



Mangawhai Hills

Flood Risk Assessment

Prepared For:
Mangawhai Hills Ltd

Chester Job Number:
15209

Date:
23 February 2023

Revision History

Revision No.	Prepared By	Description	Date
0	A. Kyriacou	Original	23 February 2023




Action	Name	Signed	Date
Prepared by	A. Kyriacou		23 February 2023
Reviewed by	D.Teh		23 February 2023
Approved by	S. Rankin		23 February 2023



Table of Contents

1	Introduction.....	1
2	Site Description.....	1
2.1	Legal Description	2
3	Purpose.....	3
4	Flood Risk Assessment.....	4
4.1	Catchment Delineation.....	4
4.2	Hydrology Methodology.....	5
4.3	Flood Analysis – HEC RAS	6
5	Conclusion.....	9
6	Limitations	10
7	Appendix.....	11
	Appendix A: Conceptual Structure Plan	12
	Appendix B: HEC-HMS Results.....	13
	Appendix C: CCL Drawings 900 Series	14

List of Figures

Figure 2-1:	KDC aerial map of Private Plan Change Area (accessed 23/11/2022)	1
Figure 3-1 :	Proposed Plan Change.....	4
Figure 4-1:	Catchment delineation.....	4
Figure 4-2:	Flooding locations of interest.....	7

List of Tables

Table 2-1:	Existing Parcels within the PPC Area	2
Table 4-1:	Catchment Areas	5
Table 4-2:	Rainfall depths.....	5
Table 4-3 :	Manning coefficients	6
Table 4-4:	Flood Results at the specified locations	8



1 Introduction

Chester Consultants Ltd (Chester) has been engaged by Mangawhai Hills Ltd to provide a Flood Risk Assessment with respect to the proposed private plan change (PPC) referred to herein as 'the PPC', the PPC area is approximately 225ha and is comprised of multiple titles.

This report has been prepared solely for the benefit of this specific project, and the Kaipara District Council (KDC). Chester accepts no liability for inaccuracies in third party information used as part of this report. The reliance by other parties on the information or opinions contained in the report shall, without our prior review and agreement in writing, be at such parties' sole risk.

This report is based on development data provided by third party contributors to the private plan change application as well as data obtained from the KDC and Northland Regional Council (NRC) maps current to the site at the time of this document's production. All vertical levels stated in this report are in New Zealand Vertical Datum 2016 (NZVD2016) unless stated otherwise. Should alterations be made which impact upon the development not otherwise authorised by this report then the design / comments / recommendations contained within this report may no longer be valid.

In the event of the above, the property owner should immediately notify Chester to enable the impact to be assessed and, if required, the design and or recommendations shall be amended accordingly and as necessary.

2 Site Description

The PPC Area is located north-west of the Mangawhai Township. The PPC Area is generally bounded by Tara Road, Cove Road, Old Waipu Road and Moir Road, refer to Figure 2-1. Its topography ranges from steeply sloping slopes to gentle sloping slopes as there are ridgelines and gully features located within the PPC Area. We understand the gully features within the PPC Area provides drainage for most of the site before draining to the Tara Road Swamp and then eventually on to the Mangawhai Estuary.

The PPC Area is predominantly in pasture with native and exotic brush near the north-east boundary. There are a few existing houses and some ancillary farm buildings throughout.

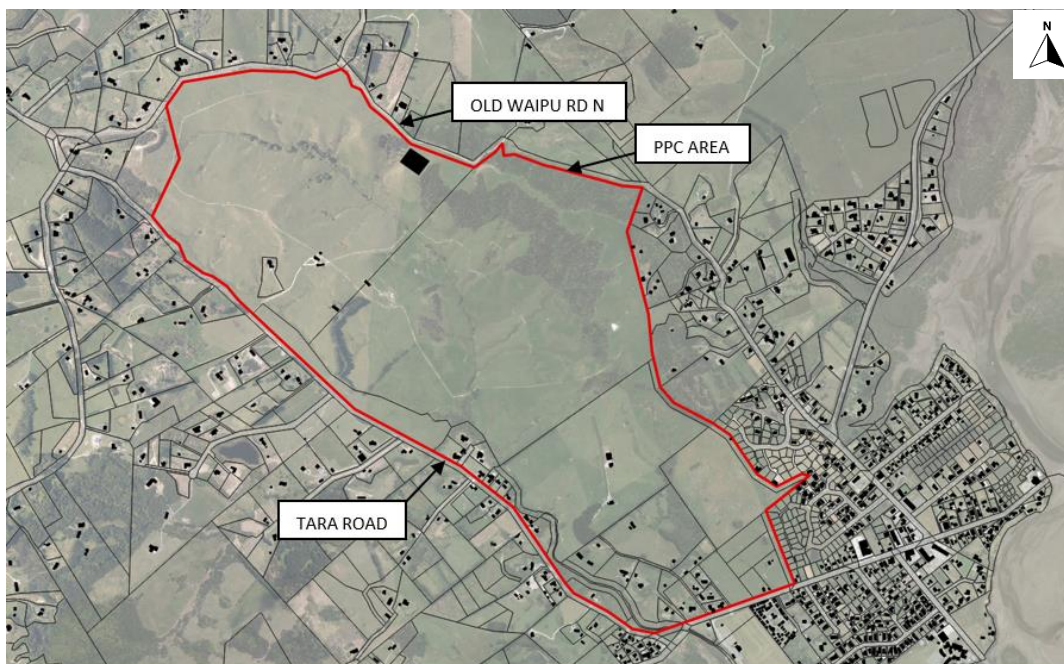


Figure 2-1: KDC aerial map of Private Plan Change Area (accessed 23/11/2022)



2.1 Legal Description

The PPC Area is comprised of multiple lots and is approximately 225ha in size. Table 1-1 shows the legal descriptions of each parcel that making up the area.

Table 1-1: Existing Parcels within the PPC Area

Parcel ID	Legal Description	Property Address
4818028	Lot 2 DP 172698	160 Tara Road
5203974	Allot 254 PSH of Mangawhai	160 Tara Road
8351500	Lot 2 DP 578282	196 Tara Road
8351501	Lot 1 DP 578282	196 Tara Road
5075209	Allot 247 PSH of Mangawhai	106 Moir Road
4789942	Lot 1 DP 206997	104D Tara Road
4886023	Lot 2 DP 206997	104C Tara Road
4782859	Lot 4 DP 206997	104B Tara Road
5129768	Lot 3 DP 206997	104A Tara Road
4818029	Lot 1 DP 135346	90 Tara Road
5000897	Lot 2 DP 135346	88 Tara Road
4866145	Lot 3 DP 135346	86 Tara Road
4771795	Lot 4 DP 135346	84 Tara Road
5075208	Lot 6 DP 135346	Local Purpose Reserve (Esplanade)
4915641	Lot 7 DP 125004	Local Purpose Reserve (Esplanade)
4737904	Lot 5 DP 135346	72 Tara Road
4677748	Lot 6 DP 125004	70 Tara Road
4898148	Lot 3 DP 139478	106B Moir Road
5041362	Lot 2 DP 139478	106 Moir Road
5158678	Lot 1 DP 139478	106 Moir Road
7867912	Lot 1 DP 521452	112 Moir Road
5038813	Lot 4 DP 125004	Local Purpose Reserve (Esplanade)
4781930	Lot 5 DP 125004	34 Tara Road
5035520	Lot 3 DP 107096	Local Purpose Reserve (Esplanade)
7867913	Lot 2 DP 521452	Moir Street
7653373	Lot 1 DP 490650	114 Moir Street
5183752	Lot 2 DP 125004	110 Moir Street
5048665	Lot 4 DP 139478	Moir Street
5042748	Lot 7 DP 139478	Moir Street



5170925	Lot 6 DP 139478	Moir Street
4791454	Lot 5 DP 139478	Moir Street
5019011	Lot 3 DP 154781	104B Moir Street
4761673	Lot 4 DP 154781	104C Moir Street
4754319	Lot 2 DP 154781	104A Moir Street
5022310	Lot 1 DP 154781	104 Moir Street
4765594	Lot 5 DP 154781	104B Moir Street
5185450	Lot 21 DEEDS W 38	96 Moir Street
4799656	Lot 17 DEEDS W 38	96 Moir Street
4916246	Lot 18 DEEDS W 38	96 Moir Street
4946787	Lot 20 DEEDS W 38	96 Moir Street
4905603	Lot 19 DEEDS W 38	96 Moir Street
5124736	Lot 1 DP 15117	30 Urlich Drive

3 Purpose

This report is intended to support the Proposed Private Plan Change by assessing the impact the PPC could potentially have on the downstream environment.

It is expected that more detailed flood assessments will be undertaken at future development stages to provide the data necessary to support a resource consent application, this model is limited with respect to the resolution of the base data and the sizes of the grids analysed. It should be used primarily to identify areas of interest where further investigation is required to inform a resource consent application.

The rainfall events being assessed will be the 1% AEP (Annual Exceedance probability), the 10% AEP and the 50% AEP whilst adopting a future climate change adjusted sea level within the Mangawhai Estuary.

This report estimates the flood flows through the site as well as downstream and comments on the changes resulting from the potential future development being enabled by the zoning proposed.

Figure 3-1 below is a visual representation of the PPC area:





Figure 3-1 : Proposed Plan Change

4 Flood Risk Assessment

4.1 Catchment Delineation

There are a total of thirteen sub-catchments which have been assessed as part of this assessment; Figure 4-1 below depicts the catchment boundaries.

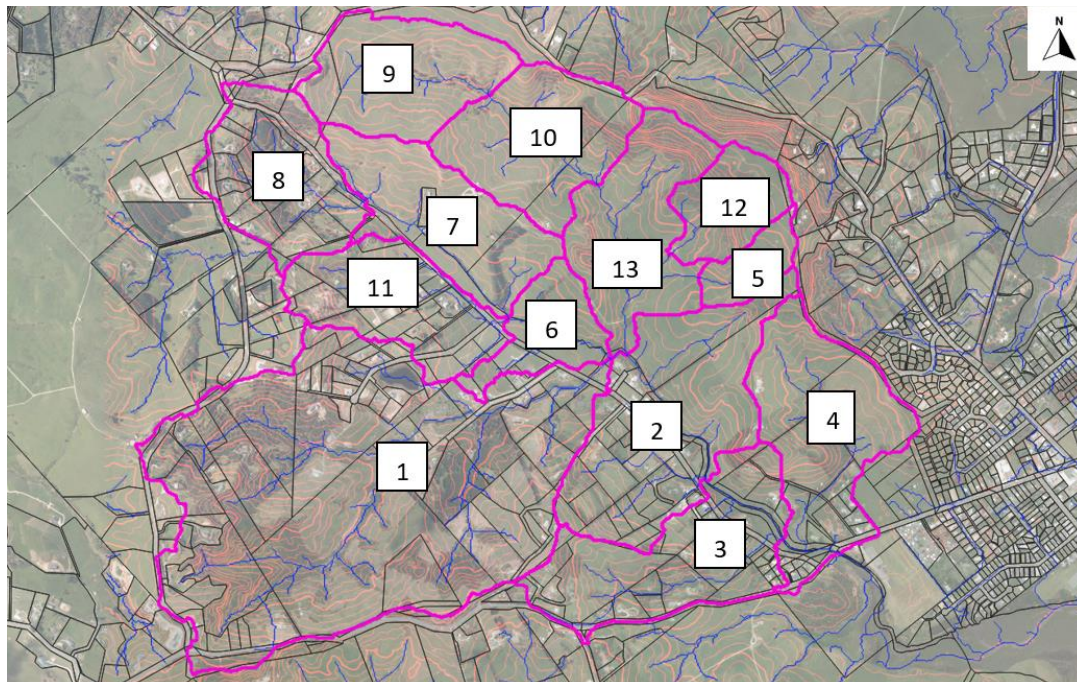


Figure 4-1: Catchment delineation

Refer to the table below for the catchment areas:



Table 4-1: Catchment Areas

Catchment	Area (km ²)
Catchment 1	1.409
Catchment 2	0.460
Catchment 3	0.353
Catchment 4	0.359
Catchment 5	0.066
Catchment 6	0.128
Catchment 7	0.284
Catchment 8	0.270
Catchment 9	0.266
Catchment 10	0.289
Catchment 11	0.252
Catchment 12	0.130
Catchment 13	0.294

4.2 Hydrology Methodology

Using HEC-HMS in accordance with the TP108 methodology we estimated the peak runoff from the delineated catchment areas for the 1% AEP, 10% AEP and the 50% AEP storm events. To estimate the extent of the flooding, a 2D flood model (5m by 5m grid) was created using HEC-RAS. The topographic data used for this flood model was obtained from the NRC Lidar (2018-2020) Tiles (1DEM), with the exception of a portion of Lot 2, DP 206997 where the dense vegetation meant the Lidar surface was misrepresenting the actual ground profile, a visual inspection was undertaken, and the ground model was adjusted to represent the observed condition.

The runoff coefficients evaluated for each catchment were based on soil group C.

4.2.1 Rainfall Depths

Rainfall data was obtained from Table 6.7 of the Kaipara District Engineering Standards (2011) and have been adjusted with a 17% allowance for climate change (2.1-degree Celsius increase in temperature). The table below represents the rainfall depths used to calculate the peak runoffs:

Table 4-2: Rainfall depths

AEP (%)	Rainfall Depth with climate change allowance (mm)
1%	324.33mm
10%	192.82mm
50%	134.20mm

4.2.2 Scenarios

We have prepared a first principal flood model to estimate the changes in the fluvial flooding that will occur when the catchment is developed. Within this assessment we have assessed three scenarios:

- Existing land zoning
- Future zoning - KDC Spatial plan
- Future zoning - PPC



NOTE: all scenarios are based on a maximum probable density.

The first scenario being existing land zoning where all catchments delineated in HEC-HMS and shown under Section 4.1 in this report were classified as rural. The second scenario is the Future Zoning scenario that represents the KDC spatial plan, the catchments delineated in HEC-HMS and shown under Section 4.1 in this report were classified as both rural and residential (the PPC area remaining as rural zoning). The third scenario is the Future zoning scenario where all the catchments delineated in HEC-HMS and shown under Section 4.1 in this report were classified as residential.

4.2.3 Coverage

We have assumed 10% of impermeable coverage for rural zones and 50% for residential zones when running the proposed conditions (zoned residential) flood assessment.

4.2.4 Mannings Roughness Coefficient

For the manning's roughness used, refer to the table below.

Table 4-3 : Manning coefficients

Land Cover	Mannings Coefficient
Rural Zones	0.05
Urban Zones	0.12
Stream and esplanade parcels	0.06
Road Parcels	0.025

4.2.5 Inundation level

The PPC area is near the coast, therefore parameters need to be set around future sea levels as an increase in the sea level in the future due to climate change will increase the fluvial flood level upstream. In this instance we set an inundation level of RL 3.2m as per the Coastal flood hazard zone 2 from the NRC hazard maps. This coastal inundation level is based on a projected sea level rise of 1.2m by 2130 and aligns with a high-emission scenario as documented by the NRC.

4.2.6 Time of concentration

Using HEC-HMS, we imported the terrain into the model and used certain functions such as the "identify streams and delineate elements" to help us identify OLFPs and their catchments. Once we identified the OLFPs and their catchments, HEC-HMS provided us with the attributes of those OLFPs which then allowed us to use equal area method from TP108 to calculate the time of concentration.

The time of concentration for each catchment was then used in the model to estimate the peak combined flows.

4.3 Flood Analysis – HEC RAS

After running the HEC-RAS model, five locations along the flood route were picked to extract data from to create a table that compares the depth, velocity, water surface elevation, houses potentially affected and flow. The results within the table represent the results from the pre-development scenario, post-development scenario (KDC Spatial Plan) and the post-development scenario (PPC Spatial Plan) for the 1% AEP, 10% AEP and the 50% AEP storm event. Below is a visual representation of the locations picked.



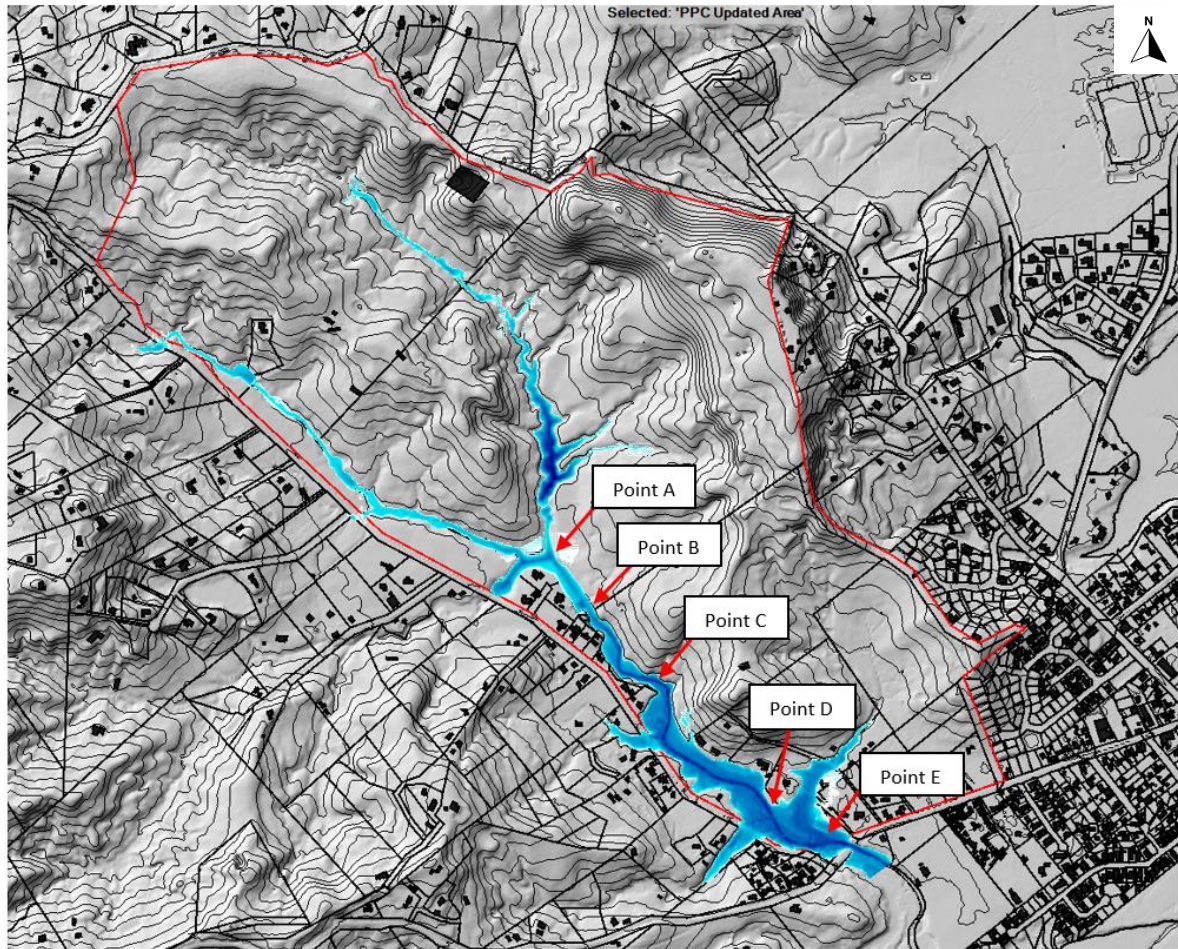


Figure 4-2: Flooding locations of interest.



Table 4-4: Flood Results at the specified locations

		Existing Zoning			Future Zoning KDC MPD			Future Zoning PPC MPD		
		50% AEP	10% AEP	1% AEP	50% AEP	10% AEP	1% AEP	50% AEP	10% AEP	1% AEP
Point A	Depth (m)	0.96	1.25	1.77	1.11	1.37	1.86	1.17	1.45	1.92
	Velocity (m/s)	1.44	1.73	2.14	1.59	1.84	2.28	1.63	1.86	2.09
	WSE (m)	5.01	5.30	5.89	5.16	5.42	5.95	5.22	5.50	6.01
	Flow (m ³ /s)	8.94	16.84	43.75	12.59	21.20	50.83	14.12	24.12	53.58
Point B	Depth (m)	1.19	1.44	2.04	1.31	1.56	2.18	1.39	1.64	2.29
	Velocity (m/s)	1.19	1.43	1.80	1.33	1.51	1.86	1.26	1.45	1.80
	WSE (m)	3.88	4.13	4.75	4.00	4.25	4.87	4.08	4.36	4.99
	Flow (m ³ /s)	9.07	17.11	44.22	12.78	21.48	51.42	14.32	24.38	53.92
Point C	Depth (m)	2.65	2.73	3.07	2.69	2.80	3.22	2.76	2.93	3.44
	Velocity (m/s)	0.29	0.53	1.12	0.40	0.64	1.21	0.43	0.66	1.16
	WSE (m)	3.23	3.30	3.64	3.27	3.37	3.78	3.33	3.50	4.02
	Flow (m ³ /s)	9.1	17.09	43.73	12.79	21.49	50.66	14.19	24.12	52.45
Point D	Depth (m)	2.48	2.52	2.76	2.51	2.57	2.91	2.57	2.70	3.15
	Velocity (m/s)	0.11	0.20	0.41	0.15	0.23	0.43	0.19	0.28	0.45
	WSE (m)	3.22	3.26	3.50	3.25	3.32	3.65	3.30	3.44	3.89
	Flow (m ³ /s)	11.53	21.55	50.65	15.86	26.24	56.82	17.17	28.01	56.15
Point E	Depth (m)	3.15	3.19	3.40	3.18	3.30	3.54	3.23	3.35	3.78
	Velocity (m/s)	0.20	0.36	0.72	0.27	0.42	0.74	0.33	0.49	0.74
	WSE (m)	3.22	3.25	3.47	3.24	3.30	3.60	3.29	3.42	3.84
	Flow (m ³ /s)	13.19	24.25	55.40	17.75	29.14	61.73	19.10	30.65	60.45



4.3.1 Results Discussion

4.3.1.1 Depths and Water Surface Elevations

Table 4-4 shows the depth and water surface elevations for all three scenarios and for all three storm events. When comparing the depths and water surface elevations of the existing conditions and the future zoning (PPC) conditions it can be seen that the depths and water surface elevation have an increase range between 0.15m - 0.39m for the 1% AEP storm event, 0.16m - 0.20m for the 10% AEP storm event and 0.08m - 0.21m for the 50% AEP storm event. Additionally, when we compare the depths of both future zoning conditions. We can see an increase in flood depths and water surface elevation for the future zoning condition (PPC). The increase ranges between 0.06m - 0.24m for the 1% AEP storm event, 0.05m - 0.13m for the 10% AEP storm event and 0.05m - 0.08m for the 50% AEP storm event.

4.3.1.2 Flows

From Table 4-4 the stream provides some form of natural attenuation during the storm duration. The flow rates decrease through the centre of the flood plain and then increase again more towards the end of the flood plain. This is assumed to happen due to the differing lengths of catchments and time of concentrations converging within the floodplain at different times during the storm event. Additionally, it can be seen that the flows from both the future zoning at point D and E are very similar. This can be explained by the law of continuity where flow equals the velocity of the water multiplied by the cross-sectional surface area of the water. Due to the slopes being relatively flat at points D and E the velocities for both scenarios are very similar, the cross-sectional areas of the water at those points are similar too thus causing the flows to be similar.

4.3.1.3 Houses potentially affected by the floodplain.

When assessing potentially affected houses, we have excluded depths less than 0.1m as they are not deemed as a hazard under the New Zealand Building Code. Based on the results from HEC-RAS and the extents of the flooding (greater than 0.1m depth), almost all the houses downstream of the PPC area are unlikely to be affected by flooding. However, one house has been flagged that is potentially susceptible to flooding; specifically 114 Moir Street (Lot 1 DP 490650). The flooding depth delta from existing to future zoning PPC ranges between 0m - 0.25m and the flood extents come near the downslope edge of the building footprint.

A visual inspection was carried out to correlate the model surface to site observations, based on this it is our opinion that the floor level is unlikely to be flooded, we expect that a detailed assessment will be completed a resource consent stage to either validate this view or if found to be incorrect propose mitigation.

5 Conclusion

In our opinion after completing the assessment for the three scenarios the PPC area does not have a specific limitation related to flooding that prevents the site being re-zoned as proposed.

Further investigation is to be undertaken at resource consent stage to demonstrate compliance with the district plan.



6 Limitations

- This assessment contains the professional opinion of Chester Consultants as to the matters set out herein, in light of the information available to it during the preparation, using its professional judgement and acting in accordance with the standard of care and skill normally exercised by professional engineers providing similar services in similar circumstances. No other express or implied warranty is made as to the professional advice contained in this report.
- We have prepared this report in accordance with the brief as provided and our terms of engagement. The information contained in this report has been prepared by Chester Consultants at the request of Mangawhai Hills Ltd Limited and is exclusively for its client use and reliance. It is not possible to make a proper assessment of this assessment without a clear understanding of the terms of engagement under which it has been prepared, including the scope of the instructions and directions given to and the assumptions made by Chester Consultants Ltd. The assessment will not address issues which would need to be considered for another party if that party's particular circumstances, requirements and experience were known and, further, may make assumptions about matters of which a third party is not aware. No responsibility or liability to any third party is accepted for any loss or damage whatsoever arising out of the use of or reliance on this assessment by any third party.
- The assessment is also based on information that has been provided to Chester Consultants Ltd from other sources or by other parties. The assessment has been prepared strictly on the basis that the information that has been provided is accurate, completed, and adequate. To the extent that any information is inaccurate, incomplete or inadequate, Chester Consultants Ltd takes no responsibility and disclaims all liability whatsoever for any loss or damage that results from any conclusions based on information that has been provided to Chester Consultants Ltd.



7 Appendix



Appendix A: Conceptual Structure Plan



5.1 Conceptual Structure Plan

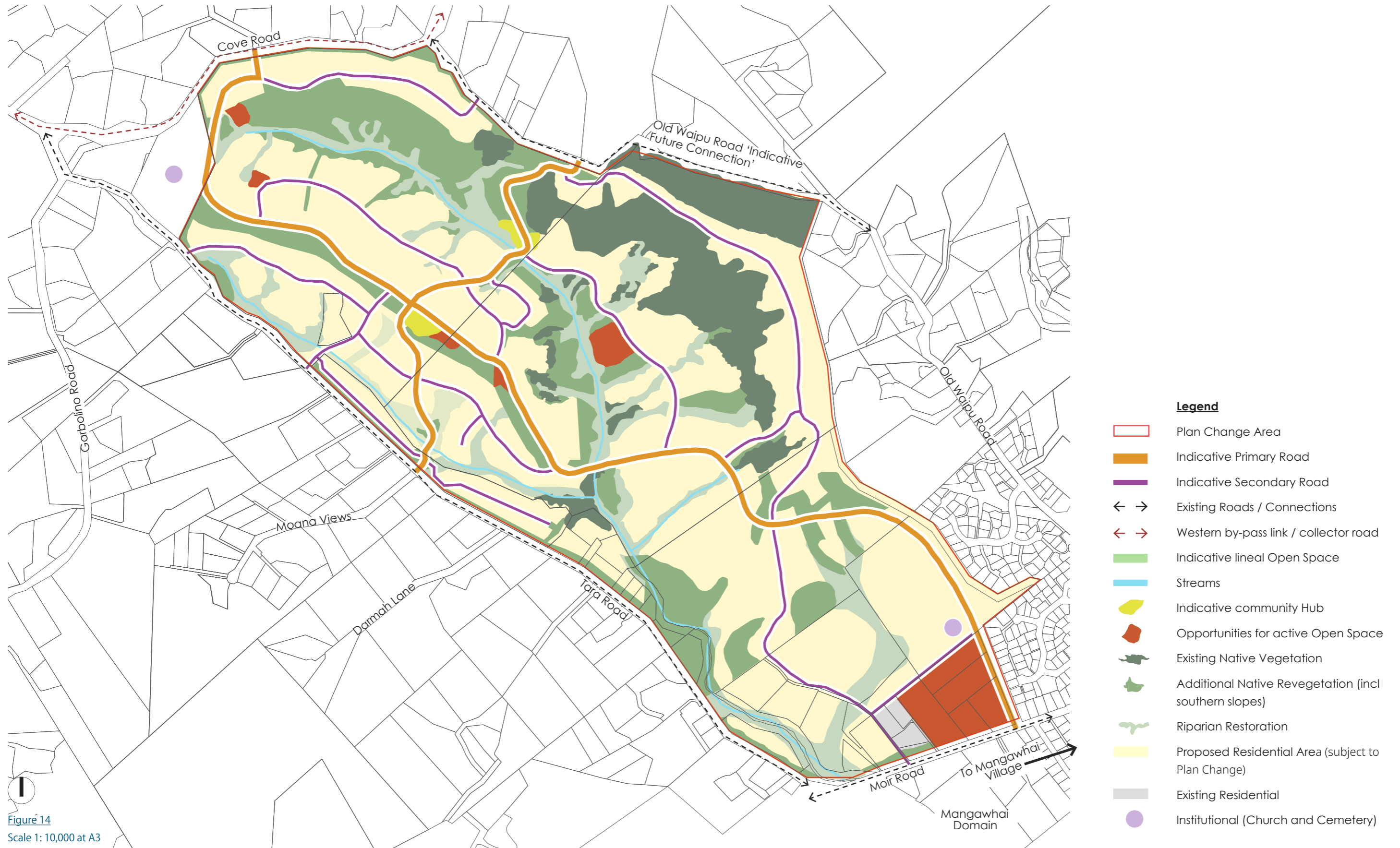
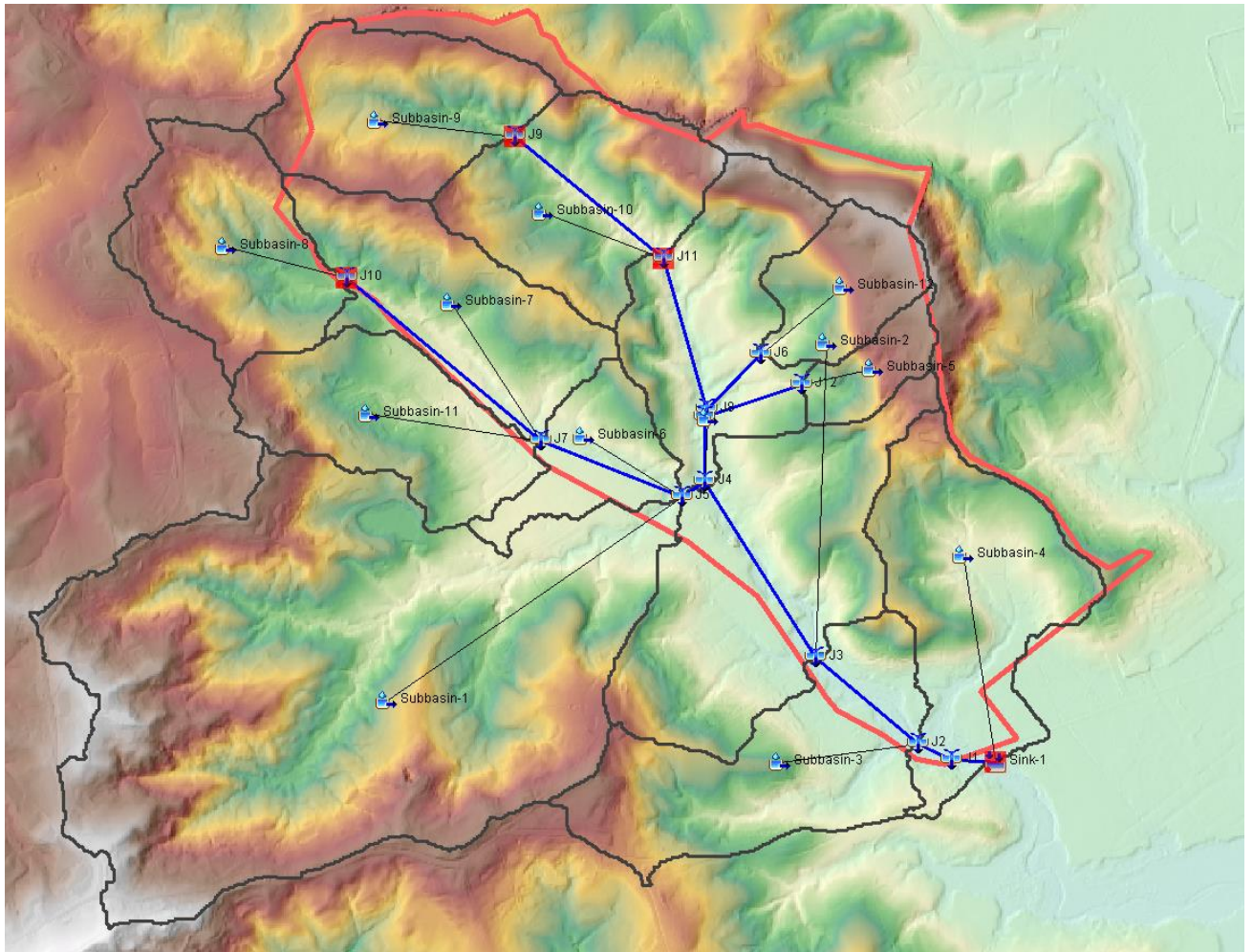


Figure 14
Scale 1: 10,000 at A3

Appendix B: HEC-HMS Results





Existing Conditions – 1% AEP Results

Global Summary Results for Run "1% AEP"

Project: Mangashai Hills - All exist Simulation Run: 1% AEP
 Start of Run: 01Jan2100, 00:00 Basin Model: Mangashai Hills
 End of Run: 02Jan2100, 00:00 Meteorologic Model: 1% AEP
 Compute Time: 12Dec2022, 14:12:41 Control Specifications: Control 1

Volume Units: MM 1000 M3

Sorting: Hydrologic

Hydrologic Element	Drainage Area (km ²)	Peak Discharge (m ³ /s)	Time of Peak	Volume (mm)
Subbasin-8	0.2695000	4.26076	01Jan2100, 08:07	247.96205
J10	0.2695000	4.26076	01Jan2100, 08:07	247.96205
R9	0.2695000	4.26076	01Jan2100, 08:37	244.91929
Subbasin-7	0.2844000	4.30915	01Jan2100, 08:10	247.52881
Subbasin-11	0.2528000	3.90097	01Jan2100, 08:09	247.71579
J7	0.8067000	10.38842	01Jan2100, 08:18	246.71598
R7	0.8067000	10.38842	01Jan2100, 08:30	245.49455
Subbasin-1	1.4093000	17.85669	01Jan2100, 08:27	245.38962
Subbasin-6	0.1280000	1.95573	01Jan2100, 08:14	247.67820
J5	2.3440000	29.81822	01Jan2100, 08:27	245.51266
R5	2.3440000	29.81822	01Jan2100, 08:29	245.31230
Subbasin-9	0.2663000	4.10572	01Jan2100, 08:09	247.70671
J9	0.2663000	4.10572	01Jan2100, 08:09	247.70671
R10	0.2663000	4.10572	01Jan2100, 08:34	245.17025
Subbasin-10	0.2893000	4.62240	01Jan2100, 08:06	248.07391
J11	0.5586000	7.00566	01Jan2100, 08:22	246.88153
Reach-1	0.5586000	7.00566	01Jan2100, 08:35	245.35630
Subbasin-12	0.1301000	2.19882	01Jan2100, 08:02	248.71411
J6	0.1301000	2.19882	01Jan2100, 08:02	248.71411
Reach-3	0.1301000	2.19882	01Jan2100, 08:06	248.31805
J8	0.6857000	8.17488	01Jan2100, 08:26	245.91843
Reach-4	0.6857000	8.17488	01Jan2100, 08:27	245.81832
Subbasin-5	0.0664750	1.13523	01Jan2100, 08:01	248.86723
J12	0.0664750	1.13523	01Jan2100, 08:01	248.86723
Reach-6	0.0664750	1.13523	01Jan2100, 08:15	247.47835
J13	0.7521750	9.14516	01Jan2100, 08:20	245.96311
Reach-5	0.7521750	9.14516	01Jan2100, 08:45	243.37296
Subbasin-13	0.2941500	4.95832	01Jan2100, 08:08	247.76124
J4	3.3903250	40.85586	01Jan2100, 08:32	245.09461
R4	3.3903250	40.85586	01Jan2100, 09:22	239.78166
Subbasin-2	0.4603000	6.91047	01Jan2100, 08:11	247.43595
J3	3.8502500	43.49202	01Jan2100, 09:21	246.59645
R3	3.8502500	43.49202	01Jan2100, 09:41	238.50471
Subbasin-3	0.3530200	5.21998	01Jan2100, 08:12	247.27922
J2	4.2036450	45.22794	01Jan2100, 09:41	238.24158
R2	4.2036450	45.22794	01Jan2100, 09:49	238.35773
J1	4.2036450	45.22794	01Jan2100, 09:49	238.35773
R1	0.3530200	45.22794	01Jan2100, 09:36	237.68852
Subbasin-4	0.3530200	5.17507	01Jan2100, 08:14	247.04539
Sink-1	4.5615150	46.89114	01Jan2100, 09:55	238.42337

Existing Conditions – 10% AEP Results

Global Summary Results for Run "10% AEP"

Project: Mangavhai Hills - All exist Simulation Run: 10% AEP
 Start of Run: 01Jan2100, 00:00 Basin Model: Mangavhai Hills
 End of Run: 02Jan2100, 00:00 Meteorologic Model: 10% AEP
 Compute Time: 12Dec2022, 14:14:26 Control Specifications: Control 1

Volume Units: M3 1000 M3

Settings: **Hydrologic**

Hydrologic Element	Drainage Area (ha)	Peak Discharge (M3/S)	Time of Peak (hr)	Volume (M3)
Subbasin-8	0.2659000	2.10938	01Jan2100, 08:08	126.59903
J10	0.2659000	2.10938	01Jan2100, 08:08	126.59903
R9	0.2659000	2.10938	01Jan2100, 08:38	124.89765
Subbasin-7	0.2844000	2.13159	01Jan2100, 08:11	126.35730
Subbasin-11	0.2528000	1.93037	01Jan2100, 08:09	126.46130
J7	0.8067000	5.13896	01Jan2100, 08:19	125.90206
R7	0.8067000	5.13896	01Jan2100, 08:31	125.21907
Subbasin-1	1.4093000	8.72110	01Jan2100, 08:28	125.16093
Subbasin-6	0.1280000	0.94766	01Jan2100, 08:14	125.10365
J5	2.3440000	14.63647	01Jan2100, 08:28	125.23242
R5	2.3440000	14.63647	01Jan2100, 08:30	125.11763
Subbasin-9	0.2663000	2.03169	01Jan2100, 08:09	126.45622
J9	0.2663000	2.03169	01Jan2100, 08:09	126.45622
R10	0.2663000	2.03169	01Jan2100, 08:34	125.03840
Subbasin-10	0.2893000	2.28863	01Jan2100, 08:07	126.66647
J11	0.5556000	3.47019	01Jan2100, 08:23	125.88301
Reach-1	0.5556000	3.47019	01Jan2100, 08:36	125.14209
Subbasin-12	0.1301000	1.09151	01Jan2100, 08:02	127.03971
J6	0.1301000	1.09151	01Jan2100, 08:02	127.03971
Reach-3	0.1301000	1.09151	01Jan2100, 08:06	126.79868
J8	0.6837000	4.04566	01Jan2100, 08:27	125.40640
Reach-4	0.6837000	4.04566	01Jan2100, 08:28	125.39923
Subbasin-5	0.0664750	0.56395	01Jan2100, 08:01	127.10537
J12	0.0664750	0.56395	01Jan2100, 08:01	127.10537
Reach-6	0.0664750	0.56395	01Jan2100, 08:15	126.32841
J13	0.7521750	4.51474	01Jan2100, 08:21	125.48143
Reach-5	0.7521750	4.51474	01Jan2100, 08:46	124.03279
Subbasin-13	0.2941500	2.25863	01Jan2100, 08:09	126.48672
J4	3.3903250	20.19378	01Jan2100, 08:33	124.99995
R4	3.3903250	20.19378	01Jan2100, 08:23	122.02855
Subbasin-2	0.4603000	3.41791	01Jan2100, 08:11	126.39481
J3	3.8506250	21.55302	01Jan2100, 09:22	122.53973
R3	3.8506250	21.55302	01Jan2100, 09:42	121.31645
Subbasin-3	0.3530200	2.58078	01Jan2100, 08:13	126.21717
J2	4.2036450	22.45337	01Jan2100, 09:42	121.72811
R2	4.2036450	22.45337	01Jan2100, 09:50	121.23486
J1	4.2036450	22.45337	01Jan2100, 09:56	120.86213
R1	4.2036450	22.45337	01Jan2100, 08:14	126.08531
Subbasin-4	0.3578700	2.55725	01Jan2100, 08:14	126.08531
Sink-1	4.5615150	23.32145	01Jan2100, 09:56	121.27191

Existing Conditions – 50% AEP Results

Global Summary Results for Run "50% AEP"

Project: Mangavhai Hills - All exist Simulation Run: 50% AEP
 Start of Run: 01Jan2100, 00:00 Basin Model: Mangavhai Hills
 End of Run: 02Jan2100, 00:00 Meteorologic Model: 50% AEP
 Compute Time: 12Dec2022, 14:15:11 Control Specifications: Control 1

Volume Units: M3 1000 M3

Settings: **Hydrologic**

Hydrologic Element	Drainage Area (ha)	Peak Discharge (M3/S)	Time of Peak (hr)	Volume (M3)
Subbasin-8	0.2659000	1.22303	01Jan2100, 08:08	76.07507
J10	0.2659000	1.22303	01Jan2100, 08:08	76.07507
R9	0.2659000	1.22303	01Jan2100, 08:38	74.91963
Subbasin-7	0.2844000	1.23480	01Jan2100, 08:11	75.91874
Subbasin-11	0.2528000	1.11850	01Jan2100, 08:10	75.88600
J7	0.8067000	2.97646	01Jan2100, 08:20	75.62451
R7	0.8067000	2.97646	01Jan2100, 08:32	75.18280
Subbasin-1	1.4093000	5.04566	01Jan2100, 08:29	75.14537
Subbasin-6	0.1280000	0.53115	01Jan2100, 08:15	75.79472
J5	2.3440000	8.47129	01Jan2100, 08:28	75.19153
R5	2.3440000	8.47129	01Jan2100, 08:30	75.11732
Subbasin-9	0.2663000	1.17719	01Jan2100, 08:10	75.98271
J9	0.2663000	1.17719	01Jan2100, 08:10	75.98271
R10	0.2663000	1.17719	01Jan2100, 08:35	75.06593
Subbasin-10	0.2893000	1.32754	01Jan2100, 08:07	76.11482
J11	0.5556000	2.01377	01Jan2100, 08:25	75.13208
Reach-1	0.5556000	2.01377	01Jan2100, 08:38	75.13305
Subbasin-12	0.1301000	0.63372	01Jan2100, 08:03	76.34720
J6	0.1301000	0.63372	01Jan2100, 08:03	76.34720
Reach-3	0.1301000	0.63372	01Jan2100, 08:07	76.20420
J8	0.6837000	2.34482	01Jan2100, 08:28	75.13628
Reach-4	0.6837000	2.34482	01Jan2100, 08:29	75.29938
Subbasin-5	0.0664750	0.32765	01Jan2100, 08:02	76.40262
J12	0.0664750	0.32765	01Jan2100, 08:02	76.40262
Reach-6	0.0664750	0.32765	01Jan2100, 08:16	75.89998
J13	0.7521750	2.61182	01Jan2100, 08:22	75.35246
Reach-5	0.7521750	2.61182	01Jan2100, 08:47	74.41687
Subbasin-13	0.2941500	1.30748	01Jan2100, 08:09	76.02244
J4	3.3903250	11.69137	01Jan2100, 08:33	75.03871
R4	3.3903250	11.69137	01Jan2100, 09:23	73.12114
Subbasin-2	0.4603000	1.97954	01Jan2100, 08:12	75.88479
J3	3.8506250	12.50659	01Jan2100, 09:23	73.42239
R3	3.8506250	12.50659	01Jan2100, 09:43	72.66296
Subbasin-3	0.3530200	1.49469	01Jan2100, 08:13	75.82812
J2	4.2036450	13.04945	01Jan2100, 09:42	72.63877
R2	4.2036450	13.04945	01Jan2100, 09:50	72.61061
J1	4.2036450	13.04945	01Jan2100, 09:50	72.61061
R1	4.2036450	13.04945	01Jan2100, 09:56	72.37019
Subbasin-4	0.3578700	1.48054	01Jan2100, 08:15	75.74286
Sink-1	4.5615150	13.97691	01Jan2100, 09:56	72.63479

Future Zoning KDC – 1% AEP Results

Global Summary Results for Run "1% AEP"

Project: Mangawhai Hills Simulation Run: 1% AEP						
Start of Run: 01Jan2100, 00:00		Basin Model: Mangawhai Hills		End of Run: 02Jan2100, 00:00		
End of Run: 02Jan2100, 00:00		Meteorologic Model: 1% AEP		Compute Time: 19Dec2022, 14:19:42		
Control Specifications: Control 1		Volume Units: <input checked="" type="radio"/> MM <input type="radio"/> 1000 MG		Sorting: Hydrologic		
Hydrologic Element	Drainage Area (04Z)	Peak Discharge (M3/S)	Time of Peak	Volume (04Z)		
Subbasin-8	0.2695000	4.83014	01Jan2100, 08:05	271.85436		
J10	0.2695000	4.83014	01Jan2100, 08:05	271.85436		
R9	0.2695000	4.83014	01Jan2100, 08:35	268.72910		
Subbasin-7	0.2844000	4.76234	01Jan2100, 08:10	271.12255		
Subbasin-11	0.2528000	4.43940	01Jan2100, 08:06	271.62909		
J7	0.8067000	11.70933	01Jan2100, 08:17	270.48503		
R7	0.8067000	11.70933	01Jan2100, 08:29	269.23232		
Subbasin-1	1.4093000	20.55044	01Jan2100, 08:22	269.56484		
Subbasin-6	0.1280000	2.25189	01Jan2100, 08:13	270.65239		
J5	2.3440000	33.92462	01Jan2100, 08:23	269.50979		
R5	2.3440000	33.92462	01Jan2100, 08:25	269.29988		
Subbasin-9	0.2663000	4.53743	01Jan2100, 08:09	271.30964		
J9	0.2663000	4.53743	01Jan2100, 08:09	271.30964		
R10	0.2663000	4.53743	01Jan2100, 08:34	268.70433		
Subbasin-10	0.2893000	5.10381	01Jan2100, 08:06	271.68217		
J11	0.5556000	7.74423	01Jan2100, 08:21	270.25488		
Reach-1	0.5556000	7.74423	01Jan2100, 08:34	268.89314		
Subbasin-12	0.1301000	2.42566	01Jan2100, 08:01	272.34190		
J6	0.1301000	2.42566	01Jan2100, 08:01	272.34190		
Reach-3	0.1301000	2.42566	01Jan2100, 08:05	271.93608		
J8	0.6857000	9.04049	01Jan2100, 08:25	269.47049		
Reach-4	0.6857000	9.04049	01Jan2100, 08:26	269.36357		
J12	0.0664750	1.25166	01Jan2100, 08:00	272.49918		
Reach-6	0.0664750	1.25166	01Jan2100, 08:14	271.07245		
J13	0.7521750	10.12963	01Jan2100, 08:19	269.51642		
Reach-5	0.7521750	10.12963	01Jan2100, 08:44	268.85429		
Subbasin-13	0.2941500	5.03861	01Jan2100, 08:08	271.36299		
J4	3.3903250	45.96594	01Jan2100, 08:28	268.93630		
R4	3.3903250	45.96594	01Jan2100, 09:18	265.04267		
Subbasin-5	0.0664750	1.25166	01Jan2100, 08:00	272.49918		
Subbasin-2	0.4603000	7.89472	01Jan2100, 08:08	271.37631		
J3	3.8506250	48.78069	01Jan2100, 09:18	264.43995		
R3	3.8506250	48.78069	01Jan2100, 09:38	262.18936		
Subbasin-3	0.3530200	5.97903	01Jan2100, 08:09	271.24386		
J2	4.2036450	50.62398	01Jan2100, 09:37	262.94967		
R2	4.2036450	50.62398	01Jan2100, 09:45	262.04371		
J1	4.2036450	50.62398	01Jan2100, 09:45	262.04371		
R1	4.2036450	50.62398	01Jan2100, 09:51	261.35871		
Subbasin-4	0.3578700	5.33883	01Jan2100, 08:10	271.02877		
R1	0.3578700	5.33883	01Jan2100, 08:10	271.02877		
Sink-1	4.5615150	52.38397	01Jan2100, 09:51	262.11727		

Future Zoning KDC – 10% AEP

Global Summary Results for Run "10% AEP"

Project: Mangawhai Hills Simulation Run: 10% AEP						
Start of Run: 01Jan2100, 00:00		Basin Model: Mangawhai Hills		End of Run: 02Jan2100, 00:00		
End of Run: 02Jan2100, 00:00		Meteorologic Model: 10% AEP		Compute Time: 19Dec2022, 14:20:35		
Control Specifications: Control 1		Volume Units: <input checked="" type="radio"/> MM <input type="radio"/> 1000 MG		Sorting: Hydrologic		
Hydrologic Element	Drainage Area (04Z)	Peak Discharge (M3/S)	Time of Peak	Volume (04Z)		
Subbasin-8	0.2695000	2.56247	01Jan2100, 08:05	145.55265		
J10	0.2695000	2.56247	01Jan2100, 08:05	145.55265		
R9	0.2695000	2.56247	01Jan2100, 08:35	143.73776		
Subbasin-7	0.2844000	2.52277	01Jan2100, 08:10	145.13957		
Subbasin-11	0.2528000	2.33578	01Jan2100, 08:07	145.42284		
J7	0.8067000	6.20248	01Jan2100, 08:17	144.76368		
R7	0.8067000	6.20248	01Jan2100, 08:29	144.04197		
Subbasin-1	1.4093000	10.87315	01Jan2100, 08:22	144.23361		
Subbasin-6	0.1280000	1.88607	01Jan2100, 08:14	144.86010		
J5	2.3440000	17.95411	01Jan2100, 08:24	144.20187		
R5	2.3440000	17.95411	01Jan2100, 08:26	144.08994		
Subbasin-9	0.2663000	2.40509	01Jan2100, 08:09	145.23877		
J9	0.2663000	2.40509	01Jan2100, 08:09	145.23877		
R10	0.2663000	2.40509	01Jan2100, 08:34	143.73777		
Subbasin-10	0.2893000	2.79718	01Jan2100, 08:06	145.45343		
J11	0.5556000	4.10444	01Jan2100, 08:22	144.63111		
Reach-1	0.5556000	4.10444	01Jan2100, 08:35	143.84662		
Subbasin-12	0.1301000	1.38814	01Jan2100, 08:02	145.83361		
J6	0.1301000	1.38814	01Jan2100, 08:02	145.83361		
Reach-3	0.1301000	1.38814	01Jan2100, 08:06	145.99973		
J8	0.6857000	4.78854	01Jan2100, 08:26	144.17524		
Reach-4	0.6857000	4.78854	01Jan2100, 08:27	144.11880		
J12	0.0664750	0.66511	01Jan2100, 08:01	145.92425		
Reach-6	0.0664750	0.66511	01Jan2100, 08:15	145.10294		
J13	0.7521750	5.35471	01Jan2100, 08:20	144.29376		
Reach-5	0.7521750	5.35471	01Jan2100, 08:45	142.67240		
Subbasin-13	0.2941500	2.66959	01Jan2100, 08:09	145.26952		
J4	3.3903250	24.32383	01Jan2100, 08:29	143.87157		
R4	3.3903250	24.32383	01Jan2100, 09:19	140.73776		
Subbasin-5	0.0664750	0.66511	01Jan2100, 08:01	145.92425		
Subbasin-2	0.4603000	4.83297	01Jan2100, 08:08	145.27718		
J3	3.8506250	25.86155	01Jan2100, 09:18	141.28040		
R3	3.8506250	25.86155	01Jan2100, 09:38	139.98745		
Subbasin-3	0.3530200	3.16745	01Jan2100, 08:09	145.20030		
J2	4.2036450	26.87177	01Jan2100, 09:38	145.45322		
R2	4.2036450	26.87177	01Jan2100, 09:46	139.90390		
J1	4.2036450	26.87177	01Jan2100, 09:46	139.90390		
R1	4.2036450	26.87177	01Jan2100, 09:52	139.59078		
Subbasin-4	0.3578700	3.14631	01Jan2100, 08:11	145.07695		
R1	0.3578700	3.14631	01Jan2100, 08:11	145.07695		
Sink-1	4.5615150	27.84098	01Jan2100, 09:52	139.94655		

Future Zoning KDC – 50% AEP Results

Global Summary Results for Run "50% AEP"

Project: Manganhai Hills Simulation Run: 50% AEP
 Start of Run: 01Jan2100, 00:00 Basin Model: Manganhai Hills
 End of Run: 02Jan2100, 00:00 Meteorologic Model: 50% AEP
 Compute Time: 13Dec2022, 14:21:33 Control Specifications: Control 1

Volume Units: (M) (M) (M) 3000 M3

Hydrologic Element	Drainage Area (sqft)	Peak Discharge (cfs)	Time of Peak	Volume (M3)
Subbasin-8	0.2695000	1.57446	01Jan2100, 08:05	91.26225
J10	0.2695000	1.57446	01Jan2100, 08:05	91.26225
R9	0.2695000	1.57446	01Jan2100, 08:35	90.06308
Subbasin-7	0.2844000	1.54834	01Jan2100, 08:11	90.98049
Subbasin-11	0.3280000	1.44623	01Jan2100, 08:07	91.17551
J7	0.3280000	1.44623	01Jan2100, 08:18	90.75112
R7	0.3280000	1.44623	01Jan2100, 08:30	90.25298
Subbasin-1	1.4093000	6.66654	01Jan2100, 08:23	90.38106
Subbasin-6	0.1280000	0.66645	01Jan2100, 08:14	90.79553
J5	2.3440000	11.01595	01Jan2100, 08:24	90.35984
R5	2.3440000	11.01595	01Jan2100, 08:26	90.27906
Subbasin-9	0.2663000	1.47669	01Jan2100, 08:09	91.02522
J9	0.2663000	1.47669	01Jan2100, 08:09	91.02522
R10	0.2663000	1.47669	01Jan2100, 08:34	90.04874
Subbasin-10	0.2893000	1.46538	01Jan2100, 08:07	91.12994
J11	0.5560000	2.52164	01Jan2100, 08:23	90.64637
Reach-1	0.5560000	2.52164	01Jan2100, 08:36	90.12252
Subbasin-12	0.1301000	0.79264	01Jan2100, 08:02	91.40000
J6	0.1301000	0.79264	01Jan2100, 08:02	91.40000
Reach-3	0.1301000	0.79264	01Jan2100, 08:06	91.28369
J8	0.6857000	2.94010	01Jan2100, 08:27	90.34473
Reach-4	0.6857000	2.94010	01Jan2100, 08:28	90.34155
J12	0.0664750	0.40948	01Jan2100, 08:01	91.51058
Reach-6	0.0664750	0.40948	01Jan2100, 08:15	90.96111
J13	0.7521750	3.28224	01Jan2100, 08:21	90.36240
Reach-5	0.7521750	3.28224	01Jan2100, 08:46	89.33839
Subbasin-13	0.2941500	1.63975	01Jan2100, 08:09	91.07306
J4	3.3903250	14.92010	01Jan2100, 08:30	90.12625
R4	3.3903250	14.92010	01Jan2100, 09:20	88.47111
Subbasin-5	0.0664750	0.40948	01Jan2100, 08:01	91.51058
Subbasin-2	0.4603000	2.56920	01Jan2100, 08:09	91.07818
J3	3.8506250	15.89259	01Jan2100, 09:19	88.48444
R3	3.8506250	15.89259	01Jan2100, 09:39	87.54674
Subbasin-3	0.3530200	1.94479	01Jan2100, 08:10	91.02681
J2	4.2036450	16.53247	01Jan2100, 09:39	87.83999
R2	4.2036450	16.53247	01Jan2100, 09:47	87.49121
J1	4.2036450	16.53247	01Jan2100, 09:47	87.49121
R1	4.2036450	16.53247	01Jan2100, 09:53	87.28322
Subbasin-4	0.3578700	1.93206	01Jan2100, 08:11	90.94440
Sink-1	4.5615150	17.15173	01Jan2100, 09:52	87.51986

Future Zoning PPC – 1% AEP Results

Global Summary Results for Run "1% AEP"

Project: Manganhai Hills - All Res Simulation Run: 1% AEP
 Start of Run: 01Jan2100, 00:00 Basin Model: Manganhai Hills
 End of Run: 02Jan2100, 00:00 Meteorologic Model: 1% AEP
 Compute Time: 13Dec2022, 14:22:31 Control Specifications: Control 1

Volume Units: (M) (M) (M) 3000 M3

Hydrologic Element	Drainage Area (sqft)	Peak Discharge (cfs)	Time of Peak	Volume (M3)
Subbasin-3	0.3530200	6.22246	01Jan2100, 08:09	282.68873
Subbasin-8	0.2695000	5.02429	01Jan2100, 08:04	283.30588
Subbasin-4	0.3578700	6.18288	01Jan2100, 08:10	282.47265
J10	0.2695000	5.02429	01Jan2100, 08:04	283.30588
R9	0.2695000	5.02429	01Jan2100, 08:34	280.16171
Subbasin-7	0.2844000	5.12017	01Jan2100, 08:07	282.91753
Subbasin-11	0.3280000	4.61936	01Jan2100, 08:06	283.37653
J7	0.3280000	12.12634	01Jan2100, 08:14	282.04733
R7	0.3280000	12.12634	01Jan2100, 08:26	280.78490
Subbasin-1	1.4093000	21.40589	01Jan2100, 08:21	280.99506
Subbasin-6	0.1280000	2.21710	01Jan2100, 08:10	282.49970
J5	2.3440000	35.37284	01Jan2100, 08:22	281.00490
R5	2.3440000	35.37284	01Jan2100, 08:24	280.79520
Subbasin-9	0.2663000	4.85989	01Jan2100, 08:06	283.95111
J9	0.2663000	4.85989	01Jan2100, 08:06	283.95111
R10	0.2663000	4.85989	01Jan2100, 08:31	280.44672
Subbasin-10	0.2893000	5.43796	01Jan2100, 08:04	283.29927
J11	0.5560000	8.17394	01Jan2100, 08:18	281.98363
Reach-1	0.5560000	8.17394	01Jan2100, 08:31	280.61393
Subbasin-12	0.1301000	2.54849	01Jan2100, 08:00	283.94981
J6	0.1301000	2.54849	01Jan2100, 08:00	283.94981
Reach-3	0.1301000	2.54849	01Jan2100, 08:04	283.56117
J8	0.6857000	9.55226	01Jan2100, 08:23	281.17312
Reach-4	0.6857000	9.55226	01Jan2100, 08:24	281.06756
Subbasin-5	0.0664750	1.31166	01Jan2100, 07:58	284.11496
J12	0.0664750	1.31166	01Jan2100, 07:58	284.11496
Reach-6	0.0664750	1.31166	01Jan2100, 08:12	282.47800
J13	0.7521750	10.71799	01Jan2100, 08:17	281.20989
Reach-5	0.7521750	10.71799	01Jan2100, 08:42	278.53117
Subbasin-13	0.2941500	5.39452	01Jan2100, 08:06	283.11868
J4	3.3903250	48.06347	01Jan2100, 08:27	280.49111
R4	3.3903250	48.06347	01Jan2100, 09:17	275.00711
Subbasin-2	0.4603000	8.21158	01Jan2100, 08:08	282.82340
J3	3.8506250	50.98816	01Jan2100, 09:16	275.94146
R3	3.8506250	50.98816	01Jan2100, 09:36	273.67612
J2	4.2036450	52.89110	01Jan2100, 09:36	274.43300
R2	4.2036450	52.89110	01Jan2100, 09:44	273.51932
J1	4.2036450	52.89110	01Jan2100, 09:44	273.51932
R1	4.2036450	52.89110	01Jan2100, 09:50	272.82846
Sink-1	4.5615150	54.70032	01Jan2100, 09:50	273.98508

Future Zoning PPC – 10% AEP Results

Global Summary Results for Run "10% AEP"

Project: Mangawhai Hills - All Res Simulation Run: 10% AEP

Start of Run: 01Jan2100, 00:00 Basin Model: Mangawhai Hills
 End of Run: 02Jan2100, 00:00 Meteorologic Model: 10% AEP
 Compute Time: 15Dec2022, 14:23:19 Control Specifications: Control 1

Volume Units: MM 1000 MG

Sorting: Hydrologic

Hydrologic Element	Drainage Area (ha)	Peak Discharge (m3/s)	Time of Peak	Volume (mm)
Subbasin-3	0.3530200	3.42008	01Jan2100, 08:09	154.89353
Subbasin-8	0.2695000	2.75039	01Jan2100, 08:05	155.25332
Subbasin-4	0.3578700	1.38706	01Jan2100, 08:11	154.76797
J10	0.2695000	2.75639	01Jan2100, 08:05	155.25332
R9	0.2695000	2.75639	01Jan2100, 08:05	155.40649
Subbasin-7	0.2844000	2.80641	01Jan2100, 08:08	155.02992
Subbasin-11	0.2828000	2.53236	01Jan2100, 08:06	155.12077
J7	0.8067000	6.64193	01Jan2100, 08:14	154.51985
R7	0.8067000	6.64193	01Jan2100, 08:26	153.78176
Subbasin-1	1.4093000	11.71457	01Jan2100, 08:22	153.90632
Subbasin-6	0.1280000	1.21445	01Jan2100, 08:10	154.78334
J5	2.3440000	19.36455	01Jan2100, 08:22	153.91203
R5	2.3440000	19.36455	01Jan2100, 08:24	153.78863
Subbasin-9	0.2663000	2.66419	01Jan2100, 08:07	155.11295
J9	0.2663000	2.66419	01Jan2100, 08:07	155.11295
R10	0.2663000	2.66419	01Jan2100, 08:32	153.58601
Subbasin-10	0.2893000	2.98325	01Jan2100, 08:04	155.30776
J11	0.5556000	4.47945	01Jan2100, 08:18	154.46252
Reach-1	0.5556000	4.47945	01Jan2100, 08:31	153.68411
Subbasin-12	0.1301000	1.39967	01Jan2100, 08:00	155.64040
J6	0.1301000	1.39967	01Jan2100, 08:00	155.64040
Reach-3	0.1301000	1.39967	01Jan2100, 08:04	155.40215
J8	0.6857000	5.23345	01Jan2100, 08:23	154.01008
Reach-4	0.6857000	5.23345	01Jan2100, 08:24	153.94855
Subbasin-5	0.0664750	0.72056	01Jan2100, 07:59	155.72503
J12	0.0664750	0.72056	01Jan2100, 07:59	155.72503
Reach-6	0.0664750	0.72056	01Jan2100, 08:13	154.88724
J13	0.7521750	5.86296	01Jan2100, 08:18	154.03151
Reach-5	0.7521750	5.86296	01Jan2100, 08:43	152.47029
Subbasin-13	0.2911500	2.95815	01Jan2100, 08:06	155.14418
J4	3.3903250	26.36244	01Jan2100, 08:28	153.61376
R4	3.3903250	26.36244	01Jan2100, 09:18	150.41709
Subbasin-2	0.4603000	4.50297	01Jan2100, 08:08	154.97204
J3	3.8506250	27.94966	01Jan2100, 09:17	150.96139
R3	3.8506250	27.94966	01Jan2100, 09:17	148.64000
J2	4.2036450	29.01812	01Jan2100, 09:37	150.08302
R2	4.2036450	29.01812	01Jan2100, 09:45	149.55085
J1	4.2036450	29.01812	01Jan2100, 09:45	149.55085
R1	4.2036450	29.01812	01Jan2100, 09:51	149.14849
Sink-1	4.5615150	30.04107	01Jan2100, 09:50	149.58933

Future Zoning PPC – 50% AEP Results

Global Summary Results for Run "50% AEP"

Project: Mangawhai Hills - All Res Simulation Run: 50% AEP

Start of Run: 01Jan2100, 00:00 Basin Model: Mangawhai Hills
 End of Run: 02Jan2100, 00:00 Meteorologic Model: 50% AEP
 Compute Time: 15Dec2022, 14:24:18 Control Specifications: Control 1

Volume Units: MM 1000 MG

Sorting: Hydrologic

Hydrologic Element	Drainage Area (ha)	Peak Discharge (m3/s)	Time of Peak	Volume (mm)
Subbasin-3	0.3530200	2.16021	01Jan2100, 08:09	99.24331
Subbasin-8	0.2695000	1.74803	01Jan2100, 08:05	99.48710
Subbasin-4	0.3578700	1.14684	01Jan2100, 08:11	99.15796
J10	0.2695000	1.74803	01Jan2100, 08:05	99.48710
R9	0.2695000	1.74803	01Jan2100, 08:35	98.24525
Subbasin-7	0.2844000	1.77912	01Jan2100, 08:08	99.33368
Subbasin-11	0.2828000	1.60566	01Jan2100, 08:07	99.39128
J7	0.8067000	4.20718	01Jan2100, 08:15	98.98999
R7	0.8067000	4.20718	01Jan2100, 08:27	98.49141
Subbasin-1	1.4093000	7.41407	01Jan2100, 08:22	98.57449
Subbasin-6	0.1280000	0.76942	01Jan2100, 08:11	99.16865
J5	2.3440000	12.25789	01Jan2100, 08:23	98.57834
R5	2.3440000	12.25789	01Jan2100, 08:25	98.49475
Subbasin-9	0.2663000	1.68936	01Jan2100, 08:07	99.39198
J9	0.2663000	1.68936	01Jan2100, 08:07	99.39198
R10	0.2663000	1.68936	01Jan2100, 08:32	98.35740
Subbasin-10	0.2893000	1.89163	01Jan2100, 08:04	99.12460
J11	0.5556000	2.83781	01Jan2100, 08:19	98.96484
Reach-1	0.5556000	2.83781	01Jan2100, 08:32	98.42391
Subbasin-12	0.1301000	0.88895	01Jan2100, 08:01	99.74942
J6	0.1301000	0.88895	01Jan2100, 08:01	99.74942
Reach-3	0.1301000	0.88895	01Jan2100, 08:05	99.58795
J8	0.6857000	3.31603	01Jan2100, 08:24	98.64477
Subbasin-5	0.0664750	0.45772	01Jan2100, 08:25	98.60308
Subbasin-5	0.0664750	0.45772	01Jan2100, 08:00	99.80677
J12	0.0664750	0.45772	01Jan2100, 08:00	99.80677
Reach-6	0.0664750	0.45772	01Jan2100, 08:14	99.29611
J13	0.7521750	3.71000	01Jan2100, 08:19	98.65928
Reach-5	0.7521750	3.71000	01Jan2100, 08:44	97.60173
Subbasin-13	0.2911500	1.87468	01Jan2100, 08:06	99.11315
J4	3.3903250	16.65513	01Jan2100, 08:28	98.37630
R4	3.3903250	16.65513	01Jan2100, 09:18	96.21152
Subbasin-2	0.4603000	2.85291	01Jan2100, 08:09	99.28650
J3	3.8506250	17.71838	01Jan2100, 09:17	96.50030
R3	3.8506250	17.71838	01Jan2100, 09:37	95.68702
J2	4.2036450	18.41699	01Jan2100, 09:37	95.86968
R2	4.2036450	18.41699	01Jan2100, 09:45	95.75447
J1	4.2036450	18.41699	01Jan2100, 09:45	95.62547
R1	4.2036450	18.41699	01Jan2100, 09:51	95.38316
Sink-1	4.5615150	19.08513	01Jan2100, 09:51	95.61587

Appendix C: CCL Drawings 900 Series



CIVIL ENGINEERING DRAWING SCHEDULE

SHEET	TITLE	REVISION DATE													
		22/02/2023													
001	SCHEDULE PAGE	0													
900	FLOODING EXTENTS PLAN - 50% AEP PRE DEVELOPMENT	0													
901	FLOODING EXTENTS PLAN - 10% AEP PRE DEVELOPMENT	0													
902	FLOODING EXTENTS PLAN - 1% AEP PRE DEVELOPMENT	0													
903	FLOODING EXTENTS PLAN - 50% AEP POST DEVELOPMENT KDC SPATIAL PLAN	0													
904	FLOODING EXTENTS PLAN - 10% AEP POST DEVELOPMENT KDC SPATIAL PLAN	0													
905	FLOODING EXTENTS PLAN - 1% AEP POST DEVELOPMENT KDC SPATIAL PLAN	0													
906	FLOODING EXTENTS PLAN - 50% AEP POST DEVELOPMENT PPC SPATIAL PLAN	0													
907	FLOODING EXTENTS PLAN - 10% AEP POST DEVELOPMENT PPC SPATIAL PLAN	0													
908	FLOODING EXTENTS PLAN - 1% AEP POST DEVELOPMENT PPC SPATIAL PLAN	0													
909	CATCHMENTS PLAN	0													

NOTE:

- THE FLOOD EXTENTS ON THE DRAWING ONLY ESTIMATE THE FLOOD EXTENTS WITHIN AND DOWNSTREAM OF THE PPC AREA, DUE TO THE PPC AREA BEING REZONED. THE FLOODING EXTENTS DO NOT SHOW THE FULL EXTENTS OF FLOODING WITHIN THE ENTIRE CATCHMENT.
- SURFACE FLOODING LESS THAN 0.1m HAS BEEN IGNORED .

SCHEDULE LEGEND	
ORIGINAL ISSUE	0
NOT REVISED	
REVISED	1
NOT INCLUDED IN SET	-
DELETED FROM SET	###

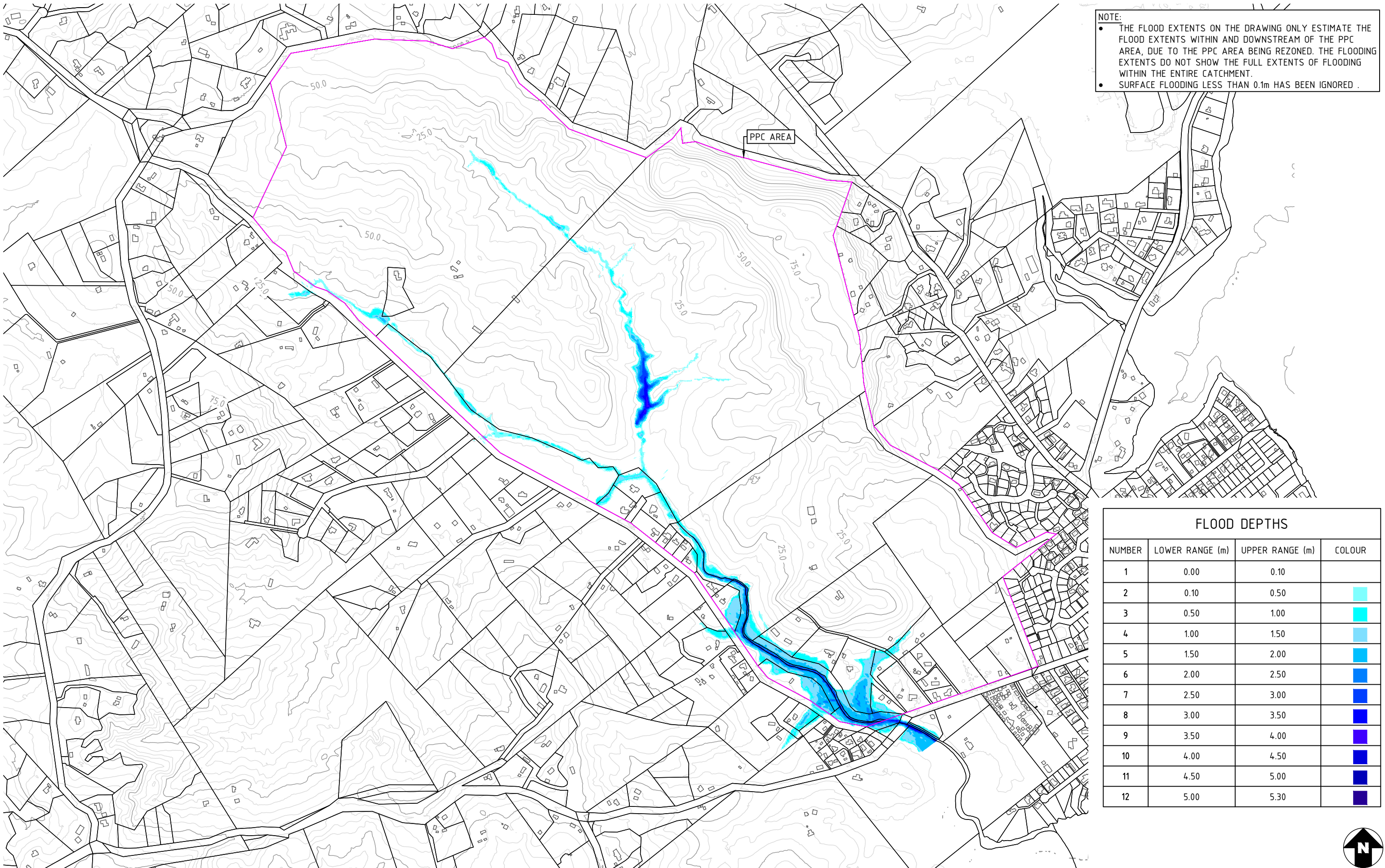
C:\Users\KecherAbdullah\OneDrive\Documents\Chester_Consultants\Central_Library - 15209 - Mangawhai Hills\3.0 Design\3.2 Civil\3.2.1 ACAD\DWG Layouts\Flooding\15209-C-DWG-900.dwg 2/22/2023 11:43 am LAST SAVED BY: KecherAbdullah

Rev	Date	Amendments	By

Drafter: A KYRIACOU Job Title: PROPOSED PRIVATE PLAN CHANGE - FRECKLINGTON FARM , MANGAWHAI HILLS
 Designer: A KYRIACOU Client: MANGAWHAI HILLS LTD
 Checker: S RANKIN Address: MANGAWHAI HILLS
 Date: 22/02/2023 Drawing Title: DRAWING SCHEDULE

Drawing: 001 Rev: 0
 Scale: NTS @ A3
 Project: 15209
 Issue: PLAN CHANGE





NOTE:

- THE FLOOD EXTENTS ON THE DRAWING ONLY ESTIMATE THE FLOOD EXTENTS WITHIN AND DOWNSTREAM OF THE PPC AREA, DUE TO THE PPC AREA BEING REZONED. THE FLOODING EXTENTS DO NOT SHOW THE FULL EXTENTS OF FLOODING WITHIN THE ENTIRE CATCHMENT.
- SURFACE FLOODING LESS THAN 0.1m HAS BEEN IGNORED .

FLOOD DEPTHS			
NUMBER	LOWER RANGE (m)	UPPER RANGE (m)	COLOUR
1	0.00	0.10	
2	0.10	0.50	
3	0.50	1.00	
4	1.00	1.50	
5	1.50	2.00	
6	2.00	2.50	
7	2.50	3.00	
8	3.00	3.50	
9	3.50	4.00	
10	4.00	4.50	
11	4.50	5.00	
12	5.00	5.30	



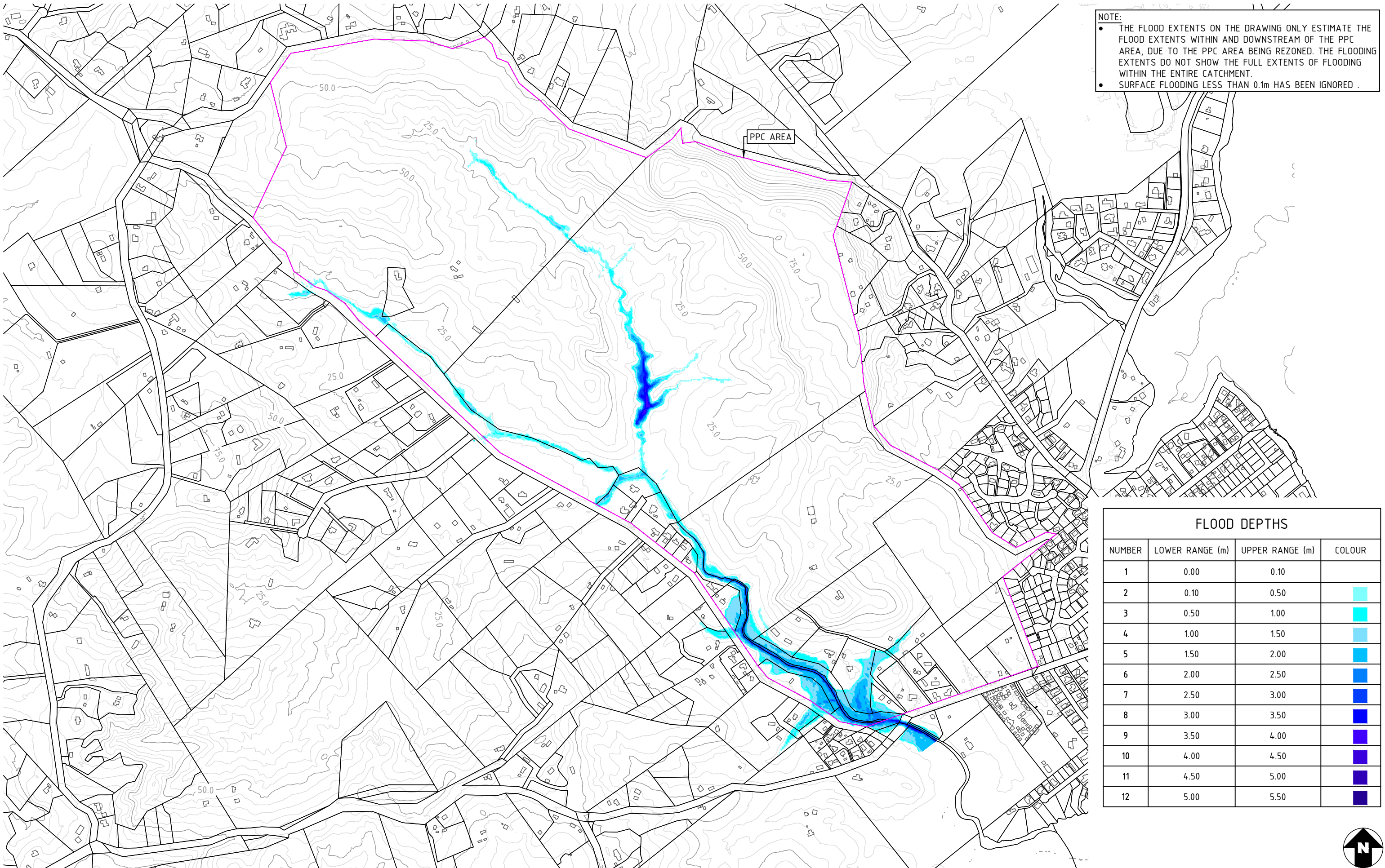
Rev	Date	Amendments	By

Drafter: A KYRIACOU Job Title: PROPOSED PRIVATE PLAN CHANGE - FRECKLINGTON FARM , MANGAWHAI HILLS
 Designer: A KYRIACOU Client: MANGAWHAI HILLS LTD
 Checker: S RANKIN Address: MANGAWHAI HILLS
 Date: 22/02/2023 Drawing Title: 50% AEP EXISTING FLOOD EXTENTS

Drawing: 900 Rev: 0
 Scale: 1:10000 @ A3
 Project: 15209
 Issue: PLAN CHANGE


 LAND DEVELOPMENT & INFRASTRUCTURE | ENGINEERING | SURVEYING | PLANNING
www.chester.co.nz

C:\Users\Kecher\Abdullah\Central Library - 15209 - Mangawai Hills\3.0 Design\3.2 CIV\3.2.1 ACAD\DWG Layout\Floods\F5209-C-DWG-900.dwg 27/27/2023 11:43 am LAST SAVED BY: KecherAbdullah



NOTE:

- THE FLOOD EXTENTS ON THE DRAWING ONLY ESTIMATE THE FLOOD EXTENTS WITHIN AND DOWNSTREAM OF THE PPC AREA, DUE TO THE PPC AREA BEING REZONED. THE FLOODING EXTENTS DO NOT SHOW THE FULL EXTENTS OF FLOODING WITHIN THE ENTIRE CATCHMENT.
- SURFACE FLOODING LESS THAN 0.1m HAS BEEN IGNORED .

FLOOD DEPTHS			
NUMBER	LOWER RANGE (m)	UPPER RANGE (m)	COLOUR
1	0.00	0.10	
2	0.10	0.50	Lightest Blue
3	0.50	1.00	Light Blue
4	1.00	1.50	Medium Light Blue
5	1.50	2.00	Medium Blue
6	2.00	2.50	Dark Blue
7	2.50	3.00	Very Dark Blue
8	3.00	3.50	Dark Purple
9	3.50	4.00	Very Dark Purple
10	4.00	4.50	Black
11	4.50	5.00	Black
12	5.00	5.50	Black



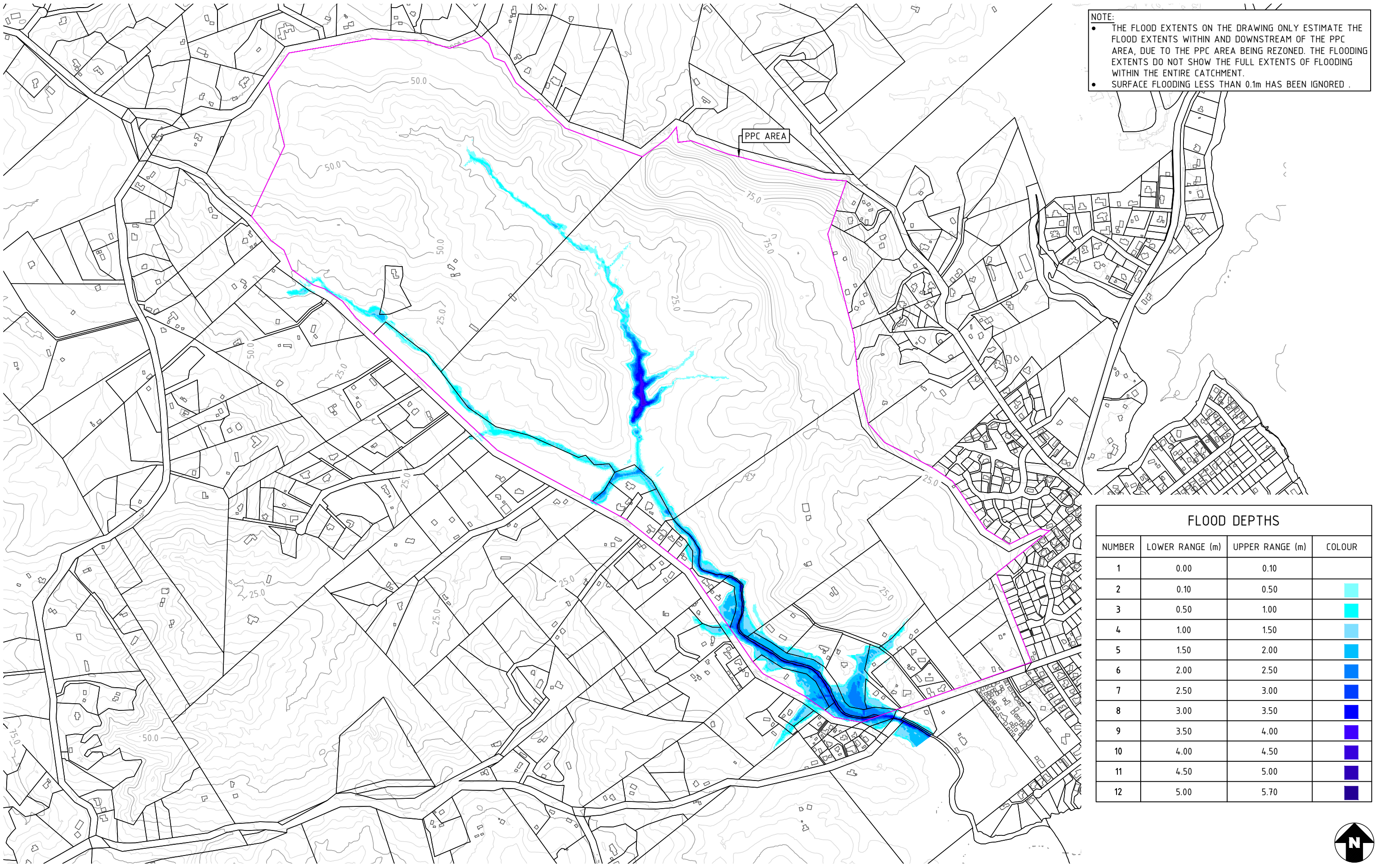
Rev	Date	Amendments	By

Drafter: A KYRIACOU Job Title: PROPOSED PRIVATE PLAN CHANGE - FRECKLINGTON FARM , MANGAWHAI HILLS
 Designer: A KYRIACOU Client: MANGAWHAI HILLS LTD
 Checker: S RANKIN Address: MANGAWHAI HILLS
 Date: 22/02/2023 Drawing Title: 10% AEP EXISTING FLOOD EXTENTS

Drawing: 901 Rev: 0
 Scale: 1:10000 @ A3
 Project: 15209
 Issue: PLAN CHANGE


 LAND DEVELOPMENT & INFRASTRUCTURE | ENGINEERING | SURVEYING | PLANNING
www.chester.co.nz

C:\Users\KecharAbdullah\OneDrive\Documents\Central Library - 15209 - Mangawhai Hills\10 Design\12 Civi\13.2.1 ACAD\DWG Layouts\Floodings\15209_C-DWG-901.dwg 27/27/2023 11:43 am LAST SAVED BY: KecharAbdullah



NOTE:

- THE FLOOD EXTENTS ON THE DRAWING ONLY ESTIMATE THE FLOOD EXTENTS WITHIN AND DOWNSTREAM OF THE PPC AREA, DUE TO THE PPC AREA BEING REZONED. THE FLOODING EXTENTS DO NOT SHOW THE FULL EXTENTS OF FLOODING WITHIN THE ENTIRE CATCHMENT.
- SURFACE FLOODING LESS THAN 0.1m HAS BEEN IGNORED .

FLOOD DEPTHS			
NUMBER	LOWER RANGE (m)	UPPER RANGE (m)	COLOUR
1	0.00	0.10	
2	0.10	0.50	Lightest Blue
3	0.50	1.00	Light Blue
4	1.00	1.50	Medium Light Blue
5	1.50	2.00	Medium Blue
6	2.00	2.50	Dark Blue
7	2.50	3.00	Very Dark Blue
8	3.00	3.50	Dark Purple
9	3.50	4.00	Very Dark Purple
10	4.00	4.50	Blackish Purple
11	4.50	5.00	Black
12	5.00	5.70	Dark Purple

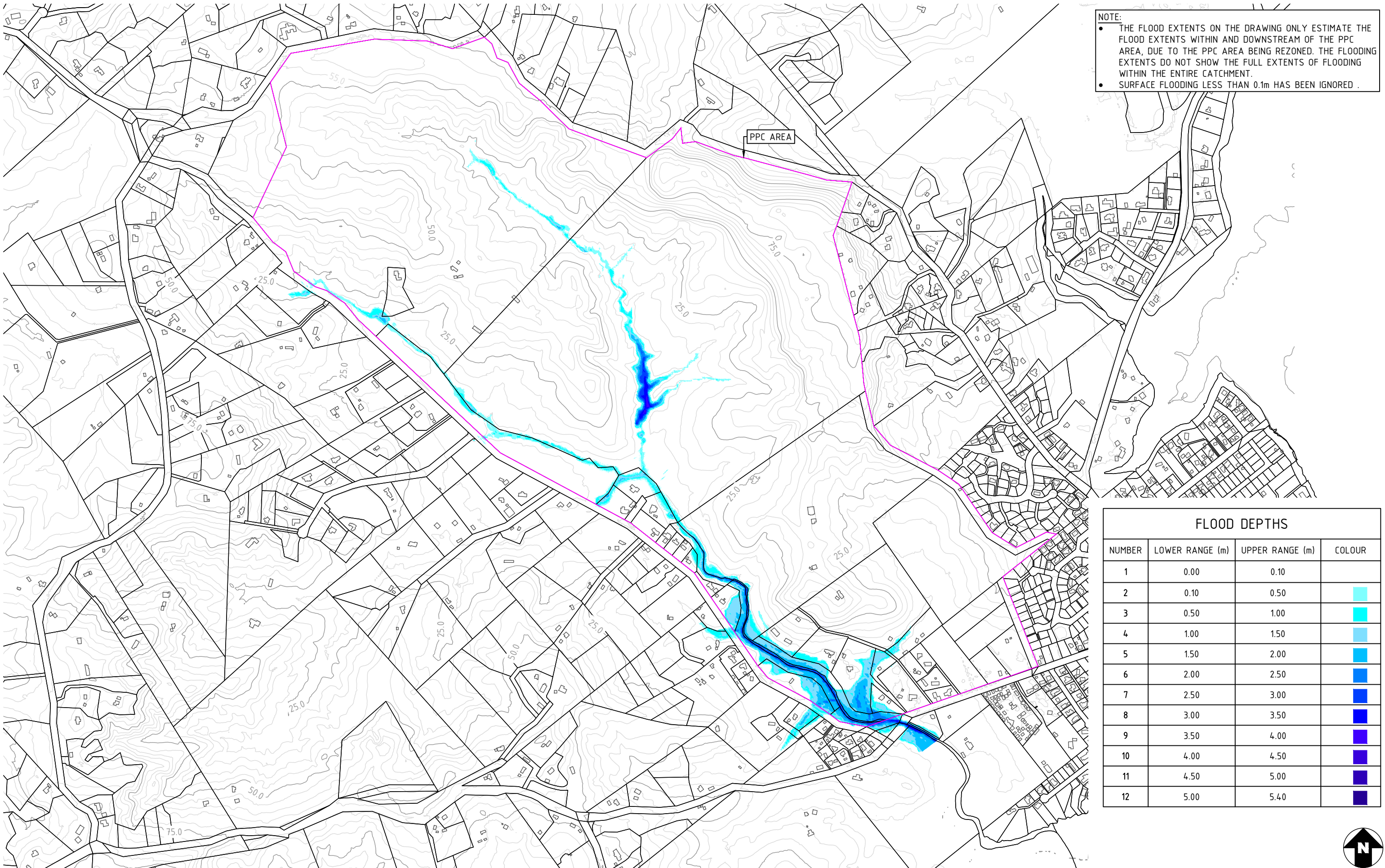


Rev	Date	Amendments	By

Drafter: A KYRIACOU	Job Title: PROPOSED PRIVATE PLAN CHANGE - FRECKLINGTON FARM , MANGAWHAI HILLS	Drawing: 902 Rev: 0
Designer: A KYRIACOU	Client: MANGAWHAI HILLS LTD	Scale: 1:10000 @ A3
Checker: S RANKIN	Address: MANGAWHAI HILLS	Project: 15209
Date: 22/02/2023	Drawing Title: 1% AEP EXISTING FLOOD EXTENTS	Issue: PLAN CHANGE

CHESTER
 LAND DEVELOPMENT & INFRASTRUCTURE | ENGINEERING | SURVEYING | PLANNING
 www.chester.co.nz

C:\Users\Kecher\Abdullah\Central Library - 15209 - Mangawai Hills\3.0 Design\3.2 CIV\3.2.1 ACAD\DWG Layout\Floods\Floods-15209-C-DWG-902.dwg 27/27/2023 11:43 am LAST SAVED BY: KecherAbdullah



NOTE:

- THE FLOOD EXTENTS ON THE DRAWING ONLY ESTIMATE THE FLOOD EXTENTS WITHIN AND DOWNSTREAM OF THE PPC AREA, DUE TO THE PPC AREA BEING REZONED. THE FLOODING EXTENTS DO NOT SHOW THE FULL EXTENTS OF FLOODING WITHIN THE ENTIRE CATCHMENT.
- SURFACE FLOODING LESS THAN 0.1m HAS BEEN IGNORED .

FLOOD DEPTHS			
NUMBER	LOWER RANGE (m)	UPPER RANGE (m)	COLOUR
1	0.00	0.10	
2	0.10	0.50	Light Cyan
3	0.50	1.00	Cyan
4	1.00	1.50	Light Blue
5	1.50	2.00	Blue
6	2.00	2.50	Dark Blue
7	2.50	3.00	Very Dark Blue
8	3.00	3.50	Dark Purple
9	3.50	4.00	Very Dark Purple
10	4.00	4.50	Black
11	4.50	5.00	Black
12	5.00	5.40	Black



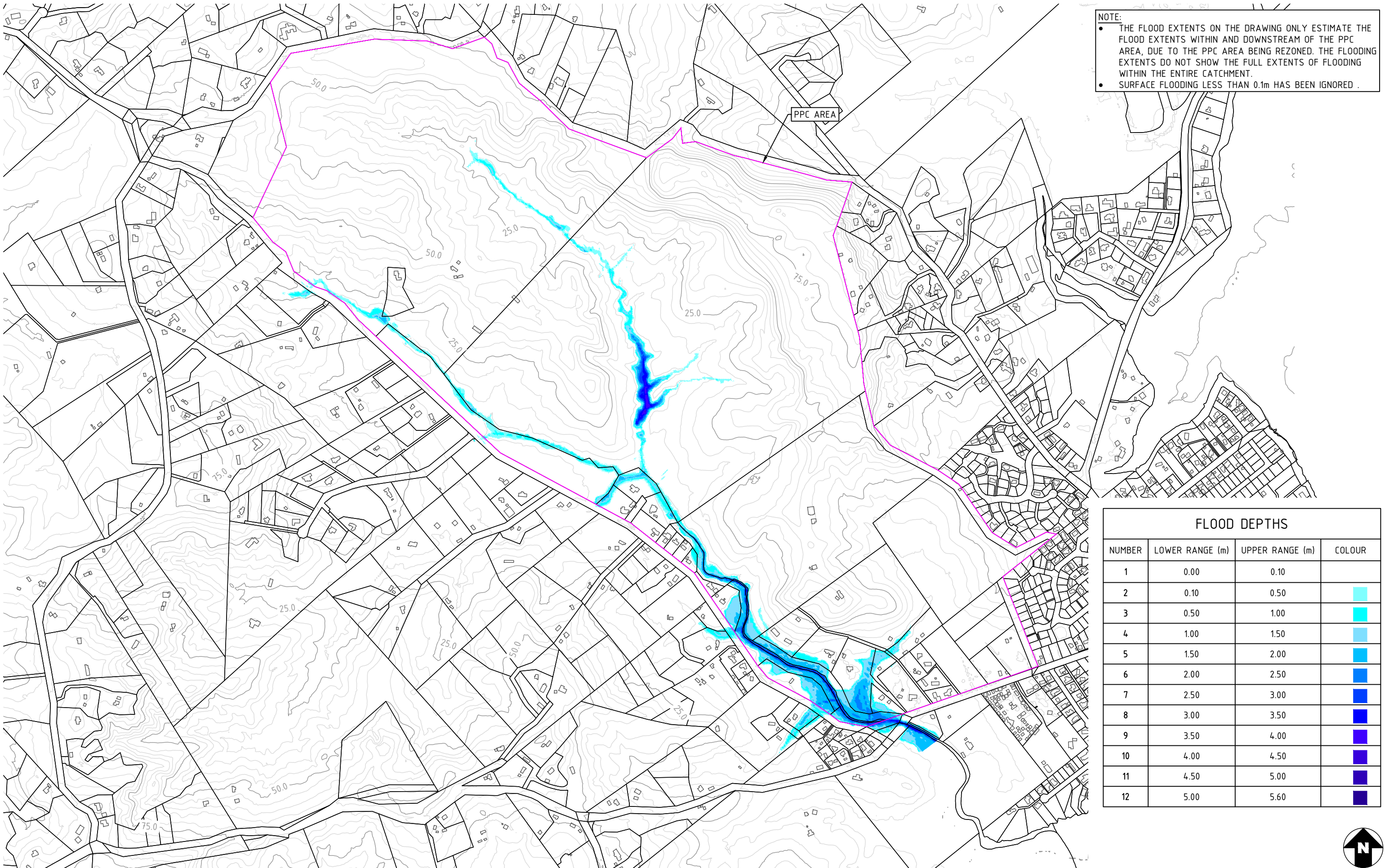
Rev	Date	Amendments	By

Drafter: A KYRIACOU Job Title: PROPOSED PRIVATE PLAN CHANGE - FRECKLINGTON FARM , MANGAWHAI HILLS
 Designer: A KYRIACOU Client: MANGAWHAI HILLS LTD
 Checker: S RANKIN Address: MANGAWHAI HILLS
 Date: 22/02/2023 Drawing Title: 50% AEP KDC MPD FLOOD EXTENTS

Drawing: 903 Rev: 0
 Scale: 1:10000 @ A3
 Project: 15209
 Issue: PLAN CHANGE


 LAND DEVELOPMENT & INFRASTRUCTURE | ENGINEERING | SURVEYING | PLANNING
www.chester.co.nz

C:\Users\WecherAbdullah\OneDrive\Documents\Projects\15209 - Mangawhai Hills\3.0 Design\3.21 ACAD\DWG Layouts\Floods\Floods-903.dwg 27/27/2023 11:43 am LAST SAVED BY: KesharAbdullah



NOTE:

- THE FLOOD EXTENTS ON THE DRAWING ONLY ESTIMATE THE FLOOD EXTENTS WITHIN AND DOWNSTREAM OF THE PPC AREA, DUE TO THE PPC AREA BEING REZONED. THE FLOODING EXTENTS DO NOT SHOW THE FULL EXTENTS OF FLOODING WITHIN THE ENTIRE CATCHMENT.
- SURFACE FLOODING LESS THAN 0.1m HAS BEEN IGNORED .

FLOOD DEPTHS			
NUMBER	LOWER RANGE (m)	UPPER RANGE (m)	COLOUR
1	0.00	0.10	
2	0.10	0.50	
3	0.50	1.00	
4	1.00	1.50	
5	1.50	2.00	
6	2.00	2.50	
7	2.50	3.00	
8	3.00	3.50	
9	3.50	4.00	
10	4.00	4.50	
11	4.50	5.00	
12	5.00	5.60	

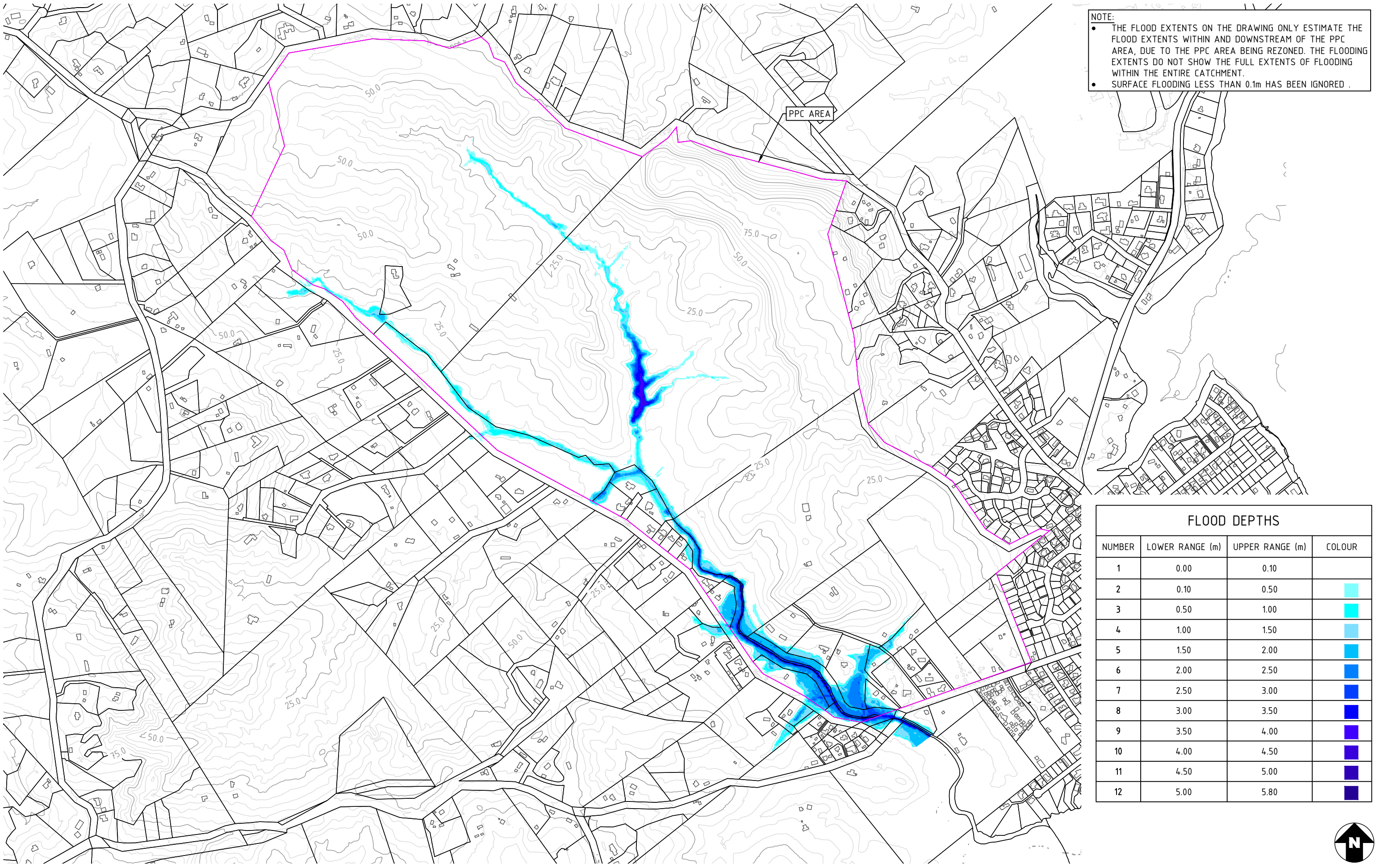


Rev	Date	Amendments	By

Drafter: A KYRIACOU	Job Title: PROPOSED PRIVATE PLAN CHANGE - FRECKLINGTON FARM , MANGAWHAI HILLS	Drawing: 904 Rev: 0
Designer: A KYRIACOU	Client: MANGAWHAI HILLS LTD	Scale: 1:10000 @ A3
Checker: S RANKIN	Address: MANGAWHAI HILLS	Project: 15209
Date: 22/02/2023	Drawing Title: 10 % AEP KDC MPD FLOOD EXTENTS	Issue: PLAN CHANGE

CHESTER
 LAND DEVELOPMENT & INFRASTRUCTURE | ENGINEERING | SURVEYING | PLANNING
 www.chester.co.nz

C:\Users\KecharAbdullah\OneDrive\Documents\Central Library - 15209 - Mangawhai Hills\3.0 Design\3.2 Civil\3.2.1 ACADDWG Layouts\Flooding\15209-C-DWG-904.dwg 2/22/2023 11:43 am LAST SAVED BY: KecharAbdullah



NOTE:

- THE FLOOD EXTENTS ON THE DRAWING ONLY ESTIMATE THE FLOOD EXTENTS WITHIN AND DOWNSTREAM OF THE PPC AREA, DUE TO THE PPC AREA BEING REZONED. THE FLOODING EXTENTS DO NOT SHOW THE FULL EXTENTS OF FLOODING WITHIN THE ENTIRE CATCHMENT.
- SURFACE FLOODING LESS THAN 0.1m HAS BEEN IGNORED .

FLOOD DEPTHS			
NUMBER	LOWER RANGE (m)	UPPER RANGE (m)	COLOUR
1	0.00	0.10	
2	0.10	0.50	Lightest Cyan
3	0.50	1.00	Light Cyan
4	1.00	1.50	Light Blue
5	1.50	2.00	Medium Light Blue
6	2.00	2.50	Medium Blue
7	2.50	3.00	Dark Blue
8	3.00	3.50	Very Dark Blue
9	3.50	4.00	Dark Purple
10	4.00	4.50	Very Dark Purple
11	4.50	5.00	Black
12	5.00	5.80	Black

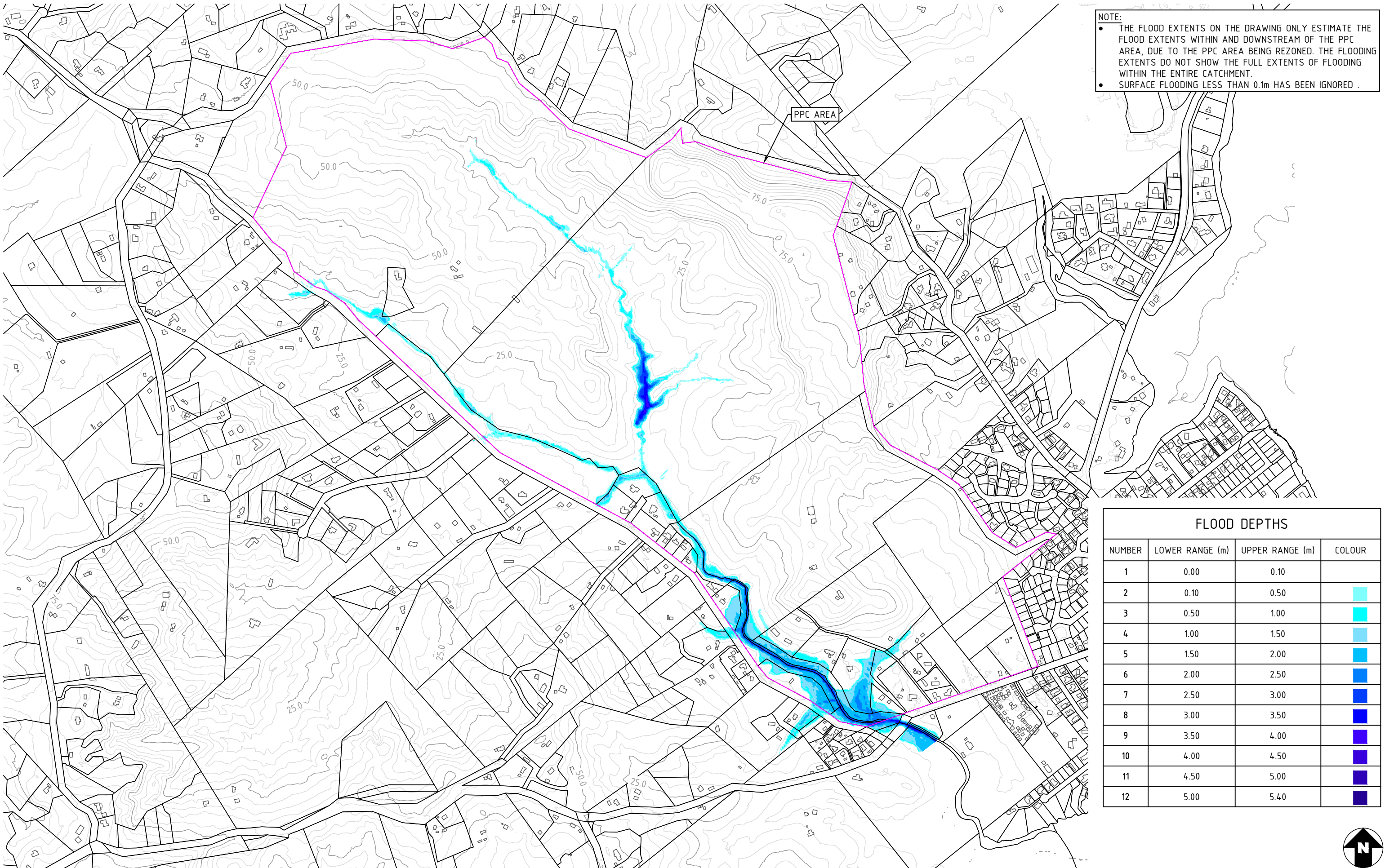


Rev	Date	Amendments	By

Drafter: A KYRIACOU	Job Title: PROPOSED PRIVATE PLAN CHANGE - FRECKLINGTON FARM , MANGAWHAI HILLS	Drawing: 905 Rev: 0
Designer: A KYRIACOU	Client: MANGAWHAI HILLS LTD	Scale: 1:10000 @ A3
Checker: S RANKIN	Address: MANGAWHAI HILLS	Project: 15209
Date: 22/02/2023	Drawing Title: 1% AEP KDC MPD FLOOD EXTENTS	Issue: PLAN CHANGE

CHESTER
 LAND DEVELOPMENT & INFRASTRUCTURE | ENGINEERING | SURVEYING | PLANNING
 www.chester.co.nz

C:\Users\Kecher\OneDrive\Documents\Projects\15209 - Mangawhai Hills\3.0 Design\3.2 CIV\3.2.1 ACAD\DWG Layout\Floods\Floods_905.dwg 2/22/2023 11:43 am LAST SAVED BY: KecherAbdullah



NOTE:

- THE FLOOD EXTENTS ON THE DRAWING ONLY ESTIMATE THE FLOOD EXTENTS WITHIN AND DOWNSTREAM OF THE PPC AREA, DUE TO THE PPC AREA BEING REZONED. THE FLOODING EXTENTS DO NOT SHOW THE FULL EXTENTS OF FLOODING WITHIN THE ENTIRE CATCHMENT.
- SURFACE FLOODING LESS THAN 0.1m HAS BEEN IGNORED .

FLOOD DEPTHS			
NUMBER	LOWER RANGE (m)	UPPER RANGE (m)	COLOUR
1	0.00	0.10	
2	0.10	0.50	Light Cyan
3	0.50	1.00	Cyan
4	1.00	1.50	Light Blue
5	1.50	2.00	Blue
6	2.00	2.50	Dark Blue
7	2.50	3.00	Very Dark Blue
8	3.00	3.50	Dark Purple
9	3.50	4.00	Medium Purple
10	4.00	4.50	Dark Purple
11	4.50	5.00	Very Dark Purple
12	5.00	5.40	Black

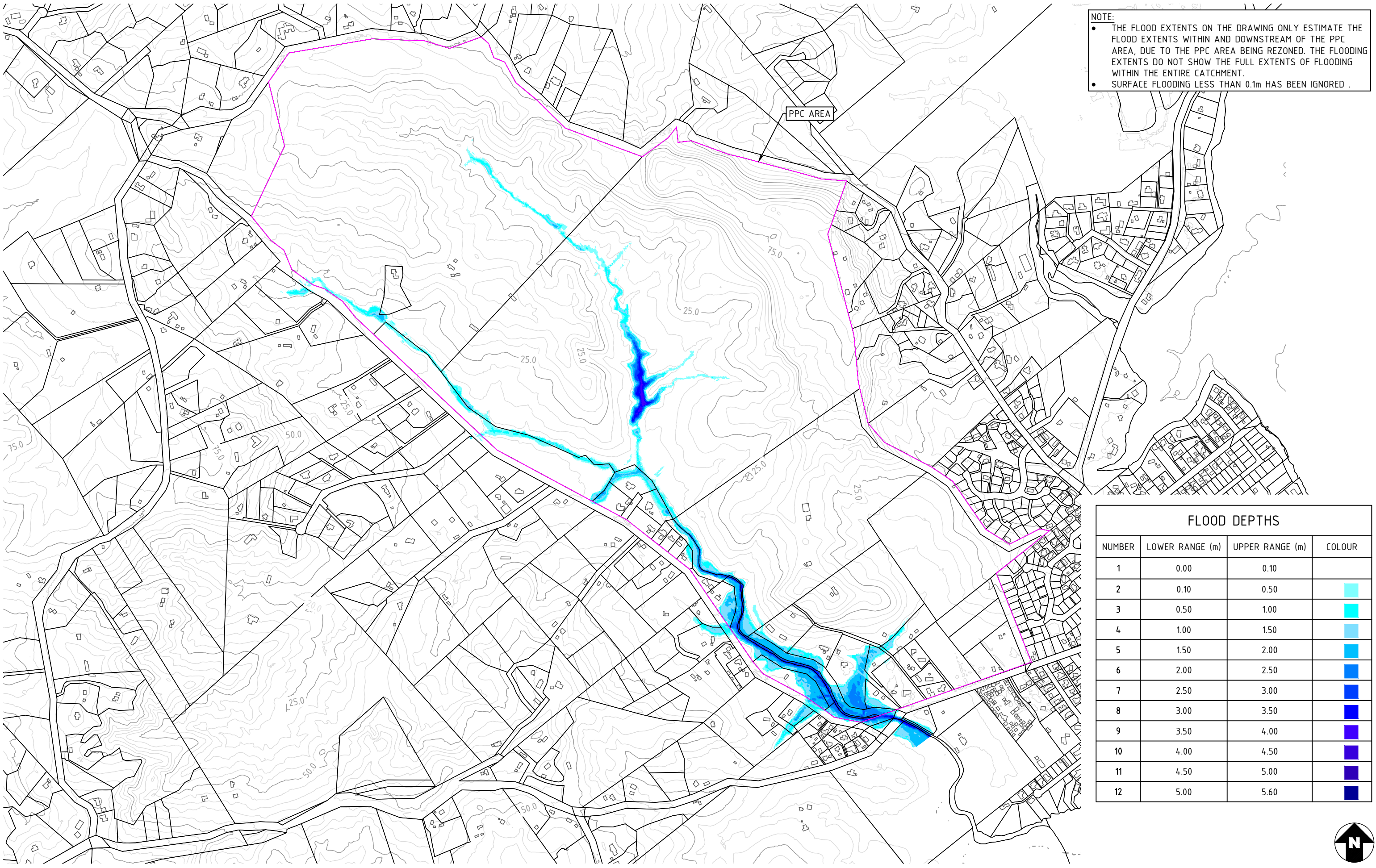
Rev	Date	Amendments	By

Drafter: A KYRIACOU Job Title: PROPOSED PRIVATE PLAN CHANGE - FRECKLINGTON FARM , MANGAWHAI HILLS
 Designer: A KYRIACOU Client: MANGAWHAI HILLS LTD
 Checker: S RANKIN Address: MANGAWHAI HILLS
 Date: 22/02/2023 Drawing Title: 50% AEP PPC MPD FLOOD EXTENTS

Drawing: 906 Rev: 0
 Scale: 1:10000 @ A3
 Project: 15209
 Issue: PLAN CHANGE

CHESTER
 LAND DEVELOPMENT & INFRASTRUCTURE | ENGINEERING | SURVEYING | PLANNING
 www.chester.co.nz

C:\Users\KecharAbdullah\OneDrive\Documents\Central Library - 15209 - Mangawhai Hills\3.0 Design\3.2 CIVIL\3.2.1 ACAD\DWG Layouts\Flooding\15209-C-DWG-906.dwg 2/22/2023 11:44 am LAST SAVED BY: KecharAbdullah



NOTE:

- THE FLOOD EXTENTS ON THE DRAWING ONLY ESTIMATE THE FLOOD EXTENTS WITHIN AND DOWNSTREAM OF THE PPC AREA, DUE TO THE PPC AREA BEING REZONED. THE FLOODING EXTENTS DO NOT SHOW THE FULL EXTENTS OF FLOODING WITHIN THE ENTIRE CATCHMENT.
- SURFACE FLOODING LESS THAN 0.1m HAS BEEN IGNORED .

FLOOD DEPTHS			
NUMBER	LOWER RANGE (m)	UPPER RANGE (m)	COLOUR
1	0.00	0.10	
2	0.10	0.50	Light Cyan
3	0.50	1.00	Cyan
4	1.00	1.50	Light Blue
5	1.50	2.00	Blue
6	2.00	2.50	Dark Blue
7	2.50	3.00	Very Dark Blue
8	3.00	3.50	Dark Purple
9	3.50	4.00	Very Dark Purple
10	4.00	4.50	Black
11	4.50	5.00	Black
12	5.00	5.60	Black

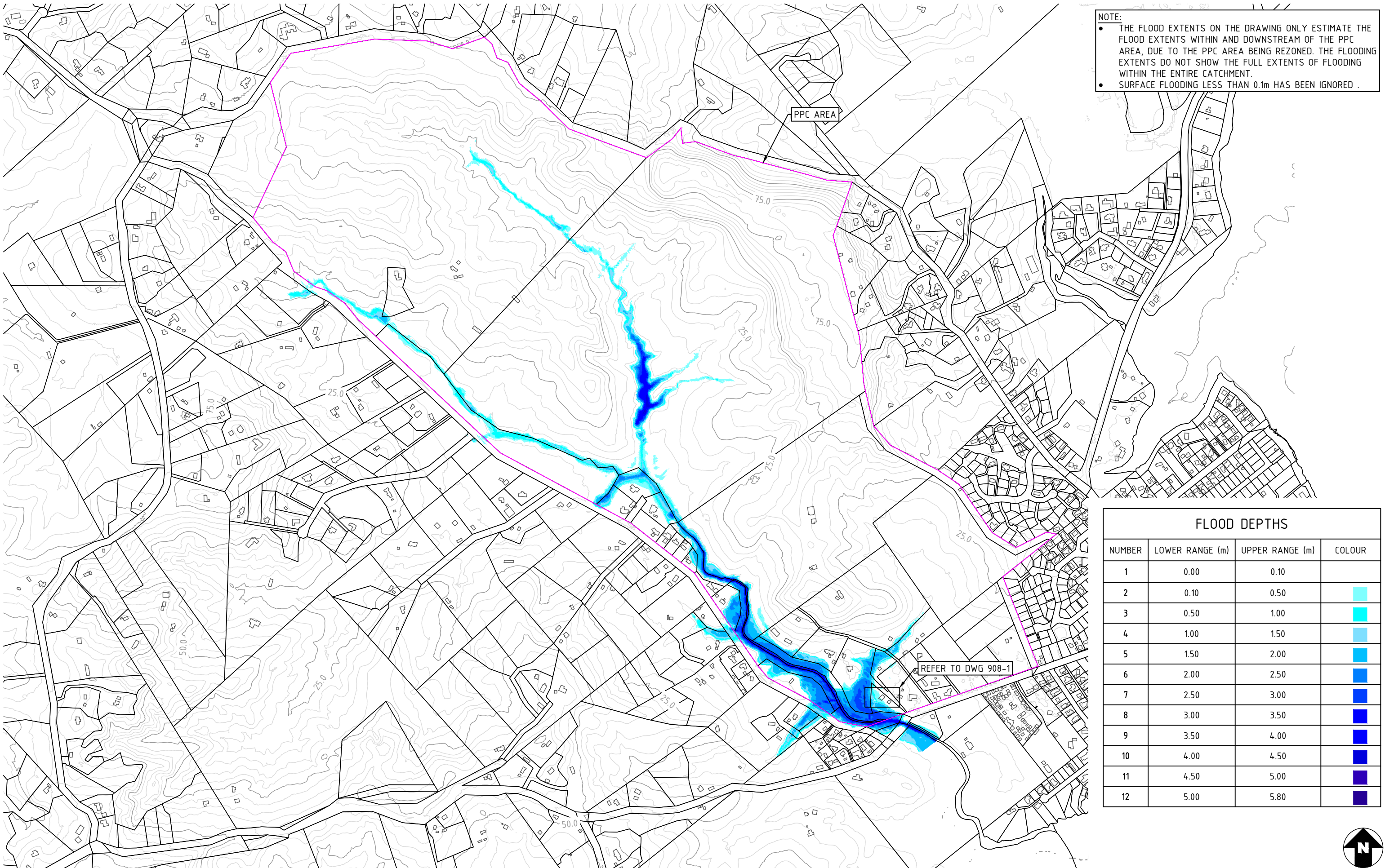


Rev	Date	Amendments	By

Drafter: A KYRIACOU	Job Title: PROPOSED PRIVATE PLAN CHANGE - FRECKLINGTON FARM , MANGAWHAI HILLS	Drawing: 907 Rev: 0
Designer: A KYRIACOU	Client: MANGAWHAI HILLS LTD	Scale: 1:10000 @ A3
Checker: S RANKIN	Address: MANGAWHAI HILLS	Project: 15209
Date: 22/02/2023	Drawing Title: 10% AEP PPC MPD FLOOD EXTENTS	Issue: PLAN CHANGE

CHESTER
 LAND DEVELOPMENT & INFRASTRUCTURE | ENGINEERING | SURVEYING | PLANNING
 www.chester.co.nz

C:\Users\KecharAbdullah\OneDrive\Documents\Central Library - 15209 - Mangawhai Hills\3.0 Design\3.2 CIVIL\3.2.1 ACAD\DWG Layouts\Flooding\15209-C-DWG-907.dwg 2/22/2023 11:44 am LAST SAVED BY: KecharAbdullah



NOTE:

- THE FLOOD EXTENTS ON THE DRAWING ONLY ESTIMATE THE FLOOD EXTENTS WITHIN AND DOWNSTREAM OF THE PPC AREA, DUE TO THE PPC AREA BEING REZONED. THE FLOODING EXTENTS DO NOT SHOW THE FULL EXTENTS OF FLOODING WITHIN THE ENTIRE CATCHMENT.
- SURFACE FLOODING LESS THAN 0.1m HAS BEEN IGNORED .

FLOOD DEPTHS			
NUMBER	LOWER RANGE (m)	UPPER RANGE (m)	COLOUR
1	0.00	0.10	
2	0.10	0.50	
3	0.50	1.00	
4	1.00	1.50	
5	1.50	2.00	
6	2.00	2.50	
7	2.50	3.00	
8	3.00	3.50	
9	3.50	4.00	
10	4.00	4.50	
11	4.50	5.00	
12	5.00	5.80	

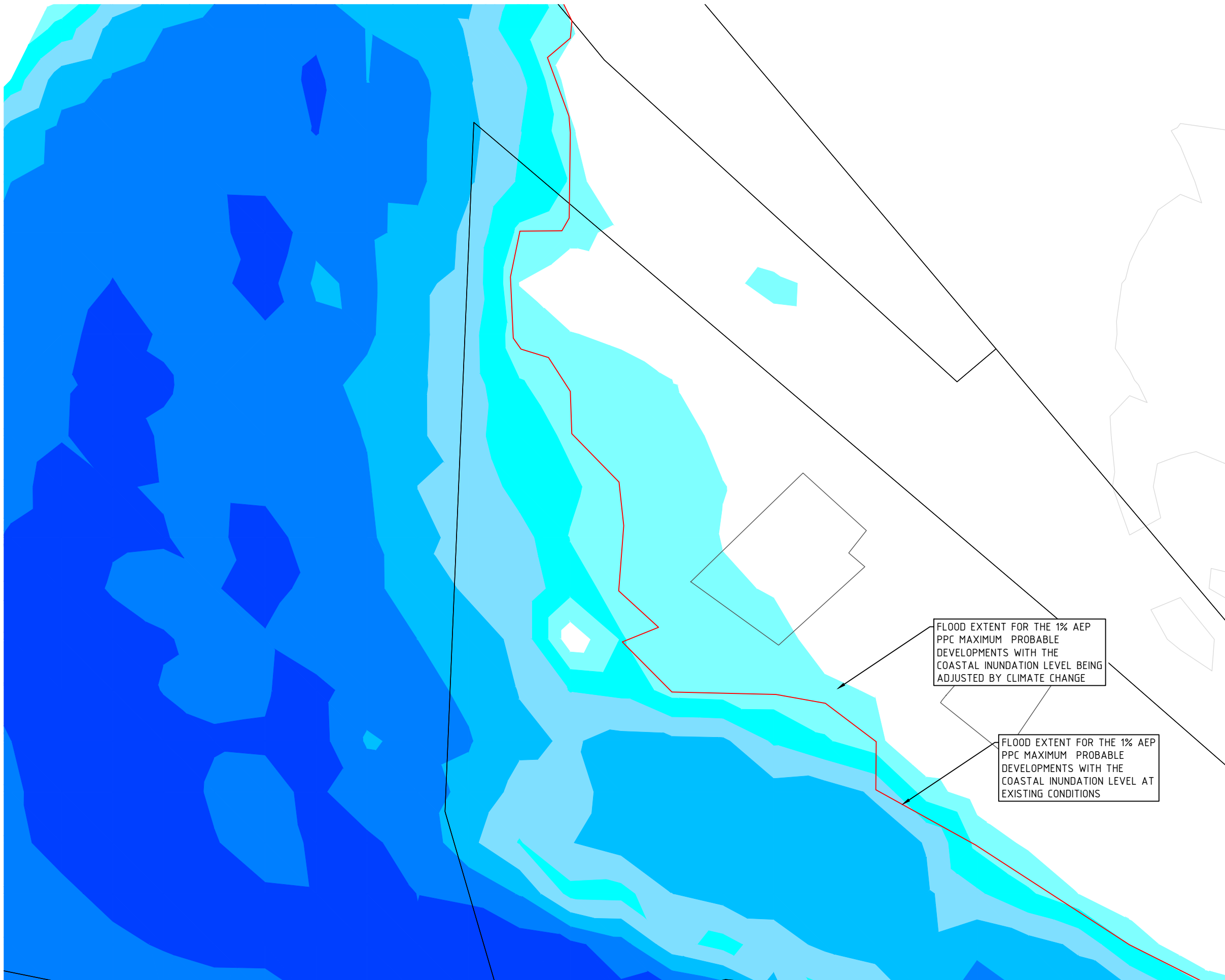


Rev	Date	Amendments	By

Drafter: A KYRIACOU	Job Title: PROPOSED PRIVATE PLAN CHANGE - FRECKLINGTON FARM , MANGAWHAI HILLS	Drawing: 908 Rev: 0
Designer: A KYRIACOU	Client: MANGAWHAI HILLS LTD	Scale: 1:10000 @ A3
Checker: S RANKIN	Address: MANGAWHAI HILLS	Project: 15209
Date: 22/02/2023	Drawing Title: 1% AEP PPC MPD FLOOD EXTENTS	Issue: PLAN CHANGE

CHESTER
 LAND DEVELOPMENT & INFRASTRUCTURE | ENGINEERING | SURVEYING | PLANNING
 www.chester.co.nz

C:\Users\KecharAbdullah\OneDrive\Documents\Central Library - 15209 - Mangawhai Hills\3.0 Design\3.2 Civil\3.2.1 ACAD\DWG Layouts\Flooding\15209-C-DWG-908.dwg 2/22/2023 11:44 am LAST SAVED BY: KecharAbdullah



NOTE:

- THE FLOOD EXTENTS ON THE DRAWING ONLY ESTIMATE THE FLOOD EXTENTS WITHIN AND DOWNSTREAM OF THE PPC AREA, DUE TO THE PPC AREA BEING REZONED. THE FLOODING EXTENTS DO NOT SHOW THE FULL EXTENTS OF FLOODING WITHIN THE ENTIRE CATCHMENT.
- SURFACE FLOODING LESS THAN 0.1m HAS BEEN IGNORED .

FLOOD EXTENT FOR THE 1% AEP PPC MAXIMUM PROBABLE DEVELOPMENTS WITH THE COASTAL INUNDATION LEVEL BEING ADJUSTED BY CLIMATE CHANGE

FLOOD EXTENT FOR THE 1% AEP PPC MAXIMUM PROBABLE DEVELOPMENTS WITH THE COASTAL INUNDATION LEVEL AT EXISTING CONDITIONS

FLOOD DEPTHS			
NUMBER	LOWER RANGE (m)	UPPER RANGE (m)	COLOUR
1	0.00	0.10	
2	0.10	0.50	
3	0.50	1.00	
4	1.00	1.50	
5	1.50	2.00	
6	2.00	2.50	
7	2.50	3.00	
8	3.00	3.50	
9	3.50	4.00	
10	4.00	4.50	
11	4.50	5.00	
12	5.00	5.80	



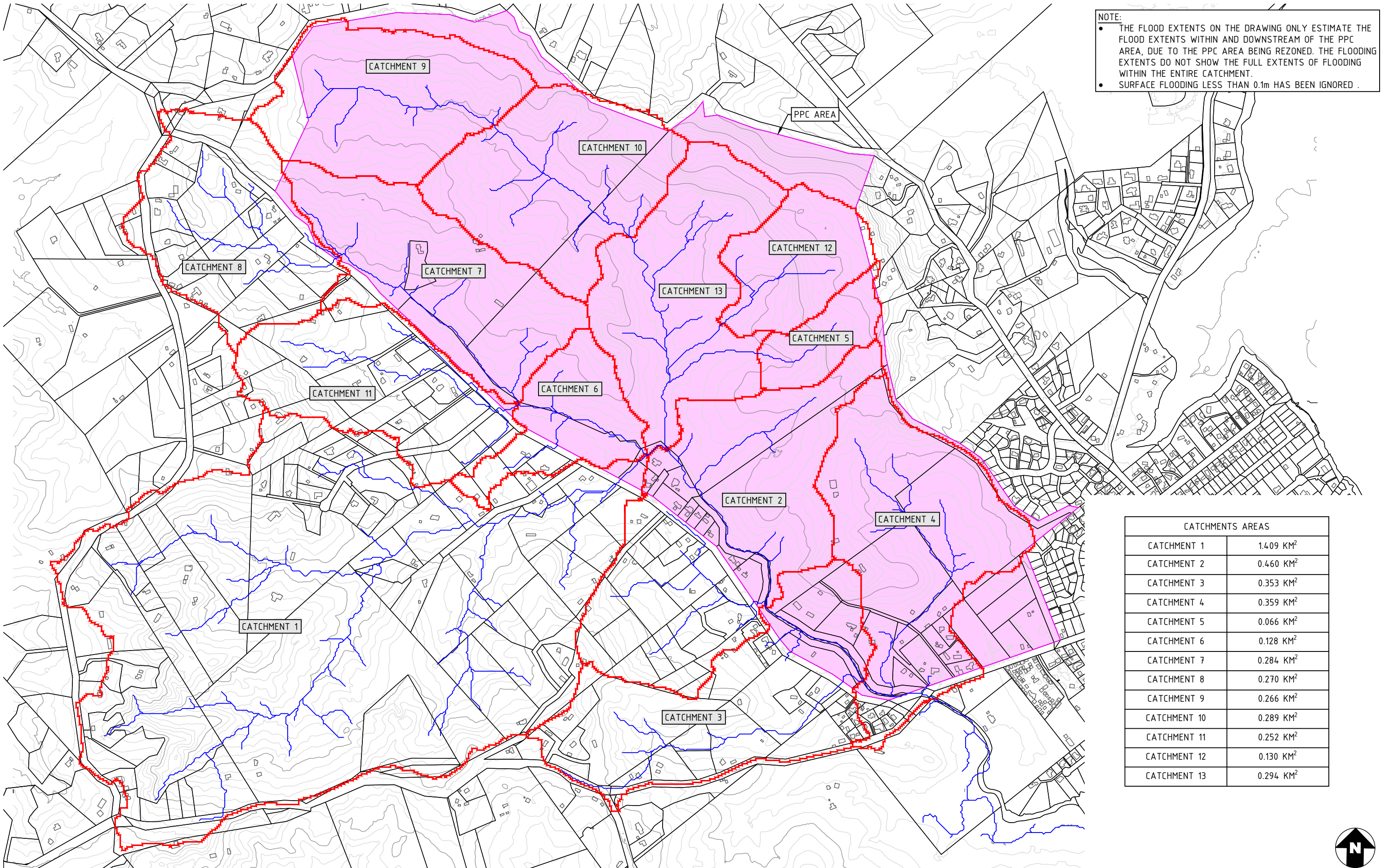
Rev	Date	Amendments	By

Drafter: A KYRIACOU Job Title: PROPOSED PRIVATE PLAN CHANGE - FRECKLINGTON FARM , MANGAWHAI HILLS
 Designer: A KYRIACOU Client: MANGAWHAI HILLS LTD
 Checker: S RANKIN Address: MANGAWHAI HILLS
 Date: 22/02/2023 Drawing Title: 1% AEP PPC MPD FLOOD EXTENTS DETAILS

Drawing: 908-1 Rev: 0
 Scale: Custom @ A3
 Project: 15209
 Issue: PLAN CHANGE


CHESTER
 LAND DEVELOPMENT & INFRASTRUCTURE | ENGINEERING | SURVEYING | PLANNING
 www.chester.co.nz

C:\Users\KecharAbdullah\OneDrive\Documents\Central Library - 15209 - Mangawhai Hills\3.0 Design\3.2 Civil\3.2.1 ACAD\DWG Layouts\Flooding\15209-C-DWG-908.dwg 2/22/2023 11:44 am LAST SAVED BY: KecharAbdullah



NOTE:

- THE FLOOD EXTENTS ON THE DRAWING ONLY ESTIMATE THE FLOOD EXTENTS WITHIN AND DOWNSTREAM OF THE PPC AREA, DUE TO THE PPC AREA BEING REZONED. THE FLOODING EXTENTS DO NOT SHOW THE FULL EXTENTS OF FLOODING WITHIN THE ENTIRE CATCHMENT.
- SURFACE FLOODING LESS THAN 0.1m HAS BEEN IGNORED .

CATCHMENTS AREAS	
CATCHMENT 1	1.409 KM ²
CATCHMENT 2	0.460 KM ²
CATCHMENT 3	0.353 KM ²
CATCHMENT 4	0.359 KM ²
CATCHMENT 5	0.066 KM ²
CATCHMENT 6	0.128 KM ²
CATCHMENT 7	0.284 KM ²
CATCHMENT 8	0.270 KM ²
CATCHMENT 9	0.266 KM ²
CATCHMENT 10	0.289 KM ²
CATCHMENT 11	0.252 KM ²
CATCHMENT 12	0.130 KM ²
CATCHMENT 13	0.294 KM ²



Rev	Date	Amendments	By

Drafter: A KYRIACOU Job Title: PROPOSED PRIVATE PLAN CHANGE - FRECKLINGTON FARM , MANGAWHAI HILLS
 Designer: A KYRIACOU Client: MANGAWHAI HILLS LTD
 Checker: S RANKIN Address: MANGAWHAI HILLS
 Date: 22/02/2023 Drawing Title: CATCHMENT PLAN

Drawing: 909 Rev: 0
 Scale: 1:10000 @ A3
 Project: 15209
 Issue: PLAN CHANGE


 LAND DEVELOPMENT & INFRASTRUCTURE | ENGINEERING | SURVEYING | PLANNING
www.chester.co.nz

C:\Users\KecharAbdullah\OneDrive\Central Library - 15209 - Mangawhai Hills\3.0 Design\3.2 CIV\3.2.1 ACAD\DWG Layouts\Flooding\15209-C-DWG-909.dwg 2/22/2023 11:44 am LAST SAVED BY: KecharAbdullah