10.iii Appendix C – AUP Rules Assessment

E8.6 (Stormwater Discharge and Diversion)

E8.6 – GENERAL STANDARDS Standard & Criteria	COMPLIANCE
E8.6.1 (1) The design of the proposed stormwater management device(s) must be consistent with any relevant precinct plan that addresses or addressed stormwater matters.	There is no precinct plan which affects the site under the AUP. **Not Applicable**
E8.6.1 (2) The diversion and discharge must not cause or increase scouring or erosion at the point of discharge or downstream.	The diversion and discharge of stormwater from the combined development will not cause or increase scouring or erosion downstream. This conclusion is reached by way of reduction of peak flows for the 2, 10 and 100-year storm events. Further, culvert upgrades (inclusive of riprap) will provide significant reduction from stream erosion from the current pre-development situation. **Complies**
E8.6.1 (3) The diversion and discharge must not result in or increase the following: (a) flooding of other properties in rainfall events up to the 10 per cent annual exceedance probability (AEP); or (b) inundation of buildings on other properties in events up to the 1 per cent annual exceedance probability (AEP).	As is detailed within the Maven Flood Modelling report, run-off post development is not increased for the 2, 10 and 100-yr storm events. This ensures no downstream effects, with a reduction in peak flows actually provided for. **Complies**
E8.6.1 (4) The diversion and discharge must not cause or increase nuisance or damage to other properties.	As is detailed within the Maven Flood Modelling report, run-off post development is not increased for the 2, 10 and 100-yr storm events. This ensures no downstream effects, with a reduction in peak flows actually provided for. **Complies**
E8.6.1 (5) The diversion and discharge of stormwater runoff must not give rise to the following in any surface water or coastal water: (a) the production of conspicuous oil or grease films, scums or foams, or floatable or suspended materials;	A robust treatment strategy has been developed in support of the development. Collectively this will ensure treatment to a standard above which is expressly required by the AUP. Treatment is provided both at source and on a catchment basis, and the overall outcome is

(b) any conspicuous change in the colour or visual clarity; (c) any emission of objectionable odour; (d) the rendering of fresh water unsuitable for consumption by farm animals; or (e) any significant adverse effects on aquatic life	expected to deliver considerable aquatic health benefits from the current degraded baseline. **COMPLIES**
E8.6.1 (6) Where the diversion and discharge is to ground soakage, groundwater recharge or peat soil areas any existing requirements for ground soakage, including devices to manage discharges or soakage, must be complied with.	No soakage and or groundwater recharge is proposed. **NOT APPLICABLE**

E3.6.1.18 Permitted Culvert Standards of the AUP

E3.6.1.18 – PERMITTED STANDARDS STANDARD & CRITERIA	COMPLIANCE
E3.6.1.18 (1) The activity must comply with the standards in E3.6.1.14 above.	Refer to the assessment below against the standards of E.3.6.1.14 **NOTED**
E3.6.1.18(2) The 1 per cent annual exceedance probability (AEP) flood shall be accommodated by the structure and/or by an overland flow path without significantly increasing flood levels up stream or downstream of the structure.	Aside from Culverts 1-1 and 7, the culverts have been designed to accommodate 100-yr flows. Where the culverts have not been designed to allow for the 100-yr flows, attenuation has been specifically designed for flood attenuation, with high-flow culverts and spillways included in the design. The Maven flood modelling report concludes that there are no downstream effects. **COMPLIES**
E3.6.1.18 (3) Culverts must be constructed of inert materials with a design life of at least 50 years.	All culverts will be designed to comply with the SW CoP V4 and the New Zealand Building Code and will ensure compliance with this standard. **COMPLIES**

E3.6.1.14 (Permitted Culvert Standards of the AUP)

E3.6.1.14– PERMITTED STANDARDS **STANDARD & CRITERIA**	**COMPLIANCE**
E3.6.1.14 (1) Structure length must comply with all of the following: (a) the total length of any extended structure must not exceed 30m measured parallel to the direction of water flow. This includes the length of any existing structure and the proposed extension but excludes erosion or scour management works; (b) any required erosion or scour management works must not exceed 5m in length, either side of the extended structure. Such works protruding into the bed do not require a separate consent as they are authorised under this rule; and (c) a new structure must not be erected or placed in individual lengths of 30m or less where this would progressively encase or otherwise modify the bed of a river or stream.	All culverts have been designed to comply with the maximum length, being less than 30m long. As noted within the SMP, the flows associated with most of the larger culverts ensures that the required riprap exceeds 5m as per design calculations. The actual length of the riprap structures will be worked around natural constraints, and will require future detailed design and approvals. All culvert locations (aside from one) are existing culverts. The upgrading therefore cannot be considered as encasing streams, or could constitute stream reclamation. **CONSENT SOUGHT (B ONLY)**
E3.6.1.14 (2) During construction bed disturbance upstream or downstream of the structure must not exceed 10m either side, excluding the length of the structure.	The culvert installations will be done as per the methodology set out in the Maven Streamworks Management Plan. The works exclusion zone (including fish nets) will be placed in compliance with this standard. **COMPLIES**
E3.6.1.14 (3) The structure must not prevent the passage of fish upstream and downstream in waterbodies that contain fish, except that temporary restrictions to fish passage may occur to enable construction work to be carried out.	All culverts are provided with embedment as per the AUP and NES FW requirements. Perched culverts will be removed and fish passage enabled through all new culverts. It is noted some perched culverts have steeper grades, and these culverts may need specific input and design as per the recommendations of the project ecologist detailed within their report. **COMPLIES**
E3.6.1.14 (4) The structure must not cause more than minor bed erosion, scouring or undercutting immediately upstream or downstream.	Riprap will be placed installed in support of all culverts, and this will be a significant improvement from the existing conditions. **COMPLIES**

E3.6.1.14 (5) Construction material and ancillary structures must be removed from the bed following completion of the activity.	Compliance with this will be ensured during construction. **COMPLIES**
E3.6.1.14 (6) Other than provided for by another rule, the activity must not increase the height or storage capacity of any existing dam.	There are no dams within the site, all existing and/or proposed attenuation areas do not exceed 4m in maximum height and 20,000m³ of volume. **NOT APPLICABLE**
E3.6.1.14 (7) The 1per cent annual exceedance probability (AEP) flood shall be accommodated by the structure and/or by an overland flow path without increasing flood levels up stream or downstream of the structure, beyond the land or structures owned or controlled by the person undertaking the activity.	Aside from Culverts 1-1 and 7, the culverts have been designed to accommodate 100-yr flows. Where the culverts have not been designed to allow for the 100-yr flows, attenuation has been specifically designed for flood attenuation, with high-flow culverts and spillways included in the design. The Maven flood modelling report concludes that there are no downstream effects. **COMPLIES**
E3.6.1.14 (8) Calculation of flow rates will be made using the Auckland Council Technical Publication 108: Guideline for stormwater runoff modelling in the Auckland Region, April 1999.	Flow rates have been calculated by TP108 and the HEC RAS Flood Model prepared by Maven Associates. **COMPLIES**