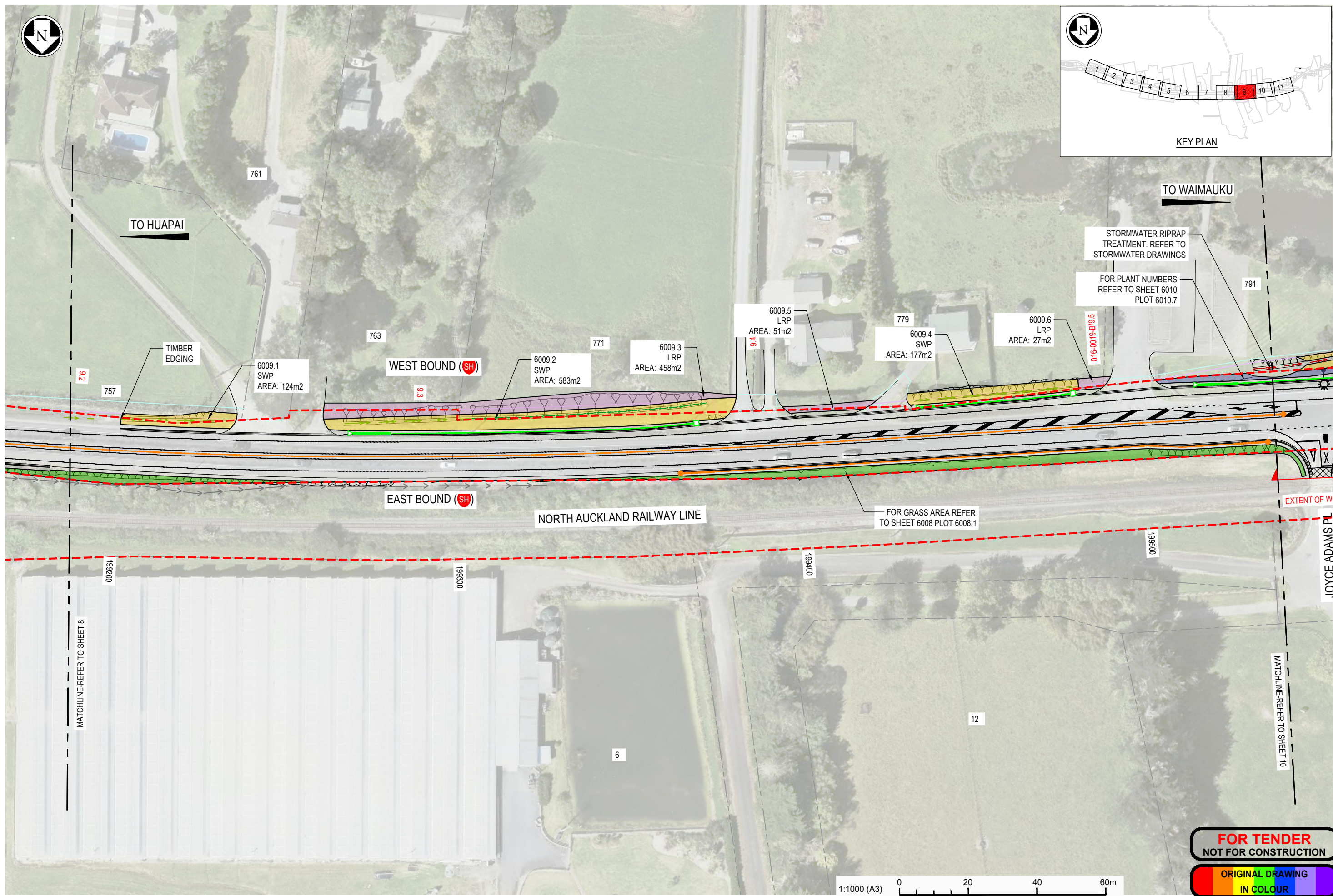
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SHEET 8 OF 11

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Rev.	0

100mm

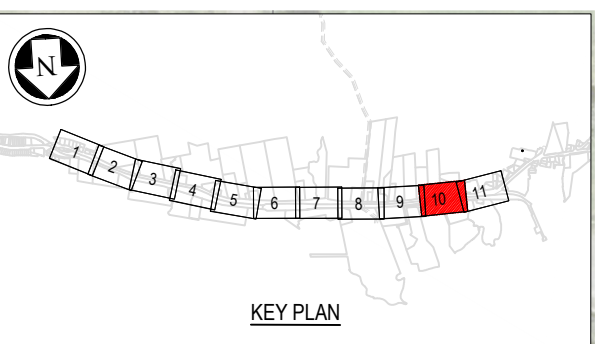
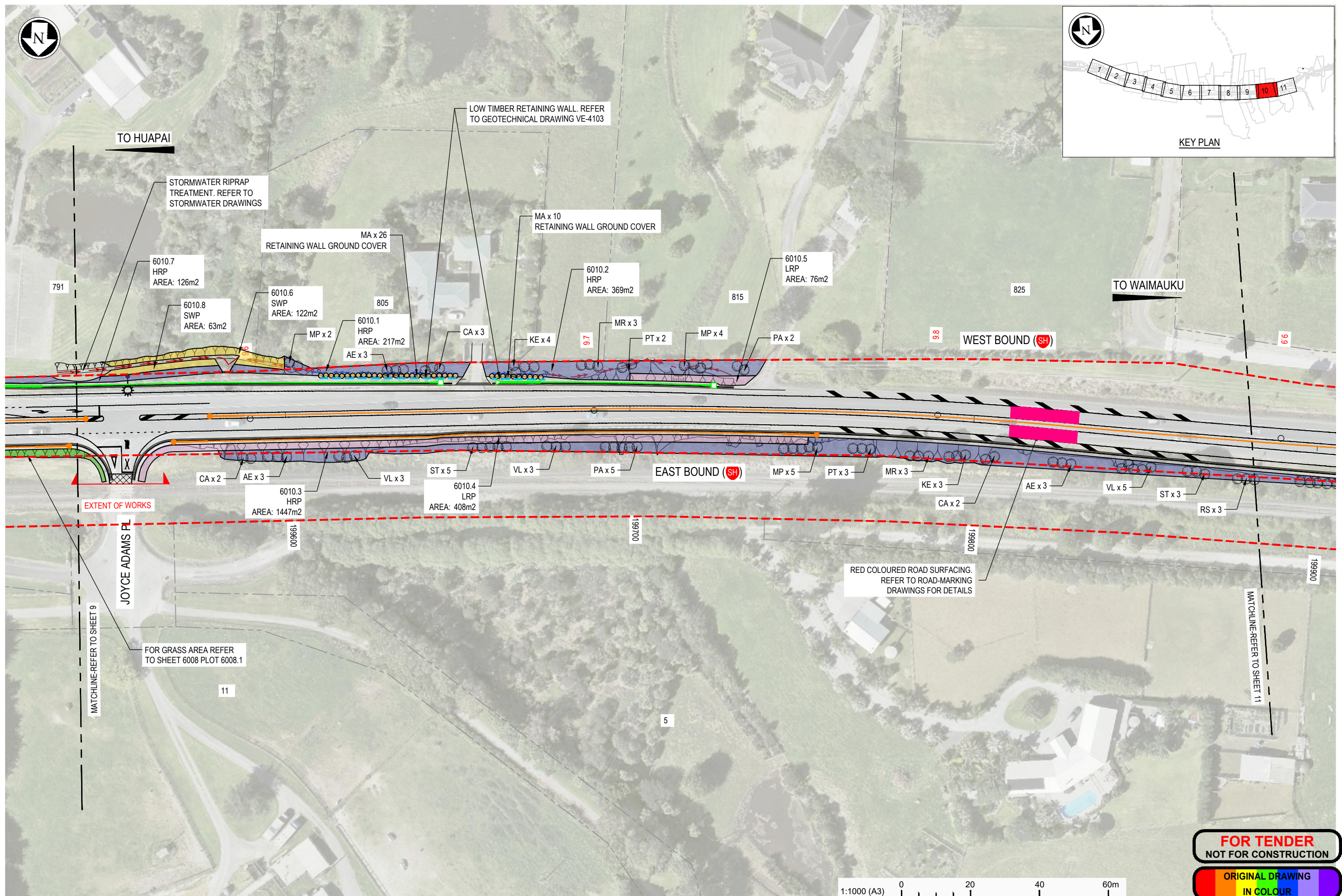
SCALE FOR VALIDATING SIZE OF A3 PLOT ONLY

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100mm  
SCALE FOR VALIDATING SIZE OF A3 PLOT ONLY

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No.	Revision	By	Chk	Appd	Date

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	Drawn ELC 23.03.18	
	Design Verifier TA 24.06.19	
	Design Check JB 24.06.19	Date -
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**NZ TRANSPORT AGENCY**  
WAKA KOTAHU



**Safe Roads**

Project: SH16 - SAFETY IMPROVEMENTS  
STAGE 1  
HUAPAI TO WAIMAUKU

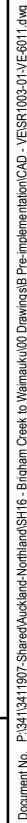
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SHEET 10 OF 11

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**FOR TENDER**  
NOT FOR CONSTRUCTION



ORIGINAL DRAWING  
IN COLOUR



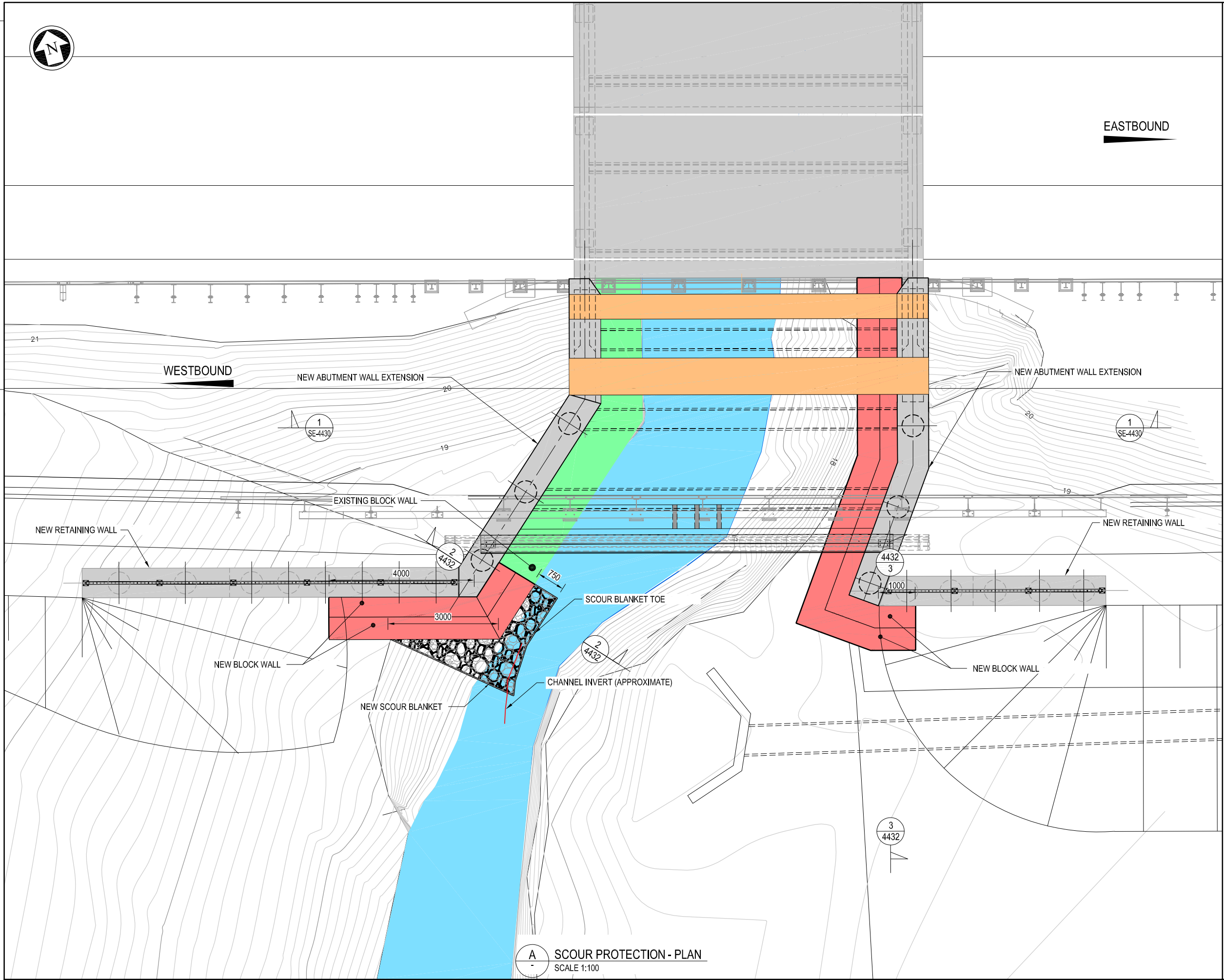
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Drawing No. SR1003 - 01 - VE - 6011		Rev. 0	

100mm  
SCALE FOR VALIDATING SIZE OF A3 PLOT ONLY



EASTBOUND

WESTBOUND



NOTES:

1. EXCAVATE AND PLACE BLOCK WALL AND SCOUR BLANKET SO THAT THE CHANNEL CROSS-SECTION REMAINS THE SAME.
2. WHERE PLACING SCOUR BLANKET IF THE CHANNEL BANK IS STEEPER THAN 1V:1.5H TRIM SLOPE TO ACHIEVE A 1V:1.5H SLOPE.
3. ALL LEVELS ARE IN TERMS OF NEW ZEALAND VERTICAL DATUM (NZVD).

MONITORING REQUIREMENTS

IT IS RECOMMENDED THAT THE BLOCK WALL AND THE SCOUR BLANKET IS INSPECTED BIENNIALY AND/OR AFTER THE ANNUAL FLOOD EVENT TO CHECK FOR SIGNS OF SCOUR AND DETERIORATION.

**FOR TENDER**  
**NOT FOR CONSTRUCTION**

0	FOR TENDER		LR	CA	LDB	29/08/19			
No.	Revision		By	Chk	Appd	Date			

Original Scale (A3) AS SHOWN	Design	LR	29/08/19	Approved For Construction*
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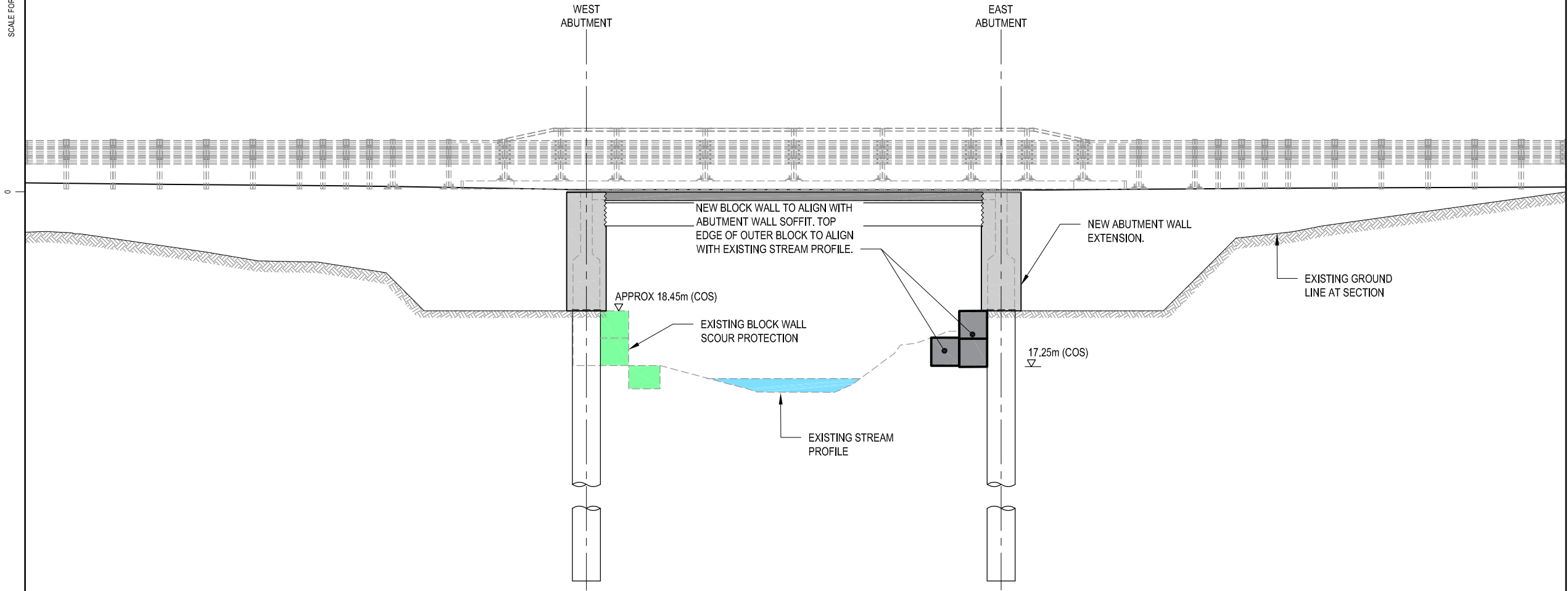
Project: SH16 - SAFETY IMPROVEMENTS  
STAGE 1  
HUAPAI TO WAIMAUKU

Title: KUMEU No.2  
PROPOSED BRIDGE WIDENING  
SCOUR PROTECTION - PLAN

Status:	<b>FOR TENDER</b>
Drawing No.	SR1003 - 01 - SE - 4430
Rev.	0

100mm

SCALE FOR VALIDATING SIZE OF A3 PLOT ONLY



1  
4430

BRIDGE LONG SECTION - AT NEW PART  
SCALE 1:100

NOTES:

1. REFER TO DRAWING SE-4430 FOR NOTES.

**FOR TENDER**  
**NOT FOR CONSTRUCTION**

0	FOR TENDER	LR	CA	LDB	29/08/19
No.	Revision	By	Chk	Appd	Date

Original Scale (A3) AS SHOWN	Design	LR	29/08/19	Approved For Construction*
	Drawn	LR	29/08/19	
	Dsg Verifier	CA	29/08/19	
	Dwg Check			
	* Refer to Revision 1 for Original Signature			Date



Safe Roads

Project: SH16 - SAFETY IMPROVEMENTS  
STAGE 1  
HUAPAI TO WAIMAUKU

Title: KUMEU No.2  
PROPOSED BRIDGE WIDENING  
SCOUR PROTECTION - CROSS SECTION

Status:	<b>FOR TENDER</b>	
Drawing No.	SR1003 - 01 - SE - 4431	Rev. 0

100mm

SCALE FOR VALIDATING SIZE OF A3 PLOT ONLY

0

17.25m (COS)  
Σ

GEOTEXTILE TO BE BIDIM  
A49 OR EQUIVALENT

NEW ABUTMENT WALL  
EXTENSION

NEW BLOCK WALL TO ALIGN  
WITH RETAINING WALL SOFFIT.  
TOP EDGE OF OUTER BLOCK TO  
ALIGN WITH EXISTING STREAM  
PROFILE.

ARMOUR LAYER  
Dn50 = 150mm  
300mm THICK

EXISTING STREAM PROFILE  
(VARIES)

UNDERLAYER  
Dn50 = 75mm  
150mm THICK

2 SCOUR PROTECTION - CROSS SECTION  
4430 SCALE 1:50

17.25m (COS)  
Σ

NEW RETAINING WALL

NEW BLOCK WALL TO ALIGN  
WITH RETAINING WALL SOFFIT.  
TOP EDGE OF OUTER BLOCK TO  
ALIGN WITH EXISTING STREAM  
PROFILE.

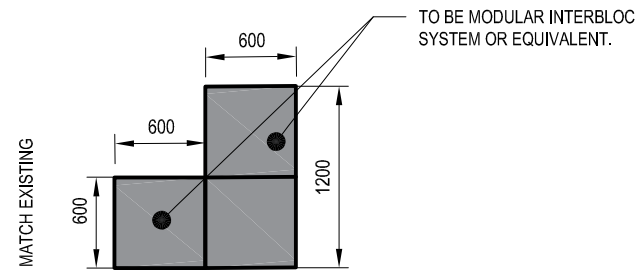
EXISTING STREAM PROFILE  
(VARIES)

3 SCOUR PROTECTION - CROSS SECTION  
4430 SCALE 1:50

SCOUR BLANKET ROCK GRADING

1. THE ARMOUR ROCK GRADING IS AS FOLLOWS:

ROCK GRADING						
NOMINAL M <sub>50</sub>	NOMINAL D <sub>n50</sub>	LAYER THICKNESS	MAX	<15% PASSING	MIN	D <sub>n85</sub> /D <sub>n15</sub>
(kg)	(m)	(m)	(kg)	(kg)	(kg)	
9	0.150	REFER DRAWINGS	2 × M <sub>50</sub>	0.5 × M <sub>50</sub>	0.3 × M <sub>50</sub>	<2
1.1	0.075	REFER DRAWINGS	2 × M <sub>50</sub>	0.5 × M <sub>50</sub>	0.3 × M <sub>50</sub>	<2



A TYPICAL BLOCK WALL CROSS SECTION  
SCALE 1:50

NOTES:

1. REFER TO DRAWING SE-4430 FOR NOTES.

FOR TENDER  
NOT FOR CONSTRUCTION

0	FOR TENDER		LR	CA	LDB	29/08/19			
No.	Revision		By	Chk	Appd	Date			

Original Scale (A3) AS SHOWN	Design	LR	29/08/19	Approved For Construction*
	Drawn	LR	29/08/19	
	Desg Verifier	CA	29/08/19	
	Dwg Check			
	* Refer to Revision 1 for Original Signature			



Project: SH16 - SAFETY IMPROVEMENTS  
STAGE 1  
HUAPAI TO WAIMAUKU

Title: KUMEU No.2  
PROPOSED BRIDGE WIDENING  
SCOUR PROTECTION - CROSS SECTION

Status:	FOR TENDER
Drawing No.	SR1003 - 01 - SE - 4432
Rev.	0