PC120 Hazard Risk Assessment (E36)- Rev B

22 Summit Drive, Mt Albert

For

A & Y Contractor Ltd

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Report Prepared by:
Michael Dennis Epis
Civil Engineer

Reviewed By:
Chong Jin Khaw
Director

Anchor Consultants Limited
PO Box 34810, Birkenhead
Auckland 0746
New Zealand

1.0 Overland Flowpath Summary

The Geomaps indicate that there are two minor OLFP recorded at the site development.

A site walk-over was conducted to verify the location of the Overland Flow Path (OLFP) as shown on Auckland Council's GIS (Geomaps). The inspection confirmed that the OLFP is minor flow and that the actual alignment of the flow path is consistent with what is shown on the Council GIS.

OLPF A

This is the overland which enters the site from the south-east boundary and exiting towards the northern boundary.

The proposed development will maintain the existing ground level along the south-eastern boundary to preserve the OLFP entry point. A V-shaped channel is proposed to divert flows toward the OLFP exit point, ensuring that overland flow is appropriately managed.

The design parameters used to calculate water depths within the proposed channel are as follows:

Q100 = 0.1 m^3/s (Based From GIS)
V Channel = 1.5mWx0.25mD

The Flowmaster program was used to determine water depths along the OLFP channel. Below are the summary.

100yr Flood Depth = 0.15m
Velocity = 1.55 m/s
Depth × Velocity (DxV): 0.23 m^2/s

Based on the above analysis, the 100-year flood level will be fully contained within the proposed V-shaped channel.

OLPF B

This is the overland flowpath which is exiting the site towards the northern boundary. The proposed building is located on the upstream of the OLFP catchment. The proposal is to maintain the existing ground at the exit point.

One cross section has been analysed and below are the summary.

Q100 = 0.07 m^3/s (Based From GIS)

The Flowmaster program was used to determine water depths along the OLFP channel. Below are the summary.

100yr Flood Depth = 0.04m
Velocity = 1.2 m/s
Depth × Velocity (DxV): 0.048 m²/s

Based on the above analysis, OLFP B should be considered as sheet flow rather than a concentrated flows.

2.0 Flood Hazard Area

OLFP A and OLFP B information indicate that the site fall within a Low Flood Hazard Area due to the maximum depth is less than 300mm and the Depth x Velocity is less than 0.24m^2/s.

3.0 Proposed Auckland Unitary Plan (Operative in Part)

E36 Natural Hazards and Flooding

The site is not in a 1% AEP flood area in either the AUP (OP) or in the amended E36 provisions set out in Plan Change 120 (PC120), nor is it in a new 'Flood Hazard Area' (PC120). Furthermore the catchment of the overland flowpath (OLFP) that runs through the site is between 2000m2 and 4000m2.The proposal does not therefore require consent under E36.4.1A(78) to E36.4.1A(98) or E36.4.1A(101). The entry and exit of the OLFP will not be altered, as shown on A15-0082, RC115 so the proposal does not require consent under E36.4.1A(102).

The proposed activity/development will not divert the entry or exit points of the flow paths or reduce its capacity. The site falls within Low Flood Hazard Area. Under Table E36.3.1B.1 with activities sensitive to the natural hazard it falls within potential Tolerable Activities.

The Council has formed a view that the subject proposal relevant to the OVFP acknowledged and described above requires consent as it includes activities within existing urbanised areas where natural hazard risk is potentially tolerable in accordance with Table E36.3.1B.1 in low flood hazard areas is a restricted discretionary activity under E36.4.1A (A79).

On this basis, to address Councils clarifications we provide the following Hazard Risk Assessment in accordance with E36.9(1) against Policies E36.3(3), E36.3(4A) and E36.3(4B) of PC120.

Policies E36.3(3) - Risk Assessment Requirements

Policies E36.3(3)

(a) The type, frequency, range and scale of the natural hazard(s), Including:

(i)Where there may be coinciding, compounding and/or cascading Hazards;

The proposal is to maintain the OLFP alignment, entry and exit points. The proposed building foundation is not blocking the OLFP alignment. The site is not located in a flood zone, flood prone area and coastal area. we expect that during 100yr storm, the natural hazard effects is only temporary. Therefore the proposal will not exacerbate the effects or create new, compounding or cascading hazards.

(ii)Whether the hazard risks will be temporary or permanent.

The effects will be temporary during the 100-year storm

100yr Flow

OLFP A=0.10m3/s (Based from GIS include climate change)

OLFP B=0.07m3/s (Based from GIS include climate change)

(iii)Whether natural hazard events or lower intensity and higher frequency than the 1 per cent AEP event will impact the property and proposed activity.

The type of activity is to construct new dwelling on this site. These natural hazard events has been mitigated by way controlling the OLFP along the proposed channel.

The OLFP largely follows the natural ground level and topography; the 100-year flood depth within the channel is estimated to be approximately 140mm. In the event of a storm resulting in the exceedance of the design capacity, any overflow from the OLFP channel is expected to disperse as sheet flow. There is sufficient open space available to accommodate excess stormwater as sheet flow. It is noted that the velocity and speed of sheet-flow will be low and will not compromise building foundations or access.

Based on the above described design of the buildings and OLFP swale, no adverse downstream impacts are anticipated.

(c) The consequences of a Natural hazard event in relation to the proposed activity;

The alignment of the entry and exit points of the OLFP remains the same and the alignment of the flow path is generally the same. The proposed dwellings are away from the OLFP and the development will not therefore increase or create a risk to those houses from the natural hazard.

The 100yr water level will be contained within the proposed OLFP swale. Therefore, the proposal will not increase risk associated with the OLFP now or in the future. The small catchment means the maximum flow and frequency of high-flow events will not noticeably change as the result of contributing factors such as climate change and changing weather (rain) events. The swale has been designed to be large enough to take flow, other than in a very high rainfall event, as discussed below.

(l) Existing and proposed mitigation measures;

The proposal is to maintain the OLFP alignment, entry and exit points.

(m) Residual risk;

The alignment of the entry and exit points of the OLFP remains the same and the alignment of the flow path is generally the same. The proposed dwellings are away from the OLFP and the development will not therefore increase or create a risk to those houses from the natural hazard.

The 100yr water level will be contained within the proposed OLFP swale. Therefore, the proposal will not increase risk associated with the OLFP now or in the future. The small catchment means the maximum flow and frequency of high-flow events will not noticeably change as the result of contributing factors such as climate change and changing weather (rain) events. The swale has been designed to be large enough to take flow, other than in a very high rainfall event, as discussed below.

(n) Any relevant management plan, strategy or hazard risk assessment relating to the area;

The proposal is to construct two dwellings, which is two activities that are sensitive to natural hazards. However the OLFP is located to the east/northeast of the proposed buildings and is not located close to a trafficable area for pedestrian or vehicle movements; the driveway, which

will double as a pedestrian access to the houses is located to the west, on the other side of the proposed dwellings. The proposed OLFP is also away from proposed outdoor living spaces.

Therefore, while the proposed dwellings are sensitive to the identified natural hazard the design of the development mitigates the potential risk to people and buildings.

Policies E36.3(4A)

(a) accelerating or exacerbating the natural hazards and/or its potential impacts;

The entry and exit points of the OLFP will remain in the same location and it has been designed with sufficient capacity to contain projected flow, safely. Therefore, the proposal will not exacerbate the effects and risk to existing and proposed buildings or residents, or create a new natural hazard.

(b) Creating natural hazard risks that previously were not present at the location;

The OLFP alignment, entry and exit points will remain the same, as noted above. Runoff will be contained in a formed swale following a new alignment. The OLFP will be clear of proposed buildings and will be contained within the site. Therefore the proposal will maintain the existing level of risk (hazard) and will not create new risk from natural hazards.

(c) The type of activity being undertaken and its sensitivity to natural hazard events;

The proposal is to construct two dwellings, which is two activities that are sensitive to natural hazards. However the OLFP is located to the east/northeast of the proposed buildings and is not located close to a trafficable area for pedestrian or vehicle movements; the driveway, which will double as a pedestrian access to the houses is located to the west, on the other side of the proposed dwellings. The proposed OLFP is also away from proposed outdoor living spaces.

Therefore, while the proposed dwellings are sensitive to the identified natural hazard the design of the development mitigates the potential risk to people and buildings.

(d) Creating or increasing the natural hazard risk(s) to people and communities, including long term impacts from more frequent hazard events;

The alignment of the entry and exit points of the OLFP remains the same and the alignment of the flow path is generally the same. The proposed dwellings are away from the OLFP and the development will not therefore increase or create a risk to those houses from the natural hazard.

The 100yr water level will be contained within the proposed OLFP swale. Therefore, the proposal will not increase risk associated with the OLFP now or in the future. The small catchment means the maximum flow and frequency of high-flow events will not noticeably change as the result of contributing factors such as climate change and changing weather (rain) events. The swale has been designed to be large enough to take flow, other than in a very high rainfall event, as discussed below.

(e) Creating or increasing the natural hazard risk(s) to other properties, infrastructure and the environment ; and

The OLFP runs through two properties and the corner of another property located downstream of the site. It is shown as commencing at a point just 22m from the boundary of the site. Therefore, the impact of development within the site on flow along the OLFP will be negligible, and the proposal will have little or no impact on risk to other properties.

(f) Cultural impacts, including consequences for Māori land, Treaty Settlement Land, Marae, Urupa, mana whenua cultural heritage and values;

The site is not Māori Land, nor is it Treaty Settlement Land, and it does not contain a Marae, Urupa or Mana Whenua Cultural heritage area.

Policies E36.3(4B)

(a) Whether any building, structure or activity located on land subject to natural hazards can be relocated within the site or removed;

As the proposed buildings will not be subject to flood risk now or in the future the houses are not required to be relocatable buildings.

(b) Whether the use, design and construction of buildings and structures can mitigate risks associated with natural hazards;

The proposed dwellings are not located within the OLFP. The water will be contained in the channel will mitigate effects and risk to buildings.

The formation of the swale channel edges using rip-rap will prevent realignment/meandering of the OLFP in a way that could compromise the integrity of building foundations and the proposed houses.

(c) The extent to which methods for long term maintenance of areas affected by natural hazards, such as easements are provided;

Maintenance of the section of the OLFP that could become a risk to the proposed houses will be the responsibility of the owner of the site that the OLFP is contained in.

(d) The ability for site layout and management to limit exposure of people and property to natural hazards, including safe egress during a natural hazard event;

Containment of the OLFP entry, exit and main alignment in a channel/swale that is away from the proposed buildings will prevent exposure of people and property to the natural hazard, as discussed above.

Runoff along the OLFP from a 2000m^2 to 4000m^2, which is generally considered to be surface flow, will be fully contained within a channel where it flows through the site. Where sheet flow beyond the swale crosses the site, this will flow at a shallow and slow rate and will not limit the resident's ability to leave their house. The OLFP will not therefore prevent safe access from the dwellings during a high rainfall event.

(e) The effect of structures to mitigate hazards on landscape values and public access;

The proposal will have no effect on landscape values or public access.

(f) The robustness of the mitigation measures, their enforceability and the ability to carry out repairs and maintenance;

Surfacing the swale in rock rip will ensure flow is controlled in in the OLFP during a 100yr storm. Maintenance of the swale will be carried out by the landowners. A Consent Notice can be imposed outlining the landowner's obligations with respect to maintenance of the swale and rip-rap.

(g) The potential consequences of events that exceed the design parameters of mitigation measures;

The OLFP largely follows the natural ground level and topography; the 100-year flood depth within the channel is estimated to be approximately 150mm. In the event of a storm resulting in the exceedance of the design capacity, any overflow from the OLFP channel is expected to disperse as sheet flow. There is sufficient open space available to accommodate excess stormwater as sheet flow. It is noted that the velocity and speed of sheet-flow will be low and will not compromise building foundations or access.

Based on the above described design of the buildings and OLFP swale, no adverse downstream impacts are anticipated.

(h) The potential effects resulting from failure of structure and nature-based mitigation measures over a 100-year timeframe;

The proposal includes construction of a 1.5m x 0.25m rip-rap channel/swale to control and direct the OLFP. With this design there is little or no likelihood of structural failure, provided the swale is maintained.

(i) The impact of the mitigation on other people, properties, infrastructure and environment;

Features of the proposal that will mitigate adverse effects to people and property associated with the OLFP are described above.

The proposed buildings will not obstruct the OLFP alignment or cause any displacement; therefore, the potential for risk to downstream properties is considered to be less than minor.

(j) Whether natural hazard risks can be reduced for Maori Land, treaty settlement Land, Marae, Urupa, Mana Whenua cultural heritage and values;

The site is not Māori Land, nor is it Treaty Settlement Land, and it does not contain a Marae, Urupa or Mana Whenua Cultural heritage area.

(k) The use of conditions of consent, including the duration of consent, to monitor changes in risk and to limit the exposure of people and property to natural hazards; and

A Consent Notice can be imposed outlining the landowner's obligations with respect to maintenance of the swale and rip-rap.

(l) The extent to which it is practicable to mitigate residual risk where infrastructure has a functional or operational need to locate in a natural hazard area.

Not applicable, the proposal is not for the construction of infrastructure, nor will it impact existing public or private infrastructure.

Climate scenarios in Auckland Council Guideline Document 15: Climate change scenarios (GD15) November 2024.

The 100-year flows used in the OLFP calculations are based on Council GIS data. The GIS shows the calculated 100-year flow extents derived using a projected future temperature increase of 3.8 °C, consistent with the GD-15 guideline.