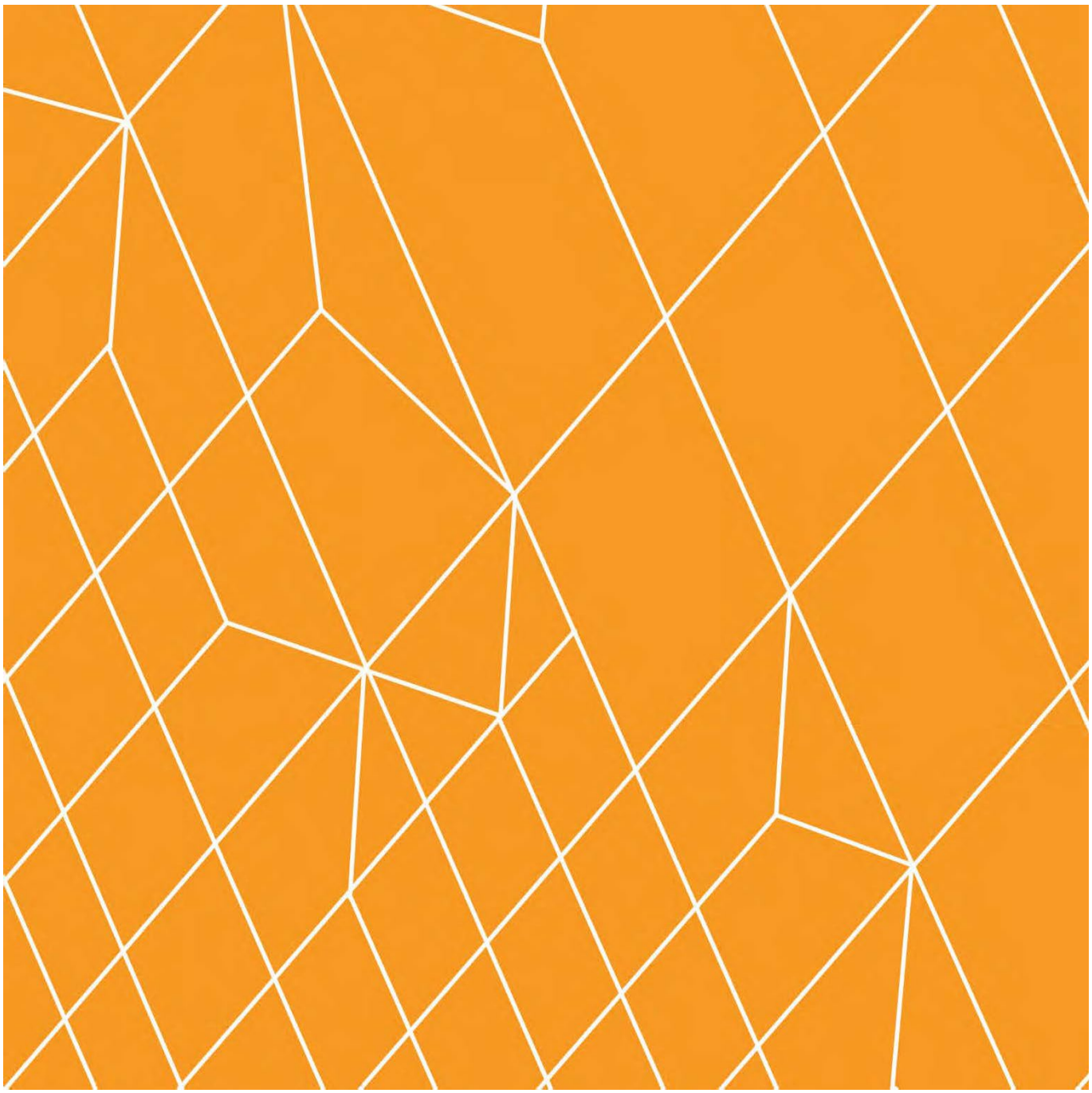

Flooding and Infrastructure Assessment to support a new Justice Facility at 14 Edmonton Road, Henderson

14 Edmonton Road

Henderson

Auckland

Flooding and Infrastructure Assessment for a new Justice Facility - Civil

Version 2.9
15 September 2025
149014.33

Flooding and Infrastructure Assessment to support a new Justice Facility at 11+ Edmonton Road, Henderson.

Waitakere District Court - NewCourthouse Project

Prepared for

The Ministry of Justice

Date: 15 September 2025

Project No: 149014.33

Version No: 2.9

Report Prepared by: Reviewed By:

[redacted]

Limitations

The information provided herein is for the sole use of Waitakere Design Team and Ministry of Justice and Ministry of the Environment Fast-Track Consenting Review Panel and Associated Stakeholders provided for the purpose of providing information on the existing overland flow path and existing public infrastructure to enable the development of Buik & Location considerations for the proposed new Justice Facility at 14 Edmonton Road, Henderson, Auckland. The findings are not intended for use by other parties and may not contain sufficient information for the purpose of other parties or other uses.

Our observations have been restricted to site information provided by our client and publicly available information from the Auckland GeoMaps GIS, Health Waters Developments, BeforeUDig utility information and topographical and utility location survey information.

Our professional services are performed using a degree of care and skill normally exercised, under similar circumstances, by reputable consultants practicing in this field at this time. No other warranty, expressed or implied, is made as to the professional advice presented in this report.

Although this application is not before the Environment Court, this report has been prepared in accordance with the Code of Conduct for Expert Witnesses contained in the Environment Court Practice Note 2023. A copy of the qualifications and experience of the authors is provided with this assessment

Report Issue Register

DATE	VER. NO.	REASONFOR ISSUE
13/11/2024	1.0	For Information
19/11/2024	1.1	Report updated
06/12/2024	1.2	Overland flow path and wastewater sections updated
20/12/2024	1.3	Concept design
07/03/2025	1.4	Concept design update
24/04/2025	2.0	Notice of Requirement
30/04/2025	2.1	Notice of Requirement update
19/05/2025	2.2	Proposed Condition Updated
11/06/2025	2.3	ACH flood assessment updated
18/07/2025	2.4	E36 Hazard Assessment
30/07/2025	2.5	Notice of Requirement & General section updated
31/07/2025	2.6	E36 Hazard Assessment Updated
01/08/2025	2.7	E36 Hazard Assessment & Limitation Updated
08/08/2025	2.8	E36 Hazard Assessment, Limitation & Summary Updated
15/09/2025	2.9	General update

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1 GENERAL

The Ministry of Justice (MoJ) intends to submit a Notice of Requirement application to designate 14 Edmonton Road, Henderson, Auckland for a new Justice Facility. As a specific development proposal is not yet available, this assessment relies on project assumptions and an indicative concept scheme for a potential future building footprint on the site.

This report has been prepared to support a Substantive Application made by Ministry of Justice (on behalf of the Requiring Authority - Minister of Justice) under the Fast Track Approval Acts 2024 in accordance with the requirements of Section 42. The proposal is a Referred Project, and this report has been prepared to support a Notice of Requirement Application to designate the site at 14 Edmonton Road, Henderson for 'Judicial and Court purposes' known as the Waitakere District Courthouse - New Courthouse project.

Under s42(4)(d), this substantive application is giving notice of a requirement to designate the site that would otherwise be applied for under the Resource Management Act 1991. Section 43 of the Fast Track Approval Act sets out the information to be included in a substantive application, which includes an assessment of adverse effects of the project on the environment. This report has been prepared to assess the infrastructure and servicing effects of the Project and confirms that a future Justice Facility can be appropriately serviced on the site, with respect to three waters servicing, power and telecommunications.

Holmes NZ LP has been engaged by the Project Management Team (The Building Intelligence Group), acting on behalf of the Ministry of Justice (Client) to provide an assessment of the existing overland flow paths, public stormwater and wastewater drainage, stormwater mitigation and ability to be serviced by existing utilities to aid in the Bulk & Location design for the proposed new Courthouse located at 14 Edmonton Road, Henderson, Auckland.

The information provided in this report is based on a desktop study using Auckland Council GeoMaps records, LiDAR, and Flood Hazard Mapping Reports in addition to updated flood information by Healthy Waters and separate preliminary overland flow path assessment completed by ACH Consulting Engineers (ACH). Topographical survey provided by Survey Worx covering existing site levels, boundary location and existing public and private services and utilities used as bases for concept drainage design levels.

1.1 Objective

This Infrastructure Report is a preliminary assessment report that summarizes the results of the assessment and calculations undertaken to determine the impact of the future Justice Facility on the existing infrastructure and the extent of the existing major overland flow path that traverses through the middle of the subject site from Edmonton Road as well as a review of the results from the separate assessment completed by ACH Consulting.

1.2 Site Description

The subject site which is located at the intersection of Edmonton Road and Alderman Drive, is legally described as Lot 1 DP 24633, largely rectangular in shape and covers an area of 4,435m^2. As per Figure 1, the existing site comprises of carparking with minor vegetation (several trees within and along the boundary) and grassed berms. Notable and protected trees are located around the road frontage boundary and the northwest corner of the site and are to remain on the site.

Figure 1: *Site location (Auckland GeoMaps – December 2024)*

Two vehicle crossings provide access into the subject site off Edmonton Road and Alderman Drive, respectively. A vehicle entrance entering the car park from the northeast is noted to be from the accessway of the church.

1.3 Assumptions

Our preliminary overland flow path assessment is based on the following Information and condition assumptions:

- Site levels are based on a combination of public GIS LiDAR and topographical survey information,
- Peak flow rates are based on information provided by Auckland Council GeoMaps with verification of catchments used to generate overland flow data,
- Additional information provided by Healthy Waters (2022 Flood data),
- Validation of Healthy Waters 2022 Flood data by ACH Consulting,
- Preliminary Flood Assessment Report by ACH Consulting verifying the depth, velocity and extent of the predicted 2022 100-year overland flow paths from both Edmonton Road and Alderman Drive,
- Proposed Building Void flow path calculations based on the verified 2022 flood data,
- For HydroExpress Calculations it is assumed that the existing stormwater network, including the 1500mmØ concrete line, and all permeable surfaces are fully submerged,

2 PROJECT INFORMATION

2.1 Site Investigation

Site investigation has been undertaken on the site; the latest relevant information is shown in the Table 2.1.1 below:

Table 2.1.1 Summary of relevant site investigation

Type	Provided by	Latest date / version	Notes
Topographic survey	Survey Worx	9722-705-01 I 22/10/24	Survey of existing levels and structures
Services Survey	Locator Worx	9722-1025-R / 14/10/24	Identified existing services and utilities
CCTV survey	Hydro Specialists	14/10/24	CCTV of all existing SW and WW drainage on subject site

3 EARTHWORKS & EROSION SEDIMENT CONTROLS

3.1 Earthworks

Bulk earthworks will be required to support a future development and building on site. This will include the scraping and removal of the existing asphalt layer to an approximate depth of 200mm to enable to re-profiling of the entranceways and the surface contours underneath the extent of the indicative building footprint.

Standard earthworks do not necessarily apply as much of the works will relate to the boring for piles (0.750m(Z) x 11.000m) in set locations along the extent of the indicative building footprint to enable to suspension of the ground floor slab over the 100-year overland flow path.

The initial material that will be removed from site due to the scrapping process will be approximately 667m^3. This will consist of asphalt and the basecourse layer of the existing carpark that is situated under the future building. Each pile will require approximate 8.25m^3 (0.7om x 11.0m) of material removed to allow it to be installed.

Once piling work has been completed it is expected that scraped surface will be restored close to existing levels with minor reshaping under the future building to provide a larger 'rectangular dish' that will allow for a better channelisation of the flood waters uncferneath the founaation. The grading extent of this wider dish will be confirmed in the next phase of the project design stage.

3.2 Erosion & Sediment Controls

To mitigate the effects of future earthworks at the subject site, Erosion & Sediment Controls are to be installed in general accordance with Auckland Council: Erosion and *Sediment Control* Guide *for Land* Disturbing *Activities in the Auckland Region* - Guidance Document 2016/05.

As the site is less than 10,000m², and the average slope is less than 5%, standard sediment control on the site will be achieved via the following methods:

- Installation, monitoring, and maintenance of erosion & sediment controls like silt fences, clean water diversion bunds to ensure adequate control of any sediment transportation following removal of vegetation on site to protect the
- Installation of stabilised construction entrance to restrict the transportation of soils onto main arterials and roadways from site vehicles.
- All affected road catchpits are to be protected by filter socks and geo-cloth as needed.

We recommend that the condition requiring an Erosion & Sediment Control Plan (ESCP) to be submitted to support future development/site works is captured as a condition in the NOR Application.

4 SITE SERVICING

Auckland GeoMaps, and Figure 2, shows the subject site to be within proximity to all public services and utilities. Suitability and connection to the public drainage and water supply services will be discussed in the sections below.

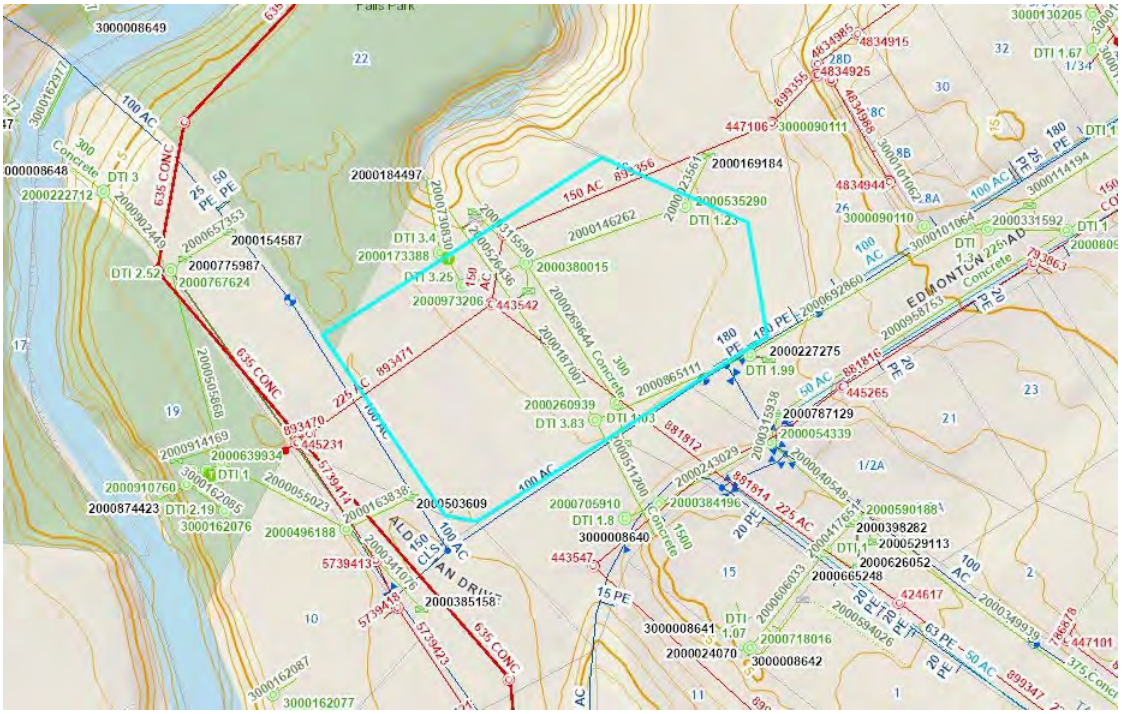

Figure 2: *Existing Services (Auckland GeoMaps – December 2024)*

4.1 Stormwater - Existing

Auckland GeoMaps records show several existing public stormwater lines traversing through the site. Most notably is the existing 1500mmØ (GIS ID: 2000187007) concrete line, servicing the upstream catchment and network within the Oratia Catchment. This runs from south to north through the centre of the site and discharges into the Waikumete Stream via a concrete outfall.

A 300mmØ concrete line (GIS ID: 2000865111) which collects run-off from Edmonton Road and the residential development upstream from the site, discharges its collected run-off directly into the 1500mmØ line via the existing Stormwater manhole (GIS ID: 2000260939).

A 225mmØ PE line (GIS ID: 2000146262), which services the car parking area for the local church to the west, is shown to discharge into a 3000mmØ chamber (GIS ID: 2000973206). CCTV has shown that this chamber is filled with a volume of water and discharges the collected run-off into a smaller diameter pipe. It is assumed that this chamber is used as detention structure to capture and slow flows prior to being treated and discharging into the Waikumete Stream via a 200mmØ concrete outfall.

A single catchpit (GIS ID: 200058545) connects to the existing manhole (GIS ID: 200085748) which discharges into the 300mmØ concrete line (GIS ID: 2000269644) and then into the 3000mmØ chamber, having its run-off treated before being discharged into the Waikumete Stream via the same 200mmØ outfall. Surface run-off within the carpark is collected via several catchpits and is directed to the piped stormwater network as described above.

Due to the 100% impervious nature of the site, capacity calculations for the existing network have not been undertaken as the resultant impervious nature of the site associated with the construction of the future building on the site will not change post development. Auckland GeoMaps has indicated that the site is situated within Stormwater Management Area Flow 2 (SMAF 2) area. The provisions and mitigation requirements outlined in Chapter E10 of the AUP(OP) applying to SMAF areas, will be used to guide and inform the proposed mitigation strategy for a future development proposal/building on the site.

4.1.1 Stormwater – Proposed

The Architectural Bulk & Location Drawings by Architectus (Dated: April 2025) and indicated on the Civil Design Drawings (Appendix A), shows that the indicative building footprint covers most of the site. Due to the extent the existing public stormwater infrastructure within the site will be required to be relocated, realigned or removed in their entirety.

As the 1500mmØ line services the Oratia Catchment upstream of the subject site, it is proposed that this line should remain. Foundations for a future building will be required to sit at least 5m away from the edge of the existing 1500mm diameter stormwater pipe that traverses the centre of the site. It is also the intention to utilise the foundation piles of the future building rather than having to design and install specific pipe bridging piles.

Due to the extent of the indicative building footprint, it is highly likely that stormwater lines will be required to be realigned outside of the footprint. This includes the existing 300mmØ line, which runs along the same alignment as the 1500mmØ line, that will need to be removed as part of the building works. The existing 225mmØ ID PE line and its associated manholes will also be removed, and a new outfall be installed to service the neighbouring property.

To support the future Justice Facility, detention in the form of 3 x 25,000L tanks will be required to provide off-set mitigation in accordance with Stormwater Management Area Flow 2 (SMAF 2) requirements. Details of the mitigation is outlined in section 4.1.2 below.

Due to the reduction in surface run-off being discharged into the outfalls (resulting from redirecting the neighbouring stormwater flows) and proposed mitigation, it is considered that the capacity of the existing outfalls will be improved, and the effects of stormwater runoff can be appropriately managed on the site, such that the effects can be considered to be less than minor.

Please refer to drawing C40-02 Rev. C for proposed drainage plan and design levels and CSK-001 for proposed demolition of services in Appendix A.

4.1.2 Stormwater Mitigation

As per Auckland GeoMaps, refer Figure 3, the subject site is located within a Stormwater Management Area Flow 2 (SMAF 2) zone. The stormwater mitigation approach for a future building on the site will be guided by the provisions and assessment criteria outlined in Chapter E10 of the AUP(OP) applying to SMAF areas.

The architectural bulk & location drawings provided by Architectus (Dated: April 2025) and, indicated on the Civil Design Drawing C40-02 (Appendix A), shows that the indicative building footprint is approximately 3,337m², which is approximately 72% of the subject site.

Figure 3: SMAF 2 Zone (Auckland GeoMaps - December 2024)

Using E10 mitigation requirements as a design guide and applying those requirements to this site, considering the redeveloped area is greater than 50%, the calculated mitigation volume required for this site is approximately 69.22m^3 (51.86m^3 (DET) and 17.36m^3 (RET)). It is understood that the mitigation will have to cater for both detention and retention and that no dispensation cannot be applied for the site location (Healthy Waters correspondence dated: 25/02/2025)

A summary of the calculation results is summarised in Table 4.2.2 below.

Table 4 2 2 Summary of SMAF 2 mitigation catcutations

SMAFZONE	Total Mitigation Volume (m•)	Detention (m•J	Retention (m•)	Orifice (1) (mm)
2	69.22	51.86	17.36	20

Due to the extent of the indicative building footprint required to meet the operational and functional requirements of a Justice Facility on the site, underground tanks are not a viable option due to the space requirements and location of all other required services.

Based on the calculated volumes above, 3x 25,000L above ground tanks would be an appropriate solution to capture roof runoff and mitigate the effects of stormwater on the site. This set up will allow for the capture of up to 75,000L of roof run-off and ultimately discharge into the Waikumete Stream via the existing 200mm0 outfall via controlled release.

In summary, the following mitigation is proposed for the future courthouse building:

- 3 Stormwater Tanks
- Type: Above Ground
- Diameter: 3.5m<l>
- Height: 3.0m
- Volume: 25,000 L

It is proposed that the first tank will be a combination retention/detention tank that will overflow into the second and third tanks (which are detention only) with a 20mm<Z> orifice outlet placed on the third tank to allow for captured run-off to be discharge into the existing stormwater network. The specific design for these tanks will be supplied at the detailed design phase. The proposed location of the above ground tanks as per drawing C40-02 Rev. C (Appendix A) with concept mitigation calculations included in Appendix B.

It.2 Wastewater - existing

Auckland GeoMaps records, refer Figure 2, shows two 225mm(2l, two 150mm<Z>AC public wastewater lines and two public 1050mm<Z> wastewater manholes located within the subject site. These existing lines collect wastewater run-off from the residential areas to the east and south of the subject site and discharge directly into the 635mm<Z> concrete main trunk line located within Alderman Drive.

Review of CCTV has confirmed that the existing network is constructed at shallow grades, because of the large stormwater line that traverses through the middle of the site. As such it is noted that a majority of the network is submerged, which does affect its operational capacity.

Preliminary calculations, summarized in Table 4.2.1 below, have been conducted and determined that the existing flows generated for the upstream catchment situated to the south of the subject site have been calculated to be 19.21l/s (PWWF). Flows generated from the eastern residential catchment were calculated to 1.39 l/s. This gives a combined flow rate of 20.61l/s.

As the existing site is a car park, with no toilet facilities available, the site currently does not generate any wastewater flows.

Table 4.2 1 Summary of existing wastewater capacity calculations

PipeDescription	Catchment Flowe (Q.m¹/a)	PiPfll Capacit1,1 (Q.m¹/a)	Capacitl,I Check
Ex. 225 AC Pipe (GIS ID: 893471) (Total Catchment)	20.61	19.48	NOTOK
Ex. 150 AC Pipe (GIS ID: 899356) reastern catchmentl	1.39	14.26	OK
Ex. 150 AC Pipe (GIS ID: 877837) reastern catchmentl	1.39	19.52	OK
Ex. 225 AC Pipe (GIS ID: 881812) fsouthern catchment)	19.21	31.18	OK

As indicated in table 4.2.1, the existing wastewater line (GIS ID: 893471), which services the total catchment, has been found to be under capacity by 1.13 l/s due to the shallow (0.16%) grade.

4.2.1 Wastewater – proposed

The Architectural Bulk & Location Drawings by Architectus (Dated: April 2025), and indicated on the Civil Design Drawing C40-02 (Appendix A), shows that the existing public wastewater network is proposed to be re-routed around the future building footprint.

Based on the scheme provided, a future Justice Facility can be appropriately serviced by wastewater, including the installation of new public 225mmØ uPVC lines and four new public 1050mmØ manholes around the future building footprint. As per drawing C40-02, the redirection of services for the southern catchment will require that drainage works be done within the Edmonton Steet Carriageway.

Consultation with the relevant stakeholders, including Auckland Transport, Auckland Council is recommended to support the future development proposal. A meeting with Watercare Services Limited was held on 13th February 2025 to discuss the following items:

1. Watercare's Takapu Street Wastewater Upgrade,
2. Manhole access and location,
3. Watercare Capacity and Constraints.

Through subsequent email correspondence between March 13 and April 11 it was confirmed that:

1. Physical works for the Takapu Street upgrade would have physical works completed in June 2025,
2. Proposed manhole location (as per C40-02 Rev. C) is in line with Watercare Design Standards though it is anticipated that Works Over Approval will be required and applied for during the Engineering Plan Approval Phase of the project (all works within 2m of Watercare local lines and 10m from transmission line),
3. Watercare advised (via email, April 11) that based on the additional design flows of 1.50 L/s, mitigation is unlikely to be required (Storage and off-peak pumping) provided Takapu Street upgrade is completed (June 2025) prior to connection of new Justice Facility. It is noted that the proposal must still follow your chosen consenting pathway (e.g. Notice of Requirement or Resource Consent), at which point the capacity and network impacts will be reassessed based on the final submitted documentation. Watercare will then provide its formal input as required by the process.

Redirection of services for the eastern catchment will remain within the subject site. These works will require approval from Auckland Council and Watercare Services and will be confirmed through the consenting approval process. It is proposed to maintain the existing connection to the 635mmØ trunk main and have the new lines discharge into the existing 225mmØ via a new 1050mmØ manhole. It is recommended that all works within the berm and road reserve of Edmonton Road must only be undertaken once all services within the berm have been located and marked out.

A capacity assessment on the proposed public wastewater drainage layout wascompleted to ensure that serviceability to the existing residence is maintained. The results of the capacity assessment are summarised in Table 4.2.1.1below.

Table 4.2.1.1 Sunmary of proposed wastewater capacity calculations

PipeDescription	Pipe flow (Q.m¹/a)	Velocity (m/a)	Pipe DeaiAn 1:18	Pipe Le n:h (m
Proposed 225 uPVC. WWP-1 (east)	42.24	1.062	0.65	41.57
Proposed 225 uPVC. WWP-2 (east)	49.36	1.241	0.89	13.30
Proposed 225 uPVC. WWP-3 [south)	27.79	0.699	0.28	37.70
Proposed 225 uPVC. WWP-4 rsouthl	28.74	0.723	0.30	44.57

To determine an increase in site flows, and as no definition within the Watercare Code of Practice relates to Courthouses, it wasconcluded that the activity should be classed as commercial in line with Table 5.1.3. to determine a design population and average daily flows per person. Based on the total floor area, it was calculated that the proposed development shall have a design population of 389 people. At 65 l/day, the Peak Wet Weather Flow (PWWF) rate has been calculated to be 1.461/s.

These additional flows increase the total catchment flow rate discharging into the existing 225mm0 AC line to 22.071/s and thus increases the shortfall in capacity for this line to 2.59 1/s. Through discussions with Watercare Services Limited it is our understanding that theincrease of flows within the line are (in principle) acceptable to Watercare and that mitigation of the additional flows may not be required, though official approval can only be provided once the design has gone through the formal consenting pathway process.

In terms of civil engineering, it is concluded that the future Justice Facility on the site can be appropriately serviced with respect to wastewater.

For capacity calculations, please refer to Appendix Band refer to drawing C40-02 Rev. C for proposed drainage plan and design levels and CSK-001 for proposed demolition of services in Appendix A.

It.3 Water Supply - existing

Auckland GeoMaps records have shown that the subject site is within proximity of existing public water reticulation and able to be serviced by the local network. The site is also located within 135m of 4 fire hydrants and thus it is considered that the site can be serviced for a sprinkler system under FW2 flows. To confirm flows and hydrant test will be carried out during the Preliminary Design Phase to ensure that a sprinkler demand flow of 2,100 l/min can be achieved. Results from this test will be provided to Council for review once it has been made available.

A new water meter and connection for domestic and fire use is proposed to be installed on the existing public water main in Alderman Drive to be in line with the current proposed valve room location for the new building. Location of these services are to be finalised and coordinated in conjunction with Building Services during the Preliminary Design phase. Indicative location of new water meter and connection is indicated on drawing C40-02 (appendix A).

In terms of civil engineering, it is concluded that the future Justice Facility on the site can be appropriately serviced with respect to Fire and Water Supply.

4.4 Utilities

Auckland GeoMaps records and survey information have shown that the subject site is within proximity of existing power and telecommunication utility services and will be able to be serviced by the existing network. It is noted that there are several telecommunication and power cables located within the subject site.

These services are to be removed and capped at the boundary where not required. It is proposed that a new Telecommunication toby box be installed near the new water meter within Alderman Drive to provide telecommunication services to the future courthouse building. All electrical cables servicing the existing streetlights within the car park are to be removed and redirected as required.

Indicative location of new telecommunication box is indicated on drawing C40-02 (appendix A).

In terms of civil engineering, it is concluded that the future Justice Facility on the site can be appropriately serviced with respect to existing utility services. All works are to be completed in accordance with the NZBC and the utility providers specifications.

5 FLOODING AND OVERLAND FLOW PATH ASSESSMENT

5.1 General

A review of Auckland GeoMaps, refer Figure 4, shows the presence of a major overland flow path which traverses through the subject site. This major OLFP follows a similar path to the existing public 1500mm0 concrete line discharges into the Waikumete Stream at the northern boundary. A minor overland flow path, which has a catchment of less than 4,000m^2 and originates on the site, is shown to discharge into the major overland flow path.

A review of the current available flood information on Auckland GeoMaps and subsequent report is based on 2016 LiDAR information and provide peak flow rates for both the existing (current) and predicted (future) floodplains and associated overland flow paths for the 10-year and 100-year storm event. Updated information received from Healthy Waters showed that a newflood model was constructed in 2022. This new information indicated a greater predicted flood extent mainly due to additional flood waters coming from Alderman Drive.

A meeting, held on 18/03/2025, with Healthy Waters confirmed that the 2022 flow data is to be used to determine a Finished Floor Level (FFL) set 300mm minimuml above the predicted 100-year flow path level. An independent flood assessment of the predicted 2022 overland flow path data was carried out by ACH Consulting. Based on their Flood Assessment Report (Dated: 2025.06.06, Rev: 250061), the data from Healthy Waters was validated and a minimum FFL of 8.32mRL was established. A summary of the findings of the ACH Consulting report will be expanded upon in Section 5.3 below.

Using the 2022 predicted flood data, Holmes carried out a preliminary desktop review of the overland flow path shown to flow from Edmonton Road. The study concluded that the 2022 data corresponded with the 20161:100-year peak flow (climate adjustedl of 10.98m^3/s. A summary of the current and predicted peak flow rates for 2016 and 2022 are out□ned in Table 4.1 below

Table 5.1.1 Summary of proposed overland flow path peak flow rates

Stormwater event	Peak Flow Rate (Current)	Peak Flow Rate (2016)	Peak Flow Rate (2022)
10-year	3.98m^3	6.85m^3	8.1m^3
100-year	6.55m^3	10.98m^3	10.98m^3

It must be noted that that for thecurrent flow rates there has been no adjustment for climate change made. For both the 2016 & 2022 predicted peak flow rates a climate change of 3.8° has been applied.

The results of the assessment will be discussed in the following sections below.

5.2 Desktop Overland Flow Assessment (2016)

As per Figure 4 the assessment was based on cutting several sections along and across the length of the overland flow path to determine its width, depth and velocity using the provided 2016 peak flow rates (as per Auckland GeoMaps) for the predicted (3.8° climate change) 100-year storm event.

Figure 4: Overland Flow and Flooding (Auckland GeoMaps - December 2024)

5.2.1 Desktop Assessment criteria

Theassessment of the existing 100-year major overland flow path was completed using the outlined storm event peak flow rates (adjusted for 3.8° climate change), being taken directly from Auckland GeoMaps and assigned to three cross- section as indicted in Figure 4. These peak flow rates are outlined in the table below.

Table 5 2.1 - Predicted 100-yea◆ Peak Fl.ow rates {2016)

Crosa-eection	100-1ear peak flow Q-m•/•l (2016)
A	10.98
B	10.87
C	10.77

In determining the extent of the major overland flow path, it wasassumed that the existing public network is fully submerged, and any permeable surfaces (grassed and vegetated areas) are fully saturated.

5.2.2 Desktop Assessment results

Using Hydro Express, Civil 3D assessment tool, sections were cut along and across the length of the major overland flow path located within the subject site. These sections are based on the existing topographical data, which was then imported into Hydro Express.

Using the peak flow rates provided in Table 5.2.1 the width, depth and velocity of the 100-year overland flow path wasdetermined. The results from that assessment have been summarised in Table 5.2.2 below.

Table 5.2.2 - Summary of overland flow path calculations (2016 - 100-yearl

Section	Peak flow (Om-m¹/a)	Width (w)	Dei:,th (d)	Velooit1,1 (m/a)
Long section 1	10.98	24.206	0.796	2.444
Cross-section A	10.98	27.437	0.259	2.348
Cross-section B	10.87	28.767	0.311	2.284
Cross-section C	10.77	22.665	0.354	2.503

Based on the assessment it was determined that the100-year overland flow path hasan average width of 26.287m, an average depth of 0.308m, an average velocity of 2.395m/s and covers an approximate area of 1,489m^2 of the subject site. The calculations have also confirmed the ponding of flood waters (due to the topographical nature of the car park) along the northern boundary to a depth of 0.800m before spilling over the embankment and discharging in the Waikumete Stream.

A review of the 2022 data provided from Healthy Waters indicated that theflows from Edmonton Drive are similar to that of the 2016 (climate adjusted flows) and therefore considered that any resultants sections would be similar in nature and therefore no separate section calculations we carried out.

Please refer to Appendix C for HydroExpress sections showing the overland flow path based on existing site conditions.

5.3 ACH Flood Assessment Repot Review

5.3.1 Summary of Pre-development assessment

ACH carried out a separate Flood Assessment on the existing major overland flow path from Edmonton Road and Alderman Drive to determine their impact on the subject site and the future building. Figure 5 shows the modelled flood extent of the subject site and neighbouring area in its current state. The model was calibrated to closely reflect the Healthy Waters 2022 data.

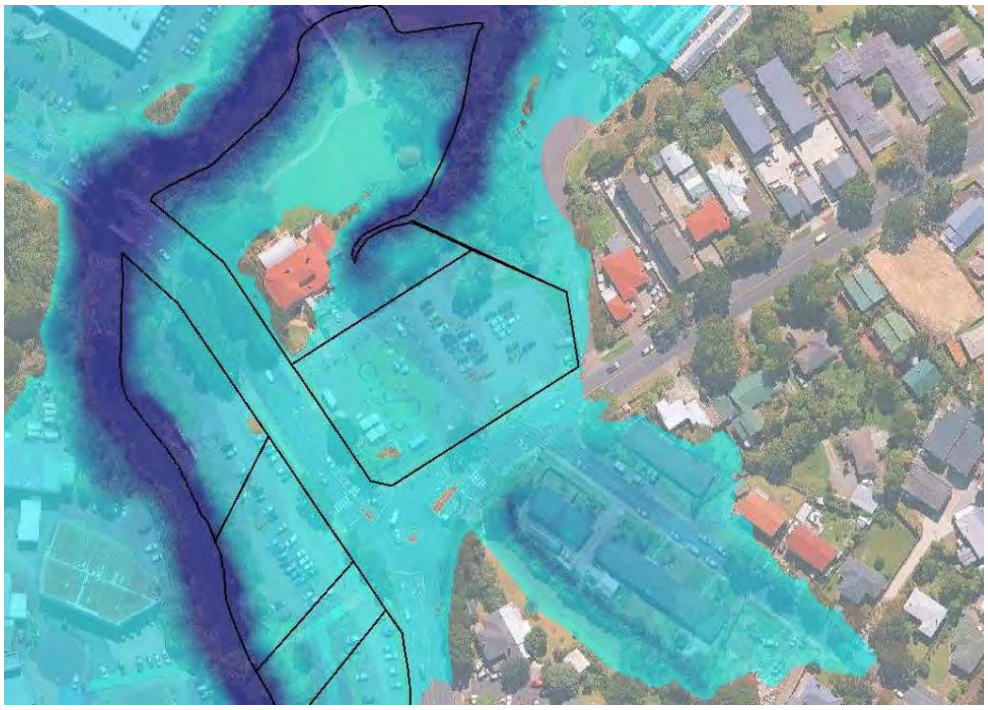

Figure 5: *ACH Flood Model - Predevelopment (June 2025)*

The modelling confirms widespread flooding across the subject site and the surrounding area. The model showed the flooding across the site is circa of 0.1 to 1.5m in depth, which the flooding extending across the vehicle crossing for the neighbouring Church.

5.3.2 Summary of Post-development assessment

The assessment of the flooding extent was then revised to include the extent of the future building. The report outlined the construction intent of the future building to be constructed on a suspended foundation slab to minimise the impact of the building on the existing overland flow paths and the floodplain.

As per Figure 6 and outlined in the report concluded that the overall impact of the future building was minor, there was an increase of the extent of the flooding over the Church vehicle crossing.

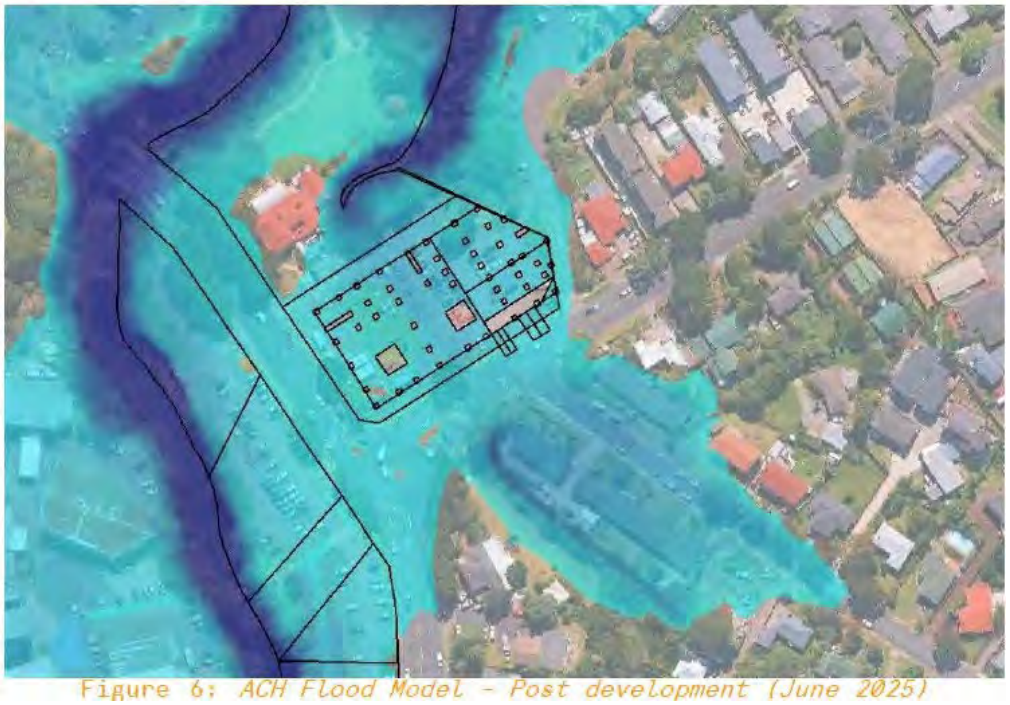

Figure 6: ACH Flood Model - Post development (June 2025)

As per Figure 6 and outlined in the report concluded that the overall impact of the future building was minor there was an increase of the extent of the flooding over the Church vehicle crossing, with an increase in flood depth by 110mm.

As part of the report, ACH provided several cross-sections to show depth and extent of the model. The results from those sections are summarised in Table 5.3.3.1below.

Table 5.3.3.1 - Summary of overland flow path calculations (2022 - 100-year)

Section	Peak flow (0--m¹/a)	Top Width (w)	Dei:,th (d)	Velocity (m/a)
Cross-section through center of buildinq	18.1	82.5	1.25	0.2-3.5
Long section through western vehicle crossin!=I	1.8	5	0.95	0.3 -1.12
Long section through eastern vehicle crossinq	0.45	5	0.90	0.1- 0.53

The sections were modelled using the proposed mitigation recommendation which are outlined below:

1. The existing ground level, along the existing gulley running through the property, has been lowered by 150 mm and replaced with a 5 m wide trapezoidal channel.

2. The ground level underneath the proposed vehicle crossings have been shaped at a uniform longitudinal slope to form a 5 m wide rectangular channel. This allows for more surface runoff to pass under the vehicle crossing bridges while also providing additional storage capacity.

3. The building footprint has decreased along the eastern corner to provide additional flood storage.

In general, the proposed solutions recommended in the report it is understood that the mitigation will not stop the flooding but rather provide additional time for church goers to egress the site during a heavy rain event.

It is noted our understanding that a copy of the flood assessment report by ACH will be accompany the NOR application.

5.3.3 Overland flow considerations

To manage the impact of the future courthouse on the existing overland flow path it has been proposed that the entire foundation slab be elevated to be situated above the calculated water level of the 2016/2022 100-year overland flow path. This suspended foundation will have minimal obstructions within the flow path extent and will provide a clear path for the water to enter and exit the site and therefore maintain the current flood situation.

Based on preliminary structural design, the western end of the future building slab will tie into the existing ground levels achieving a minimum 150mm clearance as required by the NZBC. The slab will then extend towards the eastern part of the subject site with 1200mmØ typical piles suspending the foundation a minimum off 300mm above the overland flow path (across its entire extent).

The clearance between the bottom of the concrete beam and the top of the overland flow path will vary from the front of the future building to the rear. A clearance of 300mm will be achieved at the front of the building and increasing to 700mm at the rear of the future building.

As discussed in the above section, a minimum Finished Floor Level (FFL) of 8.6mRL, measured using 2016 NZD Vertical Datum, has been indicated on the study bulk and location plans for the ground floor of a future courthouse building, which is situated well above top of the water level. This FFL will ensure that the occupants will be kept well above the flood waters in the event of a heavy rain event. Safe egress of the occupants of the building will be able to be done via the west of the future courthouse building as this area is not impacted by the overland flow path or localised ponding.

To ensure these areas stay outside of the flooding, it is proposed that existing ground levels (as best as practicable) be maintained. Little to no change to the entry or exit point levels are to occur. It is recommended that signals and telemetry alarms system is to be developed in conjunction with Healthy Waters, Auckland Civil Defence and the Project team as part of future design stages for the building occupants for the future courthouse building construction to provide an early warning system for the building occupants. This system will enable the occupants and persons in custody to be safely escorted out and away from the future building prior to being inundated by flood waters.

5.3.4 Flood risk and climate change adaptability

To further enhance climate change adaptation and resilience, the future courthouse building has been designed to mitigate and reduce flood and natural hazard risks within its own site but also ensure that downstream properties are not adversely affected.

The proposed elevated foundation slab, positioned above the 2016/2022 100-year overland flow path water level, plays a critical role in adapting to increasing rainfall intensities and potential climate change-driven flood events. The provision of a suspended foundation is that any obstructions within an overland flow path

is kept to an absolute minimum, and in doing so ensures unimpeded water flow, preserving the natural hydrological function of the site and reducing the likelihood of localised ponding or flood displacement to neighbouring properties.

Additionally, the use of 1200mmØ typical piles to elevate the foundation slab will not only provide structural integrity but also create a clearance buffer between foundation beams of the future courthouse building and potential floodwaters. The elevation strategy discussed within this report accommodates the projected 3.8º climate change impacts by allowing for increased flood capacity while maintaining accessibility and overall structural safety.

The resilience of the indicative building design is further reinforced through compliance with the minimum 300mm freeboard requirement in accordance with the Auckland Council Stormwater Code of Practice, which is situated above modelled flood levels. This measure ensures the safety of occupants, providing adequate freeboard to account for extreme weather events while aligning with best practices for flood resilience in building design. Whilst the indicative building footprint in the bulk and location study achieves 500mm freeboard (8.6m RL), it is noted that a building design that achieves the 300mm freeboard requirement (8.32m RL) is considered an appropriate to mitigate flood risk on the site, and adjacent properties.

To further mitigate flood risk, the proposal considers maintaining existing ground levels wherever feasible to avoid altering natural drainage patterns. The incorporation of signals and telemetry alarm systems will provide an early warning mechanism, enhancing response measures for building occupants in case of severe flood events.

Through these measures, the courthouse development is proactively addressing climate change adaptation while ensuring flood resilience, hazard risk reduction, and the protection of both the site and surrounding properties from future extreme weather events

5.4 E36 Risk Hazard Assessment

5.4.1 General

This assessment addressed the requirements of the Auckland Unitary Plan: Chapter E36 – Risk Hazard Assessment. The purpose of this assessment is to identify and evaluate the current and future natural hazard risks affecting the site, including those worsened by climate change, and to ensure that the proposed development does not increase the vulnerability, while avoiding or mitigating adverse effects on the surrounding properties.

5.4.2 Risk Assessment Summary

The following is a summary of the E36 Risk Hazard assessment that was completed for the proposed future justice Facility located at 14 Edmonton Road, Henderson and was completed in support of the Auckland Council Fast Track Application Number, BFR-6251. A summary of the assessment is outlined in Table 5.4.2 below. For full details on the E36.9 Risk Assessment please refer to Appendix E of this report.

E36.9(a) - The frequency, duration and scale of the flooding hazard:

- The subject site is located within the 1% AEP Oratia Catchment and is affected by a major overland flow path originating from Blacklock Avenue. This flow follows the alignment of a permanent stream, entering the site from the southern boundary and discharging into Oratia Stream within Falls Park.

- While initial flood data was from 2016, updated 2022 modelling provided by Healthy Waters (in response to the 2023 Anniversary Day Flood) has been used, showing more extreme rainfall events and confirming the extent of overland flow during a 1% AEP event.

- The overland flow path is triggered when a 1500mm culvert under Edmonton Road is blocked or overwhelmed, causing water to overtop the road and enter the site at 10.86 m³/s. The flow is also fed by runoff from Alderman Drive due to Oratia Stream overtopping its banks.

- HEC-RAS 2D modelling (ACH, June 2025) confirms flood depths of 0.3–1.5 m across the site and up to 0.5 m along the western boundary, with flooding persisting beyond 48–60 hours. Without mitigation, the 1% AEP flood risk to the site is considered **significant**.

E36.9(b) - The type of activity being undertaken and its vulnerability to flooding events:

- The proposed justice facility, with a footprint of approximately 3,337m², is entirely located within the 1% AEP floodplain and overland flow path but is not within other natural hazard areas such as coastal erosion or instability zones.

- If the project was to be consented through a resource consent process, the development would be classified as a *Restricted Discretionary Activity* under activities (A23) to (A42) in Table E36.4.1, requiring assessment under rules E36.6.1.7 and E36.6.1.9 due to its location in a 1% AEP floodplain.

- The facility design includes a suspended slab and a secure access ramp, ensuring vehicle entry points and internal parking are located at least a minimum of 500mm above the flood level, thus complying with E36.6.1.7.

- Whilst flood depths exceed 300mm in some parts of the site, the implementation of mitigation measures described in this report, including an elevated building design, ensures occupant and asset safety, and the overall risk to the development is assessed as **Low**.

E36.9(c) - The consequences of a flooding event in relation to the proposed activity and the people likely to be involved in that activity:

- The proposed justice facility is entirely within the 1% AEP floodplain and overland flow path, with flood depths ranging from 0.3 m to 1.5 m across the site.

- To mitigate flood risk, the building will be constructed on a suspended concrete slab with a *580mm freeboard above the flood level, which is more than the 300mm minimum freeboard requirement,* supported by large piles and designed with flood-resilient materials.

- A grated flood barrier will allow water to pass under normal conditions, and when water exceeds approximately 200 mm, it will open to allow unrestricted water flow beneath the building, preventing displacement impacts on neighbouring properties. However, as this is still at concept stage, it is proposed that this should form the basis of design consideration for the design team.

- Public access beneath the building will be restricted, and vehicle access limited to authorised personnel; overall, the design ensures low flood risk to occupants, vehicles, and the building's structural integrity is **Low**.

E36.9(d) - The potential effects on public safety and on other property:

- The proposed justice facility will have restricted public access due to its judicial function, with no throughfare allowed across the site for security reasons; public movement will be limited to existing footpaths outside the site.

- The development will be built on a suspended slab, and ACH modelling confirms only a minor increase in flood displacement, with sufficient freeboard provided to mitigate flood risk.

- The overall risk to public safety and neighbouring properties is considered **Low**, with E36.9(d) deemed not fully applicable; a Flood Management Plan will further manage and reduce risk through defined protocols for pre-, during, and post-flooding events.

E36.9(e) - Any exacerbation of an existing flooding hazard risks or creation of a new flooding hazard risk:

- The future justice facility will be built on a suspended concrete slab, allowing floodwaters to pass beneath the structure, thereby minimising obstruction and maintaining the existing flood flow patterns.

- Flood modelling shows minimal change in the extent and depth of 1% AEP flooding post-development, with a slight 110mm increase in flood depth at the Korean Church accessway. This is mitigated through a proposed bund and channel system to redirect water toward Oratia Stream, and a reduction in building footprint to improve flood storage.

- With these mitigation measures in place, the development does not worsen flooding impacts on neighbouring properties, maintains current exposure levels, and results in a **low flood risk** for the site and surrounding properties.

E36.9(f) - The type of activity being undertaken and its vulnerability to flooding events:

- The proposed development is situated inland and is not at risk from coastal flooding.

- No further coastal inundation assessment is required.

- The risk of coastal inundation to the future justice facility is considered ***Low***.

E36.9(g) - The ability to use of non-structural solutions, such as planting or the retention or enhancement of natural landform buffers to avoid, remedy or mitigate the hazard, rather than hard engineering solutions or protection structures:

- Due to the widespread flooding from a major overland flow path, non-structural measures like planting are ineffective. Suspending the building on open foundations is considered the most practical solution.

- A proposed grass bund and shallow channel will create additional floodwater storage on-site, delaying flood progression and allowing more time for safe egress from the adjacent Korean Church property. The facility itself does not worsen flooding at the church.

- A 5m-wide central channel will guide early floodwaters along the natural flow path and help offset volume displaced by foundation piles. Despite mitigation efforts, the site remains at **Medium risk** due to the scale of regional flooding and limited hazard avoidance options.

E36.9(h) - The design and construction of buildings and structures to mitigate the effects of flooding:

- The future justice facility will be built on a suspended concrete foundation *set 580mm above the flood level, which is more than the 300mm minimum freeboard requirement, allowing floodwaters to flow freely beneath the structure*, avoiding displacement and reducing flood risk impacts.

- Materials in contact with potential floodwaters will be impervious and durable (reinforced concrete), while all sensitive components (e.g., electrical outlets, hazardous materials) will be positioned at least 500mm above the finished floor level to ensure protection and compliance with the NZ Building Code.

- Overall, the facility's design and construction methods meet building code durability standards, effectively managing flood risk and resulting in a **Low overall flood-related risk** for the development.

E36.9(i) - The effect of structures used to mitigate hazards on landscape values and public access:

- The site will function as a judicial facility with public access limited to designated areas.
- Landscaping will be confined to the berm and remain unaffected by the building construction.
- Given the site's intended use, no additional activity assessment is needed, and the overall risk is considered **Low**.

  It is proposed that the area underneath the building be left open to allow for persons, who might be underneath the building in a flood event, to move freely towards the perimeter fencing to the north of the site.

E36.9(j) - Site layout and management to avoid or mitigate the adverse effects of flooding hazard, including access and exit during a flooding event:

- The future justice facility's finished floor level (FFL) is on a suspended concrete foundation *raised 580mm above flood and overland flow levels, which more than the 300mm minimum freeboard requirement, allowing floodwaters to pass freely underneath, reducing adverse flood impacts.*
- Additional flood safety measures include visual flood depth markers, high rain alerts, and stream level monitoring alarms to warn occupants and provide sufficient evacuation time.
- A Flood Management Plan with clear exit procedures is recommended; overall flood risk is reduced to **Low** by design but classified as **Medium** due to the extent of flooding and need for ongoing monitoring.
- All building services to be located outside of the flood prone area where practically possible as this will improve the resilience of building post event.

E36.9(k) - The duration of consent and how this may limit the exposure for more or less vulnerable activities to the effects of natural hazards including the effects of climate change:

- The development's consent is expected to be permanent, with the Judicial Facility design already accounting for increased flooding risk due to a 3.8°C climate change over the next 100 years.
- The site is not vulnerable to sea level rise or coastal erosion but may need monitoring and potential remediation of Oratia Stream banks as storm intensities increase; however, the risk remains low due to the building's deep concrete pile foundation.
- Mitigation measures such as a suspended foundation, a 5m-wide central channel, and barriers are considered sufficient to protect the building and occupants, keeping the overall risk low throughout the consent period.

E36.9(l) - Any measures and/or plans proposed to mitigate the flooding hazard or the effects of the flooding hazard:

- No information has been provided to Holmes NZ LP about any planned Auckland Council works to mitigate future flooding in the local area, which experiences large-scale flooding affecting the site and surrounding properties.
- Potential mitigation options include constructing grass bunds along road frontages to divert floodwaters and increasing public network capacity (e.g., larger culverts or raised stream heights) to reduce flood impact and improve safe evacuation during a 1% AEP event.

- Due to the scale of the flooding and lack of definitive mitigation measures, the site's flood risk is significant, with suggested measures aimed primarily at managing flooding and increasing egress time rather than preventing flooding.

The mitigation measures proposed and incorporated into the design for the future justice facility provide more than adequate protection to the structure and its occupants. The impact of the proposed development on the neighbouring properties is less than minor.

But due to the region wide scale of the flooding and the requirements for continued monitoring of stormwater in a large storm event, the overall risk to the development is considered **Low to Medium.**

6 NOTICE OF REQUIREMENT CONDITION RECOMMENDATIONS

To ensure the effects of a future courthouse building are mitigated and appropriately managed the following proposed conditions are recommended:

1. To mitigate the effects of future earthworks at the subject site, Erosion & Sediment Controls are to be installed in general accordance with Auckland Council: Erosion and Sediment Control Guide for Land Disturbing Activities in the Auckland Region - Guidance Document 2016/05.

2. An Erosion and Sediment Control Plan is required to be submitted to support any future site works/development on the Site.

3. Any earthworks undertaken on the site will adopt best practice erosion and sediment control measures in accordance with Auckland Council's GD05 Guidelines.

4. The servicing strategy for a future building should be in general accordance with the civils plans prepared by Holmes, Dated: 30/04/25, Rev: 149014.33.

5. Foundations for a future building will be required to sit at least 5m away from the edge of the existing 1500mm diameter stormwater pipe that traverses the centre of the site. It is also the intention to utilise the foundation piles of the future building rather than having to design and install specific pipe bridging piles.

6. MOJ are proposing an FFL of 8.32mRL, which allows for a minimum free board of 300mm, in relation to the peak flood level of 8.02mRL (measured using 2016 NZD Datum), which is above the 220mm requested by Healthy Waters

7. It is recommended that signals and telemetry alarms system be incorporated into the future courthouse building construction to provide an early warning in a flood event. This system is to be developed in conjunction with Healthy Waters, Auckland Civil Defence and the Project team as part of future design stages for the building occupants. This system will enable the occupants and detainees to be safely escorted out and away from the future building prior to being inundated by flood waters.

8. It is recommended that the design team consider incorporating a grated flood barrier that will allow flood water to pass under normal conditions. When flood water exceeds a depth of approximately 200 mm, the gates will open and permit unrestricted flow beneath the building. This will prevent flood water displacement impacting on neighbouring properties.

9. ACH report recommends having 5m wide trapezoidal channel that should be lowered 150mm from the existing ground level along the existing gulley running through the property. Also shaping the ground level underneath, the proposed vehicle crossings to form a 5m wide rectangular channel which allows

the surface runoff to pass underneath the crossings and building footprint along the eastern corner to provide additional flood storage.

7 SUMMARY

The Ministry of Justice (MoJ) proposes to lodge a Notice of Requirements application for a new Justice Facility at 14 Edmonton Road in Henderson, Auckland. Given the application is for a Notice of Requirement (NOR), a specific development proposal is not known at this stage, however, the assessment is based on project assumptions outlined in the report and the concept scheme for an indicative future building footprint on the site.

Holmes NZ LP have been engaged to assess the existing overland flow paths, stormwater and wastewater realignment and mitigation requirements for the site located at 14 Edmonton Road, Henderson, Auckland, to support the design of a proposed courthouse.

The subject site covers an area 4,435m² and includes car parking, minor vegetation, and grassed berms, with vehicle access from Edmonton Road and Alderman Drive. A major overland flow path traverses through the middle of the subject site, with ponding observed at the northern boundary before discharging into the Waikumete Stream. A minor flow path along the northern boundary does not affect the indicative location of future building platforms. The assessment was conducted using a combination of LiDAR data, Hydro Express modelling, and topographical surveys.

Earthworks will largely consist of scraping and removing of existing asphalt and the basecourse layer of the existing carpark and the drilling for the piles to allow for the suspended ground floor. Minor reshaping of the carpark to allow for a wider dish once the piles have been completed will allow for flood waters to spread across a wider area. This will reduce the overall depth of the flood waters as well as improve the clearance between the flood waters and the underside of the foundation beams.

Standard erosion and sediment controls (ESC) in accordance with the Auckland Council: *Erosion and Sediment Control Guide for Land Disturbing Activities in the Auckland Region* - Guidance Document 2016/05. A ESCP will need to be provided to Auckland Council prior to the start of construction.

Site servicing for the indicative building footprint for a future Justice Facility has been reviewed and assessed with respect to existing stormwater, wastewater, and water supply infrastructure evaluated for capacity and alignment. Stormwater mitigation measures include installing 75m³ of Stormwater Mitigation in the form of Detention and Retention Tanks in general accordance with the SMAF 2 requirements set out in Section E10 of the Unitary Plan. Most of the existing public stormwater drainage pipes within the site are to be removed and/or realigned due to the extent and positioning of the proposed Courthouse.

Wastewater pipes constructed of asbestos cement require realignment to avoid structural risks. The position and extent of the indicative building footprint for a future courthouse has meant that the existing public wastewater lines within the site be removed, and new public lines installed around the indicative building footprint. The site is within proximity to power and telecommunications services, and fire safety requirements are supported by nearby hydrants. The suspended foundation design minimises disruptions and ensures the site remains functional while accommodating the courthouse.

In terms of civil engineering, it is concluded that the future courthouse building on the site can be appropriately serviced with respect to wastewater. Stormwater and existing public utility services.

Based on the overland flow path assessment a suspended slab is proposed to allow for flood waters to freely move underneath the proposed Courthouse. Safe egress will be able to be done via the west of the future building as this area is not impacted by the overland flow path or localised ponding.

Overall flow path considerations have accounted for the data flows coming from Edmonton Road and Alderman Drive. Based on the validated 2022 flood data provided by Healthy Waters (validated by ACH Consulting) the recommended FFL for the future Justice Facility was recommended to be 8.32mRL (300mm freeboard). Hydro Express calculations have concluded that the proposed design FFL, 8.60mRL, is situated well above the predicted flood waters level. This provides additional protection well above the minimum requirement and provides additional protection to any further occupants.

The future courthouse has been designed to enhance climate change adaptation and resilience by mitigating flood and natural hazard risks while ensuring downstream properties remain unaffected.

The elevated foundation slab, positioned above the 100-year overland flow path, minimises obstructions within the 100-year flow path to maintain unimpeded water movement. This approach preserves the site's natural hydrology, reducing localized ponding and flood displacement risks. The foundation is supported by 1200mmØ typical piles, providing both structural integrity and a clearance buffer to accommodate increased flood capacity due to projected climate change impacts.

The bulk and location study Finished Floor Level (FFL) of 8.32mRL is set well above modelled flood levels, ensuring occupant safety by maintaining adequate freeboard for extreme weather events. To further mitigate flood risks, the design maintains existing ground levels where possible, preventing disruptions to natural drainage. Development of a Telemetry alarm system in conjunction with Healthy Waters, Auckland Civil Defence and Project Team is proposed to provide early warning of a flood event and enhance emergency response. Also, the consideration of the flood barrier which allows unrestricted flow underneath the building when the water depth exceeds beyond 200mm.

Additional flood mitigation strategies, subject to further modelling, include raising the berm height along Alderman Drive to redirect excess floodwaters into the Waikumete Stream. Installing a secondary 1500mmØ culvert may also be considered to improve stream floodwater conveyance and reduce potential backflow impacts.

These measures ensure the courthouse is resilient to climate change while safeguarding both the site and surrounding properties from future extreme weather events

Based on the assessment undertaken it is concluded that any potential adverse effects with respect to flooding will be appropriately managed through design parameters (i.e. minimum finished floor level), such that effects are considered to be less than minor.

Appendix A: Civil Design Drawings

WAITAKERE COURTHOUSE
14 EDMONTON ROAD
HENDERSON, AUCKLAND

Holmes

Project 149014.33

THE ALDERMAN

LOT 2 DP 58

Existing catchpits to be re-routed to discharge directly into existing treatment device.

New outfall to be installed to service neighbouring site.

Discussionwithneighbouring siterequired toconfirm agreement. All works will require consent (RC and EPA).

Ex. Public WWMH
LL=7.263
IL(in)=4.923
IL(out)=4.913

Ex. Public WWMH
LL=6.850
IL(out)=4.980

Indicative location of new water meter and connection to service proposed Courthouse.

Ex. Public WW
LL=7.690
IL(in)=4.620

Ex. 22
@ 0

RKING

Proposed

IL(i
IL(i
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(To be placed over exisit
wastew

AL

LL=7.822
IL(in)=4.779
IL(out)=4.769

C line
rade

TAKAPI

proposed realignment of public wastewater line within footpath and around any building platform. Exact realignment to be confirmed once building location and footprint has been confimred

1/f

All dimensions to be verified on site before making any shop drawing or commencing any work

Consultants

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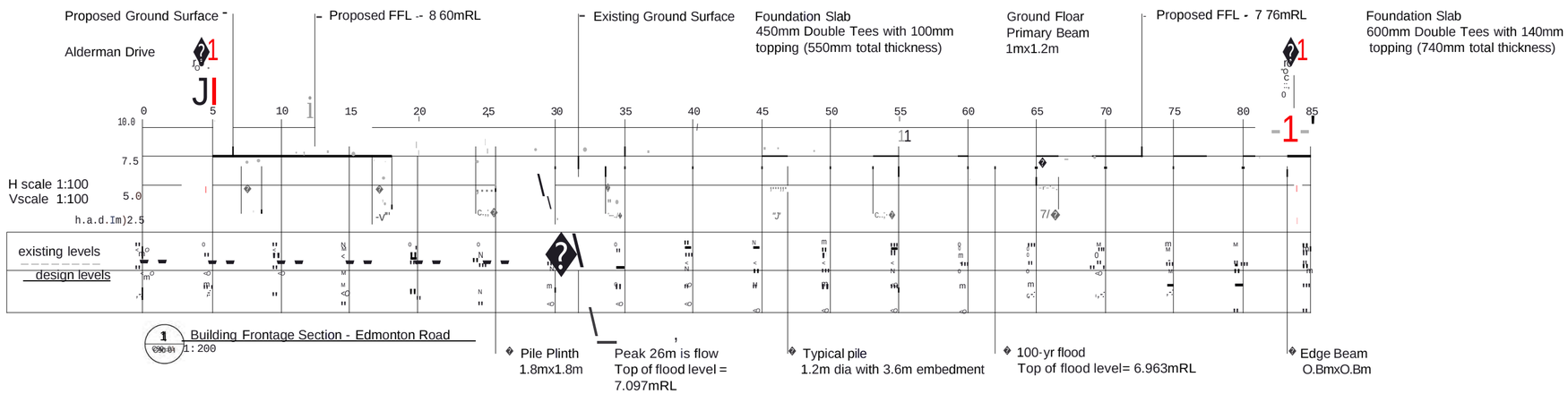
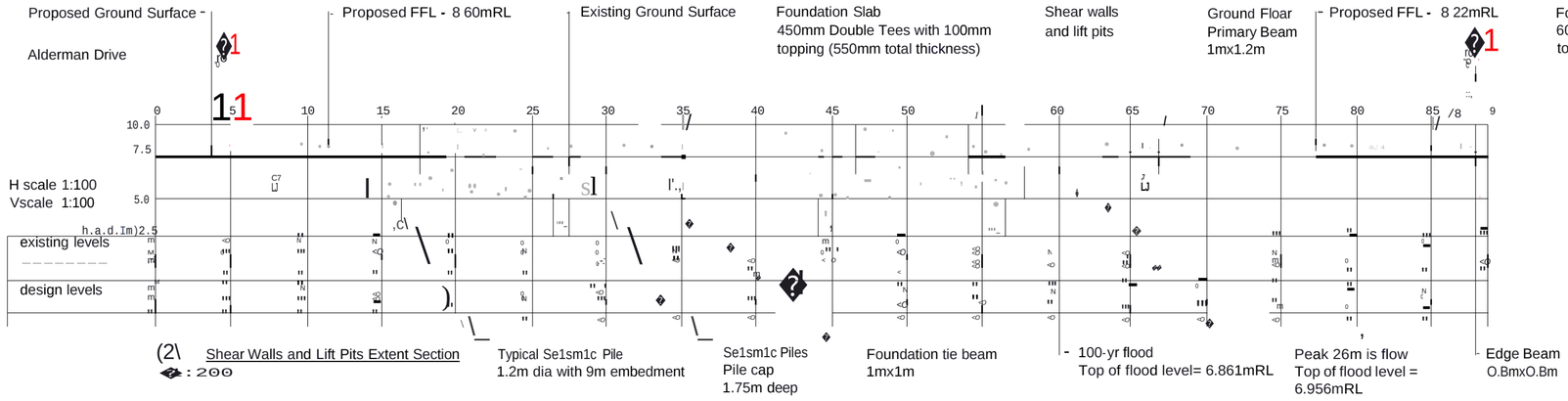
WAITAKERE COURTHOUSE
14 EDMONTON ROAD
HENDERSON,AUCKLAND

Sheet Title
proposed drainage and utility services layout plan

Drawn
Scale (atA1)
Filename
Job No
Sheet No
Re,

Date	Appd	Reason
3010412025	CG	For Consent





notes:

1. Refer to drawing C00-01 for project notes.
2. This drawing set contains colour. All reproduction to be in colour.
3. This drawing is provided for information purposes only to enable Bulk & Location.
4. Topographical information provided b Suivey Worx.
5. Overland flow path locations as per Auckland GeoMaps (November 2024).
6. Peak flow rate as per Auckland Council GeoMaps records 1:100 year event with 3.8° climate change.
7. Flood information base don 2022 region wide flood model provided by Healthy Waters
8. Additional flood modeling and report has been produced by ach (Date: 21/03/25, Ref: 250061)
9. Refer to Holmes Structural Concept design for foundation design and pile layout

legend:

- Building FFL
- Proposed Structures outline
- 100 yr top of flood level (2022)
- Proposed Ground Level
- Existing Ground Level
- Proposed Structures
- 100 yr flood level (2022)
- Boundary
- Top of peak 26m³/s flow level

Rev	Date	Appd	Reason
A	30104/2(25	JP	For Consent

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WAITAKERE COURTHOUSE
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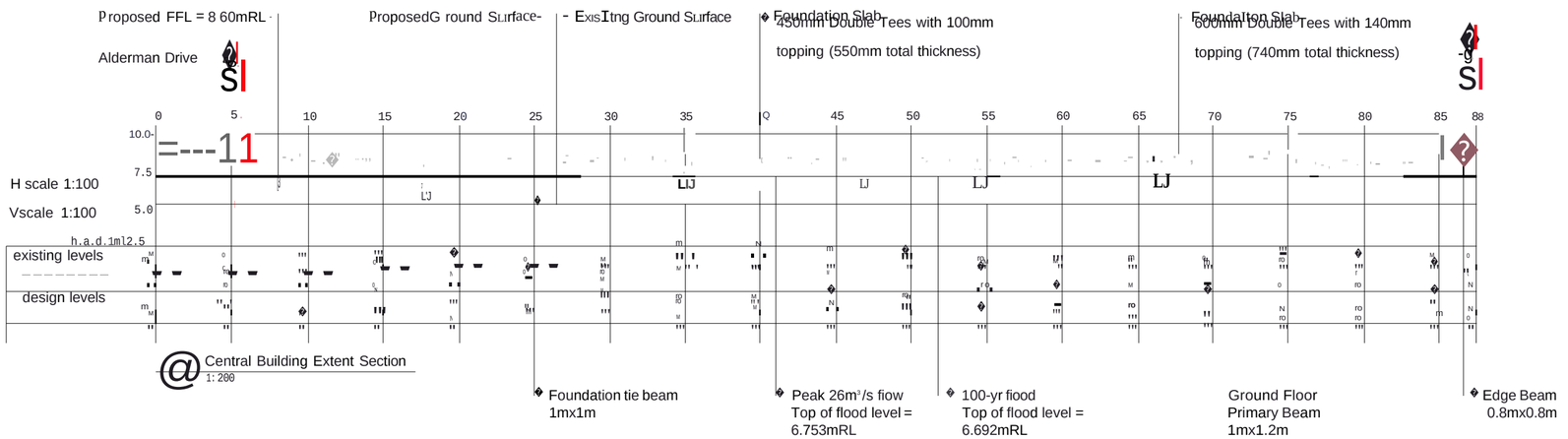
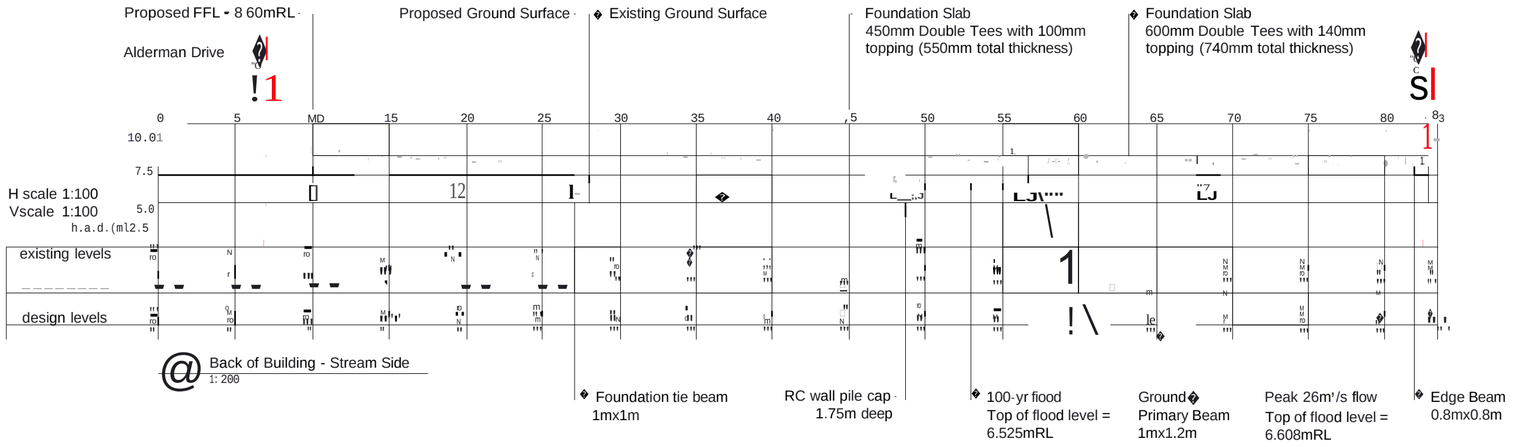
Sheet Tille: **100 yr Flood depth Sections FFL** check--t--Fi_leo_em_e_H_C-_1_4_90_14_3_3_-M_-_P_-_Co_n_cept D_esign_dwg

2022 AC Information

Drawn NG | Scale 1:200 A1 (atA1)

Job No **149014.33** | Sheet No **C40-03** | Rev **A**





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- Top of peak 26m³/s flow level

All dimensions to be verified on site before making any shop drawings or commencing any work

Consultants

Rev	Date	Appd	Reason
A	30104/2025	JP	For Consent

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WAITAKERE COURTHOUSE
14 EDMONTON ROAD
HENDERSON,AUCKLAND

Sheet Tille
100 yr Flood depth FFL Sections
2022 AC Information

Drawn NG Scale 1:200 A1 (atA1)
Job No 149014.33 Sheet No C40-04 Rev A

File: \\a1(.ollices.ho1mesgroup.com\da1a1HC\CA0\149014.331149014.33_WairaKere CourtlouselHC_149014.33 M-P - Concept Designutwg Oare Plottee. 30/0412025 5 20 11 pm By: Nathan GilUertson

Existing public stormwater
discharge into Waikumete stream

[redacted]

OLFP - Section 1 (2022 Flows)
Peak flow (Q100) = 10.98m'ls (3.8° climate change)
width (w) = 27.311m
depth (d) = 0.247m
velocity (v) = 2.503m/s

Flood waters will be restricted by Custodial access ramp. Water will have free movement past this point as ramp will be in its on piled foundation extending into the ground

EDMONTON ROAD

TAKAPU STREET

DP 42967

26

ate change)

notes:

1. Refer to drawing C00-01 for project notes.
2. This drawing set contains colour. All reproduction to be in colour.
3. This drawing is provided for information purposes only to enable Bulk & Location.
4. Topographical information provided b Suivey Worx.
5. Overland flow path locations as per Auckland GeoMaps (December 2024).
6. Peak flow rate as per Auckland Council GeoMaps records 1:100 year event with 3.8° climate change.
7. Refer to HydroExpress Sections for OLFP sections attached to the Infrastructure Report.

- Contours major (existing)
- Contours minor (existing)
- Site boundary (existing)
- Major overland flow path
- Minor overland flow path
- Direction of flow
- Overland flow path extent (existing)
- Flood plain (as per GeoMaps)
- Solid concrete walls (extend to existing ground)

All dimensions t be verif[ed on before shop drawings /2r commencing any work

Rev	Date	Appd	Reason
C	30\04/2\025	JP	For Consent

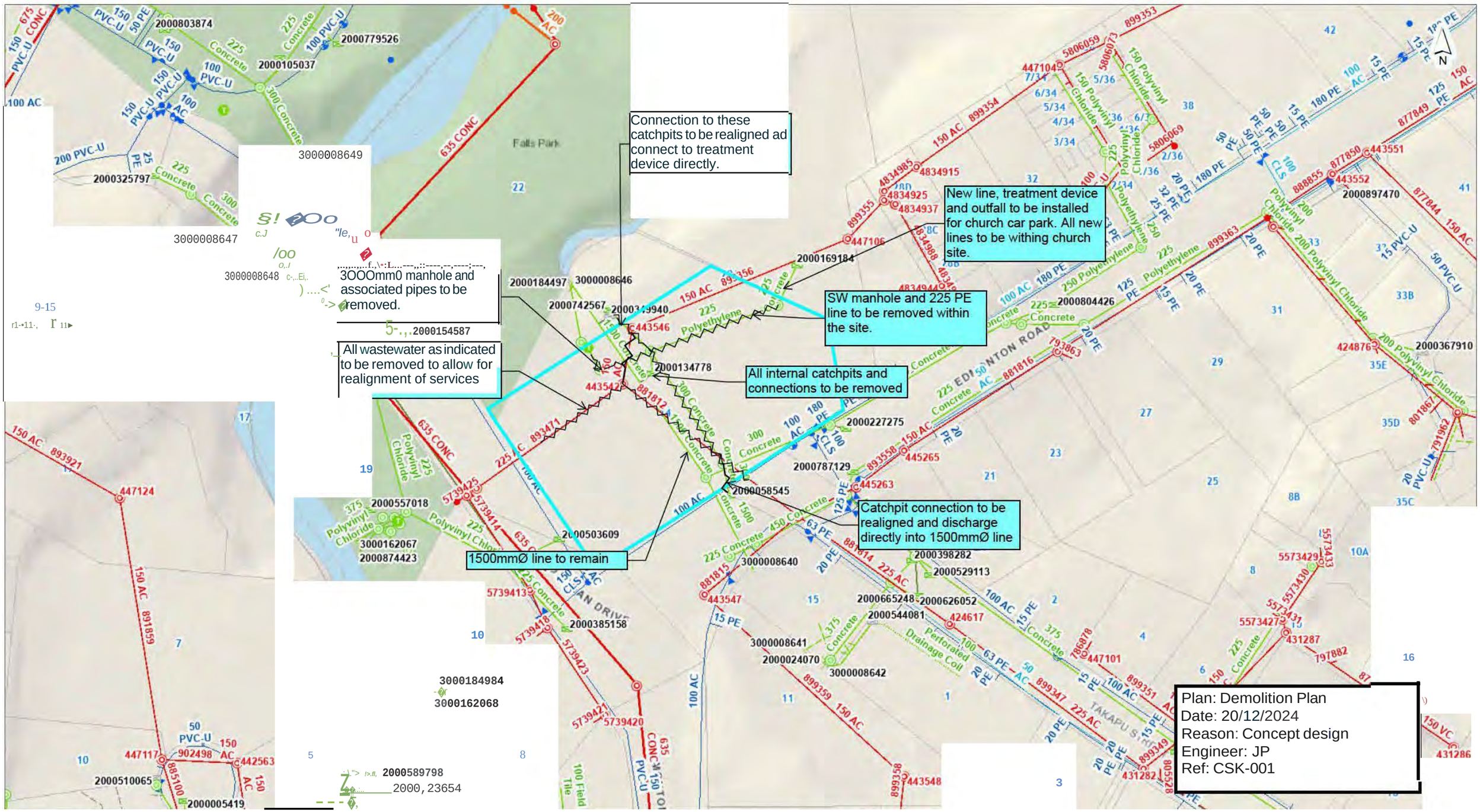
Consultants

Holmes NZ LP
254 Montreal Street
Christchurch 8442
New Zealand
holmesanz.com
T: +64 3 366 3366

WAITAKERE COURTHOUSE
14 EDMONTON ROAD
HENDERSON,AUCKLAND

Sheet Title: flooding and overland flow path extent plan

Drawn: NG | Scale: 1:200 A1 (atA1)
Filename: HC_149014.33 - M-P - Concept Design.dwg
Job No: 149014.33 | Sheet No: C90-01 | Re,: C



Edmonton Road - Demolition Plan

0 10 20 30
Meters

Scale @A3
= 1:1,000

Date Printed:
20/12/2024

Auckland Council
TeKauniheraoTllmaki Makaurau

Appendix B: SMAF & Capacity Calculations

Holmes CALCULATION SHEET	JOB NAME:	**Waitakere Courthouse**	PAGE No:
	SECTION:	**SMAF DETENTION CALCULATIONS**	**1**
	JOB NO:	**149014.33**	DESIGNED: **JP**
	DATE:	**19/12/2024**	

GD01 STORMWATER DETENTION CALCULATION - SMAF 2

INITIAL DATA

Total Site Area	4435	**m²**

Pre Development	**Area**	**C**	**Description**
Pre Development Impermeable Area	3835	0.9	Existing impervious
Pre Development Permeable Area	600	0.3	Landscaped Areas
Total Site Area	4435	**m²**	
Impervious Area %	86.5%		

Post Development	**Area**	**C**	**Description**
New/ redevelopment Impermeable Area	3471	0.9	Proposed Roof
Existing untouched impervious area	590	0.9	Hardstand areas not into tank
Post-development permeable area	374	0.3	Landscaped Areas
Total Site Area	4435	**m²**	
New/Redeveloped Impervious Area %	78.3%		

Total area redeveloped impervious > 50%	Yes
Area for Hydrology mitigation	**Entire Site**

C=	Run-off Coefficient	0.9
A=	Site Area	0.3

CONTROL DATA

Rainfall Depth	=	25	**mm**	*(As per 90th Percentile Map)*
Hydrological Soil Group	=	C		*(Table 1: Pervious Area Curve Numbers)*
Pre-Development Curve Number	=	74		*(Table 1: Pervious Area Curve Numbers)*
Post Development Curve Number	=	98		*(Constant Value)*

Initial Abstraction	
Pre	*Post*
5	0

Item	**Pre Development**	**Post Development (Imperv)**	**Post Development (perv)**
CN	74	98	74
Soil Storage (mm)	89.24	5.18	89.24
Initial Abstraction	5	0	5
Run-off Depth (mm)	3.66	20.71	3.66

VOLUME CALCULATIONS

Pre-development Runoff Volume	=	16.24	**m³**
Post Development Runoff Volume	=	85.46	**m³**
Total Mitigation Volume	=	69.22	**m³**
RETENTION VOLUME	=	**17.36**	**m³**
DETENTION VOLUME	=	**51.86**	**m³**
Limit Flows from Tank	=	0.92	**l/s**
Minimum Catchment area	=	2768.79	**m²**

PRELIMINARY TANK SIZING CALCULATIONS

Maximum Tank Height	=	1.2	**m**	
Velocity (V1) at orifice O_1	=	4.85	**m/s**	
Orifice Diameter (Ø)	=	**20**	**mm**	**Size Check - OK**
Preliminary Tank Details	=	**1.2**	**mØ**	*Tank Diameter*
	=	**61.20**	**m**	*Length of Tank*

$$0_1 = \sqrt{2gH}$$

$$0\text{rifice } \emptyset = \sqrt{\frac{4Q_1}{0.62V_1 rr}}$$

Holmes	JOB NAME:	**14 Edmonton Road, Henderson**		PAGE No:
	SECTION:	**WASTEWATER CAPACITY CHECK**		**1.0**
	JOB NO:	**149014.33**	DESIGNED:	**JP**
	DATE:	**9/04/2025**		

CATCHMENT FLOW ANALYSIS CALCULATIONS - EXISTING

EXISTING SUBJECT SITE FLOWS - Carpark

ITEM	DATA	NOTES/COMMENTS
Site area	0	Car park - no wastewater facilities
Persons/15m²	0	As per Table 5.1.3 Commercial - Office
ADWF per person, Litres/day	65	As per Table 5.1.3 Commercial - Office
PDWF peaking factor	2	As per Table 5.1.3 Commercial - Office
PWWF peaking factor	5	As per Table 5.1.3 Commercial - Office
Existing Residential ADWF, litres/sec	0.00	
Existing Residential PDWF, litres/sec	0.00	ADWF x PDWF peaking factor
Existing Residential PWWF, litres/sec	**0.00**	ADWF x PWWF peaking factor

EXISTING UPSTREAM CATCHMENT FLOWS - East of Subject Site

ITEM	DATA	NOTES/COMMENTS
Catchment Area, m²	21651	Upstream catchment
Number of Dwellings	33	Based on 650m² Lots
People per dwelling/area	3	As per Table 5.1.1 Residential
ADWF per person, Litres/day	180	As per Table 5.1.1 Residential
PDWF peaking factor	3	As per Table 5.1.1 Residential
PWWF peaking factor	6.7	As per Table 5.1.1 Residential
Existing Residential ADWF, litres/sec	0.21	
Existing Residential PDWF, litres/sec	0.62	ADWF x PDWF peaking factor
Existing Residential PWWF, litres/sec	**1.39**	ADWF x PWWF peaking factor

EXISTING UPSTREAM CATCHMENT FLOWS - South of Subject Site

ITEM	DATA	NOTES/COMMENTS
Catchment Area, m²	367090	Upstream catchment
Number of Dwellings	459	Based on 800m² Lots
People per dwelling/area	3	As per Table 5.1.1 Residential
ADWF per person, Litres/day	180	As per Table 5.1.1 Residential
PDWF peaking factor	3	As per Table 5.1.1 Residential
PWWF peaking factor	6.7	As per Table 5.1.1 Residential
Existing Residential ADWF, litres/sec	2.87	
Existing Residential PDWF, litres/sec	8.60	ADWF x PDWF peaking factor
Existing Residential PWWF, litres/sec	**19.21**	ADWF x PWWF peaking factor

Holmes	JOB NAME:	**14 Edmonton Road, Henderson**		PAGE No:
	SECTION:	**WASTEWATER CAPACITY CHECK**		**1.1**
	JOB NO:	**149014.33**	DESIGNED:	**JP**
	DATE:	**9/04/2025**		

CATCHMENT FLOW ANALYSIS CALCULATIONS - PROPOSED

PROPOSED COURTHOUSE DEVELOPMENT FLOWS

FUTURE COURTHOUSE DEVELOPMENT		
ITEM	**DATA**	**NOTES/COMMENTS**
Floor Areas (excl.service areas and public corridors)	5834.8	Total Floor Area of Courthouse
Persons/15m²	389	As per Table 5.1.3 Commercial - Office
ADWF per person, Litres/day	65	As per Table 5.1.3 Commercial - Office
PDWF peaking factor	2	As per Table 5.1.3 Commercial - Office
PWWF peaking factor	5	As per Table 5.1.3 Commercial - Office
Proposed Residential ADWF, litres/sec	0.29	
Proposed Residential PDWF, litres/sec	0.59	ADWF x PDWF peaking factor
Proposed Residential PWWF, litres/sec	**1.46**	ADWF x PWWF peaking factor

WASTEWATER FLOW CALCULATION SUMMARY

Existing Flows, Litres/second	**20.61**	Exisitng site + Existing Catchment Flows
Proposed Flows, Litres/second	**1.46**	Proposed Development Flows
Total Generated PWW Flows (Existing)	**20.61**	Total Existing Catchment Flows
Total Generated PWW Flows (Proposed)	**22.07**	Existing Flows + Proposed Flows

WASTEWATER MITIGATION: STORAGE FOR OFF-PEAK PUMPING

Proposed ADWF, Litres/second	**0.29**	Average Day Dry Weather Flows
Hours of Storage, hr	**8.00**	Hours required to be stored
Total Storage Volume, m³	**8.35**	Total storage to be detained for off-peak pumping

JOB NAME:	**14 Edmonton Road, Henderson**		PAGE No:
SECTION:	**WASTEWATER CAPACITY CHECK**		**1.2**
JOB NO:	**149014.33**	DESIGNED:	**JP**
DATE:	**9/04/2025**		

PIPE CAPACITY CALCULATIONS - Existing

Existing Line (893471) - Receiving/Critical Line - Colebrook White					
Pipe TYPE & ID	Pipe Length (m)	Pipe Diameter (Ø)	Upstream RL (m)	Downstream RL (m)	k, mm
Ex. 225mmØ AC (893471)	50.09	0.225	4.70	4.62	1.0

Slope (%)	Pipe Velocity (m/s)	Q, Pipe (l/s)	Q, Catchment (l/s)	Capacity Check (3% margin of error)
0.16%	0.490	19.48	**20.61**	Change Design

Existing Line (881812) - Colebrook White					
Pipe TYPE & ID	Pipe Length (m)	Pipe Diameter (Ø)	Upstream RL (m)	Downstream RL (m)	k, mm
Ex. 225mmØ AC (881812)	56.25	0.225	4.98	4.75	1.0

Slope (%)	Pipe Velocity (m/s)	Q, Pipe (l/s)	Q, Catchment (l/s)	Capacity Check (3% margin of error)
0.41%	0.784	31.18	19.21	OK

Existing Line (899356) - Colebrook White					
Pipe TYPE & ID	Pipe Length (m)	Pipe Diameter (Ø)	Upstream RL (m)	Downstream RL (m)	k, mm
Ex. 150mmØ AC (899356)	61.10	0.150	5.52	5.07	1.0

Slope (%)	Pipe Velocity (m/s)	Q, Pipe (l/s)	Q, Catchment (l/s)	Capacity Check (3% margin of error)
0.74%	0.807	14.26	1.39	OK

Existing Line (877837) - Colebrook White					
Pipe TYPE & ID	Pipe Length (m)	Pipe Diameter (Ø)	Upstream RL (m)	Downstream RL (m)	k, mm
Ex. 150mmØ AC (877837)	19.57	0.150	5.04	4.77	1.0

Slope (%)	Pipe Velocity (m/s)	Q, Pipe (l/s)	Q, Catchment (l/s)	Capacity Check (3% margin of error)
1.38%	1.105	19.52	1.39	OK

JOB NAME:	**14 Edmonton Road, Henderson**		PAGE No:
SECTION:	**WASTEWATER CAPACITY CHECK**		**1.3**
JOB NO:	**149014.33**	DESIGNED:	**JP**
DATE:	**9/04/2025**		

PIPE CAPACITY CALCULATIONS - Proposed

Proposed line - East Catchment - Colebrook White					
Pipe TYPE & ID	Pipe Length (m)	Pipe Diameter (Ø)	Upstream RL (m)	Downstream RL (m)	k, mm
Prop. 225mmØ uPVC WWP-01	41.57	0.225	5.06	4.79	0.6

Slope (%)	Pipe Velocity (m/s)	Q, Pipe (l/s)	Q, Catchment (l/s)	Capacity Check (3% margin of error)
0.65%	1.062	42.24	1.39	OK

Proposed line - East Catchment - Colebrook White					
Pipe TYPE & ID	Pipe Length (m)	Pipe Diameter (Ø)	Upstream RL (m)	Downstream RL (m)	k, mm
Prop. 225mmØ uPVC WWP-02	13.30	0.225	4.78	4.66	0.6

Slope (%)	Pipe Velocity (m/s)	Q, Pipe (l/s)	Q, Catchment (l/s)	Capacity Check (3% margin of error)
0.89%	1.241	49.36	1.39	OK

Proposed line - South Catchment - Colebrook White					
Pipe TYPE & ID	Pipe Length (m)	Pipe Diameter (Ø)	Upstream RL (m)	Downstream RL (m)	k, mm
Prop. 225mmØ uPVC WWP-03	37.70	0.225	4.77	4.66	0.6

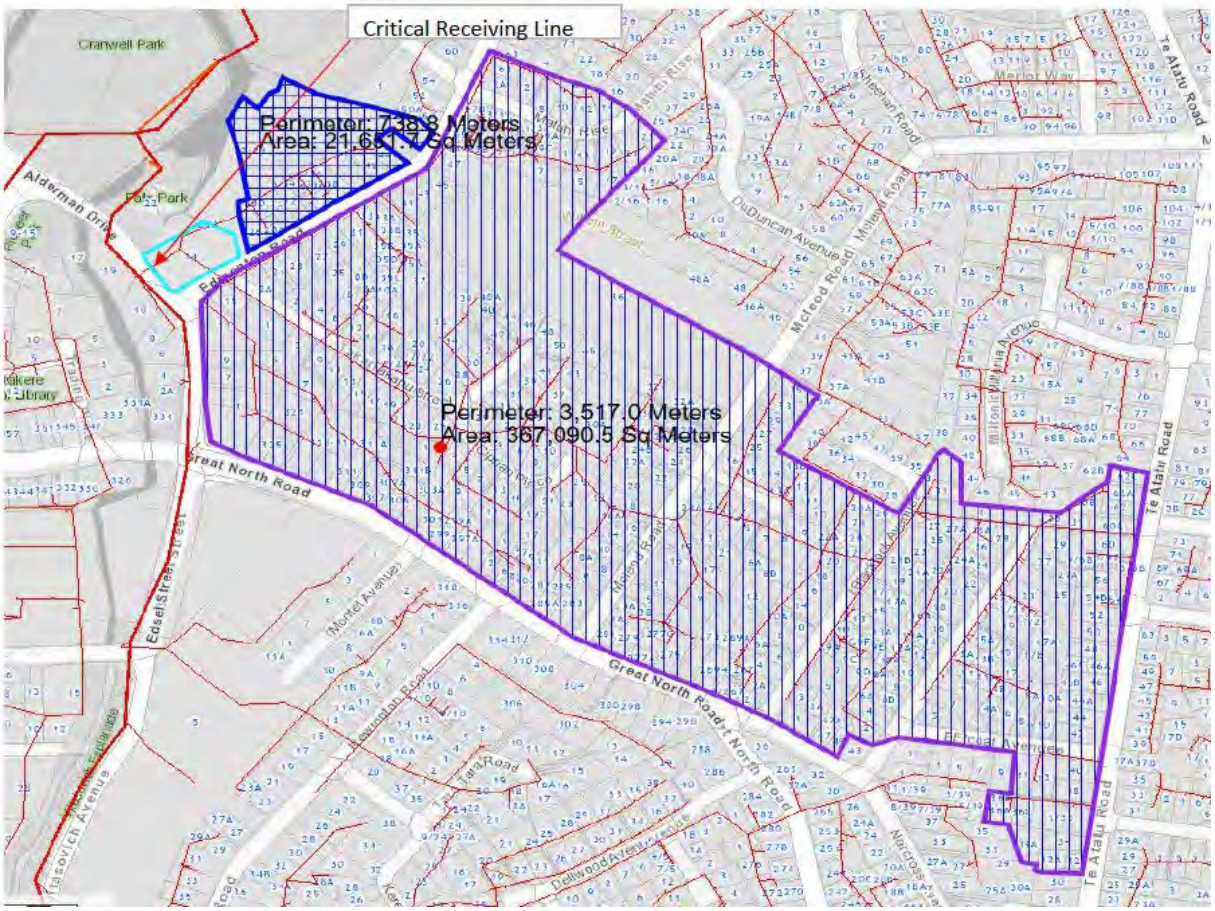
Slope (%)	Pipe Velocity (m/s)	Q, Pipe (l/s)	Q, Catchment (l/s)	Capacity Check (3% margin of error)
0.28%	0.699	27.79	19.21	OK

Proposed line - South Catchment - Colebrook White					
Pipe TYPE & ID	Pipe Length (m)	Pipe Diameter (Ø)	Upstream RL (m)	Downstream RL (m)	k, mm
Prop. 225mmØ uPVC WWP-04	44.57	0.225	4.91	4.78	0.6

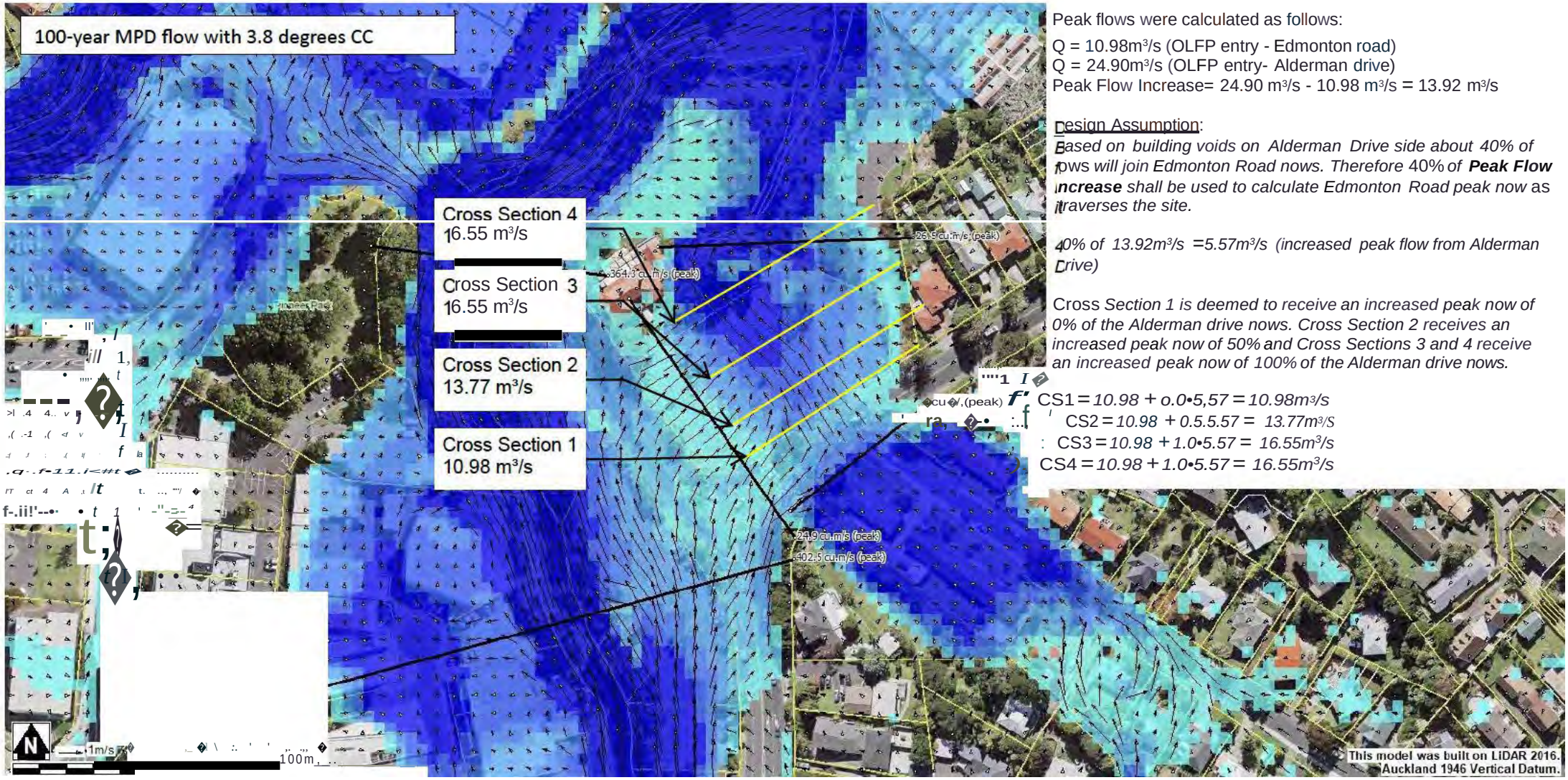
Slope (%)	Pipe Velocity (m/s)	Q, Pipe (l/s)	Q, Catchment (l/s)	Capacity Check (3% margin of error)
0.30%	0.723	28.74	19.21	OK

Holmes	JOB NAME:	14 Edmonton Road, Henderson	PAGE No:
	SECTION:	WASTEWATER CAPACITY CHECK	1.4
	JOB NO:	149014.33	
	DATE:	9/04/2025	DESIGNED: JP

Wastewatert Catchment upstream from Subject Site• Auckland GeoMaps (December 2024)



Appendix C: HydroExpress Sections



Peak flows were calculated as follows:

Q = 10.98m³/s (OLFP entry - Edmonton road)
Q = 24.90m³/s (OLFP entry- Alderman drive)
Peak Flow Increase= 24.90 m³/s - 10.98 m³/s = 13.92 m³/s

Design Assumption:

Based on building voids on Alderman Drive side about 40% of flows will join Edmonton Road flows. Therefore 40% of ***Peak Flow increase*** *shall be used to calculate Edmonton Road peak flow as it traverses the site.*

40% of 13.92m³/s =5.57m³/s (increased peak flow from Alderman Drive)

Cross *Section 1 is deemed to receive an increased peak flow of 0% of the Alderman drive flows. Cross Section 2 receives an increased peak flow of 50% and Cross Sections 3 and 4 receive an increased peak flow of 100% of the Alderman drive flows.*

CS1 = *10.98 + 0.0•5.57 = 10.98m³/s*
CS2 = *10.98 + 0.5.5.57 = 13.77m³/S*
CS3 = *10.98 + 1.0•5.57 = 16.55m³/s*
CS4 = *10.98 + 1.0•5.57 = 16.55m³/s*

Channel Report

Hydraftow Express Extension for Autodesk® Civil 30® by Autodesk, Inc. Monday, Apr 28 2025

Cross Section 1

User-defined

Invert Elev (m)	= 6.7100
Slope(%)	= 1.4000
N-Value	= 0.014

Calculations

Compute by:	Known Q
Known Q (ems)	= 10.9800

Highlighted

Depth (m)	= 0.2530
Q (ems)	= 10.9800
Area (sqm)	= 4.5548
Velodty (mis)	= 2.4106
Wetted Perim (m)	= 28.9350
Crit Depth, Ye (m)	= 0.3688
Top Width (m)	= 27.7266
EGL (m)	= 0.5494

(Sta, El, n)-(Sta, El, n)...

(0.0000, 7 9670)-(1.0410, 8.0170, 0.014)-(1.4400, 8.0520, 0.014)-(1.5820, 7.9320, 0 014)-(4.6250, 7.8780, 0.014)-(7. 3640, 7.8230, 0.014)-(7.3650, 8 0500, 0.0
-(8.3770, 8.0500, 0.014)-(83780, 7.8010, 0.014)-(12.9950, 7.7040, 0.014)-(16.8580, 7.5650, 0.014)-(16.8590, 8.0500, 0.014}-(17.8700, 8.0500, 0014}-(17 871
-(20.0000. 7.4500. 0.014}-(23 9890, 7.3160, o.0·14)-(23.9900, 7.4000, 0.014)-(24.3830, 7.4000, 0.014)-(24.3840, 8.0500, o.0·14)-(25 3950, 8.0500, o 014)-(25.3f
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-(34 8320, 8.0500, 0 014)-(34 8330, 7.4000, 0 014)-(35 2700, 7.4000, 0 014)--(35 2710, 6.7100, 0 0'14)--(39.6360, 6.7250, 0.014)-(45 5100, 6.7440, 0 014)--(45 5
-{45 9070, 7.4000, 0.014)--(45.9080, 8.0500, 0 014)-(46.9190, 8.0500, 0 014)--(46.9200, 7.4000, 0.014)--(472890, 7.4000, 0.014)-(47.2900, 6.7500, 0 014)--(52 9
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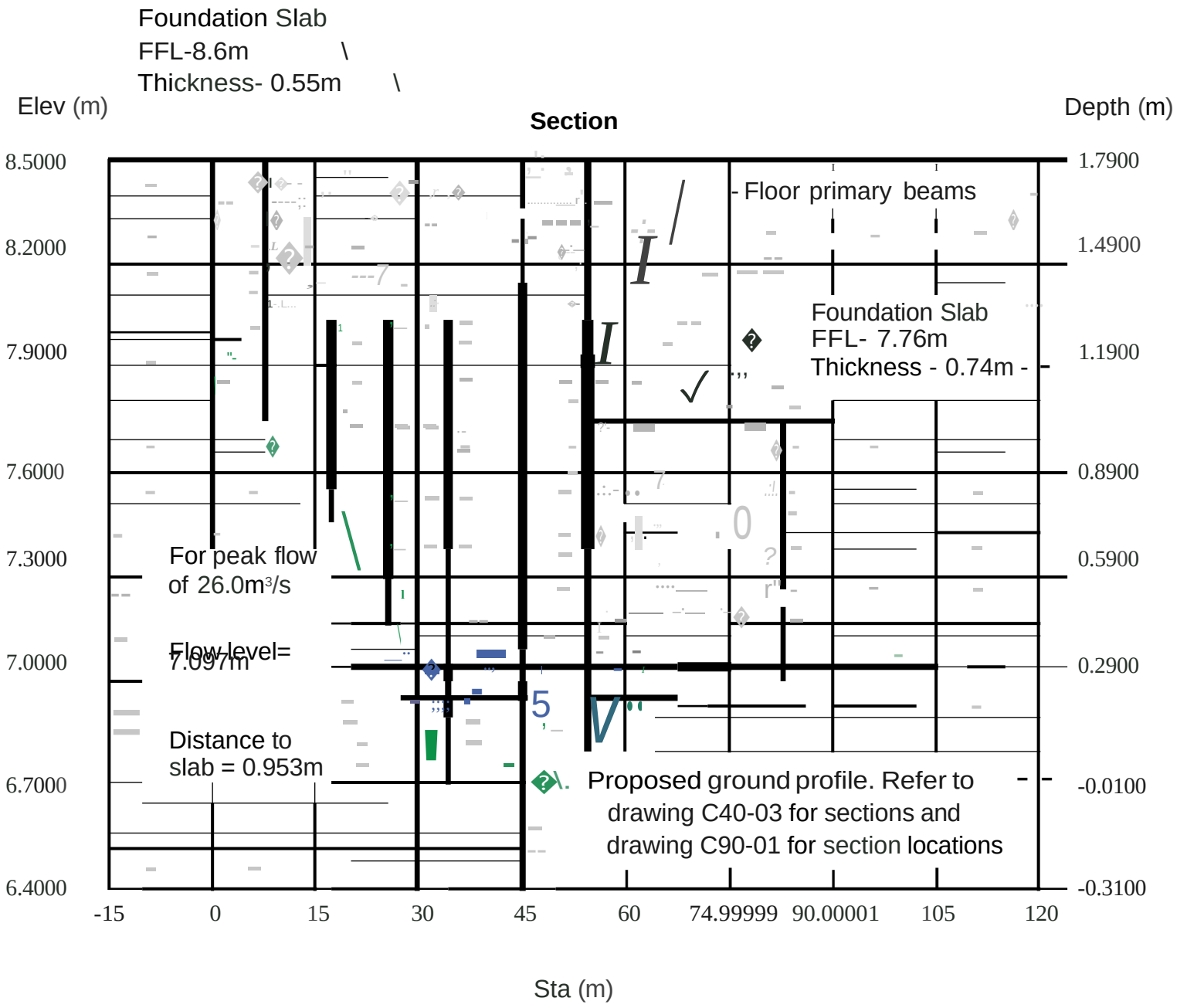


Channel Report

Hydraftow Express Extension for Autodesk® Civil 30® by Autodesk, Inc. Monday, Apr 28 2025

Cross Section 2

User-defined

Invert Elev (m)	= 6.5870
Slope(%)	= 1.4000
N-Value	= 0.014

Calculations

Compute by:	Known Q
Known Q (ems)	= 13.7700

Highlighted

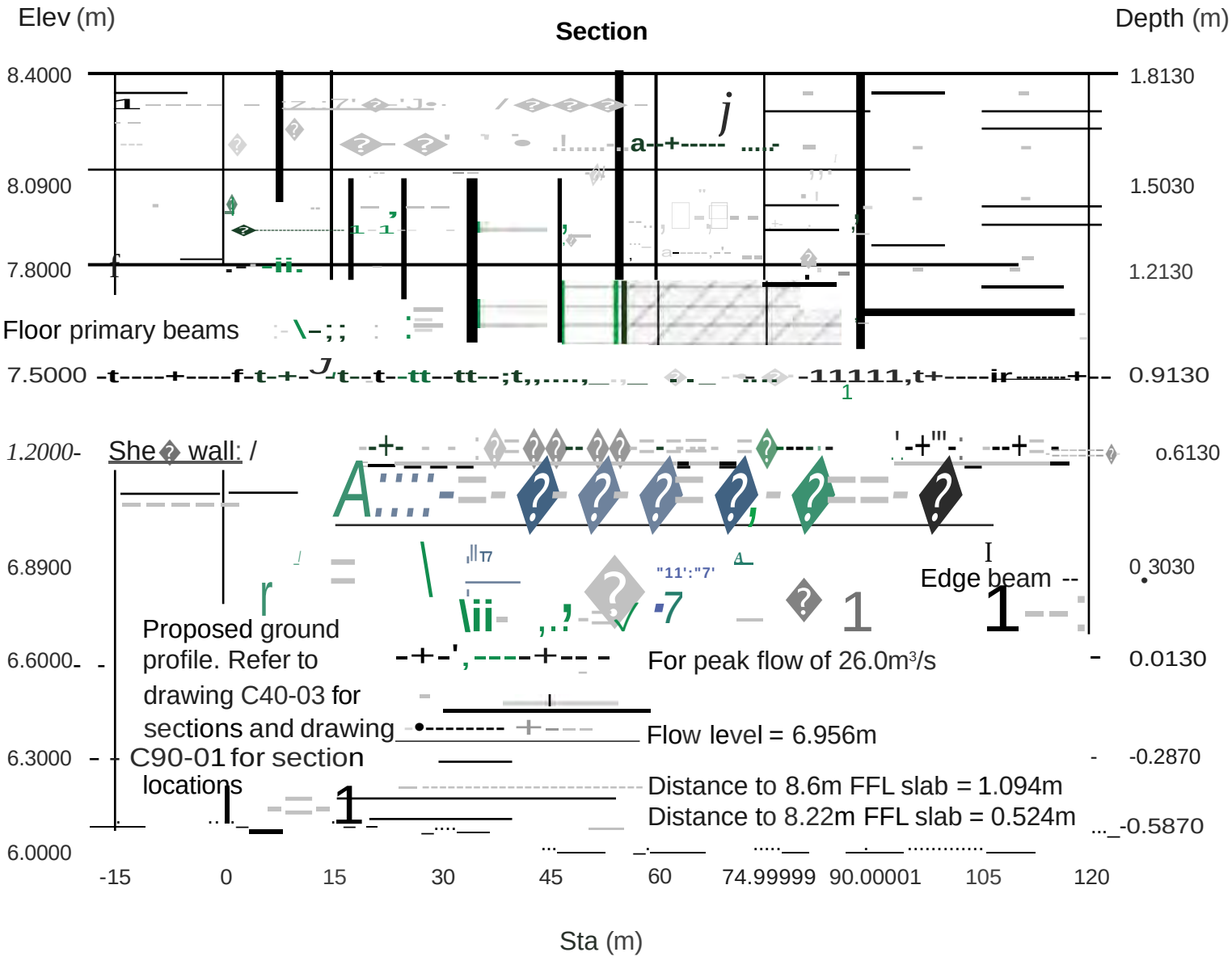
Depth (m)	= 0.2743
Q (ems)	= 13.7700
Area (sqm)	= 5.2762
Velodty (mis)	= 2.6098
Wetted Perim (m)	= 30.6348
Crit Depth, Ye (m)	= 0.3871
Top Width (m)	= 30.0329
EGL (m)	= 0.6217

(Sta, El, n)-(Sta, El, n)...

(0.0000, 7 9930)-(1.7030, 8.0210, 0.014)-(2 0220, 7.8940, 0.014)-(5.0000, 7.8600, 0.014)-(7.6010, 7.8560, 0.014)-(7.6020, 8.0500, 0.014)-(8.6130, 8.0500, 0.0 -(8.6140, 7.8540, 0.014)-('10.0000, 7.8240, 0.014)-(14.4380, 7.6400, 0.014}--(17.6090, 7.5080, 0014)-(17.6100, 8.0500, 0.014)-(25:1230, 8.0500, 0.014)-(25.12 -(29 1040, 6.9620, 0.014}--(32.1"180, 6.6730, o.0·14}(34.0930, 6.5930, o.014)-(34 0940, 6.6500, o.014}--(35.0930, 6.6500, o.0·14)-(35.0940, 6.5870, o 014)-(38.8C -{41 4130, 6.5990, 0.014}--(42.8720, 6.6000, 0.014)-(42.8730, 6.6500, 0.014}--(46.6210, 6.6500, 0.014)-(46.6220, 8.0500, 0.014)-(54.1370, 8.0500, 0 014}--{54 ·1: -(556610, 6.6500, 0 014}--{60 0000, 6.7280, 0 014)-(63 0920, 6]870, 0 014}--(72.7100, 6.9420. 0 014)-(76.0770, 6.9940, 0.014)-(83.7460, 7 0610, 0 014}--{83 8f -(86 8180, 7.0170, 0 014}--{88 8460, 7.6500, 0 014)

Foundation Slab
FFL- 8.6m
Thickness - 0.55m

Foundation Slab
FFL - 8.22m
Thickness - 0.74m



Channel Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Thursday, Apr 24 2025

Cross Section 3

User-defined

Invert Elev (m)	= 6.3630
Slope(%)	= 1.4000
N-Value	= 0.014

Calculations

Compute by:	Known Q
Known Q (ems)	= 16.5500

Highlighted

Depth (m)	= 0.3292
Q (ems)	= 16.5500
Area (sqm)	= 6.3243
Velocity (mis)	= 2.6169
Wetted Perim (m)	= 37.3199
Crit Depth, Ye (m)	= 0.4420
Top Width (m)	= 36.1757
EGL (m)	= 0.6785

(Sta, El, n)-(Sta, El, n)...

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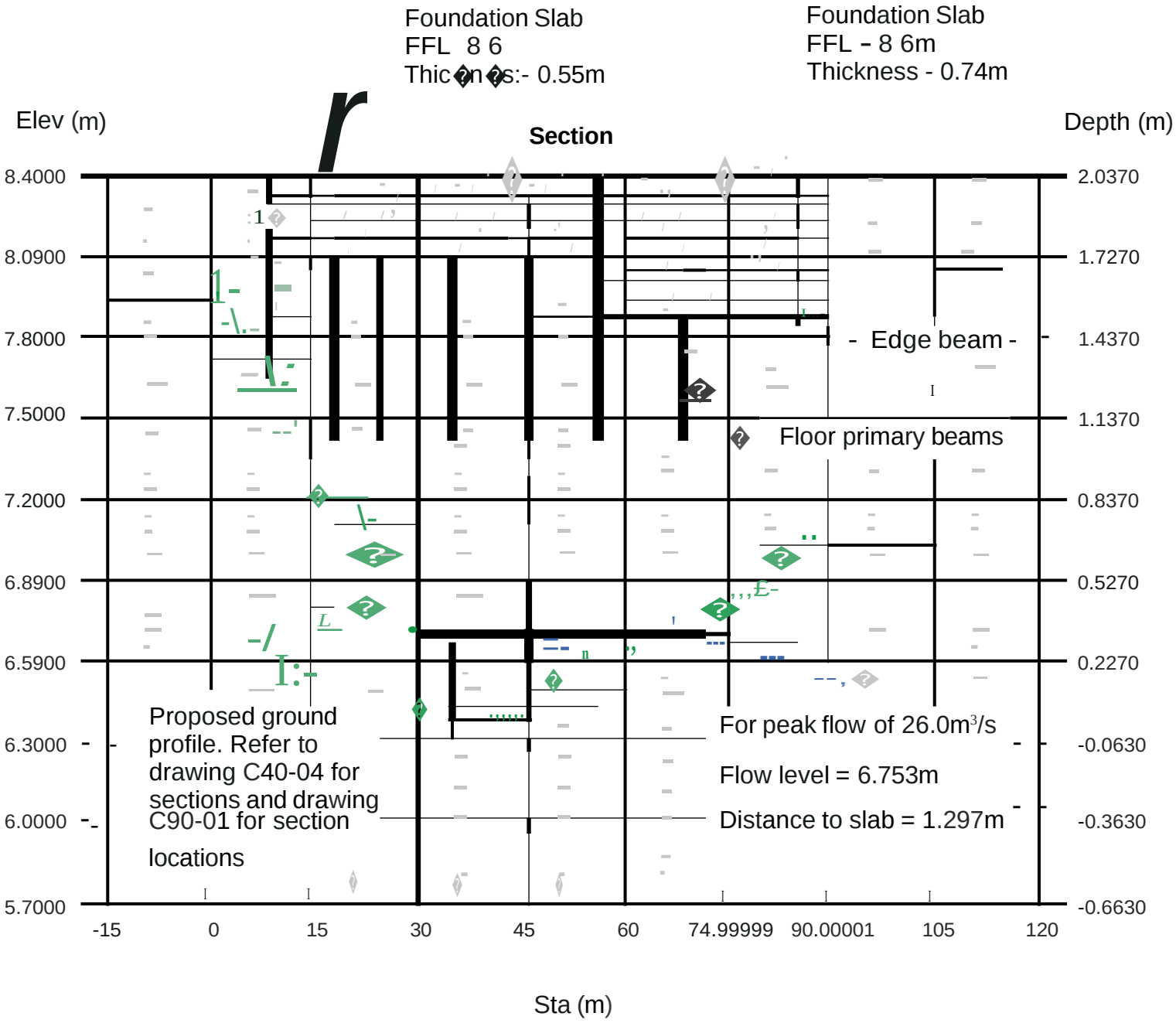

Channel Report

Hydraftow Express Extension for Autodesk® Civil 30® by Autodesk, Inc. Thursday, Apr 24 2025

Cross Section 4

User-defined

Invert Elev (m)	= 6.1900
Slope(%)	= 1.4000
N-Value	= 0.013

Calculations

Compute by:	Known Q
Known Q (ems)	= 16.5500

Highlighted

Depth (m)	= 0.3353
Q (ems)	= 16.5500
Area (sqm)	= 5.4484
Velodty (mis)	= 3.0375
Wetted Perim (m)	= 26.0929
Crit Depth, Ye (m)	= 0.4846
Top Width (m)	= 24.8543
EGL (m)	= 0.8059

(Sta, El, n)-(Sta, El, n)...

(0.0000, 7 8100)-(3.7340, 7.9800, 0.014)-(3.8530, 7.8640, 0.014)-(9.6550, 7.6910, 0.014)-(9.6560, 8.0500. 0.014)-(10.6670, 8.0500, 0 014)-(106680, 7.6490, C
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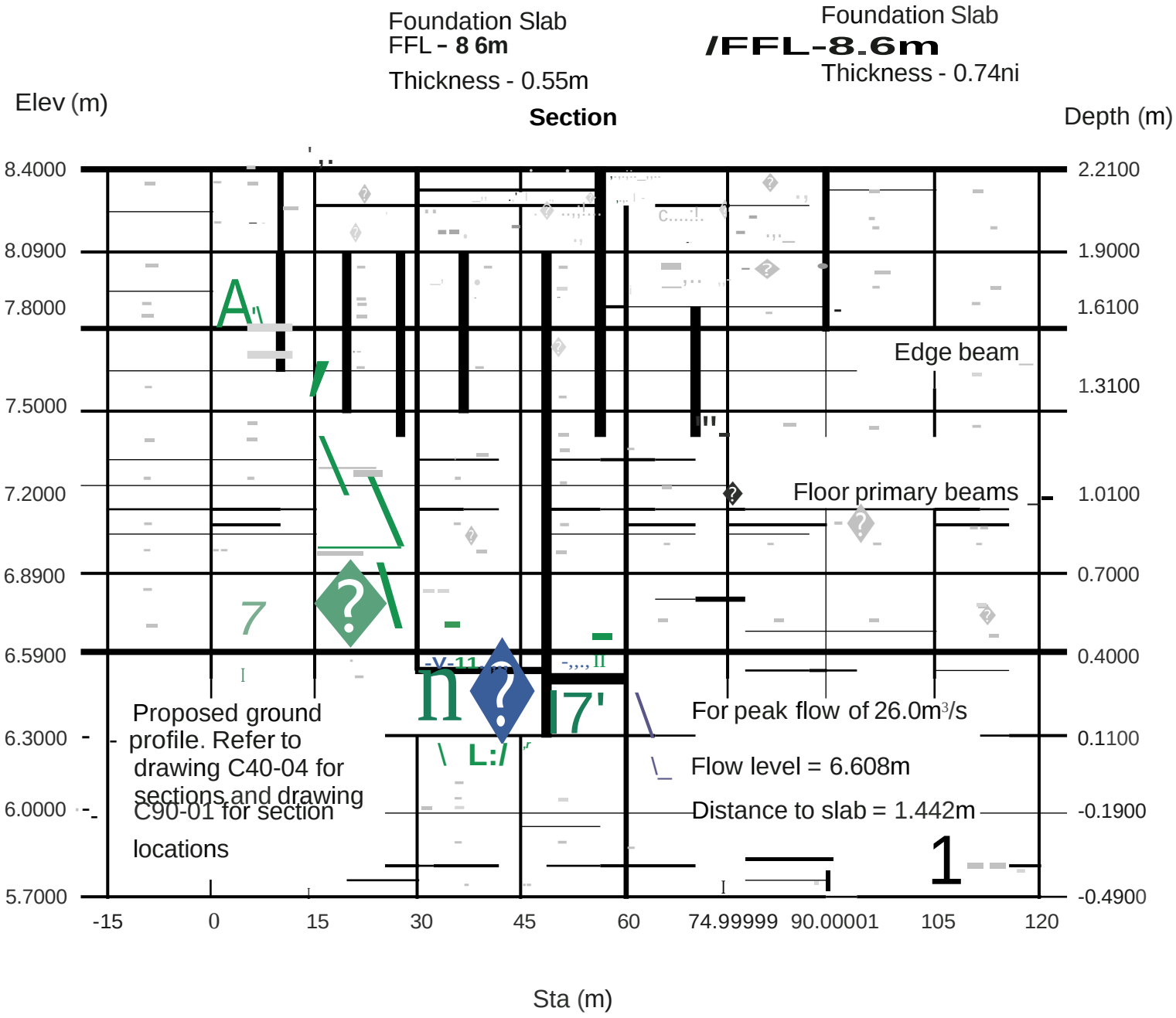


Appendix D: 2022 Flood Data by Healthy Waters

AUCKLAND COUNCIL HEALTHY WATERS

RESPONSE TO REQUEST FOR FLOODING INFORMATION

Ref: **8704080434**

Requestor details		Business Name	Email
	[redacted]	Holmes	[redacted]

Site Address	Catchment / Model
14 Edmonton Road, Henderson	Regionwide Rural Rapid Flood Model 2022 Unit D

INFORMATION TO APPLICANT

This Document provides current information held by Auckland Council relating to predicted flooding levels and extent within the catchment that includes the property noted above.

The information is extracted from a catchment wide modelling study. The study does not consider effects of built structures or potential blockage of piped infrastructure and should not be assumed to be a detailed representation of potential flooding impact that will occur within a particular **site.**

Disclaimer

Auckland Council gives no warranty as to the accuracy and completeness of any information given and accepts no liability for any error, omission or use of the information. The information provided does not preclude the need for an appropriate site-specific assessment and cannot be construed as endorsement, or approval, by Auckland Council. of any development

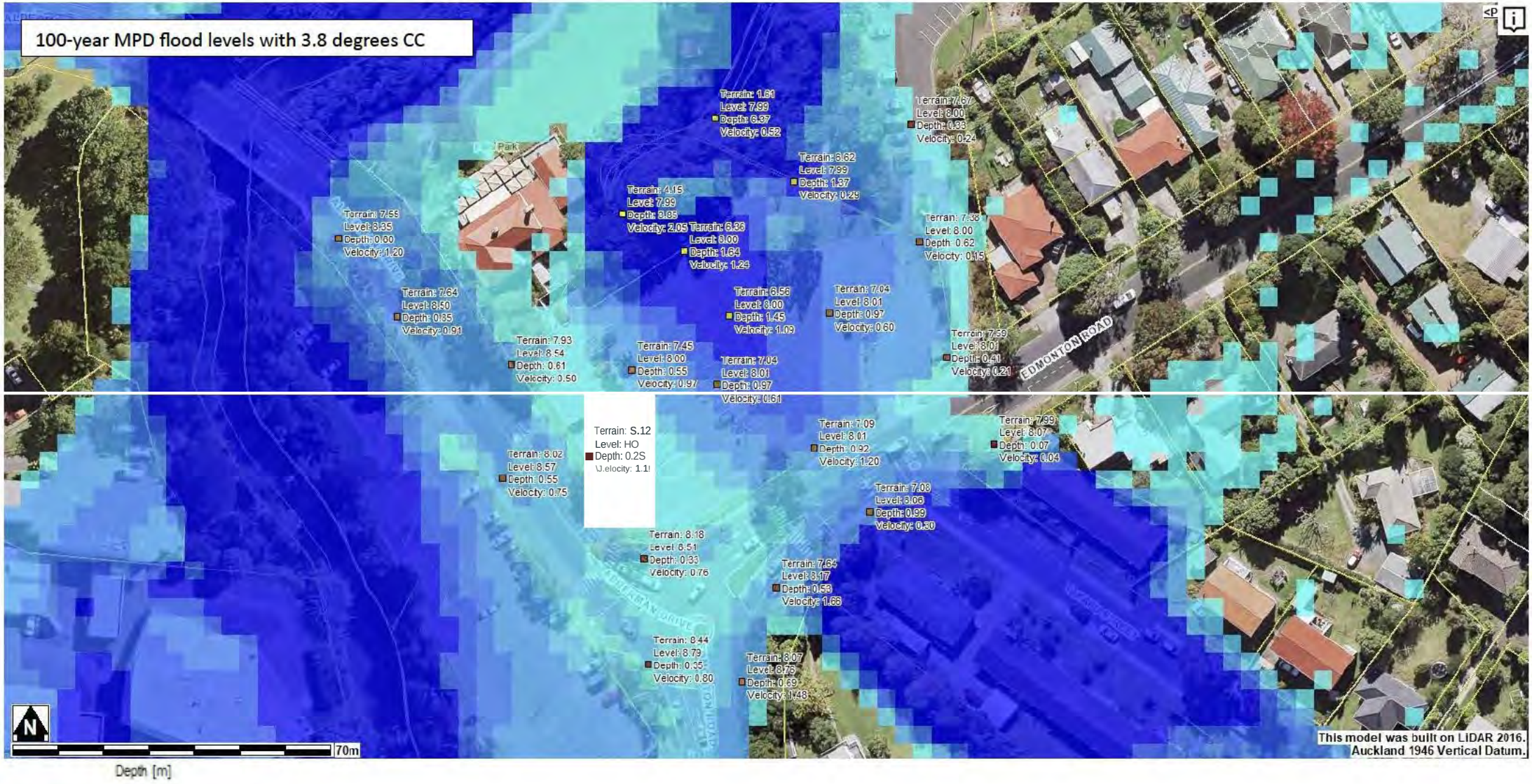
Special information requirements Auckland Unitary Plan Chapter E36 Section E36.9.2

A hazard risk assessment must be undertaken when subdivision, use or development requiring resource consent is proposed to be undertaken on land which may be subject to the 1 per cent annual exceedance probability (AEP) floodplain or overland flow paths.

A hazard risk assessment report must accompany a resource consent application for the subdivision, use or development referenced above. The flooding hazard risk should be assessed for all rainfall event frequencies where flooding of the site occurs.

FLOODING INFORMATION

	1% AEP Flooding Information	
Overland Flow: Q_{max}	402^{-5} **m_3/sec**	Please refer to the attached figures for flow rates and velocities for the 1% AEP event.
Maximum Flooding Leve	**RL 8.54 (AUK1946)**	Refer to the attached figure for a variety of flood levels and depths for the 1% AEP event across the wider site area. Note that the site is near a flood prone area.


100-year MPD flood levels with 3.8 degrees CC
Park
EDMONTON ROAD
Terrain: 7.55
Level: 8.35
Depth: 0.80
Velocity: 1.20
Terrain: 7.64
Level: 8.50
Depth: 0.85
Velocity: 0.91
Terrain: 7.93
Level: 8.54
Depth: 0.61
Velocity: 0.50
Terrain: 7.45
Level: 8.00
Depth: 0.55
Velocity: 0.97
Terrain: 7.04
Level: 8.01
Depth: 0.97
Velocity: 0.61
Terrain: 1.61
Level: 7.99
Depth: 6.37
Velocity: 0.52
Terrain: 4.15
Level: 7.99
Depth: 3.85
Velocity: 2.05
Terrain: 6.36
Level: 8.00
Depth: 1.64
Velocity: 1.24
Terrain: 6.62
Level: 7.99
Depth: 1.37
Velocity: 0.29
Terrain: 6.56
Level: 8.00
Depth: 1.45
Velocity: 1.09
Terrain: 7.04
Level: 8.01
Depth: 0.97
Velocity: 0.60
Terrain: 7.67
Level: 8.00
Depth: 0.33
Velocity: 0.24
Terrain: 7.38
Level: 8.00
Depth: 0.62
Velocity: 0.15
Terrain: 7.59
Level: 8.01
Depth: 0.41
Velocity: 0.21
Terrain: 8.02
Level: 8.57
Depth: 0.55
Velocity: 0.75
Terrain: S.12
Level: HO
Depth: 0.2S
Velocity: 1.1!
Terrain: 8.18
Level: 8.51
Depth: 0.33
Velocity: 0.76
Terrain: 8.44
Level: 8.79
Depth: 0.35
Velocity: 0.80
Terrain: 7.09
Level: 8.01
Depth: 0.92
Velocity: 1.20
Terrain: 7.99
Level: 8.07
Depth: 0.07
Velocity: 0.04
Terrain: 7.08
Level: 8.06
Depth: 0.99
Velocity: 0.30
Terrain: 7.64
Level: 8.17
Depth: 0.53
Velocity: 1.66
Terrain: 8.07
Level: 8.76
Depth: 0.69
Velocity: 1.48
N
70m
This model was built on LIDAR 2016.
Auckland 1946 Vertical Datum.
Depth [m]
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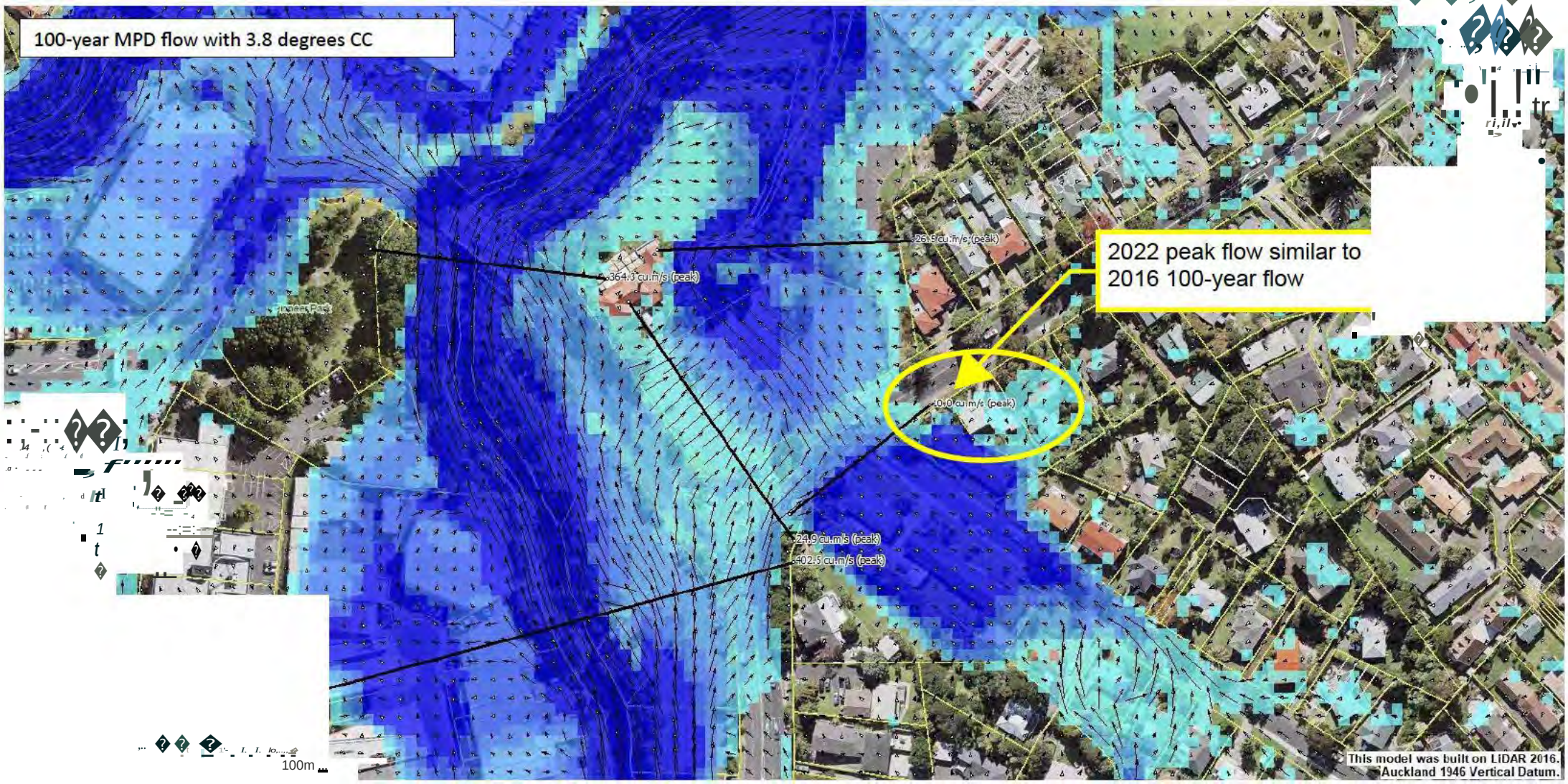
100-year MPD flow with 3.8 degrees CC
2022 peak flow similar to 2016 100-year flow
364.3 cu.m/s (peak)
26.5 cu.m/s (peak)
10.0 cu.m/s (peak)
24.9 cu.m/s (peak)
402.5 cu.m/s (peak)
100m
This model was built on LiDAR 2016. Auckland 1946 Vertical Datum.

Flood prone area information for 100-year MPD with 2.1 degrees CC

Info Legend Resulls

Flood Prone Area

Attribute	Value
Flood prone area ID	30502357
Can fill in a 10Oyr ARI rainfarl event	Yes
Catchment Area (m2)	264572
Minimum elevation (m RLAUK1946)	3.88
Minimum elevation (m RL NZV02016)	36
Spill elevation (m RL AUK1946)	7.58
Spill elevation (m RL NZVD2016)	7.3
Spill ponding dep1h(m)	3.7
Volume to spill elevation (m3)	6543
Rainfall required lo fill flood prone area (mm)	49
Raintarl depth 1OOyr ARI future scenario (mm)	234
Flood prone elevation in 100yr ARI event (m RL)	Spills - specific calculation is required
Flood prone elevation in 100yr ARI event (m RL NZVD_2016)	Spills - specific calculation is required
Flood prone depth in 100yr ARI event (m)	Spills - specific calculation is required
Flood prone volume stored in 100yr ARI event (m3)	Spills- specific calculation is required

Appendix E: E36 Risk Hazard Assessment

AUP Chapter E36.9 Flood Hazard Risk Assessment Report

Prepared by (company name) Holmes NZ LP - Jéan Petherbridge

Site Address: 14 Edmonton Road, Henderson

Application No: BRF-6251

Select level of assessed risk from drop down list attached to each cell below

(a) The frequency, duration and scale of the flooding hazard;		
State If the site being developed will be impacted by flooding in more frequent events than 1 % AEP. *If assessment is for overland flow, determine trigger event as well as 1% AEP scenario.* *An assessment of the duration of the flooding hazard for the 1 % AEP event should be made supported with a study of the hydrology of the contributing sub catchments* that is appropriate for the scale of the risk.* *Describe extent of flooding on site along with discharge rates, depths and velocities at critical points on the developed site.*	As indicated on Auckland Council GeoMaps, the subject site is shown to be located within the 1% AEP Oratia Catchment. Council records show the presence of a major overland flow path that originates from Blacklock Avenue, and flowing the same alignment as the permanent stream, enters the natural stream overland near 2 Ciprian Place. The flow path then follows this alignment along Takapu Street and enters the site from the southern boundary. The overland flow path then flows across the site and discharges into Oratia Stream located within Falls Park. The Flood model information on Auckland GeoMaps is from 2016, a request for later additional information was requested by Holmes. Healthy Waters provided 2022 flood data that accounts for the larger rain events that has recently been experienced within the Auckland Region, specifically in response to the 2023 Anniversary Day Flood event. The major overland flow path is triggered when the 1500mmØ culvert (running underneath Edmonton Road) is 100% blocked or full. Water within the permanent stream builds up, flows across Edmonton Road and will overtop the kerb into the subject site at a calculated flow rate of 10.86m^3/s. The overland flow path is also fed by run-off coming across from Alderman Drive. This is due to the Oratia Stream also overtopping its backs during the 1% AEP event. HEC-RAS 2 Flood modelling of the 2022 Data completed by ACH (June 2025) has verified the trigger events and also the overall extent of the overland flow path. Relevant sections of their report have been outlined in section 5.3 of the Civil Engineering report by Holmes NZ LP (Reference 149014.33. Rev. 2.4, July 2025). The ACH model and report, including the desktop study completed by Holmes, shows that in a 1% AEP event the depth of the overland flow and associated flooding, ranges from 0.05m to 0.5m depth along the western boundary of the subject site (within the Alderman Drive Carriageway). Flood depths of 0.3 to 1.5m and across the site, west to east, was also confirmed by the ACH HEC-RAS model. Based on the model data, the duration of the storm was set at 30 hours, with no dissipation of flood waters noted. It is assumed that the flood waters would receded well beyond this point (48-60 hours) as the volume and flow rate is substantial. A review of the stormwater network and the site has shown that the subject site is situated where the Oratia Stream converges with itself and Falls Park. The topography of the existing site, including upstream catchment indicates that the overland flow path follows the same alignment as the permanent natural stream. GIS shows the presence of several flood plain zones which initially aid but will overtop and discharge water well beyond the stormwater duration into the subject site. Based on the above assessment and resultant of the flood model, verifying Healthy Waters 2022 Data, the risk to the site from a 1% AEP flood event is significant without any mitigation measures in place.	**significant**

(b) the type of activity being undertaken and its vulnerability to flooding events;		
Identify the activity or activities incorporated in the proposed development as listed in table E36.4.1. Described the vulnerability (exposure) of the activity or activities to the flood events determined by the investigation into the flooding hazards impacting the site described in E36.9(a). This should include whether the building footprint , any vehicle parking area and means of egress are within the flooding extent	The proposed development, a future justice facility as indicated on the proposed Architectural Concept Design Plans, is shown to cover a majority of the subject site with an building footprint of approximately 3,337m^2. This does place it wholly within the 1% AEP overland flow path and associated flooding extent. Assessing the proposed future justice facility against the activities set out in Table E36.4.1, confirmed that the subject site is not located within a coastal erosion area; a coastal storm inundation 1%AEP area; A coastal hazard area, a 1% AEP zone or land which may be subject to instability. It has confirmed that the development is located in, and does have activities in, the 1% AEP flood plain and a 1% AEP overland flow path extent. A review of the activities (A23) to (A42) shows that the proposed activity would be classed as Restricted Discretionary and therefore requires additional assessment against E36.6.1.7 and E36.3.1.9. It must be noted that that under the Auckland Council Stomrwater Code of practice, the future justice facilitydoes meet the criteria for 'less than veulnerable' activity. **Assessment against E36.6.1.7 which states:** **(1) Surface parking areas and vehicle entry and exit points to above ground parking areas in the 1 per cent annual exceedance probability (AEP) floodplain must be located where the depth of flood waters in a 1 per cent annual exceedance probability (AEP) event does not exceed 200mm above ground level.** To mitigate displacement of overland flow and flood waters, the proposed future justice facility is situated on a suspended slab that is above placed the top of the flood waters. Vehicle access to the site is restricted to security/police and judicial staff and will access the building off Edmonton Road via an access ramp. The access ramp is secure and will not be able to be accessed by the public. All vehicles within the carparking area will be a minimum of 500mm over the flood and overland flow path water level. Thus this meets the requirement set out against E36.6.1.7. **Assessment against E36.6.1. which states:** **(1) The structure or building is to be located where the depth of flood waters in a 1 per cent annual exceedance probability (AEP) event does not exceed 300mm above ground level.** As stated in Section E36.9(a), the depth of flood waters ranges between 0.3m and 1.5m across the site, the location of the future justice facility does not comply with E36.6.1.9 as the depth of the flooding water exceeds the 300mm maximum depth. The activity is therefore considered as Restricted Discretionary. Based on the review of the proposed future justice facility, the risk to any vehicles within the internal carparking spaces is low. All vehicles are situated well above the flood and overland flow path levels. The access ramp is secure with no public access available. All vehicles within the road and within the public realm are not subjec to the assessment of this development. The depth of flood waters are above 300mm, but the proposed justice facility is suspended a minimum of 500mm above the top of the flood and overland flow water, thus ensuring safety of all occupants within the building. Overall, the risk to the development in terms of E36.4.1 is considered Low.	**low**
(c) the consequences of a flooding event in relation to the proposed activity and the people likely to be involved in that activity;		
Identify the impacts on the proposed activity during a flood event e.g. if the building footprint is fully or partially within the flooded area what level will the flooding reach in respect to the living areas and other components of the dwelling. If egress from the building will be flooded . . to what depth and for what period of time. Identify any potential for damage to, or deterioration of, the structural and functional integrity of the building resulting from the intensity and or frequency of flooding.	As noted in section E36.9(a) and E36.9(b), the depth of flood waters during the 1% AEP event ranges from 0.3m to 1.5m in depth across the site. The future justice facility extent is fully located within the 1%AEP flood and overland flow path extent. To mitigate any adverse effects on the neighbouring properties, the proposed facility is to be situated on a suspended foundation slab that will provide a minimum freeboard of 500mm above the flood and overland flow path water level. To ensure public access to the underside of the foundation slap is restricted, a series of automated flood barriers (gates) will be placed along the building perimeter. All vehicle access into the building will be restricted to security, police and judicial staff with no public access allowed other than in the front entrance of the building. A grated flood barrier will allow water to pass under normal conditions, and when water exceeds approximately 200mm, it will open to allow unrestricted water flow beneath the building, preventing displacement impacts on neighbouring properties. However, as this is still at concept stage, it is proposed that this should form the basis of design consideration for the design team. The construction of the proposed building is to be concrete and materials that are not affected by water. the Structural integrity of the building (which is founded on large piles) will not be compromised by the flood waters, nor the concrete beams which make up the suspended concrete slab. Based on this assessment, the risk to the occupants, vehicles and structural integrity of the building from flooding is considered Low.	**low**

(d) The potential effects on public safety and on other property;		
Describe effects on public safety if the activity will include public use. Identify any potential flooding of upstream or downstream properties that may be affected by the proposed activity. Where there are buildings on adjoining properties that are within the flood plain a detailed assessment should be undertaken of the consequences of any change in flood levels.	The subject site is situated next to Falls Park and opposite a Bistro (which is historically significant). it is our understanding that any public access to these areas will be restricted with no throughfare being allowed for security purposes. The proposed activity, being a future justice facility, will be mainly used for judicial activities and thus public access will be restricted as such. Pedestrian access is restricted to the public footpaths outside of the subject site. As the proposed development will be situated on a suspended slab, and ACH modelling confirmed the impact of the development will only have a minor increase to overall displacement, and that the proposed development has adequate provision in terms of freeboard, the overall risk to the public is Low. It is also considered that the overall impact to public safety and neighbouring properties is Low. Based on this assessment, the risk to public safety associated with this development is Low and that item E36.9(d) is therefore not entirely applicable. Futhermore, the management of public safety will be managed through a flood managment plan, which will include measures and protocols for pre-flooding, during flooding and post flooding, which further leads to reduce overall risk to Low.	**low**
(e) Any exacerbation of an existing flooding hazard risks or creation of a new flooding hazard risk;		
Describe results of investigation into any potential effects on other property if the activity results in diversion of flood flow or overland flow. Identify any new activity that results in an increase to the number of people exposed to an existing flood risk.	To manage and mitigate any possible adverse effects on the neighbouring properties, the future justice facility is proposed to be placed upon a suspended concrete slab. This will allow any flood waters to easily move underneath the building (and around the piles) unobstructed and be in keeping (as much as practically possible) with the existing situation. As part of the assessment, ACH has compiled a pre- and post development model to determine the overall impact of the development. The assessment determined that largely the depths and extent of the 1% AEP event were relatively the same, with the Bistro being above any flood waters (in keeping with existing situation) and the Korean Church building and its carpark area not being impacted by the future justice facility. Flood depths modelled are in keeping with existing expected depths (330mm). The assessment did note that the extent of flood waters across the accessway for the Korean Church was impacted as the flood depth increased by 110mm. To affectively mitigate this increase and prolong time to allow for safe egress of vehicles, a channel and bund along the eastern boundary is proposed (see ACH report) which will divert flood waters along the boundary and towards Oratia Stream. The building in this southeastern corner has also been reduced to enable an increase in flood water storage. It is therefore considered that the overall impact of the proposed future justice facility has not exacerbated the flooding situation due to the mitigation measures proposed. This has been designed to actively manage and mitigate any potential adverse effects on the neighbouring properties and also has kept the number of exposed people the same. Based on this assessment the risk to the subject site is considered Low.	**low**
(f) Whether any building, structure or activity located on land subject to natural hazards near the coast can be relocated in the event of severe coastal erosion, coastal storm inundation or shoreline retreat;		
Describe results of investigation into any potential effects on other property if the activity is located within a natural hazard such as a 1% AEP inundation that is near the coast and what measures can be taken to manage any potential adverse affects these events	The proposed development is not located near the coast and is not at risk of being inundated by coastal flooding, therefore no further assessment against this activity category is required. The risk to the proposed future justice system of coastal inundation is considered nil and thus considered as Low.	**low**

(g)	The ability to use of non-structural solutions, such as planting or the retention or enhancement of natural landform buffers to avoid, remedy or mitigate the hazard, rather than hard engineering solutions or protection structures;		
Describe results of investigation into any potential on-structural solutions that can manage or mitigate flooding within the site forma 1% AEP event.	Due to the wide scale of the flooding associated with the major overland flow path, the use of non-structural solutions such as planting is not a practical solution to mitigate the inundation of the subject site with flood waters. The proposed solution of suspending the entire building to allow for a open foundation is considered the best practical solution. To aid in the mitigation of flood water depths increasing in front of the neighbouring vehicle accessway (that provides access to the Korean Church), a grass bund along with a channel is proposed to create additional storage within the site. This will prolong the time period of flood waters within the subject site, thus providing extra time for the occupants of the church to safely egress the site during a heavy rain event. It is noted that the depth of flooding modelled in the church carpark currently is 330mm and the construction of the future justice facility bears no impact on the depths as shown in the ACH post-development model. In terms of changes to the natural landform, it is proposed that a centralised 5m wide shallow channel is formed and will run the length of the building. This channel will direct flood waters during the initial stages of a heavy rain event along a similar alignment as the existing flow path and discharge run-off towards the existing overland flow path exit point. The inclusion of this channel also provides additional capacity within the site to cater for any lost capacity due to the presence of the foundation piles. Based on the above assessment and considering the region wide scale of the flooding along with the limited ability to avoid the hazard, but rather manage the flooding (with limited affect), the overall risk to the property is considered Medium.		**medium**
(h)	The design and construction of buildings and structures to mitigate the effects of flooding		
Describe how the potential flooding effects identified above, determined by investigation and described in detail in a flooding report, will be mitigated by the design and materials of the building.	As described in the above sections, the FFL of the future justice facility is situated on a suspended concrete foundation that is placed 580mm above the flood and overland flow path water level. Being an open foundation, any flood and overland flow path water will run unobstructed underneath the building, thus mitigating and actively managing any adverse effects that may have been caused by displacement of flood waters. All surfaces of the future justice facility that will come into direct contact with flood waters will be constructed of impervious materials (reinforced concrete) that will not be subject to rot or become unstable due to flooding. Concrete cover will be designed specifically with this durability requirement in mind. All materials that are situated above the flood waters will be in accordance with the NZ Building Code and be suitable for their application. No electrical outlets or hazardous materials will be placed in areas that could come into contact with flood waters. These will be a minimum of 580mm above the minimum FFL of the ground floor as an additional mitigation measure. Any and all proposed hardstand areas not on the suspended slab will be constructed at or near grade to not increase effects, as minor as it is, of displacement. Based on the above assessment, the proposed material for the future justice facility is in line with durability requirements of the building code and all materials will be suitable for their intended application. Therefore the overall risk in terms of design and construction of the justice facility is Low.		**low**

(l) The effect of structures used to mitigate hazards on landscape values and public access;		
Describe how the use of structures to mitigate flooding on the site will impact the landscaping values of the site and its impact on the surrounding area.	The site is set to be used as a judicial facility and therefore public access is restricted to specific points within the facility. Due to the extent of the building footprint, landscaping will be restricted to the berm and will not be impacted by the construction of the proposed building post development. Considering proposed use of the site no further assessment of this activity is required and overall risk is set as Low. It is proposed that the area underneath the building be left open to allow for persons who might be underneath the building in a flood event to move freely towards the perimeter fencing to the north of the	**low**
(j) Site layout and management to avoid or mitigate the adverse effects of flooding hazard, including access and exit during a flooding event;		
Describe how the potential flooding effects identified above, including any effects on upstream and downstream properties, determined by investigation and described in detail in a flooding report, will be mitigated by the design form of any structures and site works. Describe measures proposed to provide safe egress from property.	As described in the above sections, the FFL of the future justice facility is situated on a suspended concrete foundation that is placed 580mm above the flood and overland flow path water level. Being an open foundation, any flood and overland flow path water will run unobstructed underneath the building, thus mitigating and actively managing any adverse effects that may have been caused by displacement of flood waters. In additional to the open foundation, it has been identified that additional measures should be in place to alert building occupants of a possible flooding event and to provide as much time as possible to safely exit the site and move to higher ground as required. These measure are in the form of visual flood depth marks placed at strategic areas to show depth and extent of flood waters, high rain alerts and monitoring alarms which monitor stream levels of the Oratia Stream on Alderman Drive and Takapu Street. All building services to be located outside of the flood prone area where practically possible as this will improve the resilience of building post event. It is recommended that a Flood Management Plan be adopted which outlines exit procedures for the development. Based on the assessment and the measures adopted in the design and layout of the building, along with the proposed measures that have minimised the overall risk to the building, and neighbouring properties, the risk can be considered Low. However due to the extent of the Flooding and the requirements for a Flood Management Plan, the risk should be classified as a Medium as it will require constant monitoring.	**medium**
(k) The duration of consent and how this may limit the exposure for more or less vulnerable activities to the effects of natural hazards including the effects of climate change;		
Describe whether the consent is permanent or has a limited duration (10, 20 or 35 years) and identify any increase in Risk of evolving natural hazard risk such as climate change.	The consenting period for this development is expected to be permanent as the development is set to be a Judicial Facility that serves the Henderson Area. The design considerations of the building (its design, layout, use of materials) have already considered increased risk of flooding associated with the 3.8 degree climate change over the next 100 years. Due to its location, the site is not subject to increased risk as a result of sea level rise or erosion from coastal inundation. It is however likely that monitoring of the stream banks along the Oratia Stream will be required, and this may require remediation as storm intensities increase over the next few years, however the risk to the future justice facility is considered low due to the fact the building is founded on deep concrete piles. The mitigation measures outlined above (suspended foundation, 5m wide central channel and associated barriers) will provide adequate protection to the structure and its occupancy through the foreseeable climate scenario. The risk to the structure over the prolonged consent period is Low.	**low**
(l) Any measures and/ or plans proposed to mitigate the flooding hazard or the effects of the flooding hazard.		
Describe any other measures to mitigate the flooding hazard which can include information about future works planned by Auckland Council in the wider catchment that will reduce the flooding risk. *Include any other measures to mitigate effects that are not described above.*	No information has been provided to Holmes NZ LP which indicates any future works by Auckland Council to mitigate any future flooding with the local area. The flooding that impacts the subject site and the surrounding properties is noted to be a large scale and covers a large part of the surrounding area. Possible mitigation works in the form of construction of grass bunds along the road frontage boundaries of the subject site to enable to diversion of flood waters from Alderman Drive could possible decrease the overland flow path extent and depth but it will not prevent the site from flooding. Additional capacity with the public network, such as an additional 1500mmØ culvert or the height increase (thus increasing capacity) of the streams could also be a possible measure that will allow for more time to safely exit the area during a 1% AEP event. Due to the large scale of the 1% AEP event, the risk the site is considered significant as there are no clear measures to mitigate the flooding, but rather some measures can be implemented to manage the flooding and increase egress time.	**significant**

Appendix F: [redacted]