

Appendices

Appendix A – Hydrologic and hydraulic analysis methodology

A1. Analysis evolution

Initial assessments were undertaken to assist in the provision of technical information to define the reliability for the track and reconcile early p requirements. A series of assessments were undertaken during the initial stages to evaluate various upgrade works (culverts to various AEP capacities and various track lifts) to assist that process.

Results of those initial assessments have been superseded by the issue of Technical Note ED-10-02, which has defined the definition of flood immunity. Section A6.5 provides a detailed discussion of the implications of the Technical Note.

Results provided within this report have been completed and evaluated against the Technical Note requirements.

A2. Standard culvert sizes

Culvert sizes were selected from the developed standard geometries which are shown, for a single leg length for each culvert style, in Figure A.1.

Within the geometries shown in Figure A.1 there were a variety of clear vertical opening heights (leg lengths) developed as being available. The leg lengths were:

- Culvert Type A – 300 mm; 400 mm; and 500 mm
- Culvert Type B – 500 mm; 700 mm; 900 mm; 1100 mm; 1300 mm; and 1500 mm
- Culvert Type C – 1200 mm; 1500 mm; 1800 mm; 2100 mm; 2400 mm; and 3,000 mm

A3. Selection of structure upgrade

Culverts

To select the new culvert size for the culvert upgrades the steps followed were adopted:

- The level difference between the existing culvert invert level and the proposed track level was determined.
- That gave the maximum culvert leg length (of those listed above) after allowing for ballast and rails over the culverts. The maximum culvert leg length was adopted for the culvert.
- The number of barrels forming a culvert was progressively increased until either (a) the required flood level was achieved for the one per cent AEP event, or (b) the number of culvert barrels became unrealistically large.

When considering the selection of upgraded culvert sizes, flow interaction was permitted between adjacent upstream catchments.

At some locations it was not possible to obtain a potentially realistic number of culvert cells that would achieve the desired flood immunity. This was primarily a result of the rail level between adjacent culverts being sufficiently low that the rail would overtop while further increasing the number of culvert cells did not achieve the desired flood immunity.

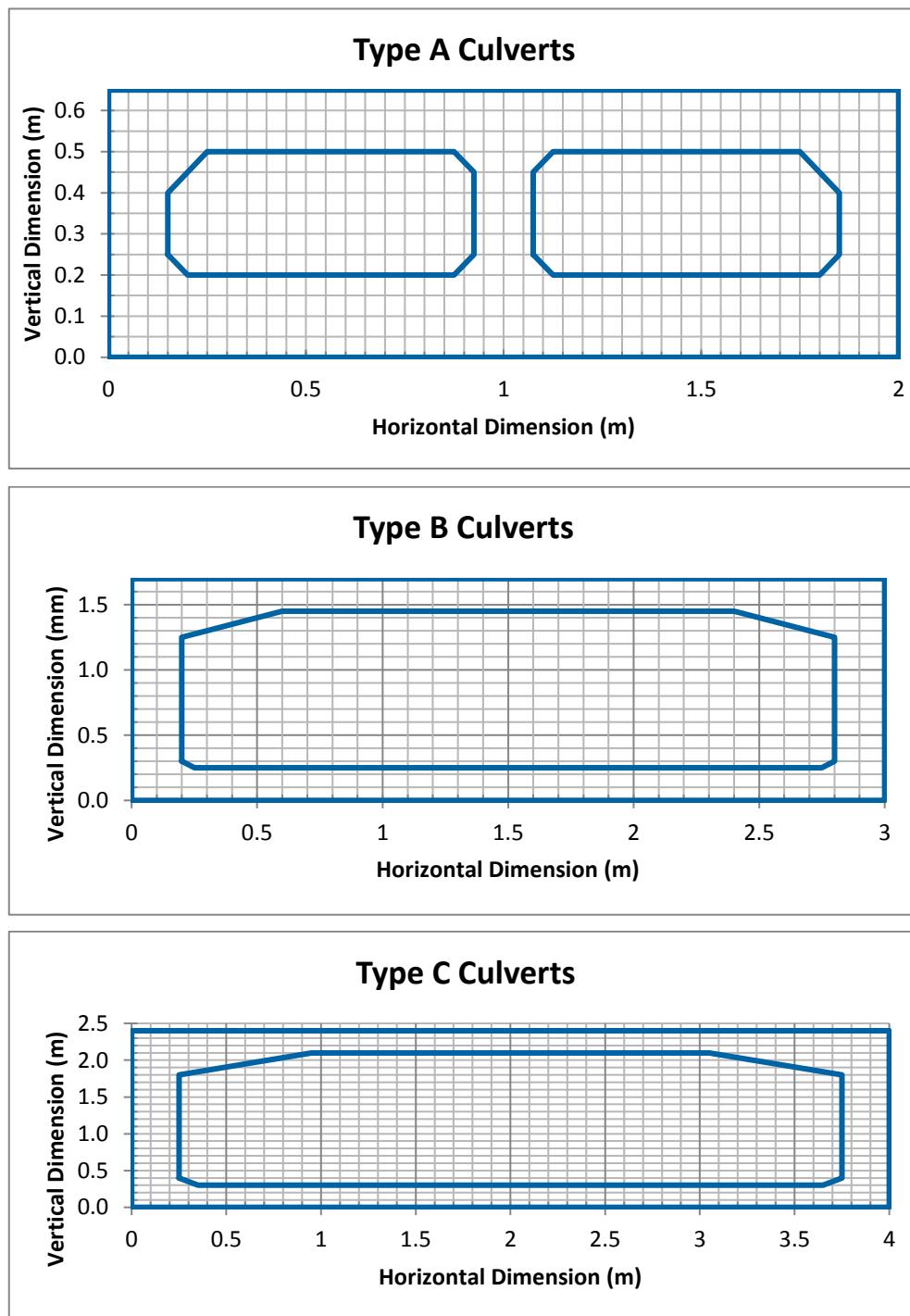


Figure A.1 Typical structure sizes

Bridges

Bridge lengths for structures over the minor watercourses were selected to suit standard bridge planks while achieving, as a minimum, a watercourse consistent with the calculated culverts required at the location.

A4. Interaction of track lifts and culvert sizes

The geography of the proposal area, in particular the dynamics of flood flows within the floodplains being analysed, means that no culvert may be considered in isolation.

Changes to a culvert (such as increasing or decreasing the capacity or locally raising the rail level) have the potential to alter flood flows across a wide floodplain area, altering patterns of rail overtopping and flood extents.

In addition, the maximum design height of a culvert can be affected by the local rail level. Where the rail levels are lifted, there is the potential to increase the design height of a culvert, which in turn may allow for the reduction in the number of culvert barrels while maintaining a comparable hydraulic capacity. As such, there is potentially an infinite number of rail lift and culvert combinations that may adequately meet the design objectives.

The upgrade options included in this report aim to balance the specified design objectives with physical limitations and impacts on the surrounding land users.

A5. Hydrologic analysis

A5.1 Overview

Estimated local catchment surface flow rates arriving at structures were developed based on the contributing catchment area and application of a design rainfall of varying duration to that catchment area.

For several catchment areas it was found that flows from adjacent local catchments would interact prior to flowing over the rail line. In these locations the hydrologic and hydraulic assessment was required to consider the coincident flows from the adjacent local catchment areas.

Two flow configurations arose:

- In circumstances where the peak flow at a structure could pass through the structure without either the (a) track overtopping or (b) the catchment boundary being overtopped into the adjacent catchment (flow parallel to rail alignment), the flood level was determined based on the capacity of the structure in a particular catchment area.
- In circumstances where flow could not pass through the structure and the predicted water level resulted in (a) overtopping of the rail level or (b) overtopping of the adjacent catchment boundary or (c) both of the above conditions, the calculations were expanded to obtain a flood level that considered the hydraulic capacity of the structure, the resulting flow over the rail and/or the resulting flow into the adjacent catchment concurrently acknowledging all resulting outflow relationships to establish the resulting flood level of the initial structure and those subsequently affected. Flow over the top of the rail was assessed as a weir.

A5.2 Analysis Process

The hydrologic elements of the analysis were identical for the structure sizing for replacement culverts for the one per cent AEP event and the evaluation of the performance for structures.

The process involved:

- Identification of the existing structures for the establishment of the base flooding conditions. These structure locations were for the most part retained for the design condition to minimise potential hydrologic and hydraulic impacts downstream of the structures.

- The structure size was identified from either existing geometry information or from the culverts selected during this design process.
- Determination of the local catchment area draining to each of the structure locations from the combined LiDAR/SRTM DEM.
- Application of design rainfalls to each local catchment to determine the peak rate of runoff from the catchments for a broad range of design rainfall durations. The analysis of the peak flow rates was completed using the Probabilistic Rational Method of calculations. These flows were then adjusted to better replicate comparative flows established using a RORB hydrologic model that had been used to evaluate design flows for ten of the local catchment areas.
- A stage -storage volume relationship was established for the area located immediately upstream of each structure for the length of the rail corridor. The storage volumes were calculated by assuming a horizontal upstream water level extending from the rail corridor to the natural ground level (as defined by the LiDAR terrain model).
- Triangular hydrographs formed from the above peak flow rates and assuming a hydrograph duration of twice the design rainfall duration were then routed through each storage volume with the outlets from that catchment being through the structure (culvert or bridge), over the rail line if the flood level exceeded the minimum track level and potentially into the adjacent catchments.
- The routing process was repeated for different rainfall durations to establish the one giving the highest flood level for each AEP when allowing, if required, flow interaction between catchments.
- For the design case the number of barrels forming a culvert was progressively increased, using the standard structure sizes, to meet the nominated design criteria.

A5.3 Catchment delineation

Catchment areas and catchment boundaries were identified from the client supplied LiDAR together with patched in SRTM data in areas where the catchment extended outside the supplied LiDAR corridor data.

The process used to delineate the catchment areas included:

- Identification of all culvert locations – initial locations for structures were identified from earlier proposal documentation. The chainages provided within that report were mapped onto the proposal aerial image.
- Minor adjustments were made to the plotted culvert locations to ensure that the identified low point along the track formation centreline was identified as the culvert location.
- The area draining to each culvert location was then determined from the terrain model formed from the LiDAR and SRTM data. An example of the catchment delineation is shown in Figure A.2. Figure A.2 shows, on the left, the overall catchment delineation for the length of the proposal while the right hand image shows an enlarged view of a localised portion of the project.

On that figure the culverts and underbridges are represented by red dots, the large culverts by pink dots and the small culverts by blue dots. The catchment for each culvert is delineated by a light blue line with catchment areas shown by different colourings to clearly identify individual catchments.

- For each catchment area the following were determined:
 - Catchment area
 - Lowest track level along the section of track crossing the catchment
 - Catchment boundary levels between adjacent catchment areas were extracted from the supplied LiDAR survey

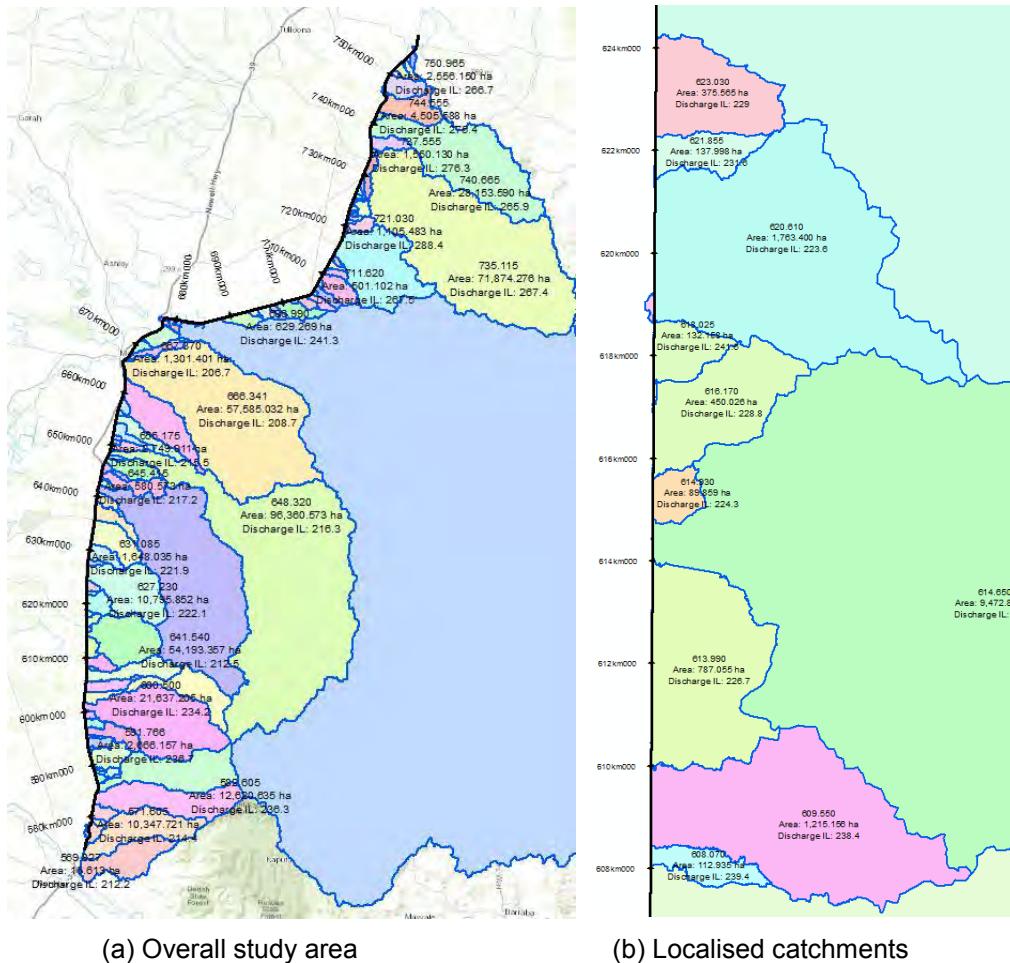


Figure A.2 Catchment delineation

A5.4 Catchment storage volumes

Storage volumes located upstream of each culvert were determined by applying a series of horizontal slices, a slice per assumed flood level, that were intersected with the catchment terrain model to determine a flood stage and storage volume relationship.

A6. Hydraulic analysis

A6.1 Overview

The hydraulic analysis for the culverts was integrated with the hydrologic analysis. The difference being restricted to the hydraulic analysis converting the flow rates into flow depths using specified rules.

A6.2 Assumed flow conditions

The hydraulic elements of the culvert sizing and assessment were based on the culverts acting under inlet control i.e., the flow depth upstream of the culvert was assumed to be directly related to the culvert geometry (size and number of barrels and the flow rate) and independent of the downstream flood level.

Since the analysis was restricted to local catchment rainfall and runoff events this gave realistic predicted flow conditions. During the rising limb of a flood hydrograph the culverts will initially act under inlet control. Should rainfall occur over two catchment areas across a culvert then the water level would raise at both ends of the relevant culvert and in this circumstance the maximum flow rate through the culvert would be reduced by backwater effects. This would also provide a situation of not being able to size the culverts without some assumption as to the downstream flood level.

A6.4 Analysis Mode

The hydraulic elements of the analysis of the system performance was slightly different to that when determining the size of a required structure.

For culvert analysis the hydraulic elements included:

- Assuming a flood level upstream of a culvert:
 - Determination of the capacity of the culvert when acting under inlet control for the assumed upstream flood level.
 - Determining whether the assumed flood level would overtop the rail and there was no flow into/out of an adjoining catchment – when the assumed flood level would overtop the rail, the flow over the rail was determined using a weir flow formulation that reflected the actual track profile.
 - Determining whether the assumed flood level would overtop the rail and there was flow into/out of an adjoining catchment – when the assumed flood level would overtop the rail, the flow over the rail was determined using a weir flow formulation that reflected the actual track profile over the entire potential overflow length across the adjacent catchments.
 - Determining whether the assumed flood level would overtop the ridge between adjacent catchments giving flow transfer between adjoining catchments – when the assumed flood level would overtop the ridge, the two local catchments were treated as a single, larger catchment with the associated culverts considered in concert.
- Applying storage routing to consider the conveyance of flow into the derived storage volume, the potential outflow and transfer rates and change in volume of the entire storage areas.

A6.5 Design mode

Analysis for the design mode included all the steps described above. An additional overarching iteration was required to progressively upgrade the number of barrels in a culvert until either an acceptable geometry was determined to achieve the required maximum upstream flood level for the one per cent AEP event, or, an unrealistic number of barrels was required to achieve compliance to Technical Note ETD-10-02.

Rail overtopping locations - local and regional catchments

The extent of rail overtopping has been determined by evaluating the rail level, at about two metre increments, throughout each catchment and comparing the rail level to the flood level for that catchment.

In some locations the track maps as overtopping when it is not overtopping at the adjacent culverts. This occurs as a result of the track formation being lower between culverts than at the culverts.

The predicted depth of track overtopping is determined as being the difference between the predicted flood level and the local track level.

Appendix B – Registered groundwater bores

Table B-1 Registered groundwater bores

ID	License No.	Type	Owner	Final depth	Salinity	Yield	SWL	Drawdown	Latitude	Longitude	Authorised Purpose	Strata
GW032260	90WA810411	Bore open thru rock	Private	131.3	(Unknown)	-	-	-	-29.1373	150.3022	Stock	Sandstone
GW038746	90BL101158	(Unknown)	(Unknown)	0	(Unknown)	-	-	-	-29.1287	150.3042	Stock	Sand, hard rock
GW000093	-	Bore	Private	62.4	Good	-	-	-	-30.2373	149.8106	Stock, Domestic	Unknown
GW000335	-	Bore open thru rock	Private	142.9	Fresh	-	-	-	-29.3415	150.2125	Public/Municipal	Shale, sand, Sandstone
GW034206	-	Bore open thru rock	Private	68.9	(Unknown)	0.83	16.6	35.1	-29.1287	150.3042	Recreation (Groundwater)	Sandy gravel, shale, sandstone
GW037919	-	Bore	Local Govt	76.2	-	-	-	-	-29.4957	149.8545	Town Water Supply	Shale, Sandstone
GW035337	90CA805032	Bore	Private	55.7	0-500 ppm	-	-	-	-29.4570	149.8592	Stock	Sandstone
GW007284	90WA810519	Bore	Other Govt	163.9	Fresh	-	-	-	-30.1176	149.7961	Stock	Shale, Sandstone
GW007525	90WA810825	Bore open thru rock	Private	114.3	Good	-	-	-	-30.1129	149.7997	Domestic	Shale, Sandstone
GW007830	90WA804905	Bore	Local Govt	51.2	Domestic	-	-	-	-29.4695	149.8511	Town Water Supply	Gravel, sand
GW014676	-	Bore	Local Govt	44.8	501-1000 ppm	-	-	-	-29.5190	149.8528	Stock, domestic	Sandstone
GW012570	90WA810898	Bore open thru rock	Private	149	Fresh	-	-	-	-29.3232	150.2233	Farming	Sandstone
GW010345	90WA810185	Bore open thru rock	Private	76.2	Good	-	-	-	-29.1287	150.3033	Stock	Sandstone
GW004629	90CA811407	Bore - GAB	Local Govt	605.9	501-1000 ppm	-	-	-	-29.9172	149.7890	Town Water Supply	Sand, gravel

ID	License No.	Type	Owner	Final depth	Salinity	Yield	SWL	Drawdown	Latitude	Longitude	Authorised Purpose	Strata
GW005249	-	Bore open thru rock	Private	96.9	Good	-	-	-	-29.2123	150.2711	Public/Municipal	Sand, clayey gravel, clayey sand
GW021193	-	Bore	Local Govt	46.9	(Unknown)	-	-	-	-29.5179	149.8534	Unknown	Unknown
GW021200	-	Bore	Local Govt	44.9	0-500 ppm	-	-	-	-29.5190	149.8528	Domestic, industrial	Sand, gravel
GW028500	90WA810376	Bore open thru rock	Private	63	1001-3000 ppm	-	-	-	-29.1282	150.3036	Stock, domestic, irrigation	Sand
GW026723	90WA811323	Bore open thru rock	Private	110.3	0-500 ppm	-	-	-	-29.1234	150.3086	Stock	Coal, Sand
GW026889	-	Bore	Local Govt	53.3	Potable	-	-	-	-29.4680	149.8523	Stock	Silty clay, Sandstone
GW027080	90WA805443	Bore	Private	21.3	Potable	-	-	-	-29.4752	149.8464	Industrial	Gravel, Sand
GW025094	90WA805167	Bore	Local Govt	54.5	-	-	-	-	-29.5001	149.8553	Domestic	Gravel
GW026182	90CA805258	Bore	Private	36.9	-	50.52	9.9	-	-29.4495	149.8647	Industrial	Sand
GW018559	90CA805177	Bore	Private	46	(Unknown)	-	-	-	-29.4682	149.8483	Industrial	Clay, silt, sand
GW019465	90WA810982	Bore open thru rock	Private	67	Potable	-	-	-	-29.2554	150.2611	Industrial	Sand
GW019573		Bore	Other Govt	39.9	Potable	-	-	-	-29.4945	149.8531	Domestic, industrial	Sand gravel
GW019032	90WA810960	Bore	Private	130.1	7001-10000 ppm	-	-	-	-29.9290	149.7892	Irrigation	Gravel
GW061127	90BL132780	Bore	Private	103.9	(Unknown)	-	-	-	-30.1137	149.8006	Unknown	Unknown
GW067438	90BL137783	Bore	Private	23		-	-	-	-30.2834	149.7951	Town Water Supply	Gravel
GW070236	90BL151011	Bore open thru rock	Private	108.5	Fresh	-	-	-	-30.1422	149.8094	Public/Municipal	Gravel, Sand

ID	License No.	Type	Owner	Final depth	Salinity	Yield	SWL	Drawdown	Latitude	Longitude	Authorised Purpose	Strata
GW070393	90CA805021	Bore	Private	55.4	Good	-	-	-	-29.4662	149.8578	Public/Municipal	Gravel, Sand
GW043778	90BL100738	Bore	Private	32.9	Good	-	-	-	-29.3848	150.0645	Domestic	Gravel
GW056943		Bore open thru rock	Private	150.3	(Unknown)	-	-	-	-29.1268	150.3042	Domestic	Shale, Shale sandstone
GW057765	90BL135008	Bore - GAB	Private	175.3	(Unknown)	1.26	-	-	-28.9498	150.3706	Domestic	Gravel
GW048891	90BL108175	Bore open thru rock	Private	163.1	Potable	-	-	-	-29.2634	150.2578	Commercial	Sandy clay, sandstone
GW053461	90CA806089	Bore	Private	54.9	(Unknown)	-	-	-	-30.2837	149.7953	Unknown	Unknown
GW901095	90CA811357	Bore	-	159	-	-	-	-	-30.2568	149.8070	Stock, domestic	Shale, Sandstone
GW901897	90CA805116	Bore	Private	53	Good	-	11	-	-29.4398	149.8764	Commercial	Shale, Sandstone
GW901898	90CA805116	Bore	Private	50	-	-	8	-	-29.4395	149.8728	Domestic	Shale, Sandstone
GW902115	90CA805213	Bore	-	34.3	-	-	-	-	-29.4036	149.9724	Domestic, irrigation	Gravel, Sandy gravel
GW966013	90BL251370	Bore	Private	15	-	-	11	-	-29.4764	149.8466	Unknown	Sandy clay
GW966014	90BL251360	Bore	Private	15	-	-	11	-	-29.4763	149.8463	Domestic	Unknown
GW966151	90BL251228	Bore	-	13	-	-	9	-	-29.4753	149.8475	Stock	Clay, sandy gravel
GW966152	90BL251229	Bore	-	13	-	-	9	-	-29.4753	149.8476	Domestic	Sandstone
GW966154	90BL251231	Bore	-	13	-	-	9	-	-29.4754	149.8475	Stock, domestic	Sandstone
GW966155	90BL251232	Bore	-	13	-	-	9	-	-29.4754	149.8476	Stock, domestic, irrigation	Sand, gravel

ID	License No.	Type	Owner	Final depth	Salinity	Yield	SWL	Drawdown	Latitude	Longitude	Authorised Purpose	Strata
GW901977	90WA811415	Bore - GAB	-	868	-	-	-	-	-29.4744	149.8470	Domestic	Sandstone
GW966260	90BL251642	Bore	-	81	-	0.945	36	-	-29.1687	150.2906	Stock, irrigation, domestic	Sandstone
GW966066	90BL251363	Bore	Private	15	-	-	11	-	-29.4767	149.8461	Stock, domestic	Sandstone
GW966067	90BL251365	Bore	Private	15	-	-	11	-	-29.4766	149.8471	Stock, domestic	Sand Gravel
GW966071	90BL251367	Bore	Private	15	-	-	11	-	-29.4766	149.8466	Stock, domestic	Gravel
GW966072	90BL251368	Bore	Private	15	-	-	11	-	-29.4764	149.8469	Stock, domestic	Sandstone
GW966074	90BL251369	Bore	Private	15	-	-	11	-	-29.4763	149.8462	Stock, domestic	Sand, hard rock
GW965706	90BL247773	Bore	-	41	-	-	-	-	-29.4311	149.8801	Unknown	Unknown
GW030436	-	Bore - Nested (2)	NSW Office of Water	37.6	Good	-	-	-	-29.4040	150.0017	Recreation (Groundwater), domestic	Shale, sand, Sandstone
GW003995	90WA811087	Bore - GAB	Private	204.2	(Unknown)	-	-	-	-29.7540	149.7995	Irrigation	Sandy gravel, shale, sandstone
GW004082	90WA811099	Bore - GAB	Local Govt	540.5	(Unknown)	-	-	-	-29.9215	149.7892	Stock, domestic, irrigation	Shale, Sandstone
GW004361	-	Bore - GAB	Local Govt	851.2	501-1000 ppm	0	0	0	-29.4740	149.8469	Stock, domestic, irrigation	Sandstone
GW017750	-	(Unknown)	Private	41.4	(Unknown)	0	0	0	-29.4850	149.8495	Recreation (Groundwater)	Shale, Sandstone
GW018238	90WA805284	Bore	Private	19.8	Fresh	0	0	0	-29.4852	149.8499	Irrigation	Shale, Sandstone
GW026079	-	Bore	Private	19.8	Good	0	0	0	-29.4755	149.8469	Unknown	Gravel, sand
GW026883	90WA804905	Bore	Local Govt	46.3	Hard	0	0	0	-29.4668	149.8487	Town Water Supply	Sandstone

ID	License No.	Type	Owner	Final depth	Salinity	Yield	SWL	Drawdown	Latitude	Longitude	Authorised Purpose	Strata
GW026886	90WA805751	Bore	Private	39.6	Potable	0	0	0	-29.4666	149.8523	Domestic	Sandstone
GW028999	90WA805485	Bore	Private	18.5	0-500 ppm	0	0	0	-29.4710	149.8492	Test bore /monitoring bore	Sandstone
GW029517	90WA811325	Bore open thru rock	Private	129.2	(Unknown)	0	0	0	-29.1306	150.3035	Test bore/ monitoring bore	Sand, gravel
GW061485	90WA805706	Bore	Private	42.7	Good	0	0	0	-29.4668	149.8559	Unknown	Sand, clayey gravel, clayey sand
GW063995	90WA805719	Bore	Private	36.6	Good	0	0	0	-29.4432	149.8700	Test bore/ monitoring bore	Unknown
GW011205	90WA810861	Bore	Private	173.7	Good	0	0	0	-29.9398	149.7884	Test bore/ monitoring bore	Sand, gravel
GW014371	90WA804905	Bore	Local Govt	57.9	(Unknown)	0	0	0	-29.4722	149.8503	Test bore/ monitoring bore	Sand
GW034587	90WA811043	Bore open thru rock	Private	178	(Unknown)	0	0	0	-29.2632	150.2545	Monitoring bore	Coal, Sand
GW965370	90CA811448	Bore	-	346	-	0	0	0	-28.9279	150.3939	Test bore/ monitoring bore	Silty clay, Sandstone
GW900084	90WA811429	Bore - GAB	Private	740.1	-	0	0	0	-29.4854	149.8492	Test bore/ monitoring bore	Gravel, Sand
GW966032	90BL251361	Bore	Private	15	-	0	11	0	-29.4763	149.8469	Test bore/ monitoring bore	Gravel
GW966065	90BL251362	Bore	Private	15	-	-	11	-	-29.4767	149.8464	Test bore/ monitoring bore	Sand
GW966068	-	Bore	Private	15	-	-	11	-	-29.4768	149.8467	Monitoring bore	Clay, silt, sand
GW966153	90BL251230	Bore		125	-	-	9	-	-29.4756	149.8477	Monitoring bore	Sand
GW902260	-	Bore	(Unknown)	-	-	-	-	-	-29.4963	149.8542	Monitoring bore	Sand gravel
GW045003	90BL103121	Bore	Private	60.4	(Unknown)	-	-	-	-29.1254	150.3053	Monitoring bore	Gravel
GW966069	90BL251366	Bore	Private	15	-	-	11	-	-29.4765	149.8471	Monitoring bore	Unknown

ID	License No.	Type	Owner	Final depth	Salinity	Yield	SWL	Drawdown	Latitude	Longitude	Authorised Purpose	Strata
GW020096	90WA805385	Bore	Private	19	Potable	-	-	-	-29.4796	149.8517	Domestic, stock	Gravel
GW967507	90BL252888	Bore	-	60	-	-	-	-	-29.5567	149.8413	Monitoring bore	Gravel, Sand
GW967536	90BL151035	Bore	-	35	-	-	-	-	-29.4865	149.8499	Monitoring bore	Gravel, Sand
GW967707	90BL252822	Bore	-	130.5	-	-	15.9	-	-29.1274	150.3045	Monitoring bore	Gravel
GW967284	90BL252814	Bore	Private	15	-	-	13	-	-29.4763	149.8462	Domestic	Shale, Shale sandstone
GW967285	90BL252815	Bore	Private	15	-	-	13	-	-29.4768	149.8464	Domestic, stock	Gravel
GW968049	90BL254387	Bore	-	13.86	-	-	-	-	-29.4744	149.8488	Monitoring bore	Sandy clay, sandstone
GW968050	90BL254388	Bore	-	13.96	-	-	-	-	-29.4747	149.8487	Monitoring bore	Unknown
GW968051	90BL254388	Bore	-	10.8	-	-	-	-	-29.4749	149.8488	Monitoring bore	Shale, Sandstone
GW968052	90BL254388	Bore	-	13.36	-	-	-	-	-29.4753	149.8486	Monitoring bore	Shale, Sandstone
GW968053	90BL254388	Bore	-	13.6	-	-	-	-	-29.4753	149.8490	Monitoring bore	Shale, Sandstone
GW968644	-	Bore	Private	36.6	-	-	10.2	-	-29.4494	149.8644	Stock, irrigation	Gravel, Sandy gravel
GW969093	90BL254506	Bore - GAB	Private	144	-	1.8	38	-	-29.1582	150.2928	Domestic, stock	Sandy clay
GW970112	90WA812901	Bore - GAB	Private	60.96	-	0.44	-	-	-29.1284	150.30308	Unknown	Unknown
GW970670	90BL256114	Bore	Private	14.75	-	-	12.5	-	-29.4755	149.84778	Monitoring bore	Clay, sandy gravel
GW970671	90BL256115	Bore	Private	14	-	-	13	-	-29.47592	149.84719	Monitoring bore	Sandstone
GW970672	90BL256115	Bore	Private	14.95	-	-	13	-	-29.47569	149.84719	Monitoring bore	Sandstone

ID	License No.	Type	Owner	Final depth	Salinity	Yield	SWL	Drawdown	Latitude	Longitude	Authorised Purpose	Strata
GW970673	90BL256115	Bore	Private	14.9	-	-	13	-	-29.47583	149.84736	Monitoring bore	Sand, gravel
GW970854	90WA829336	Bore	Private	15	-	-	11.2	-	-29.4775	149.84767	Groundwater remediation	Sandstone
GW970855	90WA829336	Bore	Private	15	-	-	11.2	-	-29.47747	149.84769	Groundwater remediation	Sandstone
GW970856	90WA829336	Bore	Private	15.3	-	-	11.5	-	-29.47742	149.84758	Groundwater remediation	Sandstone
GW970526		Bore	Private	10	-	-	-	-	-29.91667	149.79111	Monitoring bore	Sand Gravel
GW970527		Bore	Private	5	-	-	-	-	-29.91781	149.79067	Monitoring bore	Gravel
GW970528		Bore	Private	5	-	-	-	-	-29.91767	149.79103	Monitoring bore	Unknown
GW069838	90WA813005	Bore - GAB	Private	119	-	3.8	27	-	-30.11453	149.80064	Stock, Domestic	Sandstone

Appendix C – Surface water licences

Table C-1 NSW Water Register – Surface water licences (Department of Primary Industries, Water, 2016c) accessed 7 June 2016

Category	No. of WAL's	Total Share Component (ML or units)	Water made Available (ML)	Usage YTD (ML)
NSW Borders Rivers Regulated and Alluvial Water Sources 2012				
Croppa Creek and Whalan Creek Water Source				
Domestic and stock	9	65.5	65.5	0
Domestic and stock [domestic]	1	2	2	0
Domestic and stock [stock]	2	10	10	0
Unregulated river	20	9776	9776	0
Gwydir Unregulated and Alluvial Water Sources 2012				
Gil Creek Water Source				
Domestic and stock	4	27.5	27.5	0
Domestic and stock [domestic]	1	1	1	0
Domestic and stock [stock]	2	10	10	0
Domestic and stock [town water supply]	1	43	43	0
Unregulated river	6	1421	1421	0
Moree Water Source				
Unregulated river	2	1700	1700	0
Tycannah Creek Water Source				
Domestic and stock	1	7	7	0
Domestic and stock [stock]	1	5	5	0
Unregulated river	6	2768	2768	0
Gurley Creek Water Source				
None				
Millie Creek Water Source				
Domestic and stock	4	29	29	0
Domestic and stock [stock]	1	5	5	0
Unregulated river	6	9967	9967	0
Namoi Unregulated and Alluvial Water Source 2012				
Spring and Bobbiwaa Creeks Water Source				
Domestic and stock [stock]	1	5	5	0
Unregulated river	3	976	976	0

Note:

WAL: Water Access Licence

YTD: Year to date

Appendix D – Existing structure details

This appendix provides a summary of the existing structures between Narrabri to North Star considered within the assessment, the modelled local upstream catchment critical duration flow rates and flood levels for a range of design flood events.

Details of the existing structures were collected during a field inspection by GHD and ARTC staff in September 2014.

Section:	NNS
Track Lift:	Existing
Structures:	Existing

Catchment / Culvert ID	Existing Structure	Structure Invert (as modelled) (mAHD)	Existing Rail Low Point (as modelled) (mAHD)
573.360	Steel Pipe, 2 x 0.6	217.26	218.73
574.375	Steel Pipe, 2 x 1.2	217.71	219.09
574.405	Steel Pipe, 31 x 0.6	217.82	219.45
576.030	Steel Pipe, 7 x 0.45	230.05	230.63
579.475	Steel Pipe, 3 x 1.2	243.33	245.96
579.585	Steel Pipe, 10 x 0.45	243.64	244.37
579.965	Steel Pipe, 2 x 0.6	241.88	242.61
581.180	Concrete Girder, 1 x 4.5	234.66	235.70
581.800	Steel Pipe, 3 x 0.45	235.17	236.63
582.605	Concrete Girder, 8 x 4.2	236.32	238.57
582.837	Steel Pipe, 3 x 0.9	237.70	239.00
583.430	Steel Pipe, 2 x 0.45	238.75	240.25
584.805	Steel Pipe, 9 x 1.2	241.11	243.05
586.200	Steel Plate web girder welded, 4 x 8	244.62	247.74
587.090	Steel Pipe, 3 x 0.45	245.23	246.48
587.700	Steel Pipe, 4 x 0.9	244.32	245.81
587.835	Steel Pipe, 18 x 1.2	243.96	245.79
587.915	Steel Pipe, 3 x 0.6	243.99	245.85
588.815	Steel Pipe, 5 x 0.75	243.16	244.68
589.300	Concrete Box, 7 x 1.1 x 0.9	242.37	243.95
590.020	Steel Pipe, 7 x 0.45	241.82	243.00
590.225	Steel Pipe, 5 x 0.45	242.13	243.20
591.685	Steel Pipe, 6 x 1.2	236.89	238.87
591.766	Steel Pipe, 15 x 1.2	236.69	238.73
591.925	Steel Pipe, 2 x 0.75	236.93	238.84
592.075	Steel Pipe, 2 x 0.75	237.24	239.02
593.060	Steel Pipe, 3 x 0.45	241.34	242.48
593.820	Steel Pipe, 13 x 0.9, 4 x 0.9	240.33	241.69
595.520	Steel Pipe, 9 x 1.35	242.34	243.86
596.430	Steel Pipe, 20 x 1.2	239.04	240.91
597.230	Steel Pipe, 6 x 1.5	240.08	241.89
599.445	Concrete Box, 7 x 1.1 x 1.2	236.99	238.65
600.500	Steel Plate web girder welded, 1 x 11, 6 x 9	234.22	237.76
600.800	Steel Pipe, 2 x 0.45	236.61	238.25
601.865	Steel Pipe, 3 x 0.45	238.04	238.80
602.450	Steel Pipe, 15 x 1.5	236.17	238.08
603.850	Concrete Box, 7 x 3.5 x 2.4	236.83	239.99
607.830	Steel Pipe, 5 x 2.3, 4 x 2.7, 5 x 2.55	238.05	239.38
608.070	Steel Pipe, 5 x 0.45	239.39	240.25
609.550	Concrete Box, 4 x 4.8 x 1.25	238.36	239.86
613.190	Steel Pipe, 1 x 0.75	228.80	229.76
613.990	Concrete Box, 4 x 1.5 x 1.5	226.73	227.96
614.445	Steel Pipe, 5 x 1.35	225.36	226.94
614.650	Concrete Box, 26 x 1.8 x 1.8	224.91	226.31
614.930	Steel Pipe, 6 x 1.35	224.26	226.70
614.960	Concrete Box, 3 x 1.2 x 1.2	224.96	226.82
616.170	Concrete Box, 9 x 3.7 x 2.0	228.78	231.54
617.075	Steel Pipe, 3 x 0.45	242.80	243.98
618.025	Steel Pipe, 6 x 1.35	241.62	243.42
619.030	Concrete Pipe, 5 x 1.35	240.89	242.62
620.610	Concrete Prestressed concrete girder, 2 x 13	223.62	228.16
621.855	Steel Pipe, 5 x 2.4	231.61	234.87
623.030	Steel Pipe, 6 x 2.4	228.97	232.39

Catchment / Culvert ID	Existing Structure	Structure Invert (as modelled) (mAHD)	Existing Rail Low Point (as modelled) (mAHD)
Section:	NNS		
Track Lift:	Existing		

624.755	Steel Pipe, 2 x 0.6	234.54	235.98
625.520	Steel Pipe, 2 x 0.6	228.30	229.10
627.230	Concrete Box, 8 x 4.8 x 1.7	222.14	224.80
627.340	Steel Pipe, 2 x 1.2	223.05	224.83
627.490	Concrete Box, 8 x 4.8 x 1.7	222.10	224.68
630.870	Steel Pipe, 4 x 0.45	222.73	223.73
631.085	Concrete Box, 3 x 1.15 x 0.65, 5 x 1.15 x 0.85	221.93	223.34
631.525	Concrete Pipe, 3 x 0.6	221.47	222.78
633.720	Concrete Box, 21 x 1.8 x 1.5	217.00	218.68
635.090	Steel Pipe, 5 x 0.45	218.47	219.42
635.355	Steel Pipe, 1 x 0.75	218.62	219.44
636.650	Steel Pipe, 11 x 0.6	217.56	218.96
637.120	Steel Pipe, 3 x 0.6	218.19	219.15
637.230	Steel Pipe, 15 x 0.45	218.30	219.04
638.080	Steel Pipe, 5 x 0.6	216.92	218.55
638.460	Steel Pipe, 9 x 1.2	217.00	218.07
639.690	Steel Pipe, 25 x 0.6	216.83	217.66
641.540	Steel Plate web girder welded, 2 x 14.415, 6 x 14.63	212.50	218.05
642.315	Steel Pipe, 5 x 0.9	216.72	218.07
643.160	Steel Pipe, 3 x 1.2	217.24	218.62
643.910	Steel Pipe, 13 x 1.05	217.32	218.86
643.965	Steel Pipe, 3 x 0.9	217.36	218.58
644.910	Steel Pipe, 25 x 1.05	217.36	218.99
645.415	Steel Pipe, 18 x 1.2	217.23	218.74
645.850	Steel Pipe, 4 x 0.6	218.45	219.37
645.995	Steel Pipe, 3 x 0.45	217.74	219.11
646.090	Steel Pipe, 15 x 0.6	217.60	219.03
647.095	Concrete Box, 10 x 3.5 x 2.2, 2 x 5.15 x 2.8	215.33	218.68
647.254	Steel Pipe, 3 x 0.9	218.10	219.00
647.605	Steel Pipe, 7 x 1.5	216.95	219.30
647.836	Steel Pipe, 16 x 1.35	217.35	219.29
648.170	Concrete Box, 10 x 1.1 x 0.85	217.68	219.38
648.320	Concrete Box, 8 x 3.5 x 2.5	216.32	219.13
648.565	Concrete Box, 4 x 3.6 x 0.85	217.58	219.18
649.115	Steel Pipe, 10 x 0.45	217.84	219.09
649.520	Concrete Box, 4x 3.5 x 1.5, 4 x 3.5 x 2.2	216.34	218.88
650.260	Steel Pipe, 7 x 0.6	218.14	219.33
650.610	Steel Pipe, 15 x 0.9	217.94	219.55
652.440	Steel Pipe, 12 x 0.75	217.93	219.12
652.636	Steel Pipe, 6 x 0.45	217.87	218.96
653.070	Concrete Pipe, 2 x 0.3	217.12	218.24
653.540	Steel Pipe, 20 x 1.05	216.66	218.08
653.620	Concrete Slab, 1 x 2.4	217.23	218.11
654.445	Steel Pipe, 1 x 0.45	217.59	218.49
655.170	Steel Pipe, 2 x 0.9	217.58	217.75
655.175	Steel Pipe, 21 x 1.5	215.51	217.35
655.895	Steel Pipe, 15 x 1.25	215.91	217.52
658.850	Concrete Box, 4 x 3.1 x 1.1	212.95	214.27
660.610	Concrete Box, 17 x 1.9 x 1.7	209.06	211.35
663.050	Steel Pipe, 2 x 0.45	214.17	214.82
663.351	Steel Pipe, 16 x 0.6	213.61	214.88
664.770	Steel Pipe, 12 x 0.6	211.30	212.15
664.905	Concrete Box, 1 x 0.9 x 0.4	210.61	212.04
Section:	NNS		
Track Lift:	Existing		
Structures:	Existing		

Catchment / Culvert ID	Existing Structure	Structure Invert (as modelled) (mAHD)	Existing Rail Low Point (as modelled) (mAHD)
665.975	Concrete Pipe, 1 x 1.2	208.49	209.79
666.340	Steel Plate web girder riveted, 2 x 19.8, 1 x 36	208.44	209.27
666.341	Timber Girder, 7 x 7.2, 1 x 3.0	202.53	209.11
666.645	Timber Girder, 17 x 4.2	208.31	208.51
666.945	Timber Girder, 12 x 4.2	208.33	210.92
667.210	Timber Girder, 13 x 4.2	207.25	210.17

667.370	Timber Girder, 12 x 4.2, 3 x 7.2	206.75	210.88
667.625	Steel Pipe, 8 x 1.8	208.74	210.83
667.945	Timber Girder, 14 x 4.2, 6 x 7.2	208.35	210.63
668.720	Steel Rolled section, 3 x 2.4	208.65	209.91
669.202	Steel Pipe, 2 x 0.75	208.45	210.42
670.685	Steel Pipe, 4 x 0.6	209.61	210.88
671.420	Steel Pipe, 13 x 1.35	209.36	211.29
672.375	Concrete Box, 7 x 3.5 x 2.0, 10 x 3.5 x 2.5	209.08	211.25
675.275	Steel Pipe, 5 x 0.9	212.10	214.12
675.615	Steel Pipe, 5 x 0.75	213.00	215.45
676.221	Timber Girder, 4 x 7.2, 2x 7.2, 1 x 5.3	207.25	214.30
677.835	Concrete Box, 4 x 0.6	212.84	211.85
677.845	Steel Pipe, 4 x 0.6	212.18	211.91
678.500	Steel Pipe, 4 x 0.75, 7x 0.9	211.81	211.86
679.285	Steel Pipe, 4 x 0.45	210.58	212.12
680.090	Steel Pipe, 1 x 1.2	212.04	213.67
680.610	Concrete Box, 2 x 0.9 x 0.6	211.62	213.48
680.615	Steel Rolled section, 2 x 3.0	211.63	213.31
680.620	Steel Pipe, 3 x 0.9	212.35	213.48
680.720	Concrete Pipe, 1 x 0.9	211.70	213.61
684.897	Irrigation channel	212.43	222.67
686.404	Irrigation channel	220.82	222.52
686.440	Steel Pipe, 3 x 0.6	221.43	222.61
686.495	Steel Pipe, 3 x 0.75	221.40	222.61
690.820	Steel Pipe, 6 x 0.75	224.11	225.58
690.830	Steel Rolled section, 5 x 2.4	223.86	225.57
691.025	Steel Rolled section, 1 x 2.4	225.51	226.42
695.210	Steel Pipe, 3 x 0.9	238.54	240.11
695.310	Steel Pipe, 2 x 0.75	239.33	240.12
696.990	Steel Rolled section, 5 x 3.0	241.35	243.19
699.800	Steel Pipe, 20 x 0.6	248.02	249.33
699.880	Steel Pipe, 22 x 0.9	248.27	249.33
702.360	Concrete Box, 1 x 0.25 x 0.3	259.02	259.51
702.380	Concrete Box, 1 x 0.6 x 0.3	259.03	259.57
703.065	Concrete Box, 1 x 0.9 x 0.45	259.64	260.93
704.790	Steel Pipe, 10 x 1.2	264.17	265.77
706.250	Steel Rolled section, 3 x 3.0	270.52	272.59
706.510	Steel Pipe, 3 x 0.9	272.53	273.63
706.675	Concrete Box, 1 x 0.3 x 0.3	274.22	274.69
707.400	Steel Rolled section, 1x1.8	275.06	275.84
707.550	Concrete Box, 1 x 0.3 x 0.3	274.93	275.56
707.560	Concrete Box, 1 x 0.3 x 0.3	274.99	275.59
707.565	Concrete Box, 1 x 0.3 x 0.3	274.95	275.60
707.575	Concrete Box, 1 x 0.3 x 0.3	275.05	275.71
707.580	Concrete Box, 1 x 0.3 x 0.3	274.97	275.63
708.435	Steel Pipe, 6 x 0.9	272.56	273.74
708.445	Steel Rolled section, 3 x 3.0, 6 x 0.9	272.40	273.74
Section:	NNS		
Track Lift:	Existing		
Structures:	Existing		

Catchment / Culvert ID	Existing Structure	Structure Invert (as modelled) (mAHD)	Existing Rail Low Point (as modelled) (mAHD)
709.74	Steel Pipe, 17 x 0.9	271.94	272.82
711.5	Steel Pipe, 20 x 0.6	268.24	269.55
711.62	Steel Rolled section, 3 x 3.0, 20 x 0.9	267.47	269.35
711.627	Steel Pipe, 20 x 0.9	267.57	269.44
711.775	Concrete Pipe, 6 x 0.9	268.20	269.31
712.54	Concrete Box, 4 x 1.15 x 0.65	269.80	271.15
713.34	Steel Rail, 3 x 0.75	273.26	274.09
713.35	Concrete Box, 3 x 0.45 x 0.45	273.38	274.08
714.61	Steel Rail, 8 x 0.75	277.76	279.25
714.82	Steel Rolled section, 1 x 1.8	279.85	281.02
716.85	Steel Rolled section, 3 x 8.5	276.66	279.41
718.044	Concrete Box, 1 x 0.9 x 0.475	286.46	288.12

718.2	Concrete Box, 1 x 0.4 x 0.4	286.97	287.84
718.39	Steel Pipe, 1 x 0.9	285.98	287.38
718.9	Steel Pipe, 2 x 0.45	288.41	289.08
719.905	Concrete Box, 1 x 0.9 x 0.9	291.71	292.37
720.175	Steel Pipe, 2 x 1.8	288.76	290.36
720.74	Concrete Box, 1 x 0.9 x 0.45	288.71	290.40
721.03	Steel Rolled section, 5 x 2.8	288.36	290.69
721.17	Concrete Box, 1 x 0.9 x 0.3	290.02	291.45
721.645	Steel Pipe, 3 x 1.2	293.54	295.42
722.82	Concrete Box, 1 x 0.9 x 0.45	300.49	301.68
723.005	Concrete Box, 2 x 0.9 x 0.45	299.82	301.39
723.225	Steel Pipe, 4 x 0.9	299.61	301.11
723.6	Concrete Pipe, 7 x 0.6	299.33	300.48
723.875	Steel Rolled section, 2 x 2.4	299.04	300.62
724.62	Concrete Pipe, 6 x 1.2	298.67	300.65
725.275	Steel Rolled section, 4 x 3.0	301.27	302.83
725.545	Steel Pipe, 8 x 0.3	303.52	304.42
725.59	Concrete Box, 1 x 0.9 x 0.45	303.20	304.51
726.115	Steel Pipe, 3 x 0.9	307.63	308.92
726.54	Concrete Pipe, 4 x 1.2	307.31	308.71
726.96	Concrete Pipe, 9 x 0.9	308.95	310.19
727.695	Steel Pipe, 4 x 1.05	308.77	310.25
728.43	Steel Pipe, 8 x 1.05	306.26	307.57
728.91	Concrete Box, 1 x 0.9 x 0.9	303.54	304.84
729.7	Concrete Box, 2 x 0.9 x 0.9	298.56	299.72
729.96	Steel Pipe, 3 x 0.9, 7 x 0.9	295.92	297.55
730.39	Steel Pipe, 4 x 0.45	294.17	295.22
730.57	Concrete Box, 2 x 0.9 x 0.9	292.36	293.71
732.01	Concrete Box, 1 x 0.9 x 0.9	287.26	288.17
734.945	Steel Plate web girder welded, 8 x 8.5	272.36	275.89
735.115	Steel Plate web girder riveted, 2 x 19.8, 2 x 12	267.37	276.93
736.21	Timber Timber girder, 5 x 0.7	284.06	285.07
736.3	Concrete Box, 1 x 0.9 x 0.9	284.04	285.15
737.555	Steel Rolled section, 3 x 3.5	276.34	278.30
740.665	Steel Plate web girder welded, 5 x 8.4	265.87	268.82
740.945	Steel Pipe, 4 x 0.9	267.06	268.85
741.345	Steel Rolled section, 1 x 1.8	270.41	272.12
742.11	Steel Pipe, 5 x 0.6	273.98	274.65
742.24	Steel Rolled section, 1 x 1.8	274.31	275.44
742.69	Steel Rolled section, 1 x 1.8	277.81	279.53
744.555	Steel Rolled section, 4 x 5.2, 2 x 3.5	275.40	277.97
Section:	NNS		
Track Lift:	Existing		
Structures:	Existing		

Catchment / Culvert ID	Existing Structure	Structure Invert (as modelled) (mAHD)	Existing Rail Low Point (as modelled) (mAHD)
745.41	Concrete Box, 1 x 0.9 x 0.9	284.18	285.56
746.025	Concrete Box, 2 x 0.9 x 0.9	290.07	291.39
746.6	Concrete Box, 1 x 0.9 x 0.9	295.59	296.87
747.905	Concrete Box, 1 x 0.9 x 0.9	298.03	298.84
748.425	Concrete Box, 2 x 0.9 x 0.6	289.45	291.40
749.45	Concrete Box, 1 x 0.9 x 0.9	281.86	282.98
750.965	Steel Rolled section, 5 x 5.4	266.66	269.06
751.13	Concrete Box, 2 x 0.9 x 0.6	267.81	269.14
752.49	Concrete Box, 2 x 0.9 x 0.9	274.57	275.14
753.1	Steel Pipe, 20 x 0.9	272.49	273.96
755.225	Concrete Box, 3 x 0.9 x 0.9	274.19	275.49
755.495	Concrete Box, 1 x 0.9 x 0.9	273.55	275.03
755.975	Concrete Box, 2 x 0.9 x 0.9	274.21	274.98
757.003	Steel Pipe, 24 x 0.9	270.01	271.66
758.215	Steel Pipe, 2 x 0.6	267.14	267.56
758.255	Steel Pipe, 2 x 0.6	266.56	267.54
Section:	NNS		
Track Lift:	Design, Existing		

Structures:		100 year ARI, Existing								
Catchment / Culvert ID	Local Catchment Area (ha)	Local Catchment Probabilistic Ration Method Peak Flow Rate (m³/s)								
		50% AEP	20% AEP	10%	5%	2% AEP	1% AEP	0.5% AEP	0.2% AEP	PMF
573.360	5.1	0.0593	0.122	0.181	0.304	0.587	0.837	1.16	1.55	12.1
574.375	0.9	0.0132	0.0271	0.0402	0.0871	0.131	0.187	0.307	0.411	3.03
574.405	1.2	0.0178	0.0366	0.0543	0.0914	0.177	0.252	0.4	0.535	3.99
576.030	2.3	0.0308	0.0632	0.0938	0.158	0.306	0.435	0.648	0.865	6.59
579.475	819	3.06	6.23	9.19	15.4	29.6	42.1	49.6	66	602
579.585	0.000979	7.65E-05	0.000154	0.000185	0.000469	0.000666	0.00204	0.00273	0.0164	
579.965	0.1	0.00159	0.00327	0.00482	0.0108	0.0156	0.0223	0.0478	0.064	0.437
581.180	262	1.32	2.69	3.97	6.67	12.9	18.3	21.3	28.5	250
581.800	2.6	0.0336	0.0691	0.102	0.173	0.334	0.476	0.701	0.936	7.15
582.605	1050	3.68	7.44	11	18.4	35.4	50.3	59.6	79.4	729
582.837	0.0177	0.000531	0.00109	0.00158	0.00204	0.005	0.00716	0.0174	0.0233	0.152
583.430	23000	34.4	68.2	99.9	166	315	447	585	779	7880
584.805	6.6	0.0732	0.15	0.223	0.315	0.724	1.03	1.4	1.87	14.7
586.200	2.2	0.0294	0.0603	0.0895	0.151	0.292	0.416	0.621	0.83	6.31
587.090	3010	7.92	16	23.5	39.3	75.1	107	130	173	1640
587.700	146	0.845	1.73	2.56	4.3	8.3	11.8	13.8	18.5	159
587.835	4.1	0.0489	0.1	0.149	0.251	0.485	0.691	0.977	1.31	10.1
587.915	0.8	0.0118	0.0243	0.0361	0.0603	0.118	0.168	0.28	0.374	2.75
588.815	283	1.39	2.84	4.2	7.05	13.6	19.4	22.5	30	265
589.300	0.6	0.0104	0.0213	0.0317	0.0551	0.103	0.147	0.25	0.334	2.44
590.020	499	2.13	4.33	6.39	10.7	20.6	29.3	34.3	45.8	411
590.225	107	0.665	1.36	2.01	3.39	6.53	9.29	10.9	14.6	125
591.685	2.7	0.0342	0.0702	0.104	0.175	0.339	0.484	0.711	0.949	7.25
591.766	1	0.0155	0.0318	0.0472	0.0959	0.154	0.219	0.354	0.473	3.51
591.925	0.3	0.00483	0.00992	0.0147	0.0269	0.0481	0.0686	0.128	0.171	1.22
592.075	2670	7.23	14.7	21.5	36	68.9	97.7	119	158	1500
593.060	21.7	0.191	0.392	0.581	0.978	1.89	2.69	3.37	4.49	36.6
593.820	0.2	0.00352	0.00724	0.0108	0.0181	0.035	0.05	0.0971	0.13	0.913
595.520	68.4	0.471	0.967	1.43	2.41	4.65	6.61	7.88	10.5	88.8
596.430	838	3.12	6.33	9.34	15.7	30.1	42.8	50.4	67.2	613
597.230	160	0.907	1.85	2.74	4.61	8.88	12.6	14.8	19.7	171
599.445	6450	13.7	27.5	40.3	67.2	129	183	228	304	2950
600.500	576	2.36	4.82	7.11	11.9	23	32.6	38.2	50.9	459
600.800	334	1.58	3.22	4.75	7.98	15.4	21.9	25.5	34	302
601.865	12500	22.1	44	64.8	108	206	291	374	499	4930
602.450	0.0003	4.44E-05	8.65E-05	8.57E-05	0.000174	0.000243	0.00085	0.00114	0.00658	
603.850	0.0003	4.44E-05	8.65E-05	8.57E-05	0.000174	0.000243	0.00085	0.00114	0.00658	
607.830	13600	23.4	46.8	68.5	114	218	307	396	527	5240
608.070	1770	5.39	10.9	16	26.8	51.4	73	87.6	117	1090
609.550	4500	10.6	21.2	31.3	52.2	100	141	175	233	2240
613.190	113	0.695	1.42	2.11	3.54	6.83	9.72	11.4	15.2	131
613.990	1220	4.09	8.3	12.2	20.5	39.4	55.8	66.3	88.4	816
614.445	0.0012	8.55E-05	0.000173	0.000212	0.000555	0.000789	0.00237	0.00318	0.0192	
614.650	787	2.98	6.04	8.93	15	28.8	40.8	48.1	64.1	584
614.930	0.0403	0.00102	0.0021	0.00308	0.00821	0.00991	0.0142	0.032	0.0428	0.287
614.960	9470	18.1	36.4	52.9	88.6	169	239	303	404	3970
616.170	89.9	0.584	1.19	1.76	2.97	5.73	8.16	9.65	12.9	110
617.075	0.0003	4.44E-05	8.65E-05	8.57E-05	0.000174	0.000243	0.00085	0.00114	0.00658	
618.025	450	1.97	4.01	5.93	9.94	19.2	27.2	31.8	42.4	380
619.030	2.5	0.0324	0.0666	0.0988	0.166	0.322	0.459	0.678	0.906	6.91
620.610	132	0.783	1.6	2.37	3.99	7.69	10.9	12.8	17.1	148
621.855	6.1	0.0681	0.14	0.207	0.349	0.674	0.961	1.31	1.75	13.8
623.030	1760	5.37	10.8	16	26.8	51.3	72.8	87.4	116	1090
624.755	138	0.809	1.66	2.45	4.12	7.95	11.3	13.3	17.7	153
625.520	376	1.72	3.51	5.18	8.7	16.8	23.9	27.8	37.1	330
627.230	0.1	0.00131	0.00269	0.00396	0.00673	0.0128	0.0183	0.0401	0.0537	0.364

Section: NNS

Track Lift: Design, Existing

Structures: 100 year ARI, Existing

Catchment / Culvert ID	Local Catchment Area (ha)	Local Catchment Probabilistic Ration Method Peak Flow Rate (m³/s)								
		50% AEP	20% AEP	10%	5%	2% AEP	1% AEP	0.5% AEP	0.2% AEP	PMF
627.340	0.0019	0.000112	0.000228	0.000293	0.000809	0.00115	0.00334	0.00447	0.0273	
627.490	10800	19.7	39.7	58.1	97.1	185	262	334	445	4400
630.870	0.1	0.0021	0.00432	0.00639	0.0108	0.0208	0.0297	0.0614	0.0821	0.567
631.085	294	1.43	2.93	4.33	7.27	14	19.9	23.2	31	273
631.525	0.0003	4.44E-05	8.65E-05	8.57E-05	0.000174	0.000243	0.00085	0.00114	0.00658	
633.720	1650	5.09	10.3	15.3	25.5	48.9	69.4	83.2	111	1030

635.090	0.0003	4.44E-05	8.65E-05	8.57E-05	0.000174	0.000243	0.00085	0.00114	0.00658
635.355	4460	10.5	21.2	31 ^{51.7}	99.1	140	174	232	2220
636.650	0.0003	4.44E-05	8.65E-05	8.57E-05	0.000174	0.000243	0.00085	0.00114	0.00658
637.120	0.1	0.00201	0.00413	0.00612	0.0199	0.0284	0.059	0.079	0.544
637.230	0.0003	4.44E-05	8.65E-05	8.57E-05	0.000174	0.000243	0.00085	0.00114	0.00658
638.080	0.00313	0.000153	0.000313	0.000419	0.00121	0.00173	0.00482	0.00645	0.0401
638.460	0.000064	2.99E-05	5.33E-05	3.45E-05	4.17E-05	5.58E-05	0.000271	0.000363	0.002
639.690	0.0194	0.00057	0.00118	0.0017	0.0054	0.00773	0.0186	0.0249	0.164
641.540	31000	42.4	84.7	123 ²⁰⁵	392	550	732	973	9910
642.315	907	3.3	6.7	9.88 ^{16.6}	31.9	45.2	53.5	71.3	652
643.160	116000	109	218	318 ⁵³⁰	1000	1420	1930	2570	27300
643.910	297	1.44	2.94	4.36 ^{7.32}	14.1	20.1	23.4	31.2	275
643.965	82.6	0.547	1.12	1.65 ^{2.79}	5.37	7.65	9.07	12.1	103
644.910	0.1	0.00133	0.00273	0.00403	0.013	0.0186	0.0407	0.0545	0.37
645.415	2860	7.64	15.4	22.7 ^{37.9}	72.4	103	125	167	1580
645.850	0.00633	0.000247	0.000509	0.000799	0.00215	0.00308	0.00812	0.0109	0.069
645.995	581	2.38	4.83	7.14 ¹²	23.1	32.8	38.4	51.2	462
646.090	0.0001	3.22E-05	5.92E-05	4.45E-05	6.43E-05	8.76E-05	0.000377	0.000505	0.00282
647.095	0.00205	0.000117	0.000239	0.000309	0.00086	0.00123	0.00353	0.00473	0.029
647.254	0.1	0.0022	0.00452	0.0067	0.0218	0.0311	0.064	0.0856	0.592
647.605	2650	7.2	14.6	21.5 ^{35.9}	68.6	97.3	118	158	1490
647.836	0.00249	0.000132	0.00027	0.000359	0.00101	0.00144	0.00407	0.00545	0.0336
648.170	35.6	0.283	0.581	0.859 ^{1.45}	2.79	3.98	4.86	6.48	53.7
648.320	197	1.06	2.17	3.21 ^{5.39}	10.4	14.8	17.3	23	201
648.565	0.00159	0.000101	0.000204	0.000258	0.000699	0.000996	0.00292	0.00392	0.0238
649.115	6040	13.1	26.3	38.6 ^{64.4}	123	174	217	290	2810
649.520	0.00484	0.000205	0.000422	0.000579	0.00173	0.00247	0.00666	0.00892	0.0561
650.260	34.9	0.279	0.572	0.847 ^{1.43}	2.75	3.92	4.79	6.39	52.9
650.610	886	3.24	6.6	9.71 ^{16.3}	31.3	44.5	52.5	70	640
652.440	0.1	0.00185	0.00382	0.00565	0.0183	0.0262	0.055	0.0736	0.506
652.636	125	0.748	1.53	2.26 ^{3.81}	7.35	10.5	12.3	16.4	141
653.070	152	0.869	1.78	2.63 ^{4.42}	8.53	12.1	14.2	18.9	164
653.540	0.1	0.00126	0.00259	0.00381	0.0123	0.0176	0.0387	0.0518	0.351
653.620	0.0155	0.00048	0.000988	0.00142	0.00449	0.00642	0.0158	0.0211	0.138
654.445	1180	4	8.11	11.9 ²⁰	38.5	54.6	64.8	86.3	796
655.170	0.000482	0.000054	0.000107	0.000118	0.00026	0.000366	0.00121	0.00162	0.00948
655.175	0.0003	4.44E-05	8.65E-05	8.57E-05	0.000174	0.000243	0.00085	0.00114	0.00658
655.895	0.0001	3.22E-05	5.92E-05	4.45E-05	6.43E-05	8.76E-05	0.000377	0.000505	0.00282
658.850	2750	7.4	14.9	22 ^{36.7}	70.6	99.8	121	162	1530
660.610	156	0.889	1.82	2.69 ^{4.52}	8.72	12.4	14.5	19.4	168
663.050	471	2.04	4.16	6.13 ^{10.3}	19.8	28.2	32.9	43.9	393
663.351	9150	17.5	35.4	51.9 ⁸⁶	165	233	295	395	3870
664.770	0.1	0.00274	0.00563	0.00835	0.0272	0.0388	0.0777	0.104	0.725
664.905	1.8	0.0243	0.05	0.0742	0.242	0.345	0.527	0.704	5.31
665.975	4.2	0.0504	0.104	0.154	0.5	0.712	1	1.34	10.4
666.340	20.5	0.182	0.374	0.555	1.8	2.57	3.23	4.31	35
666.341	0.4	0.00715	0.0147	0.0218	0.0712	0.102	0.18	0.241	1.74
666.645	7.7	0.0829	0.17	0.252	0.822	1.17	1.57	2.1	16.6
666.945	1280000	618	1250	1810 ³⁰⁵⁰	5830	8210	11500	15200	174000
667.210	47	0.352	0.721	1.07 ^{1.8}	3.47	4.94	5.97	7.96	66.5

Section: NNS

Track Lift: Design, Existing

Structures: 100 year ARI, Existing

Catchment / Culvert ID	Local Catchment Area (ha)	Local Catchment Probabilistic Ration Method Peak Flow Rate (m³/s)							
		50% AEP	20% AEP	10	5	2% AEP	1% AEP	0.5% AEP	0.2% AEP
667.370	13.4	0.13	0.267	0.395 ^{0.665}	1.29	1.83	2.36	3.15	25.3
667.625	4	0.0483	0.0992	0.147 ^{0.248}	0.479	0.683	0.967	1.29	9.99
667.945	1300	4.29	8.72	12.9 ^{21.5}	41.3	58.7	69.8	93	860
668.720	5.2	0.0601	0.123	0.183 ^{0.308}	0.595	0.848	1.17	1.57	12.2
669.202	26.8	0.227	0.464	0.688 ^{1.16}	2.24	3.18	3.94	5.26	43.2
670.685	521	2.19	4.47	6.61 ^{11.1}	21.3	30.3	35.4	47.2	425
671.420	0.6	0.00993	0.0204	0.0303 ^{0.0511}	0.0988	0.141	0.24	0.321	2.34
672.375	0.000436	5.17E-05	0.000102	0.000108 ^{0.000108}	0.000239	0.000336	0.00112	0.0015	0.00878
675.275	64.1	0.449	0.919	1.36 ^{2.29}	4.42	6.29	7.51	10	84.5
675.615	1650	5.1	10.4	15.2 ^{25.6}	49	69.6	83.4	111	1030
676.221	6.9	0.0754	0.155	0.229 ^{0.386}	0.747	1.06	1.44	1.92	15.1
677.835	0.1	0.003	0.00617	0.00915 ^{0.0105}	0.0298	0.0425	0.0843	0.113	0.788
677.845	13500	23.3	46.6	68.1 ¹¹³	217	307	394	526	5230
678.500	0.00099	7.69E-05	0.000155	0.000186 ^{0.000186}	0.000474	0.000672	0.00206	0.00276	0.0165
679.285	0.00188	0.000111	0.000227	0.000291 ^{0.000291}	0.000802	0.00114	0.00331	0.00444	0.0271

680.090	195	1.05	2.15	3.18	5.35	10.3	14.7	17.1	22.8	199
680.610	24	0.207	0.425	0.629	1.06	2.05	2.92	3.63	4.84	39.6
680.615	0.0189	0.000558	0.00115	0.00167	0.00167	0.00528	0.00756	0.0183	0.0244	0.16
680.620	262	1.32	2.69	3.97	6.67	12.9	18.3	21.3	28.4	250
680.720	0.2	0.00371	0.00763	0.0113	0.0113	0.0369	0.0527	0.102	0.136	0.958
684.897	0.000729	6.57E-05	0.000132	0.000152	0.000152	0.000368	0.000521	0.00164	0.0022	0.0131
686.404	35.3	0.282	0.577	0.855	1.44	2.78	3.96	4.84	6.45	53.4
686.440	1.9	0.026	0.0534	0.0792	0.133	0.258	0.368	0.558	0.745	5.63
686.495	6.4	0.071	0.146	0.216	0.364	0.703	1	1.36	1.82	14.3
690.820	0.0002	3.85E-05	7.38E-05	6.69E-05	0.000122	0.000169	0.00063	0.000844	0.00481	
690.830	1340	4.39	8.89	13.1	21.9	42.2	59.9	71.3	95.1	880
691.025	0.00167	0.000104	0.000211	0.000268	0.000268	0.000728	0.00104	0.00304	0.00407	0.0248
695.210	219	1.15	2.35	3.46	5.82	11.2	16	18.6	24.8	217
695.310	0.000269	4.26E-05	8.27E-05	8.01E-05	0.000158	0.00022	0.000784	0.00105	0.00605	
696.990	629	2.53	5.14	7.58	12.7	24.5	34.7	40.7	54.4	491
699.800	392	1.78	3.62	5.34	8.98	17.3	24.6	28.7	38.3	341
699.880	1920	5.69	11.5	17	28.5	54.6	77.4	93	124	1160
702.360	0.0003	4.44E-05	8.65E-05	8.57E-05	0.000174	0.000243	0.00085	0.00114	0.00658	
702.380	0.00149	9.66E-05	0.000196	0.000246	0.000661	0.000941	0.00278	0.00372	0.0226	
703.065	103	0.647	1.32	1.96	3.3	6.36	9.05	10.7	14.2	122
704.790	581	2.38	4.84	7.14	12	23.1	32.8	38.4	51.2	462
706.250	737	2.84	5.76	8.52	14.3	27.5	38.9	45.8	61.1	555
706.510	0.00213	0.00012	0.000245	0.000317	0.000886	0.00126	0.00363	0.00486	0.0298	
706.675	0.00209	0.000119	0.000242	0.000313	0.000874	0.00125	0.00358	0.0048	0.0294	
707.400	0.00662	0.000256	0.000526	0.000734	0.00223	0.00319	0.0084	0.0113	0.0715	
707.550	70.4	0.482	0.989	1.46	2.46	4.75	6.77	8.06	10.7	90.8
707.560	0.00537	0.00022	0.000453	0.000626	0.00188	0.00269	0.00719	0.00963	0.0608	
707.565	0.027	0.00074	0.00152	0.00222	0.00711	0.0102	0.0238	0.0318	0.211	
707.575	14.7	0.14	0.287	0.425	0.717	1.38	1.97	2.53	3.37	27.2
707.580	0.00183	0.000109	0.000223	0.000285	0.000783	0.00112	0.00324	0.00434	0.0265	
708.435	0.012	0.000394	0.000812	0.00116	0.00362	0.00518	0.013	0.0174	0.113	
708.445	754	2.88	5.86	8.65	14.5	27.9	39.7	46.6	62.2	565
709.740	136	0.797	1.63	2.42	4.07	7.83	11.2	13.1	17.5	150
711.500	2500	6.89	14	20.6	34.4	66	93.6	113	151	1430
711.620	501	2.13	4.34	6.42	10.8	20.7	29.5	34.4	45.9	412
711.627	0.3	0.00594	0.0122	0.0181	0.0592	0.0844	0.153	0.205	0.205	1.47
711.775	44.3	0.336	0.69	1.02	1.72	3.32	4.73	5.72	7.63	63.6
712.540	347	1.62	3.3	4.89	8.22	15.8	22.5	26.2	34.9	310
713.340	0.1	0.00126	0.00259	0.00381	0.0123	0.0176	0.0388	0.0519	0.351	
713.350	18.8	0.17	0.349	0.517	0.871	1.68	2.4	3.02	4.04	32.8
714.610	229	1.19	2.43	3.59	6.02	11.6	16.5	19.3	25.7	225

Section: NNS

Track Lift: Design, Existing

Structures: 100 year ARI, Existing

Catchment / Culvert ID	Local Catchment Area (ha)	Local Catchment Probabilistic Ration Method Peak Flow Rate (m³/s)								
		50% AEP	20% AEP	10	5	2% AEP	1% AEP	0.5% AEP	0.2% AEP	PMF
714.820	0.00239	0.000129	0.000263	0.000345	0.000973	0.00139	0.00395	0.00529	0.0326	
716.850	17500	28	56.4	81.8	137	262	369	478	637	6390
718.044	1.1	0.0159	0.0325	0.0483	0.0814	0.158	0.225	0.361	0.483	3.59
718.200	0.2	0.00426	0.00875	0.013	0.0218	0.0424	0.0605	0.115	0.153	1.09
718.390	2.4	0.0317	0.065	0.0965	0.162	0.314	0.448	0.664	0.887	6.76
718.900	23.7	0.205	0.421	0.624	1.05	2.03	2.89	3.6	4.8	39.3
719.905	0.0409	0.00103	0.00212	0.00312	0.0101	0.0144	0.0324	0.0433	0.291	
720.175	33.4	0.27	0.553	0.819	1.38	2.66	3.79	4.64	6.2	51.2
720.740	30.8	0.252	0.518	0.767	1.29	2.49	3.55	4.37	5.83	48
721.030	1110	3.81	7.73	11.4	19.2	36.8	52.2	61.8	82.4	759
721.170	8.6	0.0907	0.186	0.276	0.465	0.898	1.28	1.7	2.27	18
721.645	119	0.72	1.48	2.18	3.67	7.07	10.1	11.8	15.8	136
722.820	15	0.142	0.291	0.431	0.726	1.4	2	2.56	3.42	27.5
723.005	205	1.09	2.23	3.3	5.55	10.7	15.2	17.8	23.7	207
723.225	2.4	0.0319	0.0655	0.0972	0.164	0.316	0.451	0.668	0.893	6.81
723.600	102	0.644	1.32	1.95	3.28	6.32	9.01	10.6	14.2	121
723.875	66.9	0.464	0.951	1.41	2.37	4.57	6.51	7.76	10.4	87.3
724.620	142	0.827	1.69	2.51	4.21	8.12	11.6	13.5	18.1	156
725.275	715	2.78	5.63	8.32	14	26.8	38.1	44.8	59.7	542
725.545	0.2	0.00314	0.00647	0.0096	0.088	0.0312	0.0446	0.0879	0.117	0.823
725.590	18.9	0.171	0.351	0.519	0.875	1.69	2.4	3.04	4.05	32.9
726.115	75.3	0.508	1.04	1.54	2.59	5	7.13	8.46	11.3	95.6
726.540	11.4	0.113	0.233	0.346	0.581	1.12	1.6	2.09	2.79	22.3
726.960	116	0.712	1.45	2.15	3.62	6.98	9.94	11.7	15.6	134

727.695	8.9	0.093	0.191	0.283	0.476	0.92	1.31	1.74	2.32	18.4
728.430	211	1.12	2.28	3.37	5.67	10.9	15.6	18.2	24.2	212
728.910	15.4	0.145	0.298	0.441	0.743	1.44	2.04	2.61	3.49	28.1
729.700	0.1	0.00207	0.00425	0.00631	0.0205	0.0292	0.0606	0.0811	0.559	
729.960	180	0.992	2.03	3	5.04	9.71	13.8	16.1	21.5	187
730.390	0.1	0.0028	0.00576	0.00853	0.0278	0.0397	0.0792	0.106	0.739	
730.570	42.7	0.327	0.669	0.991	1.67	3.22	4.59	5.56	7.42	61.7
732.010	11	0.111	0.227	0.336	0.566	1.09	1.56	2.04	2.72	21.7
734.945	1070	3.74	7.56	11.2	18.7	35.9	51	60.5	80.5	740
735.115	71900	77	154	225	372	711	1000	1370	1820	19000
736.210	71.9	0.491	1	1.49	2.5	4.83	6.87	8.17	10.9	92.3
736.300	16.8	0.156	0.32	0.474	0.798	1.54	2.2	2.79	3.72	30.1
737.555	1550	4.89	9.88	14.5	24.4	46.9	66.4	79.5	106	984
740.665	28200	39.6	78.8	115	191	364	516	680	906	9200
740.945	0.0187	0.000554	0.00114	0.00165	0.00524	0.00749	0.0181	0.0243	0.159	
741.345	7.6	0.0816	0.168	0.248	0.418	0.808	1.15	1.55	2.07	16.3
742.110	215	1.13	2.31	3.42	5.74	11.1	15.8	18.4	24.5	214
742.240	0.000266	4.24E-05	8.23E-05	7.95E-05	0.000156	0.000218	0.000777	0.00104	0.00599	
742.690	0.0027	0.000139	0.000285	0.000378	0.00107	0.00153	0.00432	0.00579	0.0358	
744.555	4510	10.6	21.2	31.2	52.3	99.8	142	175	234	2240
745.410	0.000732	6.58E-05	0.000132	0.000152	0.000369	0.000522	0.00164	0.0022	0.0131	
746.025	56.1	0.405	0.829	1.23	2.07	3.99	5.69	6.81	9.09	76.3
746.600	0.0346	0.000902	0.00186	0.00272	0.00875	0.0125	0.0286	0.0383	0.256	
747.905	12.1	0.119	0.245	0.363	0.611	1.18	1.68	2.18	2.92	23.3
748.425	43.3	0.33	0.678	1	1.69	3.26	4.64	5.62	7.5	62.5
749.450	11.2	0.112	0.23	0.34	0.573	1.11	1.58	2.06	2.75	22
750.965	2560	7.04	14.2	20.9	34.9	66.8	94.9	115	153	1450
751.130	142	0.826	1.69	2.5	4.21	8.11	11.5	13.5	18	156
752.490	5.9	0.0665	0.137	0.202	0.341	0.659	0.939	1.29	1.72	13.5
753.100	458	1.99	4.07	6	10.1	19.4	27.6	32.2	43	385
755.225	62.9	0.443	0.907	1.34	2.26	4.36	6.21	7.41	9.89	83.3
755.495	504	2.14	4.36	6.44	10.8	20.8	29.6	34.6	46.1	414

Section: NNS

Track Lift: Design, Existing

Structures: 100 year ARI, Existing

Catchment / Culvert ID	Local Catchment Area (ha)	Local Catchment Probabilistic Ration Method Peak Flow Rate (m³/s)								
		50% AEP	20% AEP	10	5	2% AEP	1% AEP	0.5% AEP	0.2% AEP	PMF
755.975	71.5	0.488	1	1.48	2.49	4.81	6.85	8.14	10.9	91.9
757.003	269	1.34	2.74	4.05	6.8	13.1	18.6	21.7	28.9	255
758.215	10.5	0.107	0.219	0.325	0.547	1.06	1.51	1.97	2.64	21
758.255	15.4	0.145	0.299	0.442	0.744	1.44	2.05	2.62	3.5	28.2

Note: The above table includes the local catchment areas only and does not include the interaction of some adjacent catchments

Appendix E – Existing flood levels (local and regional catchments)

This appendix provides a summary of the existing modelled local and regional catchment flood levels for a range of design flood events.

Section:	NNS
Track Lift:	Existing
Structures:	Existing

Culvert ID	Modelled Flood Level Local Catchments (mAHD)									Regional Catchment
	50% AEP	20% AEP	10% AEP	5% AEP	2% AEP	1% AEP	0.5% AEP	0.2% AEP	PMF	
573.360	217.32	217.33	217.33	217.33	217.34	217.34	217.35	217.37	219.51	-
574.375	217.71	217.71	217.98	218.30	218.42	218.45	218.71	218.79	219.39	-
574.405	218.20	218.43	218.53	218.54	218.65	218.67	218.71	218.79	219.50	-
576.030	229.78	229.79	229.79	229.80	229.82	229.84	229.86	229.88	230.11	-
579.475	243.33	243.42	243.43	243.45	243.48	243.49	243.51	243.53	243.61	-
579.585	243.63	243.64	243.65	243.65	243.66	243.68	243.75	243.79	244.68	-
579.965	241.89	241.97	242.03	242.15	242.27	242.29	242.34	242.39	243.34	-
581.180	235.58	236.27	236.28	236.30	236.33	236.34	236.35	236.37	237.41	-
581.800	235.49	235.54	235.80	235.98	236.18	236.30	236.35	236.55	238.59	-
582.605	237.28	237.66	237.68	237.70	237.73	237.74	237.76	237.77	238.62	-
582.837	237.67	237.67	237.68	237.69	237.71	237.73	237.83	237.88	239.00	-
583.430	238.92	238.95	238.95	238.95	239.09	239.33	239.58	239.93	239.99	-
584.805	241.83	241.84	241.84	241.85	241.87	241.88	241.89	241.90	242.00	-
586.200	244.73	244.79	244.84	244.93	245.11	245.24	245.25	245.44	247.11	-
587.090	245.19	245.21	245.23	245.25	245.28	245.30	245.41	245.44	245.51	-
587.700	244.10	244.11	244.12	244.13	244.14	244.15	244.16	244.17	244.18	-
587.835	244.10	244.10	244.11	244.12	244.14	244.15	244.16	244.16	244.33	-
587.915	244.00	244.00	244.01	244.02	244.04	244.06	244.10	244.13	244.55	-
588.815	243.56	243.58	243.59	243.61	243.64	243.65	243.67	243.68	243.71	-
589.300	242.61	242.76	242.87	243.08	243.18	243.20	243.24	243.28	243.73	-
590.020	241.87	241.89	241.91	241.93	242.04	242.12	242.14	242.14	242.22	-
590.225	242.16	242.17	242.18	242.20	242.22	242.23	242.24	242.26	242.34	-
591.685	237.02	237.28	237.47	237.78	238.70	238.86	238.87	238.94	240.10	-
591.766	237.07	237.28	237.47	237.78	238.69	238.84	238.85	238.89	240.03	-
591.925	237.02	237.28	237.47	237.78	238.69	238.71	238.79	238.85	239.99	-
592.075	237.34	237.36	237.47	237.77	238.69	238.83	238.84	238.86	240.04	-
593.060	241.35	241.36	241.36	241.80	241.82	241.83	241.84	241.85	241.94	-
593.820	240.77	241.03	241.24	241.62	241.83	241.91	241.91	242.00	242.75	-
595.520	242.49	242.50	242.51	242.52	242.55	242.56	242.57	242.59	242.63	-
596.430	239.43	239.81	240.08	240.57	240.92	241.01	241.02	241.12	242.19	-
597.230	240.57	240.89	241.15	241.60	241.87	242.19	242.20	242.21	242.28	-
599.445	237.11	237.37	237.64	238.07	238.25	238.28	238.28	238.30	240.04	-
600.500	234.94	235.37	235.70	236.29	237.41	237.94	237.96	237.96	240.04	-
600.800	236.66	236.68	236.69	236.71	236.74	237.22	237.23	237.90	240.04	-
601.865	238.04	238.07	238.09	238.11	238.14	238.16	238.17	238.19	238.22	-
602.450	237.21	237.83	238.08	238.23	238.44	238.57	238.59	238.63	239.63	-
603.850	237.30	237.57	237.79	238.19	238.93	239.21	239.22	239.24	239.85	-
607.830	238.61	238.95	239.21	239.43	239.48	239.51	239.53	239.56	239.62	-
608.070	239.47	239.50	239.51	239.54	239.56	239.58	239.60	239.62	239.69	-
609.550	238.81	239.08	239.30	239.69	239.86	239.93	239.94	240.05	240.78	-
613.190	228.82	228.84	228.85	228.86	228.89	228.90	228.91	228.92	229.27	-
613.990	226.56	226.59	226.60	226.62	226.65	226.74	226.78	227.04	229.12	-
614.445	225.37	225.37	225.49	225.85	226.56	226.73	226.75	226.94	228.91	-
614.650	225.27	225.30	225.49	225.84	226.52	226.69	226.71	226.88	228.79	-
614.930	224.66	224.88	225.15	225.49	225.52	226.36	226.37	226.73	228.68	-
614.960	224.80	224.83	224.85	225.06	225.47	226.06	226.16	226.63	228.58	-
616.170	228.97	229.09	229.18	229.35	229.66	229.90	229.91	230.28	232.20	-
617.075	242.78	242.79	242.79	242.79	242.80	242.80	242.86	242.89	243.50	-
618.025	241.67	241.69	241.70	241.80	242.43	242.82	242.83	243.32	243.98	-
619.030	240.64	240.65	240.65	240.65	240.80	240.89	241.00	241.14	241.36	-
620.610	224.06	224.33	224.54	224.92	225.63	226.16	226.19	227.09	229.47	-
621.855	231.81	231.94	232.05	232.23	232.57	232.83	232.85	233.26	235.39	-
623.030	229.27	229.46	229.61	229.88	230.39	230.76	230.77	231.33	233.07	-
624.755	234.55	234.57	234.58	234.60	234.62	234.63	234.65	234.66	234.70	-
625.520	228.34	228.36	228.38	228.40	228.42	228.44	228.45	228.47	228.55	-
627.230	223.04	223.05	223.06	223.57	223.77	223.78	223.78	223.90	225.25	-
627.340	222.92	222.93	222.93	222.95	223.26	223.37	223.38	223.50	224.67	-

Section:	NNS
Track Lift:	Existing
Structures:	Existing

Culvert ID	Modelled Flood Level Local Catchments (mAHD)									Regional Catchment
	50% AEP	20% AEP	10% AEP	5% AEP	2% AEP	1% AEP	0.5% AEP	0.2% AEP	PMF	
627.490	222.24	222.33	222.40	222.52	222.75	222.92	222.94	222.95	223.47	-
630.870	222.73	222.74	222.74	222.76	222.78	222.80	222.87	222.92	223.80	-
631.085	222.05	222.07	222.08	222.10	222.13	222.14	222.15	222.17	222.20	-
631.525	221.47	221.48	221.48	221.48	221.48	221.49	221.56	221.59	222.20	-
633.720	217.49	217.83	218.09	218.52	218.72	218.84	218.86	218.87	219.95	-
635.090	218.47	218.48	218.48	218.49	218.60	218.74	218.75	218.82	219.67	-

635.355	218.73	218.76	218.77	218.80	218.82	218.84	218.87	218.89	219.67	-
636.650	217.57	217.57	217.61	217.91	218.09	218.14	218.24	218.31	219.66	-
637.120	217.45	217.46	217.53	217.69	217.73	217.75	217.87	217.92	219.59	-
637.230	218.31	218.31	218.31	218.32	218.32	218.33	218.38	218.42	219.03	-
638.080	216.92	216.93	216.93	216.94	216.96	216.98	217.08	217.13	219.48	-
638.460	216.92	216.93	216.93	216.93	216.93	216.93	216.96	216.97	219.44	-
639.690	216.92	216.93	216.93	216.94	216.96	216.99	217.06	217.11	219.46	-
641.540	213.36	213.86	214.24	214.96	216.27	216.74	216.75	216.86	219.46	-
642.315	216.74	216.77	216.78	216.80	216.83	216.84	216.86	216.86	219.44	-
643.160	217.59	217.65	217.67	217.69	217.72	217.75	217.77	217.78	219.40	-
643.910	217.36	217.38	217.39	217.41	217.44	217.45	217.47	217.48	219.33	-
643.965	217.36	217.37	217.38	217.40	217.42	217.43	217.45	217.46	219.29	-
644.910	217.37	217.37	217.38	217.39	217.41	217.43	217.51	217.56	219.27	-
645.415	217.37	217.40	217.42	217.44	217.47	217.49	217.50	217.51	219.27	-
645.850	218.45	218.46	218.46	218.47	218.49	218.51	218.61	218.67	219.80	-
645.995	217.80	217.82	217.83	217.86	217.88	217.90	217.91	217.93	219.27	-
646.090	217.59	217.60	217.60	217.60	217.60	217.64	217.66	217.66	219.27	-
647.095	215.70	215.93	216.11	216.42	217.02	217.46	217.47	218.37	220.14	-
647.254	217.52	217.52	217.53	217.89	218.89	218.99	219.09	219.26	221.12	-
647.605	217.05	217.13	217.18	217.28	217.47	217.61	217.62	217.86	221.22	-
647.836	217.64	217.82	217.96	218.21	219.01	219.12	219.19	219.40	221.39	-
648.170	217.69	217.70	217.70	218.06	219.02	219.17	219.29	219.49	221.40	-
648.320	217.58	217.70	217.88	218.18	219.02	219.17	219.37	219.49	221.40	-
648.565	217.59	217.69	217.87	218.18	219.02	219.17	219.37	219.50	221.40	-
649.115	217.95	217.98	218.07	218.19	219.01	219.13	219.35	219.47	221.24	-
649.520	216.64	216.82	216.97	217.23	217.72	219.08	219.27	219.41	221.22	-
650.260	218.00	218.01	218.08	218.17	218.67	218.83	219.27	219.39	220.90	-
650.610	218.03	218.06	218.11	218.20	218.28	218.36	218.76	218.78	219.64	-
652.440	217.86	217.86	217.87	217.88	217.90	217.92	217.97	218.02	218.94	-
652.636	217.83	217.85	217.86	217.88	217.90	217.91	217.92	217.94	218.69	-
653.070	217.13	217.17	217.18	217.19	217.22	217.32	217.35	217.57	218.31	-
653.540	216.66	216.75	217.07	217.21	217.23	217.28	217.29	217.35	218.45	-
653.620	217.23	217.24	217.25	217.26	217.28	217.30	217.40	217.45	218.58	-
654.445	217.59	217.68	217.70	217.72	217.75	217.76	217.78	217.80	217.88	-
655.170	217.57	217.58	217.58	217.59	217.59	217.60	217.68	217.72	218.44	-
655.175	215.98	216.09	216.09	216.10	216.10	216.11	216.17	216.20	216.81	-
655.895	215.91	215.92	215.92	215.92	215.92	215.92	215.97	215.99	216.35	-
658.850	213.21	213.48	213.58	213.60	213.63	213.65	213.66	213.67	213.74	-
660.610	209.90	210.41	210.81	211.32	211.53	211.64	211.67	211.85	213.58	211.40
663.050	214.17	214.24	214.26	214.28	214.30	214.32	214.33	214.35	214.43	-
663.351	213.61	213.77	213.78	213.80	213.83	213.85	213.88	213.91	213.97	-
664.770	211.30	211.31	211.32	211.33	211.35	211.37	211.44	211.48	212.30	-
664.905	210.86	211.14	211.36	211.74	211.95	211.97	212.00	212.02	212.29	-
665.975	209.66	209.67	209.67	209.67	211.75	211.76	211.78	211.80	211.96	-
666.340	208.44	208.45	208.50	208.51	208.53	208.54	208.55	208.56	210.74	209.77
666.341	203.65	204.22	204.71	205.34	206.41	207.41	208.44	208.50	209.83	-
666.645	208.31	208.31	208.32	208.33	208.35	208.36	208.37	208.38	208.78	209.75
666.945	208.36	208.41	208.44	208.47	208.51	208.55	208.56	208.60	208.66	209.99
667.210	207.25	207.26	207.28	207.30	207.32	207.33	207.34	207.35	208.41	209.99
667.370	206.99	207.14	207.25	207.46	207.56	207.57	207.57	207.58	208.41	210.07
667.625	208.83	208.84	208.84	208.85	208.89	208.93	208.95	209.01	209.18	210.28
Section: NNS										
Track Lift: Existing										
Structures: Existing										

Catchment / Culvert ID	Modelled Flood Level Local Catchments (mAHD)							Modelled Flood Level Regional Catchment		
	50% AEP	20% AEP	10% AEP	5% AEP	2% AEP	1% AEP	0.5% AEP	0.2% AEP	PMF	1 % AEP
667.945	208.35	208.38	208.46	208.49	208.51	208.53	208.55	208.57	208.84	210.24
668.720	208.65	208.65	209.37	209.74	209.91	210.02	210.27	210.36	211.87	210.49
669.202	208.65	208.66	209.38	209.79	210.00	210.12	210.36	210.39	211.94	210.62
670.685	209.61	209.65	209.86	210.48	210.82	211.02	211.50	211.65	214.71	210.94
671.420	209.46	209.52	209.57	209.67	209.86	211.06	211.53	211.57	214.97	211.38
672.375	209.32	209.47	209.59	209.80	210.94	211.17	211.65	211.86	215.33	211.73
675.275	212.67	212.69	212.69	212.69	212.70	212.70	212.70	212.71	216.21	214.17
675.615	212.87	212.90	212.92	212.94	212.97	212.98	213.00	213.02	215.63	214.21
676.221	210.54	212.13	212.23	212.24	212.25	212.26	212.47	212.58	215.80	-
677.835	212.84	212.85	212.85	212.86	212.89	212.91	212.97	213.02	215.63	-
677.845	212.19	212.22	212.24	212.26	212.29	212.31	212.60	213.02	215.33	213.08
678.500	212.05	212.06	212.06	212.07	212.27	212.73	212.74	213.23	215.27	213.08
679.285	210.88	211.06	211.21	211.47	211.95	213.17	213.19	213.29	215.27	213.16
680.090	212.05	212.09	212.10	212.12	212.51	213.21	213.22	213.29	214.72	213.53
680.610	211.44	211.45	211.61	212.02	212.66	213.21	213.22	213.34	213.82	213.55
680.615	211.44	211.44	211.61	212.02	212.76	213.21	213.22	213.37	214.49	-
680.620	212.35	212.40	212.41	212.43	212.76	213.21	213.22	213.37	213.82	-
680.720	212.22	212.40	212.41	212.42	212.76	213.21	213.22	213.37	214.11	213.55
684.897	220.67	220.78	220.85	220.99	221.22	221.39	221.47	221.52	222.34	-

686.404	221.19	221.42	221.60	221.92	222.04	222.05	222.06	222.07	222.15	-
686.440	221.53	221.55	221.59	221.65	221.77	221.79	221.80	221.82	222.08	-
686.495	221.40	221.41	221.41	221.42	221.44	221.45	221.46	221.47	221.78	-
690.820	224.12	224.12	224.13	224.13	224.13	224.14	224.20	224.22	224.74	-
690.830	224.62	224.94	224.96	224.98	225.01	225.02	225.04	225.05	225.10	-
691.025	225.41	225.41	225.41	225.42	225.44	225.45	225.55	225.60	226.58	-
695.210	239.26	239.70	239.96	239.97	240.00	240.01	240.02	240.03	240.12	-
695.310	239.34	239.34	239.35	239.35	239.35	239.36	239.43	239.46	240.04	-
696.990	241.72	241.96	242.14	242.48	243.06	243.16	243.18	243.26	244.05	-
699.800	248.27	248.29	248.30	248.32	248.35	248.36	248.38	248.39	248.42	-
699.880	248.27	248.29	248.31	248.33	248.36	248.38	248.39	248.40	248.43	-
702.360	259.03	259.04	259.04	259.04	259.04	259.05	259.12	259.15	259.76	-
702.380	258.83	258.84	258.84	258.85	258.86	258.88	258.98	259.03	259.99	-
703.065	260.22	260.23	260.24	260.26	260.28	260.30	260.31	260.32	260.36	-
704.790	264.50	264.79	265.00	265.39	265.74	265.81	265.83	265.90	266.70	-
706.250	271.09	271.45	271.74	272.20	272.22	272.24	272.25	272.26	272.33	-
706.510	272.54	272.54	272.54	272.55	272.57	272.58	272.68	272.73	273.75	-
706.675	274.22	274.23	274.23	274.24	274.25	274.27	274.37	274.42	275.44	-
707.400	275.06	275.07	275.07	275.08	275.10	275.12	275.22	275.28	276.41	-
707.550	275.19	275.21	275.21	275.23	275.25	275.26	275.28	275.29	275.34	-
707.560	275.00	275.00	275.01	275.02	275.04	275.06	275.16	275.21	276.34	-
707.565	274.82	274.82	274.83	274.84	274.86	274.88	274.97	275.02	276.11	-
707.575	274.81	274.82	274.82	274.83	274.85	274.85	274.87	274.88	274.93	-
707.580	274.92	274.92	274.93	274.94	274.95	274.96	275.06	275.11	276.11	-
708.435	272.56	272.57	272.57	272.58	272.63	272.70	272.72	272.78	273.92	-
708.445	272.46	272.49	272.66	272.98	273.15	273.17	273.18	273.20	273.24	-
709.74	272.11	272.22	272.30	272.46	272.66	272.70	272.70	272.76	273.12	-
711.5	268.13	268.16	268.18	268.20	268.37	268.98	268.99	269.00	270.67	-
711.62	267.60	267.67	267.73	267.98	268.37	268.97	268.98	269.00	270.67	-
711.627	267.58	267.69	267.81	267.98	268.37	268.97	268.98	269.00	269.48	-
711.775	268.27	268.28	268.29	268.30	268.37	268.97	268.98	269.00	270.67	-
712.54	270.12	270.14	270.15	270.17	270.20	270.21	270.22	270.24	270.96	-
713.34	273.26	273.27	273.27	273.29	273.31	273.33	273.41	273.46	274.45	-
713.35	273.49	273.49	273.50	273.51	273.52	273.53	273.55	273.56	273.61	-
714.61	278.25	278.56	278.77	278.79	278.81	278.83	278.84	278.86	278.92	-
714.82	279.81	279.81	279.82	279.83	279.84	279.86	279.96	280.01	281.05	-
716.85	278.02	278.83	279.33	279.58	279.82	279.96	280.00	280.32	282.51	-
718.044	287.20	287.23	287.27	287.35	287.49	287.60	287.65	287.65	287.65	-

Section:	NNS
Track Lift:	Existing
Structures:	Existing

Catchment / Culvert ID	Modelled Flood Level Local Catchments (mAHD)								Modelled Flood Level Regional Catchment	
	50% AEP	20% AEP	10% AEP	5% AEP	2% AEP	1% AEP	0.5% AEP	0.2% AEP	PMF	1 % AEP
718.2	287.41	287.43	287.46	287.51	287.61	287.68	287.74	287.78	288.03	-
718.39	286.39	286.47	286.54	286.65	286.88	287.05	287.07	287.09	287.32	-
718.9	288.88	288.99	289.16	289.17	289.18	289.20	289.21	289.22	289.31	-
719.905	291.71	291.72	291.72	291.73	291.76	291.78	291.86	291.91	292.95	-
720.175	288.97	289.12	289.23	289.28	289.30	289.31	289.32	289.33	289.41	-
720.74	289.25	289.28	289.28	289.30	289.31	289.33	289.34	289.35	289.41	-
721.03	288.89	289.21	289.47	289.79	289.81	289.83	289.84	289.86	290.19	-
721.17	290.28	290.35	290.36	290.37	290.38	290.39	290.40	290.42	290.75	-
721.645	293.97	294.24	294.45	294.68	294.71	294.72	294.72	294.73	294.82	-
722.82	300.85	300.88	300.88	300.89	300.90	300.91	300.93	300.94	301.00	-
723.005	300.69	300.71	300.72	300.74	300.76	300.78	300.79	300.80	300.84	-
723.225	299.69	299.70	299.71	299.76	299.85	299.91	299.93	300.05	300.61	-
723.6	299.69	299.91	300.06	300.08	300.10	300.11	300.13	300.14	300.21	-
723.875	299.21	299.40	299.54	299.78	300.19	300.26	300.27	300.28	300.37	-
724.62	298.95	299.14	299.28	299.55	300.04	300.41	300.42	300.58	301.10	-
725.275	301.75	302.04	302.27	302.50	302.53	302.54	302.56	302.57	302.65	-
725.545	303.52	303.53	303.53	303.54	303.56	303.58	303.65	303.69	304.30	-
725.59	303.61	303.70	303.70	303.71	303.73	303.74	303.75	303.76	303.85	-
726.115	308.04	308.30	308.50	308.51	308.53	308.55	308.56	308.57	308.66	-
726.54	307.31	307.32	307.32	307.33	307.34	307.35	307.36	307.38	307.39	-
726.96	308.95	308.99	309.00	309.01	309.04	309.05	309.06	309.08	309.16	-
727.695	308.87	308.93	308.97	309.06	309.23	309.35	309.38	309.60	310.27	-
728.43	306.59	306.79	306.95	307.10	307.12	307.14	307.15	307.16	307.25	-
728.91	303.54	303.55	303.55	303.56	304.07	304.55	304.56	304.58	304.66	-
729.7	298.78	298.78	298.79	298.80	298.82	298.84	298.85	298.87	299.58	-
729.96	296.21	296.39	296.53	296.78	296.83	296.84	296.85	296.87	296.95	-
730.39	294.17	294.18	294.18	294.19	294.22	294.24	294.30	294.35	295.16	-
730.57	292.77	293.02	293.22	293.52	294.36	294.37	294.38	294.40	294.46	-
732.01	287.14	287.15	287.15	287.16	287.17	287.18	287.19	287.21	287.27	-
734.945	272.55	272.66	272.74	272.90	273.20	273.42	273.42	273.79	277.20	-
735.115	268.63	269.37	269.94	270.96	272.90	273.95	273.96	273.98	276.47	-
736.21	284.37	284.39	284.40	284.41	284.43	284.45	284.46	284.47	284.52	-

736.3	284.04	284.05	284.05	284.37	284.39	284.40	284.41	284.42	284.51	-
737.555	277.10	277.57	277.93	278.25	278.39	278.46	278.47	278.59	279.79	-
740.665	267.10	267.18	267.39	268.00	269.01	269.18	269.71	270.06	274.62	-
740.945	267.07	267.07	267.39	268.00	269.04	269.34	269.71	270.06	274.62	-
741.345	270.48	270.59	270.68	270.77	270.78	270.79	270.81	270.82	274.62	-
742.11	274.47	274.48	274.50	274.52	274.54	274.56	274.57	274.58	274.62	-
742.24	274.32	274.32	274.32	274.33	274.33	274.34	274.40	274.43	275.02	-
742.69	277.81	277.82	277.82	277.83	277.84	277.86	277.96	278.01	279.07	-
744.555	276.02	276.39	276.68	277.21	278.02	278.26	278.28	278.53	280.52	-
745.41	284.18	284.19	284.19	284.20	284.20	284.22	284.30	284.34	285.17	-
746.025	290.54	290.71	290.72	290.73	290.75	290.77	290.78	290.79	290.85	-
746.6	295.75	295.76	295.76	295.77	295.80	295.82	295.83	295.86	296.92	-
747.905	298.06	298.06	298.07	298.07	298.09	298.10	298.11	298.12	298.18	-
748.425	290.19	290.46	290.73	290.99	291.08	291.13	291.16	291.25	291.76	-
749.45	282.18	282.37	282.39	282.39	282.41	282.42	282.42	282.43	282.51	-
750.965	267.14	267.17	267.27	267.64	268.28	269.03	269.04	269.09	270.29	-
751.13	267.14	267.16	267.27	267.64	268.19	268.92	268.93	269.04	270.19	-
752.49	274.49	274.50	274.50	274.51	274.53	274.54	274.55	274.56	274.68	-
753.1	272.78	272.96	273.10	273.35	273.80	273.88	273.90	273.97	274.49	-
755.225	274.31	274.32	274.33	274.34	274.36	274.38	274.39	274.40	274.45	-
755.495	274.31	274.33	274.35	274.37	274.39	274.41	274.42	274.43	274.46	-
755.975	274.74	274.83	275.35	275.36	275.39	275.40	275.41	275.43	275.51	-
757.003	270.21	270.33	270.42	270.60	270.92	271.16	271.18	271.56	272.44	-
758.215	267.39	267.53	267.56	267.59	267.64	267.68	267.69	267.73	268.07	-
758.255	266.87	267.38	267.68	267.74	267.98	268.14	268.16	268.34	269.67	-

Appendix F – Overtopping information for existing formation (local and regional catchments)

This appendix provides a summary of length of existing track that is overtopped during the modelled design flood events.

Track overtopping occurs when the modelled local catchment flood level is higher than the existing top of rail level.

Section:	NNS
Track Lift:	Existing
Structures:	Existing

624.755	-	0.00	0.00
Section:	NNS		
Track Lift:	Existing		
Structures:	Existing		

635.355	-	0.00	0.00	0.00	0.00	0.00	-	-
636.650	-	0.00	0.00	0.00	0.00	0.00	-	-
637.120	-	0.00	0.00	0.00	0.00	0.00	-	-
637.230	-	0.00	0.00	0.00	0.00	0.00	-	-
638.080	-	0.00	0.00	0.00	0.00	0.00	-	-
638.460	-	0.00	0.00	0.00	0.00	0.00	-	-
639.690	-	0.00	0.00	0.00	0.00	0.00	-	-
641.540	-	0.00	0.00	0.00	0.00	0.00	-	-
642.315	-	0.00	0.00	0.00	0.00	0.00	-	-
643.160	-	0.00	0.00	0.00	0.00	0.00	-	-
643.910	-	0.00	0.00	0.00	0.00	0.00	-	-
643.965	-	0.00	0.00	0.00	0.00	0.00	-	-
644.910	-	0.00	0.00	0.00	0.00	0.00	-	-
645.415	-	0.00	0.00	0.00	0.00	0.00	-	-
645.850	-	0.00	0.00	0.00	0.00	0.00	-	-
645.995	-	0.00	0.00	0.00	0.00	0.00	-	-
646.090	-	0.00	0.00	0.00	0.00	0.00	-	-
647.095	-	0.00	0.00	0.00	0.00	0.00	-	-
647.254	647.241	0.00	0.00	0.00	0.00	5.49	-	-
647.605	-	0.00	0.00	0.00	0.00	0.00	-	-
647.836	-	0.00	0.00	0.00	0.00	0.00	-	-
648.170	-	0.00	0.00	0.00	0.00	0.00	-	-
648.320	648.522	0.00	0.00	0.00	0.00	198.10	-	-
648.565	648.563	0.00	0.00	0.00	0.00	13.51	-	-
649.115	649.136	0.00	0.00	0.00	0.00	5.96	-	-
649.520	649.979	0.00	0.00	0.00	0.00	467.16	-	-
650.260	-	0.00	0.00	0.00	0.00	0.00	-	-
650.610	-	0.00	0.00	0.00	0.00	0.00	-	-
652.440	-	0.00	0.00	0.00	0.00	0.00	-	-
652.636	-	0.00	0.00	0.00	0.00	0.00	-	-
653.070	-	0.00	0.00	0.00	0.00	0.00	-	-
653.540	-	0.00	0.00	0.00	0.00	0.00	-	-
653.620	-	0.00	0.00	0.00	0.00	0.00	-	-
654.445	-	0.00	0.00	0.00	0.00	0.00	-	-
655.170	-	0.00	0.00	0.00	0.00	0.00	-	-
655.175	-	0.00	0.00	0.00	0.00	0.00	-	-
655.895	-	0.00	0.00	0.00	0.00	0.00	-	-
658.850	-	0.00	0.00	0.00	0.00	0.00	0.00	0.00
660.610	660.665	0.00	0.00	1.95	354.17	426.99	57.30	57.30
663.050	-	0.00	0.00	0.00	0.00	0.00	0.00	0.00
663.351	-	0.00	0.00	0.00	0.00	0.00	-	-
664.770	-	0.00	0.00	0.00	0.00	0.00	0.00	0.00
664.905	-	0.00	0.00	0.00	0.00	0.00	0.00	0.00
665.975	-	0.00	0.00	0.00	0.00	296.37	298.27	0.00
666.340	-	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Section:	NNS							
Track Lift:	Existing							
Structures:	Existing							

686.440	-	0.00	0.00	0.00	0.00	0.00	-	-
686.495	-	0.00	0.00	0.00	0.00	0.00	-	-
690.820	-	0.00	0.00	0.00	0.00	0.00	-	-
690.830	-	0.00	0.00	0.00	0.00	0.00	-	-
691.025	-	0.00	0.00	0.00	0.00	0.00	-	-
695.210	-	0.00	0.00	0.00	0.00	0.00	-	-
695.310	-	0.00	0.00	0.00	0.00	0.00	-	-
696.990	-	0.00	0.00	0.00	0.00	0.00	-	-
699.800	-	0.00	0.00	0.00	0.00	0.00	-	-
699.880	-	0.00	0.00	0.00	0.00	0.00	-	-
702.360	-	0.00	0.00	0.00	0.00	0.00	-	-
702.380	-	0.00	0.00	0.00	0.00	0.00	-	-
703.065	-	0.00	0.00	0.00	0.00	0.00	-	-
704.790	704.824	0.00	0.00	0.00	0.00	108.39	149.37	-
706.250	-	0.00	0.00	0.00	0.00	0.00	-	-
706.510	-	0.00	0.00	0.00	0.00	0.00	-	-
706.675	-	0.00	0.00	0.00	0.00	0.00	-	-
707.400	-	0.00	0.00	0.00	0.00	0.00	-	-
707.550	-	0.00	0.00	0.00	0.00	0.00	-	-
707.560	-	0.00	0.00	0.00	0.00	0.00	-	-
707.565	-	0.00	0.00	0.00	0.00	0.00	-	-
707.575	-	0.00	0.00	0.00	0.00	0.00	-	-
707.580	-	0.00	0.00	0.00	0.00	0.00	-	-
708.435	-	0.00	0.00	0.00	0.00	0.00	-	-
708.445	-	0.00	0.00	0.00	0.00	0.00	-	-
709.74	-	0.00	0.00	0.00	0.00	0.00	-	-
711.5	-	0.00	0.00	0.00	0.00	0.00	-	-
711.62	-	0.00	0.00	0.00	0.00	0.00	-	-
Section:	NNS							
Track Lift:	Existing							
Structures:	Existing							

Catchment / Culvert ID	Kilometerage (at mid point)	Length of rail overtopping Local catchments (m)						Length of rail overtopping Regional catchments (m)	
		50% AEP	20% AEP	10% AEP	5% AEP	2% AEP	1% AEP	10% AEP	1% AEP
711.627	-	0.00	0.00	0.00	0.00	0.00	0.00	-	-
711.775	-	0.00	0.00	0.00	0.00	0.00	0.00	-	-
712.54	-	0.00	0.00	0.00	0.00	0.00	0.00	-	-
713.34	-	0.00	0.00	0.00	0.00	0.00	0.00	-	-
713.35	-	0.00	0.00	0.00	0.00	0.00	0.00	-	-
714.61	-	0.00	0.00	0.00	0.00	0.00	0.00	-	-
714.82	-	0.00	0.00	0.00	0.00	0.00	0.00	-	-
716.85	716.646	0.00	0.00	0.00	196.22	395.74	459.79	-	-
718.044	-	0.00	0.00	0.00	0.00	0.00	0.00	-	-
718.2	-	0.00	0.00	0.00	0.00	0.00	0.00	-	-
718.39	-	0.00	0.00	0.00	0.00	0.00	0.00	-	-
718.9	718.875	0.00	0.00	79.10	91.08	99.07	105.07	-	-
719.905	-	0.00	0.00	0.00	0.00	0.00	0.00	-	-
720.175	-	0.00	0.00	0.00	0.00	0.00	0.00	-	-
720.74	-	0.00	0.00	0.00	0.00	0.00	0.00	-	-
721.03	-	0.00	0.00	0.00	0.00	0.00	0.00	-	-
721.17	-	0.00	0.00	0.00	0.00	0.00	0.00	-	-
721.645	-	0.00	0.00	0.00	0.00	0.00	0.00	-	-
722.82	-	0.00	0.00	0.00	0.00	0.00	0.00	-	-
723.005	-	0.00	0.00	0.00	0.00	0.00	0.00	-	-
723.225	-	0.00	0.00	0.00	0.00	0.00	0.00	-	-
723.6	-	0.00	0.00	0.00	0.00	0.00	0.00	-	-
723.875	-	0.00	0.00	0.00	0.00	0.00	0.00	-	-
724.62	-	0.00	0.00	0.00	0.00	0.00	0.00	-	-
725.275	-	0.00	0.00	0.00	0.00	0.00	0.00	-	-
725.545	-	0.00	0.00	0.00	0.00	0.00	0.00	-	-
725.59	-	0.00	0.00	0.00	0.00	0.00	0.00	-	-
726.115	-	0.00	0.00	0.00	0.00	0.00	0.00	-	-
726.54	-	0.00	0.00	0.00	0.00	0.00	0.00	-	-
726.96	-	0.00	0.00	0.00	0.00	0.00	0.00	-	-
727.695	-	0.00	0.00	0.00	0.00	0.00	0.00	-	-
728.43	-	0.00	0.00	0.00	0.00	0.00	0.00	-	-
728.91	-	0.00	0.00	0.00	0.00	0.00	0.00	-	-
729.7	-	0.00	0.00	0.00	0.00	0.00	0.00	-	-
729.96	-	0.00	0.00	0.00	0.00	0.00	0.00	-	-
730.39	-	0.00	0.00	0.00	0.00	0.00	0.00	-	-
730.57	730.654	0.00	0.00	0.00	0.00	453.30	457.13	-	-
732.01	-	0.00	0.00	0.00	0.00	0.00	0.00	-	-
734.945	-	0.00	0.00	0.00	0.00	0.00	0.00	-	-
735.115	-	0.00	0.00	0.00	0.00	0.00	0.00	-	-
736.21	-	0.00	0.00	0.00	0.00	0.00	0.00	-	-
736.3	-	0.00	0.00	0.00	0.00	0.00	0.00	-	-
737.555	737.673	0.00	0.00	0.00	46.57	146.24	187.22	-	-

740.665	740.953	0.00	0.00	0.00	0.00	201.57	288.80	-	-
740.945	740.947	0.00	0.00	0.00	0.00	16.38	16.38	-	-
741.345	-	0.00	0.00	0.00	0.00	0.00	0.00	-	-
742.11	741.830	15.76	19.64	20.61	20.61	28.36	37.09	-	-
742.24	-	0.00	0.00	0.00	0.00	0.00	0.00	-	-
742.69	-	0.00	0.00	0.00	0.00	0.00	0.00	-	-
744.555	744.577	0.00	0.00	0.00	0.00	13.29	90.16	-	-
745.41	-	0.00	0.00	0.00	0.00	0.00	0.00	-	-
746.025	-	0.00	0.00	0.00	0.00	0.00	0.00	-	-
746.6	-	0.00	0.00	0.00	0.00	0.00	0.00	-	-
747.905	-	0.00	0.00	0.00	0.00	0.00	0.00	-	-
Section: NNS									
Track Lift: Existing									
Structures: Existing									

Catchment / Culvert ID	Kilometerage (at mid point)	Length of rail overtopping Local catchments (m)						Length of rail overtopping Regional catchments (m)	
		50% AEP	20% AEP	10% AEP	5% AEP	2% AEP	1% AEP	10% AEP	1% AEP
748.425	-	0.00	0.00	0.00	0.00	0.00	0.00	-	-
749.45	-	0.00	0.00	0.00	0.00	0.00	0.00	-	-
750.965	750.976	0.00	0.00	0.00	0.00	0.00	77.44	-	-
751.13	-	0.00	0.00	0.00	0.00	0.00	0.00	-	-
752.49	-	0.00	0.00	0.00	0.00	0.00	0.00	-	-
753.1	-	0.00	0.00	0.00	0.00	0.00	0.00	-	-
755.225	-	0.00	0.00	0.00	0.00	0.00	0.00	-	-
755.495	-	0.00	0.00	0.00	0.00	0.00	0.00	-	-
755.975	755.965	0.00	0.00	0.00	177.53	184.85	188.51	-	-
757.003	-	0.00	0.00	0.00	0.00	0.00	0.00	-	-
758.215	758.238	0.00	0.00	0.00	3.61	7.20	9.89	-	-
758.255	758.242	0.00	0.00	0.00	21.40	21.40	21.40	-	-

Appendix G – Compliance to ETD-10-02 for existing formation (local and regional catchments)

ETD-10-02 requires that the ballast of the upgraded track be above the modelled one per cent AEP local and regional catchment flood level.

This appendix provides a summary of length of existing track which does not meet the design requirements of ETD-10-02. This appendix also provides a summary of the length of existing ballast that is flooded by a range of modelled local and regional flood events.

It should be noted that the depth of ballast of the existing track is not accurate known and varies significantly. In lieu of a measured depth of ballast, a range of ballast depths (measured from the top of the existing rail) are used in the estimation of non-compliance with ETD-10-02. As such, at some locations the assumed base of the existing ballast may be below the surrounding ground level. The compliance of the existing track conditions to ETD-10-02 is used for comparative purposes only, therefore the potential for a small overestimate of the length of flooded ballast is considered to be of minimal impact.

Section:	NNS
Track Lift:	Existing
Structures:	Existing

Catchment / Culvert ID	Length of non-compliance with ETD-10-02 Local Catchments (m)					Length of non-compliance with ETD-10-02 Regional catchments (m)
	400 mm Ballast	582 mm Ballast	600 mm Ballast	720 mm Ballast	582 mm Ballast	
573.360	0.00	0.00	0.00	0.00	0.00	-
574.375	0.00	0.00	0.00	0.00	34.18	-
574.405	0.00	0.00	0.00	0.00	0.00	-
576.030	0.00	0.00	0.00	0.00	0.00	-
579.475	0.00	0.00	0.00	0.00	0.00	-
579.585	0.00	6.88	0.00	0.00	28.40	-
579.965	76.02	102.17	0.00	0.00	127.13	-
581.180	993.80	1093.04	0.00	0.00	1151.58	-
581.800	15.89	15.89	0.00	0.00	15.89	-
582.605	0.00	0.00	0.00	0.00	0.00	-
582.837	0.00	0.00	0.00	0.00	0.00	-
583.430	0.00	0.00	0.00	0.00	0.00	-
584.805	0.00	0.00	0.00	0.00	0.00	-
586.200	0.00	0.00	0.00	0.00	0.00	-
587.090	0.00	0.00	10.69	0.00	0.00	-
587.700	0.00	0.00	102.17	0.00	0.00	-
587.835	0.00	0.00	1099.99	0.00	0.00	-
587.915	0.00	0.00	15.89	0.00	0.00	-
588.815	0.00	0.00	0.00	0.00	0.00	-
589.300	0.00	0.00	0.00	0.00	1.82	-
590.020	0.00	0.00	0.00	0.00	0.00	-
590.225	0.00	0.00	0.00	0.00	0.00	-
591.685	181.52	181.52	0.00	0.00	181.52	-
591.766	181.32	289.99	0.00	0.00	343.42	-
591.925	184.52	184.52	0.00	0.00	186.82	-
592.075	65.26	118.35	0.00	0.00	125.01	-
593.060	0.00	0.00	0.00	0.00	138.09	-
593.820	324.12	454.79	0.00	0.00	524.21	-
595.520	0.00	0.00	0.00	0.00	0.00	-
596.430	407.50	472.80	0.00	0.00	515.34	-
597.230	536.96	599.78	0.00	0.00	701.00	-
599.445	80.90	372.32	181.52	0.00	766.54	-
600.500	497.39	552.55	297.76	0.00	601.84	-
600.800	0.00	0.00	184.52	0.00	0.00	-
601.865	0.00	0.00	125.01	0.00	0.00	-
602.450	853.96	929.53	0.00	0.00	987.87	-
603.850	0.00	0.00	461.49	0.00	0.00	-
607.830	279.90	349.86	0.00	0.00	376.28	-
608.070	0.00	5.52	480.38	0.00	37.43	-
609.550	278.98	351.44	609.28	0.00	437.34	-
613.190	0.00	0.00	442.18	0.00	0.00	-
613.990	0.00	0.00	557.26	0.00	0.00	-
614.445	22.96	22.96	939.90	0.00	22.96	-
614.650	415.47	438.44	0.00	0.00	456.42	-
614.930	77.96	187.89	356.85	0.00	216.88	-
614.960	0.00	0.00	10.51	0.00	0.00	-
616.170	0.00	0.00	360.00	0.00	0.00	-
617.075	0.00	0.00	0.00	0.00	0.00	-
Section:	NNS					
Track Lift:	Existing					
Structures:	Existing					

Catchment / Culvert ID	Length of non-compliance with ETD-10-02 Local Catchments (m)					Length of non-compliance with ETD-10-02 Regional catchments (m)
	400 mm Ballast	582 mm Ballast	600 mm Ballast	720 mm Ballast	582 mm Ballast	
618.025	0.00	16.64	22.96	0.00	86.85	-
619.030	0.00	0.00	440.44	0.00	0.00	-
620.610	0.00	0.00	191.89	0.00	0.00	-
621.855	0.00	0.00	0.00	0.00	0.00	-
623.030	0.00	0.00	0.00	0.00	0.00	-
624.755	0.00	0.00	0.00	0.00	0.00	-

625.520	0.00	0.00	46.97	0.00	-
627.230	0.00	0.00	0.00	0.00	-
627.340	0.00	0.00	0.00	0.00	-
627.490	0.00	0.00	0.00	0.00	-
630.870	0.00	0.00	0.00	0.00	-
631.085	0.00	0.00	0.00	0.00	-
631.525	0.00	0.00	0.00	0.00	-
633.720	1551.82	1978.75	0.00	2311.96	-
635.090	0.00	0.00	0.00	3.02	-
635.355	0.00	20.93	0.00	110.09	-
636.650	0.00	0.00	0.00	0.00	-
637.120	0.00	0.00	0.00	0.00	-
637.230	0.00	0.00	0.00	0.00	-
638.080	0.00	0.00	2087.79	0.00	-
638.460	0.00	0.00	0.00	0.00	-
639.690	0.00	0.00	54.22	0.00	-
641.540	0.00	0.00	0.00	0.00	-
642.315	0.00	0.00	0.00	0.00	-
643.160	0.00	0.00	0.00	0.00	-
643.910	0.00	0.00	0.00	0.00	-
643.965	0.00	0.00	0.00	0.00	-
644.910	0.00	0.00	0.00	0.00	-
645.415	0.00	0.00	0.00	0.00	-
645.850	0.00	0.00	0.00	0.00	-
645.995	0.00	0.00	0.00	0.00	-
646.090	0.00	0.00	0.00	0.00	-
647.095	0.00	0.00	0.00	0.00	-
647.254	5.49	5.49	0.00	5.49	-
647.605	0.00	0.00	0.00	0.00	-
647.836	397.64	414.46	0.00	414.46	-
648.170	6.33	6.33	0.00	6.33	-
648.320	886.90	886.90	0.00	886.90	-
648.565	13.51	13.51	0.00	13.51	-
649.115	299.68	299.68	5.49	299.68	-
649.520	998.93	1242.19	0.00	1242.19	-
650.260	0.00	17.77	414.46	37.74	-
650.610	0.00	0.00	6.33	0.00	-
652.440	0.00	0.00	886.90	0.00	-
652.636	0.00	0.00	13.51	0.00	-
653.070	0.00	0.00	299.68	0.00	-
653.540	0.00	0.00	1242.19	0.00	-
653.620	0.00	0.00	24.15	0.00	-

Section: NNS

Track Lift: Existing

Structures: Existing

Catchment / Culvert ID	Length of non-compliance with ETD-10-02 Local Catchments (m)				Length of non-compliance with ETD-10-02 Regional catchments (m) 582 mm Ballast
	400 mm Ballast	582 mm Ballast	600 mm Ballast	720 mm Ballast	
654.445	0.00	0.00	0.00	1.56	-
655.170	0.99	0.99	0.00	0.99	-
655.175	0.00	0.00	0.00	0.00	-
655.895	0.00	0.00	0.00	0.00	-
658.850	0.00	0.00	0.00	230.16	0.00
660.610	535.86	572.46	0.00	608.89	474.88
663.050	2.00	99.95	0.00	99.95	0.00
663.351	0.00	0.00	0.99	0.00	-
664.770	0.00	0.00	0.00	0.00	0.00
664.905	214.07	362.99	0.00	402.96	0.00
665.975	349.85	363.75	0.00	363.75	0.00
666.340	0.00	0.00	578.12	0.00	796.59
666.341	0.00	0.00	99.95	0.00	-
666.645	0.00	0.00	0.00	0.00	0.00
666.945	0.00	0.00	0.00	0.00	0.00
667.210	0.00	0.00	368.98	0.00	0.00
667.370	0.00	0.00	363.75	0.00	0.00
667.625	0.00	0.00	0.00	0.00	40.82
667.945	0.00	0.00	0.00	0.00	446.31
668.720	718.29	1731.56	0.00	2310.77	2535.38
669.202	115.22	216.12	0.00	216.12	108.06

670.685	0.00	0.00	0.00	0.00	0.00
671.420	495.03	495.03	0.00	495.03	1325.84
672.375	797.02	894.73	0.00	996.06	2547.98
675.275	0.00	0.00	0.00	0.00	0.00
675.615	0.00	0.00	1799.01	0.00	0.00
676.221	0.00	0.00	216.12	0.00	-
677.835	0.00	5.42	495.03	5.42	-
677.845	0.00	0.00	903.10	0.00	0.00
678.500	0.00	245.06	0.00	1471.90	2651.33
679.285	352.03	474.52	0.00	576.93	442.52
680.090	0.00	9.31	0.00	9.31	0.00
680.610	480.53	696.32	5.42	779.24	856.95
680.615	107.79	107.79	0.00	107.79	51.11
680.620	2.83	2.83	395.30	2.83	-
680.720	18.67	52.42	484.81	75.23	0.00
684.897	0.00	0.00	9.31	0.00	-
686.404	0.00	606.12	0.00	830.86	-
686.440	0.00	0.00	703.32	0.00	-
686.495	0.00	0.00	107.79	0.00	-
690.820	0.00	0.00	2.83	0.00	-
690.830	0.00	74.95	55.16	328.77	-
691.025	0.00	0.00	0.00	0.00	-
695.210	282.86	389.80	630.73	476.76	-
695.310	0.00	0.00	0.00	0.00	-
696.990	207.04	295.10	0.00	337.25	-
699.800	0.00	0.00	0.00	0.00	-
699.880	0.00	0.00	93.93	0.00	-
Section:	NNS				
Track Lift:	Existing				
Structures:	Existing				

Catchment / Culvert ID	Length of non-compliance with ETD-10-02 Local Catchments (m)				Length of non-compliance with ETD-10-02 Regional catchments (m) 582 mm Ballast
	400 mm Ballast	582 mm Ballast	600 mm Ballast	720 mm Ballast	
702.360	0.00	3.02	0.00	3.02	-
702.380	0.00	0.00	397.80	3.20	-
703.065	0.00	179.07	0.00	247.44	-
704.790	293.28	347.94	300.72	388.04	-
706.250	246.62	400.56	0.00	418.10	-
706.510	0.00	0.00	3.02	0.00	-
706.675	0.00	2.33	0.00	2.33	-
707.400	0.00	0.00	190.92	7.10	-
707.550	115.01	171.80	350.67	227.73	-
707.560	0.00	4.30	402.37	4.30	-
707.565	0.00	0.00	0.00	8.35	-
707.575	0.00	0.00	2.33	0.00	-
707.580	0.00	0.00	0.00	4.73	-
708.435	0.00	0.00	176.71	0.00	-
708.445	0.00	52.00	4.30	174.99	-
709.74	253.09	390.99	0.00	438.88	-
711.5	0.00	0.00	0.00	115.50	-
711.62	41.90	80.26	0.00	96.79	-
711.627	9.25	95.73	0.00	95.73	-
711.775	123.47	252.34	88.99	329.06	-
712.54	0.00	0.00	396.71	0.00	-
713.34	0.00	0.00	0.00	0.00	-
713.35	0.00	9.26	86.65	71.20	-
714.61	27.25	57.26	95.73	73.63	-
714.82	0.00	0.00	272.43	0.00	-
716.85	610.69	658.26	0.00	695.77	-
718.044	0.00	16.89	0.00	40.72	-
718.2	141.19	147.15	14.26	147.15	-
718.39	70.25	155.92	59.99	233.38	-
718.9	271.56	306.47	0.00	325.77	-
719.905	0.00	6.13	662.84	19.06	-
720.175	0.00	0.00	19.87	0.00	-
720.74	0.00	0.00	147.15	0.00	-
721.03	0.00	0.00	163.37	0.00	-
721.17	0.00	0.00	308.31	0.00	-
721.645	0.00	0.00	7.12	37.23	-

722.82	0.00	0.00	0.00	35.55	-
723.005	0.00	127.79	0.00	186.74	-
723.225	0.00	0.00	0.00	0.00	-
723.6	202.82	315.23	0.00	368.08	-
723.875	112.42	134.01	0.00	149.04	-
724.62	159.39	233.07	1.83	273.74	-
725.275	99.83	150.95	140.28	174.68	-
725.545	0.00	0.00	0.00	11.09	-
725.59	0.00	0.00	325.20	5.73	-
726.115	109.76	198.41	135.89	226.30	-
726.54	0.00	0.00	237.98	0.00	-
726.96	0.00	0.00	154.60	0.00	-
Section:	NNS				
Track Lift:	Existing				
Structures:	Existing				

Catchment / Culvert ID	Length of non-compliance with ETD-10-02 Local Catchments (m)				Length of non-compliance with ETD-10-02 Regional catchments (m) 582 mm Ballast
	400 mm Ballast	582 mm Ballast	600 mm Ballast	720 mm Ballast	
727.695	0.00	0.00	0.00	0.00	-
728.43	0.00	110.02	0.00	162.03	-
728.91	111.45	146.94	203.39	171.59	-
729.7	0.00	0.00	0.00	0.00	-
729.96	0.00	0.00	0.00	29.24	-
730.39	0.00	0.00	0.00	8.87	-
730.57	581.80	626.68	116.92	652.78	-
732.01	0.00	0.00	150.88	0.00	-
734.945	0.00	0.00	0.00	0.00	-
735.115	0.00	0.00	0.00	0.00	-
736.21	0.00	0.00	0.00	101.36	-
736.3	0.00	0.00	630.57	0.00	-
737.555	268.26	307.23	0.00	333.92	-
740.665	576.37	621.60	0.00	658.99	-
740.945	16.38	16.38	0.00	16.38	-
741.345	0.00	0.00	8.91	0.00	-
742.11	117.54	158.96	0.00	371.84	-
742.24	0.00	0.00	310.08	0.00	-
742.69	0.00	0.00	626.51	0.00	-
744.555	203.55	252.07	16.38	286.38	-
745.41	0.00	0.00	0.00	0.00	-
746.025	0.00	18.92	245.05	38.20	-
746.6	0.00	0.00	0.00	0.00	-
747.905	0.00	0.00	0.00	18.05	-
748.425	16.59	34.53	255.74	50.38	-
749.45	15.15	39.90	0.00	57.72	-
750.965	301.89	327.03	0.00	342.85	-
751.13	278.21	325.79	20.92	342.57	-
752.49	0.00	89.98	0.00	142.49	-
753.1	277.41	347.02	1.79	397.41	-
755.225	0.00	0.00	36.52	0.00	-
755.495	0.00	0.00	42.88	79.59	-
755.975	326.72	414.39	328.89	468.38	-
757.003	0.00	51.36	327.77	124.67	-
758.215	47.68	68.81	100.09	85.88	-
758.255	21.40	21.40	356.18	21.40	-

0

Total:	20362.97	27806.28	0.00	34727.87	12277.8
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429.0317017
60.64701155
69.74626098
21.40145266

Appendix H – Proposed structure details

This appendix provides a summary of the proposed structures between Narrabri and North Star that have been identified, using the methods outlined in 0.

Section:	NNS
Track Lift:	Design
Structures:	1% AEP

Catchment / Culvert ID	Proposed Culvert			Structure Invert (as modelled) (mAHD)	Design Rail Low Point (as modelled) (mAHD)
	Type	# Units	# Barrels		
573.360	B1100	1	1	217.26	219.39
574.375	C1800	1	1	217.71	219.42
574.405	B1300	1	1	217.82	219.72
576.030	B700	1	1	230.05	230.90
579.475	C1800	1	1	243.33	246.65
579.585	B700	1	1	243.64	245.10
579.965	B700	1	1	241.88	243.37
581.180	C1800	10	10	234.66	235.75
581.800	C2100	14	14	235.17	236.92
582.605	C2400	5	5	236.32	238.57
582.837	B700	1	1	237.70	239.60
583.430	B700	1	1	238.75	240.95
584.805	B1300	1	1	241.11	243.76
586.200	Underbridge			244.62	248.38
587.090	B1100	1	1	245.23	246.79
587.700	B900	1	1	244.32	246.43
587.835	B1300	1	1	243.96	246.07
587.915	B1300	1	1	243.99	246.18
588.815	B700	1	1	243.16	245.01
589.300	B900	1	1	242.37	243.94
590.020	B1100	1	1	241.82	243.29
590.225	B1100	1	1	242.13	243.53
591.685	C1500	6	6	236.89	239.15
591.766	C1500	6	6	236.69	239.11
591.925	C1500	2	2	236.93	239.18
592.075	C1500	2	2	237.24	239.32
593.060	A400	2	4	241.34	242.91
593.820	B900	6	6	240.33	242.31
595.520	C1500	1	1	242.34	244.19
596.430	C2100	10	10	239.04	241.23
597.230	C1500	2	2	240.08	242.21
599.445	B1100	1	1	236.99	238.95
600.500	Underbridge			234.22	238.08
600.800	B900	1	1	236.61	238.54
601.865	B900	1	1	238.04	239.10
602.450	C2100	24	24	236.17	238.36
603.850	C2400	1	1	236.83	240.07
607.830	C2400	1	1	238.05	239.92
608.070	B500	1	1	239.39	240.94
609.550	B1300	10	10	238.36	239.85
613.190	B900	1	1	228.80	230.04
613.990	B900	1	1	226.73	227.98
614.445	B1300	6	6	225.36	227.27
Section:	NNS				
Track Lift:	Design				
Structures:	1% AEP				

Catchment / Culvert ID	Proposed Culvert			Structure Invert (as modelled) (mAHD)	Design Rail Low Point (as modelled) (mAHD)
	Type	# Units	# Barrels		
614.650	C2400	16	16	224.91	226.32
614.930	C1800	6	6	224.26	226.89
614.960	C1800	1	1	224.96	227.41
616.170	C1800	4	4	228.78	231.55
617.075	B500	1	1	242.80	244.28
618.025	B1500	1	1	241.62	243.78

619.030	C1500	1	1	240.89	243.19
620.610	Underbridge			223.62	228.17
621.855	Underbridge			231.61	235.27
623.030	Underbridge			228.97	232.72
624.755	B700	1	1	234.54	236.32
625.520	A400	1	2	228.30	229.13
627.230	C1800	3	3	222.14	224.76
627.340	B1300	1	1	223.05	224.80
627.490	C1800	1	1	222.10	224.73
630.870	B700	1	1	222.73	224.05
631.085	B900	1	1	221.93	223.35
631.525	B1100	1	1	221.47	223.11
633.720	C2400	24	24	217.00	218.70
635.090	A400	1	2	218.47	219.92
635.355	B700	1	1	218.62	219.46
636.650	B1100	1	1	217.56	219.23
637.120	B1100	1	1	218.19	219.40
637.230	B1300	1	1	218.30	219.35
638.080	B1300	1	1	216.92	218.85
638.460	B1300	1	1	217.00	218.39
639.690	C1500	1	1	216.83	218.02
641.540	Underbridge			212.50	218.42
642.315	C1800	1	1	216.72	218.39
643.160	B1100	1	1	217.24	218.80
643.910	B1300	1	1	217.32	219.25
643.965	B1500	1	1	217.36	218.59
644.910	B1100	1	1	217.36	219.27
645.415	B1300	1	1	217.23	219.11
645.850	B1100	1	1	218.45	219.62
645.995	B700	1	1	217.74	219.47
646.090	B900	1	1	217.60	219.39
647.095	C3000	3	3	215.33	218.78
647.254	B700	4	4	218.10	219.20
647.605	C1800	6	6	216.95	219.69
647.836	B700	6	6	217.35	219.63
648.170	B1100	12	12	217.68	219.39
648.320	C2400	24	24	216.32	219.17
Section:	NNS				
Track Lift:	Design				
Structures:	1% AEP				

Catchment / Culvert ID	Proposed Culvert			Structure Invert (as modelled) (mAHD)	Design Rail Low Point (as modelled) (mAHD)
	Type	# Units	# Barrels		
648.565	B900	16	16	217.58	219.19
649.115	B900	3	3	217.84	219.48
649.520	C2100	22	22	216.34	219.20
650.260	B1100	4	4	218.14	219.64
650.610	B1300	1	1	217.94	219.84
652.440	B900	1	1	217.93	219.46
652.636	B700	1	1	217.87	219.27
653.070	B700	1	1	217.12	218.58
653.540	B1100	1	1	216.66	218.42
653.620	B1100	1	1	217.23	218.43
654.445	B900	1	1	217.59	218.89
655.170	B1300	1	1	217.58	218.01
655.175	C1500	2	2	215.51	217.70
655.895	C1800	1	1	215.91	217.85
658.850	B1100	1	1	212.95	214.32
660.610	C1800	16	16	209.06	211.39
663.050	B500	1	1	214.17	214.85
663.351	B500	2	2	213.61	214.83

664.770	B700	1	1	211.30	212.17
664.905	B700	7	7	210.61	212.06
665.975	B1100	1	1	208.49	210.01
666.340	Underbridge			208.44	210.11
666.341	Underbridge			202.53	210.14
666.645	Underbridge			208.31	209.43
666.945	Underbridge			208.33	210.97
667.210	Underbridge			207.25	210.22
667.370	Underbridge			206.75	210.89
667.625	Underbridge			208.74	210.88
667.945	Underbridge			208.35	210.65
668.720	B1300	4	4	208.65	209.97
669.202	B1300	1	1	208.45	210.57
670.685	B700	10	10	209.61	210.92
671.420	C1800	20	20	209.36	211.29
672.375	C2400	57	57	209.08	211.32
675.275	B1300	1	1	212.10	214.26
675.615	B1300	1	1	213.00	215.44
676.221	Underbridge			207.25	214.37
677.835	B900	2	2	212.84	211.95
677.845	B900	1	1	212.18	212.04
678.500	B1300	2	2	211.81	211.76
679.285	B700	1	1	210.58	212.12
680.090	B1300	7	7	212.04	213.97
680.610	B1300	1	1	211.62	213.66
Section:	NNS				
Track Lift:	Design				
Structures:	1% AEP				

Catchment / Culvert ID	Proposed Culvert			Structure Invert (as modelled) (mAHD)	Design Rail Low Point (as modelled) (mAHD)
	Type	# Units	# Barrels		
680.615	B1300	1	1	211.63	213.42
680.620	B1300	1	1	212.35	213.55
680.720	B900	1	1	211.70	213.62
684.897	B1300	1	1	212.43	222.97
686.404	B900	1	1	220.82	222.82
686.440	B900	1	1	221.43	222.91
686.495	B900	1	1	221.40	222.91
690.820	B1300	1	1	224.11	225.89
690.830	B1100	1	1	223.86	225.88
691.025	B700	1	1	225.51	226.71
695.210	C1500	1	1	238.54	240.41
695.310	C1800	1	1	239.33	240.42
696.990	C1500	3	3	241.35	243.49
699.800	B1300	1	1	248.02	249.63
699.880	B1300	1	1	248.27	249.63
702.360	B700	1	1	259.02	259.82
702.380	B700	1	1	259.03	259.87
703.065	B900	1	1	259.64	261.23
704.790	C1500	3	3	264.17	266.07
706.250	C1800	9	9	270.52	273.20
706.510	B1100	1	1	272.53	273.64
706.675	A400	1	2	274.22	274.81
707.400	B500	1	1	275.06	276.44
707.550	A300	1	2	274.93	276.17
707.560	A300	1	2	274.99	276.18
707.565	A300	1	2	274.95	276.20
707.575	A300	1	2	275.05	276.31
707.580	A300	1	2	274.97	276.23
708.435	B900	1	1	272.56	274.05
708.445	B1100	1	1	272.40	274.06

709.74	B1300	3	3	271.94	273.12
711.5	B1300	1	1	268.24	269.85
711.62	B1300	15	15	267.47	269.73
711.627	B1300	1	1	267.57	269.73
711.775	B1100	1	1	268.20	269.66
712.54	B700	1	1	269.80	271.15
713.34	B900	2	2	273.26	274.39
713.35	B900	1	1	273.38	274.42
714.61	B900	42	42	277.76	279.57
714.82	B900	1	1	279.85	281.33
716.85	Underbridge			276.66	280.03
718.044	B1100	1	1	286.46	289.05
718.2	B500	1	1	286.97	288.68
Section:	NNS				
Track Lift:	Design				
Structures:	1% AEP				

Catchment / Culvert ID	Proposed Culvert			Structure Invert (as modelled) (mAHD)	Design Rail Low Point (as modelled) (mAHD)
	Type	# Units	# Barrels		
718.39	B900	1	1	285.98	288.29
718.9	B500	2	2	288.41	289.08
719.905	B500	1	1	291.71	293.07
720.175	B1300	1	1	288.76	291.06
720.74	B900	1	1	288.71	291.10
721.03	C1800	4	4	288.36	291.39
721.17	B1100	4	4	290.02	292.15
721.645	C1500	8	8	293.54	295.72
722.82	B1100	1	1	300.49	301.94
723.005	B1100	1	1	299.82	301.71
723.225	B1300	1	1	299.61	301.41
723.6	B1300	1	1	299.33	300.78
723.875	C1500	1	1	299.04	300.94
724.62	B1300	4	4	298.67	300.95
725.275	B1300	15	15	301.27	303.13
725.545	B700	2	2	303.52	304.72
725.59	C1500	1	1	303.20	304.81
726.115	B1300	10	10	307.63	309.21
726.54	B1300	2	2	307.31	309.07
726.96	B1300	1	1	308.95	310.51
727.695	B1300	1	1	308.77	310.55
728.43	B1300	1	1	306.26	307.87
728.91	B1300	1	1	303.54	305.14
729.7	B1500	1	1	298.56	300.02
729.96	B1300	1	1	295.92	297.86
730.39	B500	1	1	294.17	295.23
730.57	B1100	4	4	292.36	294.01
732.01	B1300	1	1	287.26	288.47
734.945	Underbridge			272.36	276.19
735.115	Underbridge			267.37	278.00
736.21	B500	1	1	284.06	285.33
736.3	B500	1	1	284.04	285.21
737.555	C1800	10	10	276.34	279.00
740.665	Underbridge			265.87	269.08
740.945	C1800	4	4	267.06	269.10
741.345	C1500	1	1	270.41	272.41
742.11	B900	1	1	273.98	274.95
742.24	B700	1	1	274.31	275.75
742.69	B1300	1	1	277.81	279.80
744.555	C1800	12	12	275.40	278.47
745.41	B1100	1	1	284.18	285.86
746.025	B700	1	1	290.07	291.68

746.6	B900	1	1	295.59	297.16
Section:	NNS				
Track Lift:	Design				
Structures:	1% AEP				

Catchment / Culvert ID	Proposed Culvert			Structure Invert (as modelled) (mAHD)		Design Rail Low Point (as modelled) (mAHD)	
	Type	# Units	# Barrels				
747.905	B700	1	1		298.03		299.14
748.425	C3000	1	1		289.45		292.12
749.45	B1100	1	1		281.86		283.29
750.965	C2700	4	4		266.66		269.38
751.13	C1500	1	1		267.81		269.44
752.49	B700	4	4		274.57		275.44
753.1	B1300	6	6		272.49		274.26
755.225	C1500	1	1		274.19		275.79
755.495	B700	1	1		273.55		275.19
755.975	B900	1	1		274.21		275.53
757.003	B1300	2	2		270.01		271.95
758.215	B500	1	1		267.14		267.71
758.255	B500	2	2		266.56		267.54

Section: NNS
 Track Lift: Design, Existing
 Structures: 100 year ARI, Existing

Catchment / Culvert ID	Local Catchment Area (ha)	Local Catchment Probabilistic Ration Method Peak Flow Rate (m³/s)								
		50% AEP	20% AEP	10% AEP	5% AEP	2% AEP	1% AEP	0.5% AEP	0.2% AEP	PMF
573.360	5.1	0.0593	0.122	0.181	0.304	0.587	0.837	1.16	1.55	12.1
574.375	0.9	0.0132	0.0271	0.0402	0.0677	0.131	0.187	0.307	0.411	3.03
574.405	1.2	0.0178	0.0366	0.0543	0.0914	0.177	0.252	0.4	0.535	3.99
576.030	2.3	0.0308	0.0632	0.0938	0.158	0.306	0.435	0.648	0.865	6.59
579.475	819	3.06	6.23	9.19	15.4	29.6	42.1	49.6	66	602
579.585	0.000979	7.65E-05	0.000154	0.000185	0.000319	0.000469	0.000666	0.00204	0.00273	0.0164
579.965	0.1	0.00159	0.00327	0.00482	0.00816	0.0156	0.0223	0.0478	0.064	0.437
581.180	262	1.32	2.69	3.97	6.67	12.9	18.3	21.3	28.5	250
581.800	2.6	0.0336	0.0691	0.102	0.173	0.334	0.476	0.701	0.936	7.15
582.605	1050	3.68	7.44	11	18.4	35.4	50.3	59.6	79.4	729
582.837	0.0177	0.000531	0.00109	0.00158	0.00269	0.005	0.00716	0.0174	0.0233	0.152
583.430	23000	34.4	68.2	99.9	166	315	447	585	779	7880
584.805	6.6	0.0732	0.15	0.223	0.375	0.724	1.03	1.4	1.87	14.7
586.200	2.2	0.0294	0.0603	0.0895	0.151	0.292	0.416	0.621	0.83	6.31
587.090	3010	7.92	16	23.5	39.3	75.1	107	130	173	1640
587.700	146	0.845	1.73	2.56	4.3	8.3	11.8	13.8	18.5	159
587.835	4.1	0.0489	0.1	0.149	0.251	0.485	0.691	0.977	1.31	10.1
587.915	0.8	0.0118	0.0243	0.0361	0.0608	0.118	0.168	0.28	0.374	2.75
588.815	283	1.39	2.84	4.2	7.06	13.6	19.4	22.5	30	265
589.300	0.6	0.0104	0.0213	0.0317	0.0533	0.103	0.147	0.25	0.334	2.44
590.020	499	2.13	4.33	6.39	10.7	20.6	29.3	34.3	45.8	411
590.225	107	0.665	1.36	2.01	3.39	6.53	9.29	10.9	14.6	125
591.685	2.7	0.0342	0.0702	0.104	0.175	0.339	0.484	0.711	0.949	7.25
591.766	1	0.0155	0.0318	0.0472	0.0795	0.154	0.219	0.354	0.473	3.51
591.925	0.3	0.00483	0.00992	0.0147	0.0249	0.0481	0.0686	0.128	0.171	1.22
592.075	2670	7.23	14.7	21.5	36	68.9	97.7	119	158	1500
593.060	21.7	0.191	0.392	0.581	0.978	1.89	2.69	3.37	4.49	36.6
593.820	0.2	0.00352	0.00724	0.0108	0.0181	0.035	0.05	0.0971	0.13	0.913
595.520	68.4	0.471	0.967	1.43	2.41	4.65	6.61	7.88	10.5	88.8
596.430	838	3.12	6.33	9.34	15.7	30.1	42.8	50.4	67.2	613
597.230	160	0.907	1.85	2.74	4.61	8.88	12.6	14.8	19.7	171
599.445	6450	13.7	27.5	40.3	67.2	129	183	228	304	2950
600.500	576	2.36	4.82	7.11	11.9	23	32.6	38.2	50.9	459
600.800	334	1.58	3.22	4.75	7.98	15.4	21.9	25.5	34	302
601.865	12500	22.1	44	64.8	108	206	291	374	499	4930
602.450	0.0003	4.44E-05	8.65E-05	8.57E-05	0.000149	0.000174	0.000243	0.00085	0.00114	0.00658
603.850	0.0003	4.44E-05	8.65E-05	8.57E-05	0.000149	0.000174	0.000243	0.00085	0.00114	0.00658
607.830	13600	23.4	46.8	68.5	114	218	307	396	527	5240
608.070	1770	5.39	10.9	16	26.8	51.4	73	87.6	117	1090
609.550	4500	10.6	21.2	31.3	52.2	100	141	175	233	2240
613.190	113	0.695	1.42	2.11	3.54	6.83	9.72	11.4	15.2	131
613.990	1220	4.09	8.3	12.2	20.5	39.4	55.8	66.3	88.4	816
614.445	0.0012	8.55E-05	0.000173	0.000212	0.000367	0.000555	0.000789	0.00237	0.00318	0.0192
614.650	787	2.98	6.04	8.93	15	28.8	40.8	48.1	64.1	584
614.930	0.0403	0.00102	0.0021	0.00308	0.00522	0.00991	0.0142	0.032	0.0428	0.287
614.960	9470	18.1	36.4	52.9	88.6	169	239	303	404	3970
616.170	89.9	0.584	1.19	1.76	2.97	5.73	8.16	9.65	12.9	110

617.075	0.0003	4.44E-05	8.65E-05	8.57E-05	0.000149	0.000174	0.000243	0.00085	0.00114	0.00658
618.025	450	1.97	4.01	5.93	9.94	19.2	27.2	31.8	42.4	380
619.030	2.5	0.0324	0.0666	0.0988	0.166	0.322	0.459	0.678	0.906	6.91
620.610	132	0.783	1.6	2.37	3.99	7.69	10.9	12.8	17.1	148
621.855	6.1	0.0681	0.14	0.207	0.349	0.674	0.961	1.31	1.75	13.8
623.030	1760	5.37	10.8	16	26.8	51.3	72.8	87.4	116	1090
624.755	138	0.809	1.66	2.45	4.12	7.95	11.3	13.3	17.7	153
625.520	376	1.72	3.51	5.18	8.7	16.8	23.9	27.8	37.1	330
627.230	0.1	0.00131	0.00269	0.00396	0.00671	0.0128	0.0183	0.0401	0.0537	0.364

Section:

NNS

Track Lift:

Design, Existing

Structures:

100 year ARI, Existing

Catchment / Culvert ID	Local Catchment Area (ha)	Local Catchment Probabilistic Ration Method Peak Flow Rate (m³/s)								
		50% AEP	20% AEP	10% AEP	5% AEP	2% AEP	1% AEP	0.5% AEP	0.2% AEP	PMF
627.340	0.0019	0.000112	0.000228	0.000293	0.000505	0.000809	0.00115	0.00334	0.00447	0.0273
627.490	10800	19.7	39.7	58.1	97.1	185	262	334	445	4400
630.870	0.1	0.0021	0.00432	0.00639	0.0108	0.0208	0.0297	0.0614	0.0821	0.567
631.085	294	1.43	2.93	4.33	7.27	14	19.9	23.2	31	273
631.525	0.0003	4.44E-05	8.65E-05	8.57E-05	0.000149	0.000174	0.000243	0.00085	0.00114	0.00658
633.720	1650	5.09	10.3	15.3	25.5	48.9	69.4	83.2	111	1030
635.090	0.0003	4.44E-05	8.65E-05	8.57E-05	0.000149	0.000174	0.000243	0.00085	0.00114	0.00658
635.355	4460	10.5	21.2	31	51.7	99.1	140	174	232	2220
636.650	0.0003	4.44E-05	8.65E-05	8.57E-05	0.000149	0.000174	0.000243	0.00085	0.00114	0.00658
637.120	0.1	0.00201	0.00413	0.00612	0.0103	0.0199	0.0284	0.059	0.079	0.544
637.230	0.0003	4.44E-05	8.65E-05	8.57E-05	0.000149	0.000174	0.000243	0.00085	0.00114	0.00658
638.080	0.00313	0.000153	0.000313	0.000419	0.000719	0.00121	0.00173	0.00482	0.00645	0.0401
638.460	0.000064	2.99E-05	5.33E-05	3.45E-05	5.95E-05	4.17E-05	5.58E-05	0.000271	0.000363	0.002
639.690	0.0194	0.00057	0.00118	0.0017	0.00289	0.0054	0.00773	0.0186	0.0249	0.164
641.540	31000	42.4	84.7	123	205	392	550	732	973	9910
642.315	907	3.3	6.7	9.88	16.6	31.9	45.2	53.5	71.3	652
643.160	116000	109	218	318	530	1000	1420	1930	2570	27300
643.910	297	1.44	2.94	4.36	7.32	14.1	20.1	23.4	31.2	275
643.965	82.6	0.547	1.12	1.65	2.79	5.37	7.65	9.07	12.1	103
644.910	0.1	0.00133	0.00273	0.00403	0.00682	0.013	0.0186	0.0407	0.0545	0.37
645.415	2860	7.64	15.4	22.7	37.9	72.4	103	125	167	1580
645.850	0.00633	0.000247	0.000509	0.000709	0.00121	0.00215	0.00308	0.00812	0.0109	0.069
645.995	581	2.38	4.83	7.14	12	23.1	32.8	38.4	51.2	462
646.090	0.0001	3.22E-05	5.92E-05	4.45E-05	0.000077	6.43E-05	8.76E-05	0.000377	0.000505	0.00282
647.095	0.00205	0.000117	0.000239	0.000309	0.000532	0.00086	0.00123	0.00353	0.00473	0.029
647.254	0.1	0.0022	0.00452	0.0067	0.0113	0.0218	0.0311	0.064	0.0856	0.592
647.605	2650	7.2	14.6	21.5	35.9	68.6	97.3	118	158	1490
647.836	0.00249	0.000132	0.00027	0.000355	0.00061	0.00101	0.00144	0.00407	0.00545	0.0336
648.170	35.6	0.283	0.581	0.859	1.45	2.79	3.98	4.86	6.48	53.7
648.320	197	1.06	2.17	3.21	5.39	10.4	14.8	17.3	23	201
648.565	0.00159	0.000101	0.000204	0.000258	0.000445	0.000699	0.000996	0.00292	0.00392	0.0238
649.115	6040	13.1	26.3	38.6	64.4	123	174	217	290	2810
649.520	0.00484	0.000205	0.000422	0.000579	0.000992	0.00173	0.00247	0.00666	0.00892	0.0561
650.260	34.9	0.279	0.572	0.847	1.43	2.75	3.92	4.79	6.39	52.9
650.610	886	3.24	6.6	9.71	16.3	31.3	44.5	52.5	70	640
652.440	0.1	0.00185	0.00382	0.00565	0.00955	0.0183	0.0262	0.055	0.0736	0.506
652.636	125	0.748	1.53	2.26	3.81	7.35	10.5	12.3	16.4	141
653.070	152	0.869	1.78	2.63	4.42	8.53	12.1	14.2	18.9	164
653.540	0.1	0.00126	0.00259	0.00381	0.00645	0.0123	0.0176	0.0387	0.0518	0.351
653.620	0.0155	0.00048	0.000988	0.00142	0.00242	0.00449	0.00642	0.0158	0.0211	0.138
654.445	1180	4	8.11	11.9	20	38.5	54.6	64.8	86.3	796
655.170	0.000482	0.000054	0.000107	0.000116	0.0002	0.00026	0.000366	0.00121	0.00162	0.00948
655.175	0.0003	4.44E-05	8.65E-05	8.57E-05	0.000149	0.000174	0.000243	0.00085	0.00114	0.00658
655.895	0.0001	3.22E-05	5.92E-05	4.45E-05	0.000077	6.43E-05	8.76E-05	0.000377	0.000505	0.00282
658.850	2750	7.4	14.9	22	36.7	70.6	99.8	121	162	1530
660.610	156	0.889	1.82	2.69	4.52	8.72	12.4	14.5	19.4	168
663.050	471	2.04	4.16	6.13	10.3	19.8	28.2	32.9	43.9	393
663.351	9150	17.5	35.4	51.9	86	165	233	295	395	3870
664.770	0.1	0.00274	0.00563	0.00835	0.0141	0.0272	0.0388	0.0777	0.104	0.725
664.905	1.8	0.0243	0.05	0.0742	0.125	0.242	0.345	0.527	0.704	5.31
665.975	4.2	0.0504	0.104	0.154	0.258	0.5	0.712	1	1.34	10.4
666.340	20.5	0.182	0.374	0.555	0.934	1.8	2.57	3.23	4.31	35
666.341	0.4	0.00715	0.0147	0.0218	0.0368	0.0712	0.102	0.18	0.241	1.74
666.645	7.7	0.0829	0.17	0.252	0.425	0.822	1.17	1.57	2.1	16.6
666.945	1280000	618	1250	1810	3050	5830	8210	11500	15200	174000
667.210	47	0.352	0.721	1.07	1.8	3.47	4.94	5.97	7.96	66.5

Section:

NNS

Track Lift:

Design, Existing

Structures:

100 year ARI, Existing

Catchment / Culvert ID	Local Catchment Area (ha)	Local Catchment Probabilistic Ration Method Peak Flow Rate (m³/s)								
		50% AEP	20% AEP	10% AEP	5% AEP	2% AEP	1% AEP	0.5% AEP	0.2% AEP	PMF
667.370	13.4	0.13	0.267	0.395	0.665	1.29	1.83	2.36	3.15	25.3
667.625	4	0.0483	0.0992	0.147	0.248	0.479	0.683	0.967	1.29	9.99
667.945	1300	4.29	8.72	12.9	21.5	41.3	58.7	69.8	93	860

668.720	5.2	0.0601	0.123	0.183	0.308	0.595	0.848	1.17	1.57	12.2
669.202	26.8	0.227	0.464	0.688	1.16	2.24	3.18	3.94	5.26	43.2
670.685	521	2.19	4.47	6.61	11.1	21.3	30.3	35.4	47.2	425
671.420	0.6	0.00993	0.0204	0.0303	0.0511	0.0988	0.141	0.24	0.321	2.34
672.375	0.000436	5.17E-05	0.000102	0.000108	0.000188	0.000239	0.000336	0.00112	0.0015	0.00878
675.275	64.1	0.449	0.919	1.36	2.29	4.42	6.29	7.51	10	84.5
675.615	1650	5.1	10.4	15.2	25.6	49	69.6	83.4	111	1030
676.221	6.9	0.0754	0.155	0.229	0.386	0.747	1.06	1.44	1.92	15.1
677.835	0.1	0.003	0.00617	0.00915	0.0155	0.0298	0.0425	0.0843	0.113	0.788
677.845	13500	23.3	46.6	68.1	113	217	307	394	526	5230
678.500	0.00099	7.69E-05	0.000155	0.000186	0.000322	0.000474	0.000672	0.00206	0.00276	0.0165
679.285	0.00188	0.000111	0.000227	0.000291	0.000501	0.000802	0.00114	0.00331	0.00444	0.0271
680.090	195	1.05	2.15	3.18	5.35	10.3	14.7	17.1	22.8	199
680.610	24	0.207	0.425	0.629	1.06	2.05	2.92	3.63	4.84	39.6
680.615	0.0189	0.000558	0.00115	0.00167	0.00283	0.00528	0.00756	0.0183	0.0244	0.16
680.620	262	1.32	2.69	3.97	6.67	12.9	18.3	21.3	28.4	250
680.720	0.2	0.00371	0.00763	0.0113	0.0191	0.0369	0.0527	0.102	0.136	0.958
684.897	0.000729	6.57E-05	0.000132	0.000152	0.000262	0.000368	0.000521	0.00164	0.0022	0.0131
686.404	35.3	0.282	0.577	0.855	1.44	2.78	3.96	4.84	6.45	53.4
686.440	1.9	0.026	0.0534	0.0792	0.133	0.258	0.368	0.558	0.745	5.63
686.495	6.4	0.071	0.146	0.216	0.364	0.703	1	1.36	1.82	14.3
690.820	0.0002	3.85E-05	7.38E-05	6.69E-05	0.000116	0.000122	0.000169	0.00063	0.000844	0.00481
690.830	1340	4.39	8.89	13.1	21.9	42.2	59.9	71.3	95.1	880
691.025	0.00167	0.000104	0.000211	0.000268	0.000461	0.000728	0.00104	0.00304	0.00407	0.0248
695.210	219	1.15	2.35	3.46	5.82	11.2	16	18.6	24.8	217
695.310	0.000269	4.26E-05	8.27E-05	8.01E-05	0.000139	0.000158	0.000222	0.000784	0.00105	0.00605
696.990	629	2.53	5.14	7.58	12.7	24.5	34.7	40.7	54.4	491
699.800	392	1.78	3.62	5.34	8.98	17.3	24.6	28.7	38.3	341
699.880	1920	5.69	11.5	17	28.5	54.6	77.4	93	124	1160
702.360	0.0003	4.44E-05	8.65E-05	8.57E-05	0.000149	0.000174	0.000243	0.00085	0.00114	0.00658
702.380	0.00149	9.66E-05	0.000196	0.000246	0.000425	0.000661	0.000941	0.00278	0.00372	0.0226
703.065	103	0.647	1.32	1.96	3.3	6.36	9.05	10.7	14.2	122
704.790	581	2.38	4.84	7.14	12	23.1	32.8	38.4	51.2	462
706.250	737	2.84	5.76	8.52	14.3	27.5	38.9	45.8	61.1	555
706.510	0.00213	0.00012	0.000245	0.000317	0.000546	0.000886	0.00126	0.00363	0.00486	0.0298
706.675	0.00209	0.000119	0.000242	0.000313	0.00054	0.000874	0.00125	0.00358	0.0048	0.0294
707.400	0.00662	0.000256	0.000526	0.000734	0.00126	0.00223	0.00319	0.0084	0.0113	0.0715
707.550	70.4	0.482	0.989	1.46	2.46	4.75	6.77	8.06	10.7	90.8
707.560	0.00537	0.00022	0.000453	0.000626	0.00107	0.00188	0.00269	0.00719	0.00963	0.0608
707.565	0.027	0.00074	0.00152	0.00222	0.00378	0.00711	0.0102	0.0238	0.0318	0.211
707.575	14.7	0.14	0.287	0.425	0.717	1.38	1.97	2.53	3.37	27.2
707.580	0.00183	0.000109	0.000223	0.000285	0.000491	0.000783	0.00112	0.00324	0.00434	0.0265
708.435	0.012	0.000394	0.000812	0.00116	0.00198	0.00362	0.00518	0.013	0.0174	0.113
708.445	754	2.88	5.86	8.65	14.5	27.9	39.7	46.6	62.2	565
709.740	136	0.797	1.63	2.42	4.07	7.83	11.2	13.1	17.5	150
711.500	2500	6.89	14	20.6	34.4	66	93.6	113	151	1430
711.620	501	2.13	4.34	6.42	10.8	20.7	29.5	34.4	45.9	412
711.627	0.3	0.00594	0.0122	0.0181	0.0306	0.0592	0.0844	0.153	0.205	1.47
711.775	44.3	0.336	0.69	1.02	1.72	3.32	4.73	5.72	7.63	63.6
712.540	347	1.62	3.3	4.89	8.22	15.8	22.5	26.2	34.9	310
713.340	0.1	0.00126	0.00259	0.00381	0.00646	0.0123	0.0176	0.0388	0.0519	0.351
713.350	18.8	0.17	0.349	0.517	0.871	1.68	2.4	3.02	4.04	32.8
714.610	229	1.19	2.43	3.59	6.02	11.6	16.5	19.3	25.7	225

Section:

NNS

Track Lift: Design, Existing

Structures: 100 year ARI, Existing

Catchment / Culvert ID	Local Catchment Area (ha)	Local Catchment Probabilistic Ration Method Peak Flow Rate (m³/s)								
		50% AEP	20% AEP	10% AEP	5% AEP	2% AEP	1% AEP	0.5% AEP	0.2% AEP	PMF
714.820	0.00239	0.000129	0.000263	0.000345	0.000593	0.000973	0.00139	0.00395	0.00529	0.0326
716.850	17500	28	56.4	81.8	137	262	369	478	637	6390
718.044	1.1	0.0159	0.0325	0.0483	0.0814	0.158	0.225	0.361	0.483	3.59
718.200	0.2	0.00426	0.00875	0.013	0.0219	0.0424	0.0605	0.115	0.153	1.09
718.390	2.4	0.0317	0.065	0.0965	0.162	0.314	0.448	0.664	0.887	6.76
718.900	23.7	0.205	0.421	0.624	1.05	2.03	2.89	3.6	4.8	39.3
719.905	0.0409	0.00103	0.00212	0.00312	0.00529	0.0101	0.0144	0.0324	0.0433	0.291
720.175	33.4	0.27	0.553	0.819	1.38	2.66	3.79	4.64	6.2	51.2
720.740	30.8	0.252	0.518	0.767	1.29	2.49	3.55	4.37	5.83	48
721.030	1110	3.81	7.73	11.4	19.2	36.8	52.2	61.8	82.4	759
721.170	8.6	0.0907	0.186	0.276	0.465	0.898	1.28	1.7	2.27	18
721.645	119	0.72	1.48	2.18	3.67	7.07	10.1	11.8	15.8	136
722.820	15	0.142	0.291	0.431	0.726	1.4	2	2.56	3.42	27.5
723.005	205	1.09	2.23	3.3	5.55	10.7	15.2	17.8	23.7	207
723.225	2.4	0.0319	0.0655	0.0972	0.164	0.316	0.451	0.668	0.893	6.81
723.600	102	0.644	1.32	1.95	3.28	6.32	9.01	10.6	14.2	121
723.875	66.9	0.464	0.951	1.41	2.37	4.57	6.51	7.76	10.4	87.3
724.620	142	0.827	1.69	2.51	4.21	8.12	11.6	13.5	18.1	156
725.275	715	2.78	5.63	8.32	14	26.8	38.1	44.8	59.7	542
725.545	0.2	0.00314	0.00647	0.0096	0.0162	0.0312	0.0446	0.0879	0.117	0.823

725.590	18.9	0.171	0.351	0.519	0.875	1.69	2.4	3.04	4.05	32.9
726.115	75.3	0.508	1.04	1.54	2.59	5	7.13	8.46	11.3	95.6
726.540	11.4	0.113	0.233	0.346	0.581	1.12	1.6	2.09	2.79	22.3
726.960	116	0.712	1.45	2.15	3.62	6.98	9.94	11.7	15.6	134
727.695	8.9	0.093	0.191	0.283	0.476	0.92	1.31	1.74	2.32	18.4
728.430	211	1.12	2.28	3.37	5.67	10.9	15.6	18.2	24.2	212
728.910	15.4	0.145	0.298	0.441	0.743	1.44	2.04	2.61	3.49	28.1
729.700	0.1	0.00207	0.00425	0.0063	0.0106	0.0205	0.0292	0.0606	0.0811	0.559
729.960	180	0.992	2.03	3	5.04	9.71	13.8	16.1	21.5	187
730.390	0.1	0.0028	0.00576	0.00853	0.0144	0.0278	0.0397	0.0792	0.106	0.739
730.570	42.7	0.327	0.669	0.991	1.67	3.22	4.59	5.56	7.42	61.7
732.010	11	0.111	0.227	0.336	0.566	1.09	1.56	2.04	2.72	21.7
734.945	1070	3.74	7.56	11.2	18.7	35.9	51	60.5	80.5	740
735.115	71900	77	154	225	372	711	1000	1370	1820	19000
736.210	71.9	0.491	1	1.49	2.5	4.83	6.87	8.17	10.9	92.3
736.300	16.8	0.156	0.32	0.474	0.798	1.54	2.2	2.79	3.72	30.1
737.555	1550	4.89	9.88	14.5	24.4	46.9	66.4	79.5	106	984
740.665	28200	39.6	78.8	115	191	364	516	680	906	9200
740.945	0.0187	0.000554	0.00114	0.00165	0.00281	0.00524	0.00749	0.0181	0.0243	0.159
741.345	7.6	0.0816	0.168	0.248	0.418	0.808	1.15	1.55	2.07	16.3
742.110	215	1.13	2.31	3.42	5.74	11.1	15.8	18.4	24.5	214
742.240	0.000266	4.24E-05	8.23E-05	7.95E-05	0.000138	0.000156	0.000218	0.000777	0.00104	0.00599
742.690	0.0027	0.000139	0.000285	0.000376	0.000647	0.00107	0.00153	0.00432	0.00579	0.0358
744.555	4510	10.6	21.2	31.2	52.3	99.8	142	175	234	2240
745.410	0.000732	6.58E-05	0.000132	0.000152	0.000263	0.000369	0.000522	0.00164	0.0022	0.0131
746.025	56.1	0.405	0.829	1.23	2.07	3.99	5.69	6.81	9.09	76.3
746.600	0.0346	0.000902	0.00186	0.00272	0.00462	0.00875	0.0125	0.0286	0.0383	0.256
747.905	12.1	0.119	0.245	0.363	0.611	1.18	1.68	2.18	2.92	23.3
748.425	43.3	0.33	0.678	1	1.69	3.26	4.64	5.62	7.5	62.5
749.450	11.2	0.112	0.23	0.34	0.573	1.11	1.58	2.06	2.75	22
750.965	2560	7.04	14.2	20.9	34.9	66.8	94.9	115	153	1450
751.130	142	0.826	1.69	2.5	4.21	8.11	11.5	13.5	18	156
752.490	5.9	0.0665	0.137	0.202	0.341	0.659	0.939	1.29	1.72	13.5
753.100	458	1.99	4.07	6	10.1	19.4	27.6	32.2	43	385
755.225	62.9	0.443	0.907	1.34	2.26	4.36	6.21	7.41	9.89	83.3
755.495	504	2.14	4.36	6.44	10.8	20.8	29.6	34.6	46.1	414
Section:	NNS									
Track Lift:	Design, Existing									
Structures:	100 year ARI, Existing									
Catchment / Culvert ID	Local Catchment Area (ha)	Local Catchment Probabilistic Ration Method Peak Flow Rate (m³/s)								
		50% AEP	20% AEP	10% AEP	5% AEP	2% AEP	1% AEP	0.5% AEP	0.2% AEP	PMF
755.975	71.5	0.488	1	1.48	2.49	4.81	6.85	8.14	10.9	91.9
757.003	269	1.34	2.74	4.05	6.8	13.1	18.6	21.7	28.9	255
758.215	10.5	0.107	0.219	0.325	0.547	1.06	1.51	1.97	2.64	21
758.255	15.4	0.145	0.299	0.442	0.744	1.44	2.05	2.62	3.5	28.2

Note: The above table includes the local catchment areas only and does not include the interaction of some adjacent catchments

Appendix I – Design structure flood levels (local and regional catchments)

This appendix provides a summary of the modelled local upstream catchment flood levels for a range of design flood events.

Section:	NNS
Track Lift:	Design
Structures:	1% AEP

Catchment / Culvert ID	Modelled Flood Level Local catchments (mAHD)									Modelled Flood Level Regional Catchment (mAHD)
	50%	20%	10%	5%	2%	1%	0.5%	0.2%	PMF	
573.360	217.32	217.33	217.33	217.33	217.34	217.34	217.35	217.37	219.83	-
574.375	217.71	217.76	217.83	219.16	219.27	219.29	219.56	219.59	220.31	-
574.405	218.53	218.54	218.54	219.16	219.27	219.29	219.56	219.58	220.42	-
576.030	229.78	229.79	229.79	229.80	229.82	229.84	229.86	229.88	230.11	-
579.475	243.39	243.42	243.43	243.45	243.48	243.49	243.51	243.53	243.61	-
579.585	243.64	243.64	243.65	243.65	243.66	243.68	243.75	243.79	244.68	-
579.965	241.89	241.97	241.98	242.05	242.18	242.27	242.27	242.32	243.26	-
581.180	234.95	235.12	235.26	235.51	235.81	235.89	235.90	236.00	237.68	-
581.800	235.23	235.51	235.63	235.90	236.22	236.39	236.67	236.85	239.11	-
582.605	237.66	237.69	237.70	237.73	237.75	237.77	237.78	237.80	239.13	-
582.837	237.67	237.67	237.68	237.69	237.71	237.73	237.80	237.86	239.14	-
583.430	238.92	238.95	238.95	238.95	239.02	239.13	239.26	239.44	239.49	-
584.805	241.83	241.84	241.84	241.85	241.87	241.88	241.89	241.90	242.00	-
586.200	244.83	245.05	245.22	245.50	246.03	246.43	246.44	247.07	247.31	-
587.090	245.19	245.21	245.23	245.25	245.28	245.30	245.31	245.32	245.35	-
587.700	244.10	244.11	244.12	244.13	244.14	244.15	244.16	244.17	244.18	-
587.835	244.10	244.10	244.11	244.12	244.14	244.15	244.16	244.16	244.33	-
587.915	244.00	244.00	244.01	244.02	244.04	244.06	244.10	244.13	244.55	-
588.815	243.56	243.58	243.59	243.61	243.64	243.65	243.67	243.68	243.71	-
589.300	242.89	243.18	243.19	243.20	243.22	243.24	243.27	243.30	243.76	-
590.020	241.87	241.89	241.91	241.93	242.07	242.15	242.16	242.16	242.25	-
590.225	242.16	242.17	242.18	242.20	242.22	242.23	242.24	242.26	242.34	-
591.685	236.97	237.15	237.27	237.56	238.31	239.11	239.12	239.13	240.53	-
591.766	237.07	237.15	237.27	237.55	238.21	239.04	239.05	239.07	240.53	-
591.925	236.96	237.14	237.26	237.55	237.57	237.59	238.15	239.04	240.53	-
592.075	237.34	237.36	237.38	237.55	238.15	238.99	239.00	239.01	240.54	-
593.060	241.35	241.36	241.36	241.37	241.39	241.80	241.81	241.83	241.91	-
593.820	240.77	241.04	241.25	241.64	242.18	242.20	242.24	242.28	243.03	-
595.520	242.49	242.50	242.51	242.52	242.55	242.56	242.57	242.59	242.63	-
596.430	239.48	239.75	239.95	240.33	241.03	241.52	241.52	241.75	242.19	-
597.230	240.10	240.57	240.97	241.60	242.19	242.20	242.21	242.23	242.30	-
599.445	237.11	237.13	237.15	237.32	238.25	238.28	238.30	238.90	240.80	-
600.500	235.26	235.88	236.35	237.21	237.94	237.96	237.97	238.86	240.80	-
600.800	236.66	236.68	236.69	236.71	236.74	237.35	237.68	238.74	240.80	-
601.865	238.04	238.07	238.09	238.11	238.14	238.16	238.17	238.19	238.21	-
602.450	236.61	236.87	237.08	237.45	238.14	238.59	238.61	238.73	239.98	-
603.850	238.57	239.21	239.21	239.22	239.22	239.23	239.29	239.32	239.93	-
607.830	239.48	239.51	239.53	239.55	239.58	239.60	239.61	239.63	239.65	-
608.070	239.48	239.51	239.52	239.55	239.57	239.59	239.60	239.62	239.69	-
609.550	238.73	238.96	239.14	239.46	239.95	240.07	240.07	240.20	240.78	-
613.190	228.82	228.84	228.85	228.86	228.89	228.90	228.91	228.92	229.77	-
613.990	226.56	226.59	226.60	226.62	226.65	226.79	226.80	227.15	229.55	-
614.445	225.37	225.37	225.38	225.56	226.10	226.61	226.62	227.04	229.32	-
614.650	225.27	225.30	225.31	225.46	225.89	226.45	226.46	226.94	229.18	-
614.930	224.63	224.90	225.06	225.34	225.89	225.91	226.24	226.94	229.06	-
614.960	224.80	224.83	224.91	225.21	225.70	226.22	226.23	226.82	228.96	-
616.170	229.13	229.35	229.52	229.82	230.40	230.82	230.83	231.53	232.62	-
617.075	242.78	242.79	242.79	242.79	242.80	242.80	242.86	242.89	243.50	-
618.025	241.67	241.69	241.70	241.72	242.45	243.51	243.52	243.53	244.66	-
619.030	240.64	240.65	240.65	240.65	240.89	241.04	241.22	241.44	241.66	-
620.610	224.29	224.70	225.03	225.61	226.70	227.51	227.56	228.38	229.92	-
621.855	232.09	232.39	232.63	233.05	233.85	234.45	234.46	235.43	235.85	-
623.030	229.47	229.78	230.03	230.47	231.30	231.91	231.92	232.92	233.99	-
624.755	234.55	234.57	234.58	234.60	234.62	234.63	234.65	234.66	234.70	-

Section: NNS

Track Lift:	Design
Structures:	1% AEP

Catchment / Culvert ID	Modelled Flood Level Local catchments (mAHD)									Modelled Flood Level Regional Catchment (mAHD)	
	50%	20%	10%	5%	2%	1%	0.5%	0.2%	PMF	1 % AEP	
625.520	228.34	228.36	228.38	228.40	228.42	228.44	228.45	228.47	228.55	-	
627.230	223.04	223.37	223.66	223.96	224.23	224.38	224.53	224.70	225.92	-	
627.340	222.92	223.11	223.28	223.43	223.58	223.67	223.79	223.90	225.05	-	
627.490	222.82	222.92	222.94	222.96	222.99	223.01	223.03	223.03	223.64	-	
630.870	222.73	222.74	222.74	222.76	222.78	222.80	222.87	222.92	223.80	-	
631.085	222.05	222.07	222.08	222.10	222.13	222.14	222.15	222.17	222.20	-	
631.525	221.47	221.48	221.48	221.48	221.48	221.49	221.56	221.59	222.20	-	
633.720	217.29	217.50	217.65	217.93	218.44	218.79	218.82	219.11	220.41	-	
635.090	218.47	218.48	218.48	218.49	218.49	218.50	218.56	218.86	220.23	-	
635.355	218.73	218.76	218.77	218.80	218.82	218.84	218.87	218.89	220.23	-	
636.650	217.57	217.57	217.58	217.70	218.03	218.19	218.75	220.23	-		
637.120	217.45	217.46	217.46	217.47	217.58	217.75	217.88	218.17	220.22	-	
637.230	218.31	218.31	218.31	218.32	218.32	218.33	218.38	218.42	219.03	-	
638.080	216.92	216.93	216.93	216.94	216.96	216.98	217.08	217.13	220.15	-	
638.460	216.92	216.93	216.93	216.93	216.93	216.93	216.96	216.97	219.68	-	
639.690	216.92	216.93	216.93	216.94	216.96	216.99	217.06	217.11	220.22	-	
641.540	213.22	213.64	213.96	214.56	215.65	216.46	216.74	216.77	219.75	-	
642.315	216.74	216.77	216.78	216.80	216.83	216.84	216.86	216.87	220.09	-	
643.160	217.65	217.68	217.70	217.72	217.75	217.78	217.80	217.81	219.89	-	
643.910	217.36	217.38	217.39	217.41	217.44	217.45	217.47	217.48	219.89	-	
643.965	217.36	217.37	217.38	217.40	217.42	217.43	217.45	217.46	219.89	-	
644.910	217.37	217.37	217.38	217.39	217.41	217.53	217.69	217.91	219.94	-	
645.415	217.37	217.40	217.42	217.44	217.67	218.05	218.13	218.59	219.91	-	
645.850	218.45	218.46	218.46	218.47	218.49	218.53	218.61	218.93	220.12	-	
645.995	217.80	217.82	217.83	217.86	218.19	218.71	218.73	218.98	220.01	-	
646.090	217.59	217.60	217.60	217.60	218.45	218.88	218.89	219.01	220.01	-	
647.095	216.04	216.48	216.82	217.43	218.20	218.73	220.86	220.87	220.95	-	
647.254	217.52	217.52	217.53	217.65	218.48	219.19	219.20	219.70	221.65	-	
647.605	217.05	217.08	217.10	217.17	217.29	217.38	217.39	217.55	221.77	-	
647.836	217.56	217.70	217.80	217.99	218.35	219.43	219.44	219.77	221.95	-	
648.170	217.69	217.70	217.70	217.72	218.65	219.44	219.45	219.79	221.98	-	
648.320	217.58	217.60	217.61	217.73	218.71	219.44	219.45	219.79	221.98	-	
648.565	217.59	217.59	217.71	218.65	219.44	219.45	219.45	219.79	221.98	-	
649.115	217.95	217.98	218.00	218.02	218.57	219.43	219.44	219.77	221.83	-	
649.520	216.50	216.59	216.67	216.80	217.06	217.24	217.25	217.56	221.77	-	
650.260	218.00	218.01	218.02	218.03	218.47	219.14	219.15	219.51	221.51	-	
650.610	217.99	218.04	218.06	218.08	218.30	218.66	218.69	218.92	220.36	-	
652.440	217.86	217.86	217.87	217.88	217.92	218.10	218.17	218.25	219.22	-	
652.636	217.81	217.84	217.86	217.88	217.90	217.93	217.95	217.96	218.13	-	
653.070	217.12	217.15	217.18	217.19	217.22	217.23	217.24	217.26	217.64	-	
653.540	216.66	216.94	217.21	217.23	217.25	217.27	217.29	217.30	218.25	-	
653.620	217.23	217.24	217.25	217.26	217.28	217.30	217.40	217.45	218.58	-	
654.445	217.59	217.68	217.70	217.72	217.75	217.76	217.78	217.80	217.88	-	
655.170	217.57	217.58	217.58	217.59	217.59	217.60	217.68	217.72	218.44	-	
655.175	216.09	216.09	216.10	216.10	216.10	216.11	216.17	216.20	216.81	-	
655.895	215.91	215.92	215.92	215.92	215.92	215.92	215.97	215.99	216.35	-	
658.850	213.58	213.61	213.63	213.65	213.67	213.69	213.71	213.72	213.74	-	
660.610	209.65	210.02	210.30	210.80	211.55	211.69	211.71	211.91	213.58	211.39	
663.050	214.22	214.24	214.26	214.28	214.30	214.32	214.33	214.35	214.43	-	
663.351	213.67	213.77	213.78	213.80	213.83	213.85	213.88	213.91	213.97	-	
664.770	211.30	211.31	211.32	211.33	211.35	211.37	211.44	211.48	212.30	-	
664.905	210.59	210.62	210.64	210.69	210.79	210.87	210.89	210.92	211.19	-	
665.975	209.66	209.67	209.67	209.67	209.68	209.68	209.69	209.71	209.87	-	
666.340	208.44	208.49	208.50	208.51	208.53	208.54	208.55	208.56	208.63	209.86	

Structures:	1% AEP
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Catchment / Culvert ID	Modelled Flood Level Local catchments (mAHD)									Modelled Flood Level Regional Catchment (mAHD)
	50%	20%	10%	5%	2%	1%	0.5%	0.2%	PMF	
666.341	203.56	204.08	204.54	205.12	206.11	207.03	208.03	208.50	209.06	-
666.645	208.31	208.32	208.32	208.33	208.35	208.36	208.37	208.38	208.49	209.84
666.945	208.33	208.40	208.43	208.47	208.50	208.54	208.56	208.59	208.64	210.08
667.210	207.25	207.26	207.28	207.30	207.32	207.33	207.34	207.35	208.74	210.09
667.370	206.99	207.13	207.25	207.46	207.56	207.57	207.57	207.58	209.51	210.17
667.625	208.84	208.88	208.92	209.00	209.01	209.03	209.04	209.06	209.56	210.37
667.945	208.35	208.45	208.46	208.49	208.51	208.53	208.55	208.57	209.98	210.40
668.720	208.65	209.02	209.28	209.61	209.91	210.07	210.24	210.32	212.41	210.72
669.202	208.65	209.03	209.04	209.51	209.70	209.93	210.08	210.18	212.60	210.87
670.685	209.61	209.63	209.65	209.67	209.69	209.71	209.72	209.74	209.77	211.16
671.420	209.45	209.46	209.50	209.56	209.68	209.77	209.78	211.69	215.17	211.56
672.375	209.27	209.39	209.48	209.65	210.86	211.14	211.55	211.69	215.17	211.84
675.275	212.67	212.69	212.69	212.69	212.70	212.70	212.70	212.71	215.22	214.22
675.615	212.87	212.90	212.92	212.94	212.97	212.98	213.00	213.02	215.17	214.26
676.221	210.05	211.41	212.23	212.24	212.25	212.26	212.27	212.28	215.17	-
677.835	212.84	212.85	212.85	212.86	212.89	212.91	212.97	213.02	214.93	-
677.845	212.19	212.21	212.22	212.24	212.27	212.28	212.30	212.31	213.43	213.04
678.500	211.93	211.95	211.96	211.98	212.01	212.02	212.03	212.05	212.69	213.04
679.285	210.82	210.97	211.09	211.30	211.70	212.00	212.05	212.07	212.15	213.78
680.090	212.04	212.05	212.07	212.09	212.11	212.13	212.14	212.15	212.24	213.85
680.610	211.44	211.44	211.46	211.47	211.50	211.51	211.53	211.54	211.63	213.88
680.615	211.44	211.44	211.45	211.47	211.50	211.51	211.53	211.54	212.55	-
680.620	212.35	212.37	212.38	212.40	212.42	212.44	212.45	212.46	212.55	-
680.720	211.95	212.14	212.29	212.30	212.33	212.35	212.36	212.37	212.43	213.85
684.897	220.67	220.74	220.76	220.83	220.94	221.03	221.11	221.16	222.35	-
686.404	221.18	221.41	221.58	221.90	222.04	222.05	222.06	222.07	222.15	-
686.440	221.51	221.53	221.56	221.61	221.70	221.78	221.79	221.80	222.06	-
686.495	221.40	221.41	221.41	221.42	221.44	221.45	221.46	221.68	221.80	-
690.820	224.12	224.12	224.13	224.13	224.13	224.14	224.20	224.22	224.74	-
690.830	224.94	224.97	224.98	225.01	225.03	225.05	225.06	225.08	225.10	-
691.025	225.41	225.41	225.41	225.42	225.44	225.45	225.55	225.60	226.58	-
695.210	239.17	239.55	239.85	239.97	239.99	240.01	240.02	240.03	240.12	-
695.310	239.34	239.34	239.35	239.35	239.35	239.36	239.43	239.46	240.04	-
696.990	241.83	242.15	242.39	242.83	243.66	244.12	244.13	244.14	244.22	-
699.800	248.27	248.29	248.30	248.32	248.35	248.36	248.38	248.39	248.42	-
699.880	248.27	248.29	248.31	248.33	248.36	248.38	248.39	248.40	248.43	-
702.360	259.03	259.03	259.04	259.04	259.04	259.05	259.12	259.15	259.76	-
702.380	258.83	258.84	258.84	258.85	258.86	258.88	258.96	259.00	259.97	-
703.065	260.15	260.22	260.23	260.24	260.27	260.28	260.29	260.31	260.36	-
704.790	264.45	264.80	265.06	265.50	266.31	266.58	266.59	266.70	267.32	-
706.250	270.76	270.93	271.05	271.28	271.71	272.02	272.03	272.20	272.28	-
706.510	272.54	272.54	272.54	272.55	272.57	272.58	272.68	272.73	273.75	-
706.675	274.22	274.23	274.23	274.24	274.25	274.27	274.37	274.42	275.44	-
707.400	275.06	275.07	275.07	275.08	275.10	275.12	275.22	275.28	276.41	-
707.550	275.19	275.21	275.21	275.23	275.25	275.26	275.28	275.29	275.34	-
707.560	275.00	275.00	275.01	275.02	275.04	275.06	275.16	275.21	276.34	-
707.565	274.82	274.82	274.83	274.84	274.86	274.88	274.97	275.02	276.11	-
707.575	274.81	274.82	274.82	274.83	274.85	274.85	274.87	274.88	274.93	-
707.580	274.92	274.92	274.93	274.94	274.95	274.96	275.06	275.11	276.11	-
708.435	272.56	272.57	272.59	272.65	272.67	272.69	272.85	272.90	274.04	-
708.445	273.15	273.18	273.19	273.21	273.24	273.26	273.27	273.28	273.31	-
709.74	272.22	272.39	272.53	272.77	273.23	273.54	273.55	273.62	274.01	-
711.5	268.13	268.16	268.18	268.27	268.95	269.92	269.93	270.21	271.54	-
711.62	267.65	267.77	268.06	268.26	268.94	269.92	269.93	270.21	271.54	-

Section: NNS

Track Lift: Design

Structures: 1% AEP

Catchment / Culvert ID	Modelled Flood Level Local catchments (mAHD)									Modelled Flood Level Regional Catchment (mAHD)	
	50%	20%	10%	5%	2%	1%	0.5%	0.2%	PMF	1 % AEP	
711.627	267.68	267.89	268.07	268.26	268.94	269.92	269.93	270.21	271.54	-	
711.775	268.27	268.28	268.29	268.30	268.95	269.92	269.93	270.23	271.54	-	
712.54	270.12	270.14	270.15	270.17	270.20	270.21	270.22	270.24	271.82	-	
713.34	273.26	273.27	273.27	273.36	273.38	273.40	273.41	273.46	274.45	-	
713.35	273.49	273.49	273.50	273.51	273.52	273.53	273.55	273.56	273.61	-	
714.61	277.84	277.86	277.89	277.94	278.05	278.12	278.14	278.25	278.77	-	
714.82	279.81	279.81	279.82	279.83	279.84	279.86	279.96	280.01	281.05	-	
716.85	277.19	277.51	277.75	278.20	279.04	279.66	279.86	280.49	283.25	-	
718.044	287.18	287.19	287.19	287.22	287.29	287.34	287.37	287.49	287.49	-	
718.2	287.37	287.39	287.45	287.46	287.48	287.50	287.56	287.60	288.30	-	
718.39	286.36	286.36	286.40	286.45	286.57	286.65	286.67	286.69	286.92	-	
718.9	288.56	288.66	288.73	288.86	289.11	289.16	289.17	289.18	289.25	-	
719.905	291.71	291.72	291.72	291.73	291.76	291.78	291.86	291.91	292.95	-	
720.175	289.04	289.22	289.28	289.29	289.31	289.32	289.33	289.35	289.41	-	
720.74	288.98	289.15	289.28	289.29	289.31	289.32	289.33	289.35	289.41	-	
721.03	288.90	289.23	289.50	289.79	289.81	289.83	289.83	289.85	290.51	-	
721.17	290.10	290.12	290.13	290.18	290.27	290.33	290.35	290.66	291.48	-	
721.645	293.65	293.72	293.77	293.88	294.06	294.21	294.22	294.44	294.68	-	
722.82	300.67	300.78	300.87	300.88	300.90	300.91	300.91	300.92	301.00	-	
723.005	300.55	300.69	300.70	300.72	300.74	300.76	300.77	300.79	300.84	-	
723.225	299.61	299.62	299.62	299.63	299.80	299.91	299.93	300.12	300.61	-	
723.6	299.84	300.06	300.07	300.09	300.11	300.12	300.14	300.15	300.21	-	
723.875	299.36	299.58	299.74	300.04	300.07	300.38	300.40	300.46	301.01	-	
724.62	298.89	299.04	299.16	299.37	299.76	300.05	300.07	300.54	301.58	-	
725.275	301.49	301.62	301.73	301.92	302.28	302.50	302.51	302.52	302.60	-	
725.545	303.52	303.53	303.53	303.54	303.56	303.58	303.65	303.69	304.47	-	
725.59	303.37	303.48	303.56	303.70	303.71	303.72	303.74	303.75	303.81	-	
726.115	307.72	307.78	307.82	307.90	308.06	308.17	308.18	308.37	308.50	-	
726.54	307.31	307.32	307.32	307.33	307.58	307.73	307.74	307.76	308.49	-	
726.96	308.95	308.99	309.00	309.01	309.04	309.05	309.06	309.07	309.85	-	
727.695	308.90	308.99	309.05	309.18	309.41	309.58	309.65	309.97	310.61	-	
728.43	306.99	307.10	307.11	307.13	307.15	307.17	307.18	307.19	307.25	-	
728.91	303.54	303.55	303.55	303.56	303.80	304.15	304.23	304.55	304.63	-	
729.7	298.67	298.67	298.68	298.69	298.71	298.73	298.74	298.78	299.67	-	
729.96	296.60	296.83	296.84	296.86	296.88	296.90	296.91	296.92	296.98	-	
730.39	294.17	294.18	294.18	294.19	294.22	294.24	294.30	294.35	295.16	-	
730.57	292.49	292.57	292.63	292.74	292.95	293.11	293.13	293.40	294.36	-	
732.01	287.14	287.15	287.15	287.16	287.17	287.18	287.19	287.21	287.27	-	
734.945	272.61	272.75	272.87	273.08	273.47	273.76	273.77	273.95	276.34	-	
735.115	267.98	268.34	268.62	269.12	270.06	270.75	271.11	272.41	276.34	-	
736.21	284.37	284.39	284.40	284.41	284.43	284.45	284.46	284.47	284.52	-	
736.3	284.04	284.05	284.05	284.23	284.37	284.38	284.40	284.41	284.49	-	
737.555	276.69	276.90	277.07	277.37	277.93	278.35	278.37	279.03	280.69	-	
740.665	266.54	266.94	267.18	267.20	267.87	268.87	268.88	269.65	275.49	-	
740.945	267.07	267.07	267.08	267.09	267.87	269.01	269.02	269.65	274.56	-	
741.345	270.50	270.53	270.59	270.69	270.77	270.78	270.79	270.80	274.56	-	
742.11	274.47	274.48	274.50	274.52	274.54	274.56	274.57	274.58	274.62	-	
742.24	274.32	274.32	274.32	274.33	274.33	274.34	274.40	274.43	275.02	-	
742.69	277.81	277.82	277.82	277.83	277.84	277.86	277.96	278.01	279.07	-	
744.555	275.92	276.23	276.48	276.92	277.74	278.35	278.45	278.98	281.24	-	
745.41	284.18	284.19	284.19	284.20	284.20	284.22	284.30	284.34	285.17	-	
746.025	290.45	290.68	290.71	290.72	290.74	290.76	290.77	290.78	290.85	-	
746.6	295.61	295.68	295.78	295.79	295.81	295.83	295.85	295.87	296.92	-	
747.905	298.06	298.06	298.07	298.07	298.09	298.10	298.11	298.12	298.18	-	

Section: NIN

Section 11.5

Structures: 1% AEP

Catchment / Culvert ID	Modelled Flood Level Local catchments (mAHD)									Modelled Flood Level Regional Catchment (mAHD)	
	50%	20%	10%	5%	2%	1%	0.5%	0.2%	PMF	1 % AEP	
748.425	290.28	290.49	290.64	290.90	291.36	291.55	291.59	291.74	292.43	-	
749.45	282.02	282.12	282.19	282.33	282.39	282.40	282.40	282.41	282.50	-	
750.965	267.14	267.17	267.23	267.63	268.18	269.09	269.10	269.35	271.05	-	
751.13	267.14	267.16	267.23	267.63	268.18	268.87	268.88	269.25	270.95	-	
752.49	274.49	274.50	274.50	274.51	274.53	274.54	274.55	274.56	274.68	-	
753.1	272.82	273.02	273.17	273.46	273.99	274.39	274.40	274.49	274.57	-	
755.225	274.31	274.32	274.33	274.34	274.36	274.38	274.39	274.40	274.45	-	
755.495	274.31	274.33	274.35	274.37	274.39	274.41	274.42	274.43	274.46	-	
755.975	274.63	274.89	275.10	275.35	275.37	275.38	275.40	275.41	275.47	-	
757.003	270.41	270.66	270.85	271.20	271.85	272.34	272.35	272.53	273.30	-	
758.215	267.21	267.22	267.23	267.25	267.31	267.36	267.38	267.47	268.07	-	
758.255	266.68	266.76	266.81	266.92	267.12	267.27	267.31	267.58	268.38	-	
Section:	NNS										
Track Lift:	Design										
Structures:	1% AEP										
Catchment / Culvert ID	Change in Modelled Flood Level Local catchments (metres)									Change in Modelled Flood Level Regional Catchment (metres)	
	50%	20%	10%	5%	2%	1%	0.5%	0.2%	PMF	1 % AEP	
573.360	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.31	-	
574.375	0.00	0.05	-0.15	0.86	0.85	0.85	0.85	0.81	0.92	-	
574.405	0.33	0.11	0.01	0.62	0.62	0.62	0.84	0.80	0.92	-	
576.030	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-	
579.475	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-	
579.585	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-	
579.965	0.00	0.00	-0.06	-0.10	-0.09	-0.02	-0.07	-0.07	-0.07	-	
581.180	-0.63	-1.14	-1.02	-0.79	-0.52	-0.45	-0.46	-0.36	0.27	-	
581.800	-0.26	-0.03	-0.17	-0.08	0.04	0.09	0.32	0.30	0.52	-	
582.605	0.38	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.52	-	
582.837	0.00	0.00	0.00	0.00	0.00	0.00	-0.03	-0.03	0.14	-	
583.430	0.00	0.00	0.00	0.00	-0.07	-0.20	-0.33	-0.50	-0.50	-	
584.805	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-	
586.200	0.10	0.26	0.37	0.57	0.93	1.19	1.19	1.64	0.20	-	
587.090	0.00	0.00	0.00	0.00	0.00	0.00	-0.10	-0.11	-0.16	-	
587.700	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-	
587.835	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-	
587.915	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-	
588.815	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-	
589.300	0.28	0.43	0.32	0.12	0.04	0.04	0.02	0.02	0.02	-	
590.020	0.00	0.00	0.00	0.00	0.04	0.02	0.02	0.02	0.02	-	
590.225	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-	
591.685	-0.05	-0.13	-0.20	-0.22	-0.39	0.24	0.24	0.19	0.43	-	
591.766	0.00	-0.13	-0.21	-0.23	-0.48	0.20	0.20	0.18	0.51	-	
591.925	-0.06	-0.14	-0.21	-0.23	-1.12	-1.12	-0.64	0.18	0.54	-	
592.075	0.00	0.00	-0.09	-0.22	-0.54	0.16	0.16	0.16	0.50	-	
593.060	0.00	0.00	0.00	-0.43	-0.43	-0.03	-0.03	-0.03	-0.03	-	
593.820	0.00	0.01	0.01	0.01	0.35	0.29	0.33	0.28	0.28	-	
595.520	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-	
596.430	0.05	-0.06	-0.13	-0.24	0.11	0.51	0.50	0.63	0.00	-	
597.230	-0.46	-0.33	-0.18	0.00	0.32	0.01	0.01	0.01	0.01	0.01	-
599.445	0.00	-0.23	-0.48	-0.75	0.00	0.00	0.02	0.60	0.76	-	
600.500	0.32	0.51	0.65	0.91	0.53	0.01	0.02	0.90	0.76	-	
600.800	0.00	0.00	0.00	0.00	0.00	0.13	0.45	0.84	0.76	-	
601.865	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.01	-	
602.450	-0.60	-0.96	-1.00	-0.78	-0.30	0.02	0.01	0.10	0.34	-	
603.850	1.27	1.64	1.42	1.03	0.29	0.02	0.07	0.08	0.08	-	
607.830	0.88	0.57	0.31	0.12	0.10	0.10	0.08	0.07	0.03	-	
608.070	0.01	0.01	0.01	0.01	0.01	0.01	0.00	0.00	0.00	-	

609.550	-0.08	-0.13	-0.16	-0.23	0.10	0.13	0.13	0.15	0.00	-
613.190	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.51	-
613.990	0.00	0.00	0.00	0.00	0.00	0.05	0.02	0.11	0.42	-
614.445	0.00	0.00	-0.12	-0.28	-0.47	-0.12	-0.13	0.10	0.41	-
614.650	0.00	0.00	-0.17	-0.38	-0.64	-0.24	-0.24	0.07	0.39	-
614.930	-0.03	0.02	-0.09	-0.16	0.37	-0.45	-0.13	0.21	0.39	-
614.960	0.00	0.00	0.06	0.16	0.24	0.16	0.07	0.19	0.39	-
616.170	0.16	0.26	0.34	0.47	0.73	0.93	0.93	1.24	0.41	-
617.075	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-
618.025	0.00	0.00	0.00	-0.08	0.01	0.69	0.69	0.22	0.68	-
619.030	0.00	0.00	0.00	0.00	0.09	0.15	0.22	0.30	0.30	-
620.610	0.23	0.38	0.49	0.69	1.07	1.35	1.37	1.29	0.45	-
621.855	0.28	0.45	0.58	0.82	1.27	1.61	1.61	2.17	0.46	-
623.030	0.20	0.32	0.41	0.59	0.91	1.15	1.15	1.59	0.93	-

Section: NNS

Track Lift: Design

Structures: 1% AEP

Catchment / Culvert ID	Change in Modelled Flood Level Local catchments (metres)									Change in Modelled Flood Level Regional Catchment (metres)	
	50%	20%	10%	5%	2%	1%	0.5%	0.2%	PMF	1 % AEP	
624.755	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-
625.520	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-
627.230	0.01	0.33	0.61	0.90	0.66	0.61	0.75	0.80	0.67		
627.340	0.00	0.18	0.34	0.48	0.33	0.30	0.41	0.40	0.38		
627.490	0.58	0.60	0.54	0.44	0.24	0.09	0.09	0.08	0.18		
630.870	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-
631.085	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-
631.525	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-
633.720	-0.20	-0.33	-0.44	-0.60	-0.28	-0.06	-0.03	0.24	0.46		
635.090	0.00	0.00	0.00	0.00	-0.12	-0.24	-0.18	0.03	0.57		
635.355	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.57		
636.650	0.00	0.00	-0.03	-0.33	-0.39	-0.11	-0.05	0.44	0.57		
637.120	0.00	0.00	-0.06	-0.22	-0.15	0.00	0.01	0.25	0.64		
637.230	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-
638.080	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.67		
638.460	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.24		
639.690	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.77		
641.540	-0.14	-0.22	-0.28	-0.40	-0.62	-0.28	-0.01	-0.09	0.29		
642.315	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.64		
643.160	0.06	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.49		
643.910	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.56		
643.965	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.59		
644.910	0.00	0.00	0.00	0.00	0.00	0.10	0.17	0.35	0.67		
645.415	0.00	0.00	0.00	0.00	0.20	0.57	0.64	1.07	0.64		
645.850	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.26	0.32		
645.995	0.00	0.00	0.00	0.00	0.31	0.82	0.81	1.06	0.74		
646.090	0.00	0.00	0.00	0.00	0.85	1.28	1.25	1.34	0.74		
647.095	0.34	0.55	0.71	1.00	1.19	1.27	3.39	2.50	0.81		
647.254	0.00	0.00	0.00	-0.24	-0.41	0.20	0.11	0.44	0.53		
647.605	-0.01	-0.05	-0.08	-0.12	-0.18	-0.23	-0.23	-0.32	0.54		
647.836	-0.07	-0.12	-0.16	-0.22	-0.67	0.30	0.25	0.37	0.56		
648.170	0.00	0.00	0.00	-0.34	-0.36	0.27	0.16	0.30	0.58		
648.320	0.00	-0.10	-0.27	-0.45	-0.31	0.26	0.08	0.30	0.58		
648.565	0.00	-0.10	-0.28	-0.47	-0.36	0.26	0.08	0.29	0.58		
649.115	0.00	0.00	-0.08	-0.17	-0.45	0.30	0.10	0.30	0.59		
649.520	-0.14	-0.23	-0.30	-0.43	-0.66	-1.83	-2.02	-1.84	0.54		
650.260	0.00	0.00	-0.06	-0.13	-0.20	0.31	-0.12	0.13	0.61		
650.610	-0.05	-0.01	-0.05	-0.12	0.02	0.31	-0.06	0.13	0.72		
652.440	0.00	0.00	0.00	0.00	0.02	0.18	0.20	0.23	0.28		
652.636	-0.02	-0.01	0.00	0.00	0.00	0.02	0.02	0.02	-0.56		
653.070	-0.01	-0.01	0.00	0.00	0.00	-0.08	-0.11	-0.32	-0.66		

653.540	0.00	0.19	0.14	0.02	0.02	-0.01	-0.01	-0.05	-0.19	-
653.620	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-
654.445	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-
655.170	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-
655.175	0.11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-
655.895	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-
658.850	0.37	0.13	0.04	0.04	0.04	0.04	0.04	0.05	0.00	-
660.610	-0.25	-0.39	-0.51	-0.52	0.01	0.04	0.04	0.06	0.00	-0.01
663.050	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-
663.351	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-
664.770	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-
664.905	-0.26	-0.52	-0.72	-1.04	-1.16	-1.10	-1.10	-1.10	-1.10	-

Section: NNS

Track Lift: Design

Structures: 1% AEP

Catchment / Culvert ID	Change in Modelled Flood Level Local catchments (metres)									Change in Modelled Flood Level Regional Catchment (metres)	
	50%	20%	10%	5%	2%	1%	0.5%	0.2%	PMF	1 % AEP	
665.975	0.00	0.00	0.00	0.00	-2.07	-2.08	-2.08	-2.08	-2.08	-2.08	-
666.340	0.00	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-2.11	0.09
666.341	-0.09	-0.13	-0.17	-0.22	-0.30	-0.38	-0.41	0.00	-0.77	-	
666.645	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.29	0.09
666.945	-0.02	-0.01	-0.01	-0.01	-0.01	-0.01	0.00	0.00	-0.02	-0.02	0.09
667.210	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.33	0.10
667.370	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.09	0.10
667.625	0.01	0.04	0.08	0.14	0.12	0.10	0.09	0.05	0.39		0.09
667.945	0.00	0.07	0.00	0.00	0.00	0.00	0.00	0.00	1.14		0.16
668.720	0.00	0.37	-0.10	-0.13	0.00	0.05	-0.04	-0.04	0.54		0.23
669.202	0.00	0.37	-0.33	-0.28	-0.30	-0.18	-0.28	-0.21	0.66		0.25
670.685	0.00	-0.02	-0.22	-0.81	-1.12	-1.31	-1.78	-1.91	-4.95		0.22
671.420	-0.01	-0.06	-0.07	-0.11	-0.17	-1.29	-1.75	0.12	0.20		0.18
672.375	-0.05	-0.08	-0.11	-0.16	-0.08	-0.03	-0.10	-0.17	-0.16		0.11
675.275	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.99		0.05
675.615	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.45		0.05
676.221	-0.48	-0.72	0.00	0.00	0.00	0.00	-0.20	-0.30	-0.63	-	
677.835	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.70	-	
677.845	0.00	-0.01	-0.01	-0.02	-0.02	-0.03	-0.31	-0.71	-1.90	-	-0.04
678.500	-0.12	-0.11	-0.10	-0.09	-0.26	-0.71	-0.71	-1.18	-2.58	-	-0.04
679.285	-0.06	-0.09	-0.12	-0.17	-0.25	-1.18	-1.13	-1.22	-3.12		0.62
680.090	-0.02	-0.03	-0.03	-0.03	-0.40	-1.08	-1.08	-1.14	-2.48		0.32
680.610	0.00	-0.01	-0.15	-0.55	-1.16	-1.69	-1.69	-1.79	-2.19		0.33
680.615	0.00	0.00	-0.16	-0.55	-1.26	-1.70	-1.69	-1.83	-1.94	-	
680.620	0.00	-0.04	-0.04	-0.04	-0.33	-0.77	-0.77	-0.91	-1.27	-	
680.720	-0.27	-0.27	-0.12	-0.12	-0.43	-0.86	-0.86	-1.00	-1.67		0.30
684.897	0.00	-0.04	-0.09	-0.16	-0.27	-0.36	-0.36	-0.36	0.01	-	
686.404	-0.01	-0.01	-0.01	-0.02	0.00	0.00	0.00	0.00	0.00	-	
686.440	-0.02	-0.02	-0.03	-0.04	-0.07	-0.01	-0.01	-0.03	-0.03	-	
686.495	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.20	0.03	-	
690.820	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-	
690.830	0.32	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.00	-	
691.025	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-	
695.210	-0.09	-0.15	-0.10	-0.01	-0.01	-0.01	0.00	0.00	0.00	-	
695.310	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-	
696.990	0.12	0.19	0.25	0.35	0.60	0.95	0.95	0.88	0.17	-	
699.800	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-	
699.880	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-	
702.360	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-	
702.380	0.00	0.00	0.00	0.00	0.00	0.00	-0.02	-0.02	-0.02	-	
703.065	-0.07	-0.01	-0.01	-0.01	-0.01	-0.01	-0.01	-0.01	0.00	-	
704.790	-0.05	0.01	0.05	0.11	0.57	0.76	0.76	0.80	0.62	-	
706.250	-0.33	-0.53	-0.68	-0.92	-0.52	-0.22	-0.22	-0.07	-0.05	-	

706.510	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-
706.675	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-
707.400	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-
707.550	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-
707.560	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-
707.565	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-
707.575	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-
707.580	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-
708.435	0.00	0.00	0.01	0.06	0.04	-0.02	0.12	0.12	0.12	-
708.445	0.69	0.69	0.54	0.23	0.09	0.09	0.09	0.09	0.08	-

Section: NI

Track Lift: De

Structures: 1% AEP

737.555	-0.42	-0.67	-0.86	-0.89	-0.45	-0.11	-0.10	0.45	0.89	-
740.665	-0.55	-0.25	-0.20	-0.79	-1.14	-0.31	-0.83	-0.42	0.87	-
740.945	0.00	0.00	-0.31	-0.91	-1.17	-0.34	-0.69	-0.42	-0.06	-
741.345	0.02	-0.06	-0.09	-0.08	-0.02	-0.02	-0.02	-0.02	-0.06	-
742.11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-
742.24	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-
742.69	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-
744.555	-0.10	-0.16	-0.20	-0.29	-0.28	0.10	0.17	0.45	0.72	-

Section: NNS

Track Lift: Design

Structures: 1% AEP

Catchment / Culvert ID	Change in Modelled Flood Level Local catchments (metres)									Change in Modelled Flood Level Regional Catchment (metres)	
	50%	20%	10%	5%	2%	1%	0.5%	0.2%	PMF	1 % AEP	
745.41	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-
746.025	-0.09	-0.03	-0.01	-0.01	-0.01	-0.01	-0.01	-0.01	-0.01	0.00	-
746.6	-0.14	-0.08	0.01	0.01	0.01	0.01	0.01	0.01	0.00	0.00	-
747.905	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-
748.425	0.08	0.03	-0.09	-0.09	0.27	0.42	0.43	0.49	0.67	-	
749.45	-0.16	-0.26	-0.19	-0.06	-0.02	-0.02	-0.01	-0.01	-0.01	-0.01	-
750.965	0.00	0.00	-0.03	-0.01	-0.09	0.06	0.06	0.25	0.76	-	
751.13	0.00	0.00	-0.03	-0.01	-0.01	-0.05	-0.05	0.20	0.76	-	
752.49	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-
753.1	0.03	0.06	0.07	0.10	0.19	0.50	0.50	0.52	0.08	-	
755.225	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-
755.495	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-
755.975	-0.11	0.06	-0.25	-0.01	-0.01	-0.01	-0.01	-0.01	-0.01	-0.04	-
757.003	0.20	0.33	0.43	0.60	0.93	1.18	1.18	0.97	0.86	-	
758.215	-0.18	-0.31	-0.34	-0.34	-0.32	-0.32	-0.31	-0.26	-0.01	-	
758.255	-0.19	-0.62	-0.87	-0.82	-0.86	-0.87	-0.85	-0.76	-1.28	-	

Appendix J – Overtopping for design conditions (local and regional catchments)

This appendix provides a summary of length of the design track that is overtopped during the modelled local and regional design flood events.

Track overtopping occurs when the modelled local or regional catchment flood level is higher than the design top of rail level.

Section:	NNS
Track Lift:	Design
Structures:	1% AEP

Catchment / Culvert ID	Kilometerage (at mid point)	Length of rail overtopping (m)						Length of rail overtopping	
		50%	20%	10%	5%	2%	1% AEP	10% AEP	1% AEP
573.360	-	0.00	0.00	0.00	0.00	0.00	0.00	-	-
574.375	-	0.00	0.00	0.00	0.00	0.00	0.00	-	-
574.405	-	0.00	0.00	0.00	0.00	0.00	0.00	-	-
576.030	-	0.00	0.00	0.00	0.00	0.00	0.00	-	-
579.475	-	0.00	0.00	0.00	0.00	0.00	0.00	-	-
579.585	-	0.00	0.00	0.00	0.00	0.00	0.00	-	-
579.965	-	0.00	0.00	0.00	0.00	0.00	0.00	-	-
581.180	581.119	0.00	0.00	0.00	0.00	161.33	187.11	-	-
581.800	-	0.00	0.00	0.00	0.00	0.00	0.00	-	-
582.605	-	0.00	0.00	0.00	0.00	0.00	0.00	-	-
582.837	-	0.00	0.00	0.00	0.00	0.00	0.00	-	-
583.430	-	0.00	0.00	0.00	0.00	0.00	0.00	-	-
584.805	-	0.00	0.00	0.00	0.00	0.00	0.00	-	-
586.200	-	0.00	0.00	0.00	0.00	0.00	0.00	-	-
587.090	-	0.00	0.00	0.00	0.00	0.00	0.00	-	-
587.700	-	0.00	0.00	0.00	0.00	0.00	0.00	-	-
587.835	-	0.00	0.00	0.00	0.00	0.00	0.00	-	-
587.915	-	0.00	0.00	0.00	0.00	0.00	0.00	-	-
588.815	-	0.00	0.00	0.00	0.00	0.00	0.00	-	-
589.300	-	0.00	0.00	0.00	0.00	0.00	0.00	-	-
590.020	-	0.00	0.00	0.00	0.00	0.00	0.00	-	-
590.225	-	0.00	0.00	0.00	0.00	0.00	0.00	-	-
591.685	-	0.00	0.00	0.00	0.00	0.00	0.00	-	-
591.766	-	0.00	0.00	0.00	0.00	0.00	0.00	-	-
591.925	-	0.00	0.00	0.00	0.00	0.00	0.00	-	-
592.075	-	0.00	0.00	0.00	0.00	0.00	0.00	-	-
593.060	-	0.00	0.00	0.00	0.00	0.00	0.00	-	-
593.820	-	0.00	0.00	0.00	0.00	0.00	0.00	-	-
595.520	-	0.00	0.00	0.00	0.00	0.00	0.00	-	-
596.430	596.553	0.00	0.00	0.00	0.00	0.00	90.15	-	-
597.230	-	0.00	0.00	0.00	0.00	0.00	0.00	-	-
599.445	-	0.00	0.00	0.00	0.00	0.00	0.00	-	-
600.500	-	0.00	0.00	0.00	0.00	0.00	0.00	-	-
600.800	-	0.00	0.00	0.00	0.00	0.00	0.00	-	-
601.865	-	0.00	0.00	0.00	0.00	0.00	0.00	-	-
602.450	-	0.00	0.00	0.00	0.00	0.00	0.00	-	-
603.850	-	0.00	0.00	0.00	0.00	0.00	0.00	-	-
607.830	-	0.00	0.00	0.00	0.00	0.00	0.00	-	-
608.070	-	0.00	0.00	0.00	0.00	0.00	0.00	-	-
609.550	609.588	0.00	0.00	0.00	0.00	109.91	164.22	-	-
613.190	-	0.00	0.00	0.00	0.00	0.00	0.00	-	-
613.990	-	0.00	0.00	0.00	0.00	0.00	0.00	-	-
614.445	-	0.00	0.00	0.00	0.00	0.00	0.00	-	-
614.650	614.668	0.00	0.00	0.00	0.00	0.00	70.91	-	-
614.930	-	0.00	0.00	0.00	0.00	0.00	0.00	-	-
614.960	-	0.00	0.00	0.00	0.00	0.00	0.00	-	-
616.170	-	0.00	0.00	0.00	0.00	0.00	0.00	-	-
617.075	-	0.00	0.00	0.00	0.00	0.00	0.00	-	-
618.025	-	0.00	0.00	0.00	0.00	0.00	0.00	-	-
619.030	-	0.00	0.00	0.00	0.00	0.00	0.00	-	-
620.610	-	0.00	0.00	0.00	0.00	0.00	0.00	-	-

Section:	NNS
Track Lift:	Design
Structures:	1% AEP

Catchment / Culvert ID	Kilometerage (at mid point)	Length of rail overtopping (m)						Length of rail overtopping	
		50%	20%	10%	5%	2%	1% AEP	10% AEP	1% AEP
621.855-		0.00	0.00	0.00	0.00	0.00	0.00	-	-
623.030-		0.00	0.00	0.00	0.00	0.00	0.00	-	-
624.755-		0.00	0.00	0.00	0.00	0.00	0.00	-	-
625.520-		0.00	0.00	0.00	0.00	0.00	0.00	-	-
627.230-		0.00	0.00	0.00	0.00	0.00	0.00	-	-
627.340-		0.00	0.00	0.00	0.00	0.00	0.00	-	-
627.490-		0.00	0.00	0.00	0.00	0.00	0.00	-	-
630.870-		0.00	0.00	0.00	0.00	0.00	0.00	-	-
631.085-		0.00	0.00	0.00	0.00	0.00	0.00	-	-
631.525-		0.00	0.00	0.00	0.00	0.00	0.00	-	-
633.720	633.771	0.00	0.00	0.00	0.00	0.00	93.46	-	-
635.090-		0.00	0.00	0.00	0.00	0.00	0.00	-	-
635.355-		0.00	0.00	0.00	0.00	0.00	0.00	-	-
636.650-		0.00	0.00	0.00	0.00	0.00	0.00	-	-
637.120-		0.00	0.00	0.00	0.00	0.00	0.00	-	-
637.230-		0.00	0.00	0.00	0.00	0.00	0.00	-	-
638.080-		0.00	0.00	0.00	0.00	0.00	0.00	-	-
638.460-		0.00	0.00	0.00	0.00	0.00	0.00	-	-
639.690-		0.00	0.00	0.00	0.00	0.00	0.00	-	-
641.540-		0.00	0.00	0.00	0.00	0.00	0.00	-	-
642.315-		0.00	0.00	0.00	0.00	0.00	0.00	-	-
643.160-		0.00	0.00	0.00	0.00	0.00	0.00	-	-
643.910-		0.00	0.00	0.00	0.00	0.00	0.00	-	-
643.965-		0.00	0.00	0.00	0.00	0.00	0.00	-	-
644.910-		0.00	0.00	0.00	0.00	0.00	0.00	-	-
645.415-		0.00	0.00	0.00	0.00	0.00	0.00	-	-
645.850-		0.00	0.00	0.00	0.00	0.00	0.00	-	-
645.995-		0.00	0.00	0.00	0.00	0.00	0.00	-	-
646.090-		0.00	0.00	0.00	0.00	0.00	0.00	-	-
647.095-		0.00	0.00	0.00	0.00	0.00	0.00	-	-
647.254	647.241	0.00	0.00	0.00	0.00	0.00	3.73	-	-
647.605-		0.00	0.00	0.00	0.00	0.00	0.00	-	-
647.836-		0.00	0.00	0.00	0.00	0.00	0.00	-	-
648.170	648.170	0.00	0.00	0.00	0.00	0.00	6.33	-	-
648.320	648.480	0.00	0.00	0.00	0.00	0.00	457.88	-	-
648.565	648.554	0.00	0.00	0.00	0.00	0.00	13.51	-	-
649.115-		0.00	0.00	0.00	0.00	0.00	0.00	-	-
649.520-		0.00	0.00	0.00	0.00	0.00	0.00	-	-
650.260-		0.00	0.00	0.00	0.00	0.00	0.00	-	-
650.610-		0.00	0.00	0.00	0.00	0.00	0.00	-	-
652.440-		0.00	0.00	0.00	0.00	0.00	0.00	-	-
652.636-		0.00	0.00	0.00	0.00	0.00	0.00	-	-
653.070-		0.00	0.00	0.00	0.00	0.00	0.00	-	-
653.540-		0.00	0.00	0.00	0.00	0.00	0.00	-	-
653.620-		0.00	0.00	0.00	0.00	0.00	0.00	-	-
654.445-		0.00	0.00	0.00	0.00	0.00	0.00	-	-
655.170-		0.00	0.00	0.00	0.00	0.00	0.00	-	-
655.175-		0.00	0.00	0.00	0.00	0.00	0.00	-	-
655.895-		0.00	0.00	0.00	0.00	0.00	0.00	-	-
658.850-		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
660.610	660.580	0.00	0.00	0.00	0.00	0.00	289.95	374.47	0.00

664.770	-	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
664.905	-	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
665.975	-	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
666.340	-	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
666.341	-	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
666.645	-	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
666.945	-	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
667.210	-	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
667.370	-	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
667.625	-	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
667.945	-	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
668.720	-	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4932.00
669.202	-	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
670.685	-	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
671.420	-	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
672.375	-	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
675.275	-	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
675.615	-	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
676.221	-	0.00	0.00	0.00	0.00	0.00	0.00	-	-
677.835	-	0.00	0.00	0.00	0.00	0.00	0.00	-	-
677.845	-	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
678.500	-	0.00	0.00	0.00	0.00	0.00	0.00	70.00	1788.00
679.285	-	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
680.090	-	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
680.610	-	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
680.615	-	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
680.620	-	0.00	0.00	0.00	0.00	0.00	0.00	-	-
680.720	-	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
684.897	-	0.00	0.00	0.00	0.00	0.00	0.00	-	-
686.404	-	0.00	0.00	0.00	0.00	0.00	0.00	-	-
686.440	-	0.00	0.00	0.00	0.00	0.00	0.00	-	-
686.495	-	0.00	0.00	0.00	0.00	0.00	0.00	-	-
690.820	-	0.00	0.00	0.00	0.00	0.00	0.00	-	-
690.830	-	0.00	0.00	0.00	0.00	0.00	0.00	-	-
691.025	-	0.00	0.00	0.00	0.00	0.00	0.00	-	-
695.210	-	0.00	0.00	0.00	0.00	0.00	0.00	-	-
695.310	-	0.00	0.00	0.00	0.00	0.00	0.00	-	-
696.990	697.032	0.00	0.00	0.00	0.00	0.00	90.87	-	-
699.800	-	0.00	0.00	0.00	0.00	0.00	0.00	-	-
699.880	-	0.00	0.00	0.00	0.00	0.00	0.00	-	-
702.360	-	0.00	0.00	0.00	0.00	0.00	0.00	-	-
702.380	-	0.00	0.00	0.00	0.00	0.00	0.00	-	-
703.065	-	0.00	0.00	0.00	0.00	0.00	0.00	-	-
704.790	704.804	0.00	0.00	0.00	0.00	0.00	136.62	-	-
706.250	-	0.00	0.00	0.00	0.00	0.00	0.00	-	-
706.510	-	0.00	0.00	0.00	0.00	0.00	0.00	-	-
706.675	-	0.00	0.00	0.00	0.00	0.00	0.00	-	-
707.400	-	0.00	0.00	0.00	0.00	0.00	0.00	-	-
707.550	-	0.00	0.00	0.00	0.00	0.00	0.00	-	-

Section: NNS

Track Lift: Design

Structures: 1% AEP

Catchment / Culvert ID	Kilometerage (at mid point)	Length of rail overtopping (m)						Length of rail overtopping		
		50%	20%	10%	5%	2%	1% AEP	10% AEP	1% AEP	
707.560	-	0.00	0.00	0.00	0.00	0.00	0.00	-	-	
707.565	-	0.00	0.00	0.00	0.00	0.00	0.00	-	-	
707.575	-	0.00	0.00	0.00	0.00	0.00	0.00	-	-	
707.580	-	0.00	0.00	0.00	0.00	0.00	0.00	-	-	
708.435	-	0.00	0.00	0.00	0.00	0.00	0.00	-	-	
708.445	-	0.00	0.00	0.00	0.00	0.00	0.00	-	-	
709.74	709.630	0.00	0.00	0.00	0.00	0.00	0.00	62.78	-	

Section: NNS

Track Lift: Design

Structures: 1% AEP

748.425	-	0.00	0.00	0.00	0.00	0.00	-	-
749.45	-	0.00	0.00	0.00	0.00	0.00	-	-
750.965	-	0.00	0.00	0.00	0.00	0.00	-	-
751.13	-	0.00	0.00	0.00	0.00	0.00	-	-
752.49	-	0.00	0.00	0.00	0.00	0.00	-	-
753.1	-	0.00	0.00	0.00	0.00	0.00	-	-
755.225	-	0.00	0.00	0.00	0.00	0.00	-	-
755.495	-	0.00	0.00	0.00	0.00	0.00	-	-
755.975	-	0.00	0.00	0.00	0.00	0.00	-	-
757.003	757.000	0.00	0.00	0.00	0.00	0.92	-	-
758.215	-	0.00	0.00	0.00	0.00	0.00	-	-
758.255	-	0.00	0.00	0.00	0.00	0.00	-	-

Total:	0.0	0.0	0.0	0.0	599.8	1338.1	70.0	6720.0
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Appendix K – Compliance to ETD-10-02 – design conditions (local and regional catchments)

ETD-10-02 requires that the ballast of the upgraded track be above the modelled one per cent AEP local and regional catchment flood level.

This appendix provides a summary of length of design track which does not meet the design requirements of ETD-10-02. This appendix also provides a summary of the length of design ballast that is flooded by a range of modelled local and regional flood events.

Section:	NNS
Track Lift:	Design
Structures:	1% AEP

Catchment / Culvert ID	Length of non-compliance with ETD-10-02	Length of non-compliance with ETD-10-02
	Local catchments (m)	Regional catchments (m)
573.360	504.91	-
574.375	0.00	-
574.405	122.94	-
576.030	0.00	-
579.475	0.00	-
579.585	0.00	-
579.965	42.18	-
581.180	494.06	-
581.800	0.00	-
582.605	0.00	-
582.837	0.00	-
583.430	1169.86	-
584.805	0.00	-
586.200	43.62	-
587.090	1.56	-
587.700	436.83	-
587.835	0.00	-
587.915	0.00	-
588.815	0.00	-
589.300	70.96	-
590.020	0.00	-
590.225	0.00	-
591.685	85.73	-
591.766	124.24	-
591.925	0.00	-
592.075	0.00	-
593.060	0.00	-
593.820	649.16	-
595.520	0.00	-
596.430	427.95	-
597.230	440.48	-
599.445	211.58	-
600.500	364.79	-
600.800	0.00	-
601.865	0.00	-
602.450	334.86	-
603.850	0.00	-
607.830	123.96	-
608.070	0.00	-
609.550	447.49	-
613.190	0.00	-
Section:	NNS	

Track Lift:	Design
Structures:	1% AEP

Catchment / Culvert ID	Length of non-compliance with ETD-10-02	Length of non-compliance with ETD-10-02
	Local catchments (m)	Regional catchments (m)
613.990	0.00	-
614.445	22.01	-
614.650	372.53	-
614.930	0.00	-
614.960	0.00	-
616.170	35.96	-
617.075	0.00	-
618.025	225.59	-
619.030	371.03	-
620.610	98.84	-
621.855	0.00	-
623.030	0.00	-
624.755	0.00	-
625.520	0.00	-
627.230	192.02	-
627.340	0.00	-
627.490	0.00	-
630.870	0.00	-
631.085	282.59	-
631.525	0.00	-
633.720	1551.80	-
635.090	0.00	-
635.355	5.90	-
636.650	0.00	-
637.120	0.00	-
637.230	0.00	-
638.080	0.00	-
638.460	109.04	-
639.690	0.00	-
641.540	2.81	-
642.315	0.00	-
643.160	43.72	-
643.910	0.00	-
643.965	0.00	-
644.910	0.00	-
645.415	0.00	-
645.850	0.00	-
645.995	0.00	-
646.090	0.00	-
647.095	812.83	-
647.254	5.49	-
Section:	NNS	
Track Lift:	Design	

Structures:	1% AEP
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Catchment / Culvert ID	Length of non-compliance with ETD-10-02	
	Local catchments (m)	Regional catchments (m)
647.605	0.00	-
647.836	414.46	-
648.170	6.33	-
648.320	886.90	-
648.565	13.51	-
649.115	299.68	-
649.520	0.00	-
650.260	0.00	-
650.610	0.00	-
652.440	0.00	-
652.636	0.00	-
653.070	0.00	-
653.540	0.00	-
653.620	0.00	-
654.445	0.00	-
655.170	0.99	-
655.175	0.00	-
655.895	0.00	-
658.850	149.19	0.00
660.610	643.87	529.00
663.050	99.95	0.00
663.351	0.00	-
664.770	0.00	0.00
664.905	1831.73	0.00
665.975	363.75	0.00
666.340	227.25	10.00
666.341	223.10	247.00
666.645	271.56	0.00
666.945	0.00	0.00
667.210	0.00	0.00
667.370	0.00	423.00
667.625	0.00	0.00
667.945	0.00	242.00
668.720	1709.70	4932.00
669.202	216.12	0.00
670.685	0.00	0.00
671.420	0.00	0.00
672.375	371.72	1617.00
675.275	1704.93	0.00
675.615	0.00	0.00
676.221	139.39	-
Section:	NNS	
Track Lift:	Design	
Structures:	1% AEP	

Catchment / Culvert ID	Length of non-compliance with ETD-10-02	Length of non-compliance with ETD-10-02
	Local catchments (m)	Regional catchments (m)
677.835	5.42	-
677.845	3.71	0.00
678.500	2682.12	2821.00
679.285	130.65	51.00
680.090	0.00	0.00
680.610	0.00	0.00
680.615	0.00	0.00
680.620	0.00	-
680.720	0.00	0.00
684.897	0.00	-
686.404	0.00	-
686.440	0.00	-
686.495	0.00	-
690.820	0.00	-
690.830	0.00	-
691.025	0.00	-
695.210	0.00	-
695.310	0.00	-
696.990	270.74	-
699.800	0.00	-
699.880	0.00	-
702.360	0.00	-
702.380	0.00	-
703.065	0.00	-
704.790	283.26	-
706.250	0.00	-
706.510	0.00	-
706.675	2.33	-
707.400	0.00	-
707.550	0.00	-
707.560	0.00	-
707.565	0.00	-
707.575	0.00	-
707.580	0.00	-
708.435	0.00	-
708.445	0.00	-
709.74	420.79	-
711.5	184.59	-
711.62	96.79	-
711.627	95.73	-
711.775	367.42	-
Section:	NNS	
Track Lift:	Design	
Structures:	1% AEP	

Catchment / Culvert ID	Length of non-compliance with ETD-10-02	Length of non-compliance with ETD-10-02
	Local catchments (m)	Regional catchments (m)
712.54	0.00	-
713.34	0.00	-
713.35	0.00	-
714.61	0.00	-
714.82	0.00	-
716.85	333.24	-
718.044	124.16	-
718.2	147.15	-
718.39	309.22	-
718.9	201.74	-
719.905	0.00	-
720.175	0.00	-
720.74	0.00	-
721.03	0.00	-
721.17	0.00	-
721.645	0.00	-
722.82	0.00	-
723.005	0.00	-
723.225	0.00	-
723.6	0.00	-
723.875	0.00	-
724.62	0.00	-
725.275	15.85	-
725.545	0.00	-
725.59	0.00	-
726.115	0.00	-
726.54	0.00	-
726.96	0.00	-
727.695	0.00	-
728.43	0.00	-
728.91	0.00	-
729.7	0.00	-
729.96	0.00	-
730.39	29.82	-
730.57	16.07	-
732.01	0.00	-
734.945	0.00	-
735.115	28.62	-
736.21	0.00	-
736.3	0.00	-
737.555	134.13	-
Section:	NNS	
Track Lift:	Design	
Structures:	1% AEP	

Catchment / Culvert ID	Length of non-compliance with ETD-10-02	Length of non-compliance with ETD-10-02
	Local catchments (m)	Regional catchments (m)
740.665	326.04	-
740.945	0.00	-
741.345	0.00	-
742.11	27.39	-
742.24	0.00	-
742.69	0.00	-
744.555	193.20	-
745.41	0.00	-
746.025	0.00	-
746.6	0.00	-
747.905	0.00	-
748.425	1261.41	-
749.45	0.00	-
750.965	0.00	-
751.13	0.00	-
752.49	0.00	-
753.1	349.83	-
755.225	0.00	-
755.495	0.00	-
755.975	158.30	-
757.003	178.78	-
758.215	833.95	-
758.255	21.40	-
Total:	20596.20	10872.0

Appendix L – Detailed flood impacts (local and regional catchments)

This appendix contains a summary table of the maximum modelled flood levels for the one per cent AEP flood events for the existing and proposed (C100) conditions, as well as detailed views of the one per cent AEP flood impact areas for the length of the proposal site.

Section:	NNS
Track Lift:	Exist, Design
Structures:	1% AEP

Catchment / Culvert ID	1% AEP Modelled Flood Level Local Catchment (mAHD)		1% AEP Modelled Flood Level	
	Existing	C100	Existing	C100
573.360	217.34	217.34	-	-
574.375	218.45	219.29	-	-
574.405	218.67	219.29	-	-
576.030	229.84	229.84	-	-
579.475	243.49	243.49	-	-
579.585	243.68	243.68	-	-
579.965	242.29	242.27	-	-
581.180	236.34	235.89	-	-
581.800	236.30	236.39	-	-
582.605	237.74	237.77	-	-
582.837	237.73	237.73	-	-
583.430	239.33	239.13	-	-
584.805	241.88	241.88	-	-
586.200	245.24	246.43	-	-
587.090	245.30	245.30	-	-
587.700	244.15	244.15	-	-
587.835	244.15	244.15	-	-
587.915	244.06	244.06	-	-
588.815	243.65	243.65	-	-
589.300	243.20	243.24	-	-
590.020	242.12	242.15	-	-
590.225	242.23	242.23	-	-
591.685	238.86	239.11	-	-
591.766	238.84	239.04	-	-
591.925	238.71	237.59	-	-
592.075	238.83	238.99	-	-
593.060	241.83	241.80	-	-
593.820	241.91	242.20	-	-
595.520	242.56	242.56	-	-
596.430	241.01	241.52	-	-
597.230	242.19	242.20	-	-
599.445	238.28	238.28	-	-
600.500	237.94	237.96	-	-
600.800	237.22	237.35	-	-
601.865	238.16	238.16	-	-
602.450	238.57	238.59	-	-
603.850	239.21	239.23	-	-
607.830	239.51	239.60	-	-
608.070	239.58	239.59	-	-
609.550	239.93	240.07	-	-
613.190	228.90	228.90	-	-
613.990	226.74	226.79	-	-
614.445	226.73	226.61	-	-
614.650	226.69	226.45	-	-
614.930	226.36	225.91	-	-
Section:	NNS			

Track Lift:	Exist, Design
Structures:	1% AEP

Catchment / Culvert ID	1% AEP Modelled Flood Level Local Catchment (mAHD)		1% AEP Modelled Flood Level	
	Existing	C100	Existing	C100
614.960	226.06	226.22	-	-
616.170	229.90	230.82	-	-
617.075	242.80	242.80	-	-
618.025	242.82	243.51	-	-
619.030	240.89	241.04	-	-
620.610	226.16	227.51	-	-
621.855	232.83	234.45	-	-
623.030	230.76	231.91	-	-
624.755	234.63	234.63	-	-
625.520	228.44	228.44	-	-
627.230	223.77	224.38	-	-
627.340	223.37	223.67	-	-
627.490	222.92	223.01	-	-
630.870	222.80	222.80	-	-
631.085	222.14	222.14	-	-
631.525	221.49	221.49	-	-
633.720	218.84	218.79	-	-
635.090	218.74	218.50	-	-
635.355	218.84	218.84	-	-
636.650	218.14	218.03	-	-
637.120	217.75	217.75	-	-
637.230	218.33	218.33	-	-
638.080	216.98	216.98	-	-
638.460	216.93	216.93	-	-
639.690	216.99	216.99	-	-
641.540	216.74	216.46	-	-
642.315	216.84	216.84	-	-
643.160	217.75	217.78	-	-
643.910	217.45	217.45	-	-
643.965	217.43	217.43	-	-
644.910	217.43	217.53	-	-
645.415	217.49	218.05	-	-
645.850	218.51	218.53	-	-
645.995	217.90	218.71	-	-
646.090	217.60	218.88	-	-
647.095	217.46	218.73	-	-
647.254	218.99	219.19	-	-
647.605	217.61	217.38	-	-
647.836	219.12	219.43	-	-
648.170	219.17	219.44	-	-
648.320	219.17	219.44	-	-
648.565	219.17	219.44	-	-
649.115	219.13	219.43	-	-
649.520	219.08	217.24	-	-
650.260	218.83	219.14	-	-

Section: NNS

Track Lift: Exist, Design

Structures:	1% AEP
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Catchment / Culvert ID	1% AEP Modelled Flood Level Local Catchment (mAHD)		1% AEP Modelled Flood Level	
	Existing	C100	Existing	C100
650.610	218.36	218.66	-	-
652.440	217.92	218.10	-	-
652.636	217.91	217.93	-	-
653.070	217.32	217.23	-	-
653.540	217.28	217.27	-	-
653.620	217.30	217.30	-	-
654.445	217.76	217.76	-	-
655.170	217.60	217.60	-	-
655.175	216.11	216.11	-	-
655.895	215.92	215.92	-	-
658.850	213.65	213.69	-	-
660.610	211.64	211.69	211.40	211.39
663.050	214.32	214.32	-	-
663.351	213.85	213.85	-	-
664.770	211.37	211.37	-	-
664.905	211.97	210.87	-	-
665.975	211.76	209.68	-	-
666.340	208.54	208.54	209.77	209.86
666.341	207.41	207.03	-	-
666.645	208.36	208.36	209.75	209.84
666.945	208.55	208.54	209.99	210.08
667.210	207.33	207.33	209.99	210.09
667.370	207.57	207.57	210.07	210.17
667.625	208.93	209.03	210.28	210.37
667.945	208.53	208.53	210.24	210.40
668.720	210.02	210.07	210.49	210.72
669.202	210.12	209.93	210.62	210.87
670.685	211.02	209.71	210.94	211.16
671.420	211.06	209.77	211.38	211.56
672.375	211.17	211.14	211.73	211.84
675.275	212.70	212.70	214.17	214.22
675.615	212.98	212.98	214.21	214.26
676.221	212.26	212.26	-	-
677.835	212.91	212.91	-	-
677.845	212.31	212.28	213.08	213.04
678.500	212.73	212.02	213.08	213.04
679.285	213.17	212.00	213.16	213.78
680.090	213.21	212.13	213.53	213.85
680.610	213.21	211.51	213.55	213.88
680.615	213.21	211.51	-	-
680.620	213.21	212.44	-	-
680.720	213.21	212.35	213.55	213.85
684.897	221.39	221.03	-	-
686.404	222.05	222.05	-	-
686.440	221.79	221.78	-	-

Section:	NNS
Track Lift:	Exist, Design
Structures:	1% AEP

Catchment / Culvert ID	1% AEP Modelled Flood Level		1% AEP Modelled Flood Level	
	Local Catchment (maHD) Existing	C100	Existing	C100
686.495	221.45	221.45	-	-
690.820	224.14	224.14	-	-
690.830	225.02	225.05	-	-
691.025	225.45	225.45	-	-
695.210	240.01	240.01	-	-
695.310	239.36	239.36	-	-
696.990	243.16	244.12	-	-
699.800	248.36	248.36	-	-
699.880	248.38	248.38	-	-
702.360	259.05	259.05	-	-
702.380	258.88	258.88	-	-
703.065	260.30	260.28	-	-
704.790	265.81	266.58	-	-
706.250	272.24	272.02	-	-
706.510	272.58	272.58	-	-
706.675	274.27	274.27	-	-
707.400	275.12	275.12	-	-
707.550	275.26	275.26	-	-
707.560	275.06	275.06	-	-
707.565	274.88	274.88	-	-
707.575	274.85	274.85	-	-
707.580	274.96	274.96	-	-
708.435	272.70	272.69	-	-
708.445	273.17	273.26	-	-
709.74	272.70	273.54	-	-
711.5	268.98	269.92	-	-
711.62	268.97	269.92	-	-
711.627	268.97	269.92	-	-
711.775	268.97	269.92	-	-
712.54	270.21	270.21	-	-
713.34	273.33	273.40	-	-
713.35	273.53	273.53	-	-
714.61	278.83	278.12	-	-
714.82	279.86	279.86	-	-
716.85	279.96	279.66	-	-
718.044	287.60	287.34	-	-
718.2	287.68	287.50	-	-
718.39	287.05	286.65	-	-
718.9	289.20	289.16	-	-
719.905	291.78	291.78	-	-
720.175	289.31	289.32	-	-
720.74	289.33	289.32	-	-
721.03	289.83	289.83	-	-
721.17	290.39	290.33	-	-
721.645	294.72	294.21	-	-
Section:	NNS			
Track Lift:	Exist, Design			
Structures:	1% AEP			

Catchment / Culvert ID	1% AEP Modelled Flood Level Local Catchment (mAHD)		1% AEP Modelled Flood Level	
	Existing	C100	Existing	C100
722.82	300.91	300.91	-	-
723.005	300.78	300.76	-	-
723.225	299.91	299.91	-	-
723.6	300.11	300.12	-	-
723.875	300.26	300.38	-	-
724.62	300.41	300.05	-	-
725.275	302.54	302.50	-	-
725.545	303.58	303.58	-	-
725.59	303.74	303.72	-	-
726.115	308.55	308.17	-	-
726.54	307.35	307.73	-	-
726.96	309.05	309.05	-	-
727.695	309.35	309.58	-	-
728.43	307.14	307.17	-	-
728.91	304.55	304.15	-	-
729.7	298.84	298.73	-	-
729.96	296.84	296.90	-	-
730.39	294.24	294.24	-	-
730.57	294.37	293.11	-	-
732.01	287.18	287.18	-	-
734.945	273.42	273.76	-	-
735.115	273.95	270.75	-	-
736.21	284.45	284.45	-	-
736.3	284.40	284.38	-	-
737.555	278.46	278.35	-	-
740.665	269.18	268.87	-	-
740.945	269.34	269.01	-	-
741.345	270.79	270.78	-	-
742.11	274.56	274.56	-	-
742.24	274.34	274.34	-	-
742.69	277.86	277.86	-	-
744.555	278.26	278.35	-	-
745.41	284.22	284.22	-	-
746.025	290.77	290.76	-	-
746.6	295.82	295.83	-	-
747.905	298.10	298.10	-	-
748.425	291.13	291.55	-	-
749.45	282.42	282.40	-	-
750.965	269.03	269.09	-	-
751.13	268.92	268.87	-	-
752.49	274.54	274.54	-	-
753.1	273.88	274.39	-	-
755.225	274.38	274.38	-	-
755.495	274.41	274.41	-	-
755.975	275.40	275.38	-	-
Section:	NNS			
Track Lift:	Exist, Design			
Structures:	1% AEP			

Catchment / Culvert ID	1% AEP Modelled Flood Level Local Catchment (mAHD)		1% AEP Modelled Flood Level	
	Existing	C100	Existing	C100
757.003	271.16	272.34	-	-
758.215	267.68	267.36	-	-
758.255	268.14	267.27	-	-



Paper Size A3
0 100 200 400 600 800
Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 55



LEGEND

- Culvert / underbridge location
- Increase in local flood extent
- Cadastre
- Reduction in local flood extent
- Existing 1% AEP local flood extent
- Increase in regional flood extent
- Existing 1% AEP regional flood extent
- Reduction in regional flood extent

NORTH STAR
MOREE
NARRABRI



Australian Rail Track Corporation
Inland Rail - Narrabri to North Star

Job Number 22-17916
Revision 1
Date 16 Aug 2017

Detailed Changes to 1% AEP Local Catchments Flood Level Impact Extents Around Moree

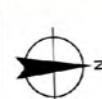
Figure L-1

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LEGEND

- Culvert / underbridge location
- Increase in local flood extent
- Cadastre
- Reduction in local flood extent
- Existing 1% AEP local flood extent
- Increase in regional flood extent
- Existing 1% AEP regional flood extent
- Reduction in regional flood extent

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 55



Australian Rail Track Corporation
Inland Rail - Narrabri to North Star

Job Number 22-17916
Revision 1
Date 16 Aug 2017

Detailed Changes to 1% AEP Local Catchments Flood Level Impact Extents Around Moree

Figure L-2

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Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 55



LEGEND
■ Culvert / underbridge location
● Impacted structure
■ Cadastre
🕒 Existing 1% AEP local flood extent
🕒 Existing 1% AEP regional flood extent

■ Increase in local flood extent
■ Reduction in local flood extent
■ Increase in regional flood extent
■ Reduction in regional flood extent

NORTH STAR
MOREE
NARRABRI



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Inland Rail - Narrabri to North Star

Job Number 22-17916
Revision 1
Date 16 Aug 2017

Detailed Changes to 1% AEP Local Catchments Flood Level Impact Extents Around Moree

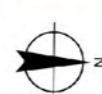
Figure L-3

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LEGEND

- Culvert / underbridge location
- Cadastre
- Existing 1% AEP local flood extent
- Existing 1% AEP regional flood extent
- Increase in local flood extent
- Reduction in local flood extent
- Increase in regional flood extent
- Reduction in regional flood extent

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 55

NORTH STAR
MOREE
NARRABRI



Australian Rail Track Corporation
Inland Rail - Narrabri to North Star

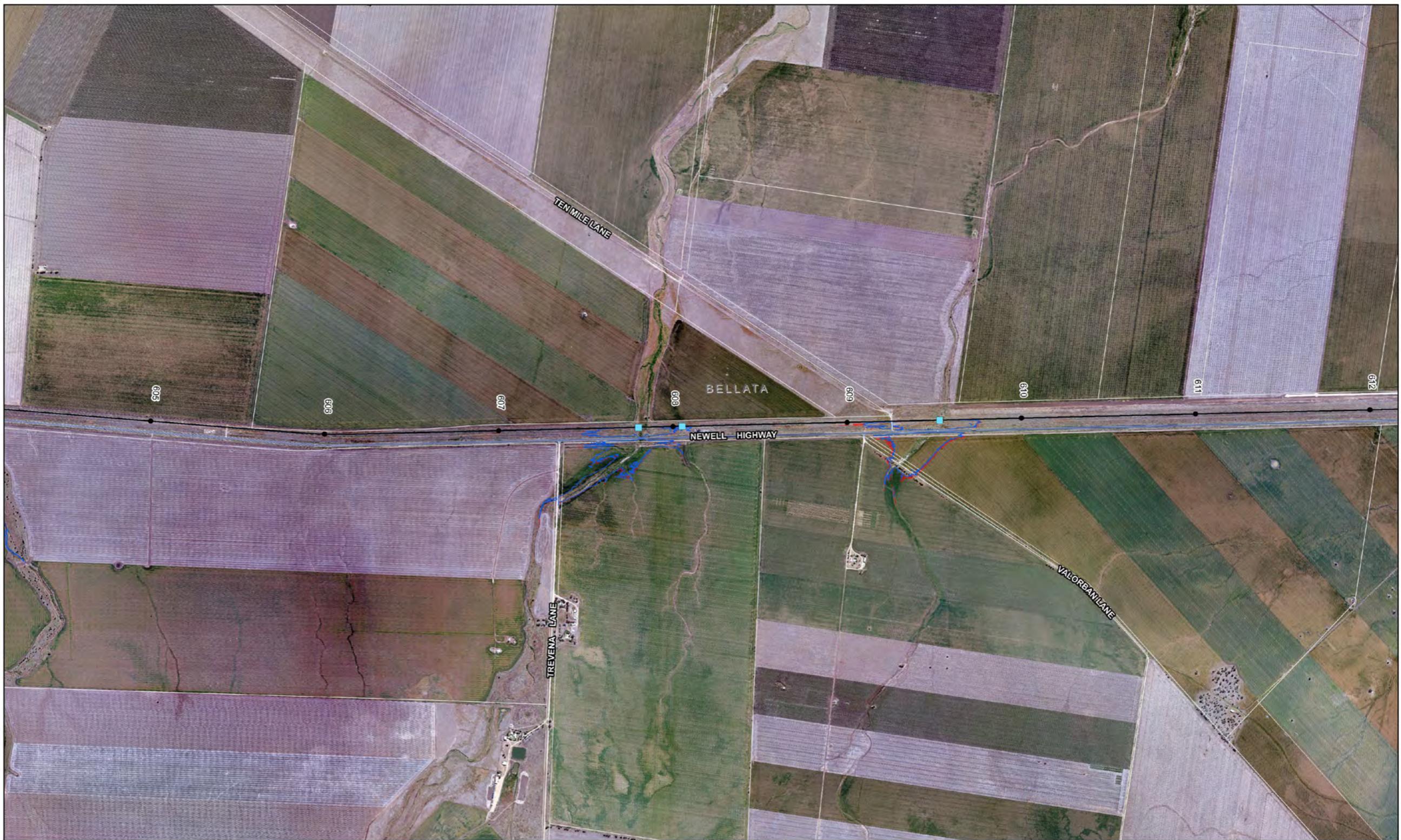
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Detailed Changes to 1% AEP Local Catchments Flood Level Impact Extents Around Moree

Figure L-4

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LEGEND

- Culvert / underbridge location
- Cadastre
- Existing 1% AEP local flood extent
- Existing 1% AEP regional flood extent
- Increase in local flood extent
- Reduction in local flood extent
- Increase in regional flood extent
- Reduction in regional flood extent

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 55

NORTH STAR
MOREE
NARRABRI



Australian Rail Track Corporation
Inland Rail - Narrabri to North Star

Job Number | 22-17916
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Detailed Changes to 1% AEP Local Catchments Flood Level Impact Extents Around Moree

Figure L-5

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Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 55



LEGEND
■ Culvert / underbridge location
○ Impacted structure
□ Cadastre
🕒 Existing 1% AEP local flood extent
🕒 Existing 1% AEP regional flood extent

■ Increase in local flood extent
■ Reduction in local flood extent
■ Increase in regional flood extent
■ Reduction in regional flood extent

NORTH STAR
MOREE
NARRABRI



Australian Rail Track Corporation
Inland Rail - Narrabri to North Star

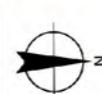
Detailed Changes to 1% AEP Local Catchments Flood Level Impact Extents Around Moree

Job Number 22-17916
Revision 1
Date 16 Aug 2017

Figure L-6



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Metres



LEGEND

- Culvert / underbridge location
- Increase in local flood extent
- Cadastre
- Reduction in local flood extent
- Existing 1% AEP local flood extent
- Increase in regional flood extent
- Existing 1% AEP regional flood extent
- Reduction in regional flood extent

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 55

NORTH STAR
MOREE
NARRABRI



Australian Rail Track Corporation
Inland Rail - Narrabri to North Star

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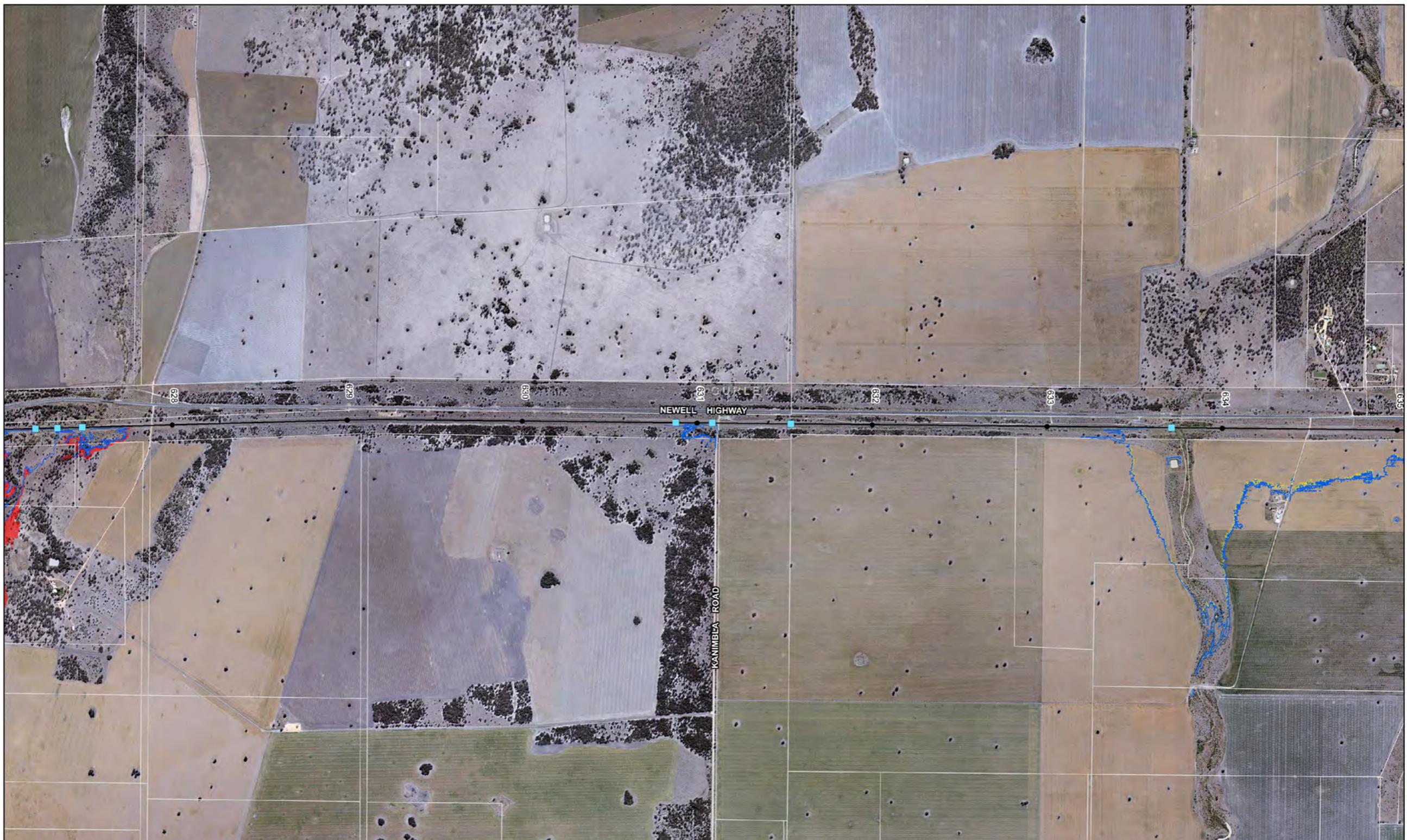
Detailed Changes to 1% AEP Local Catchments Flood Level Impact Extents Around Moree

Figure L-7

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Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 55



LEGEND

- Culvert / underbridge location
- Increase in local flood extent
- Cadastre
- Reduction in local flood extent
- Existing 1% AEP local flood extent
- Increase in regional flood extent
- Existing 1% AEP regional flood extent
- Reduction in regional flood extent

NORTH STAR
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NARRABRI



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Inland Rail - Narrabri to North Star

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Detailed Changes to 1% AEP Local Catchments
Flood Level Impact Extents Around Moree

Figure L-8

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Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 55



LEGEND

- Culvert / underbridge location
- Increase in local flood extent
- Cadastre
- Reduction in local flood extent
- Existing 1% AEP local flood extent
- Increase in regional flood extent
- Existing 1% AEP regional flood extent
- Reduction in regional flood extent

NORTH STAR
MOREE
NARRABRI



Australian Rail Track Corporation
Inland Rail - Narrabri to North Star

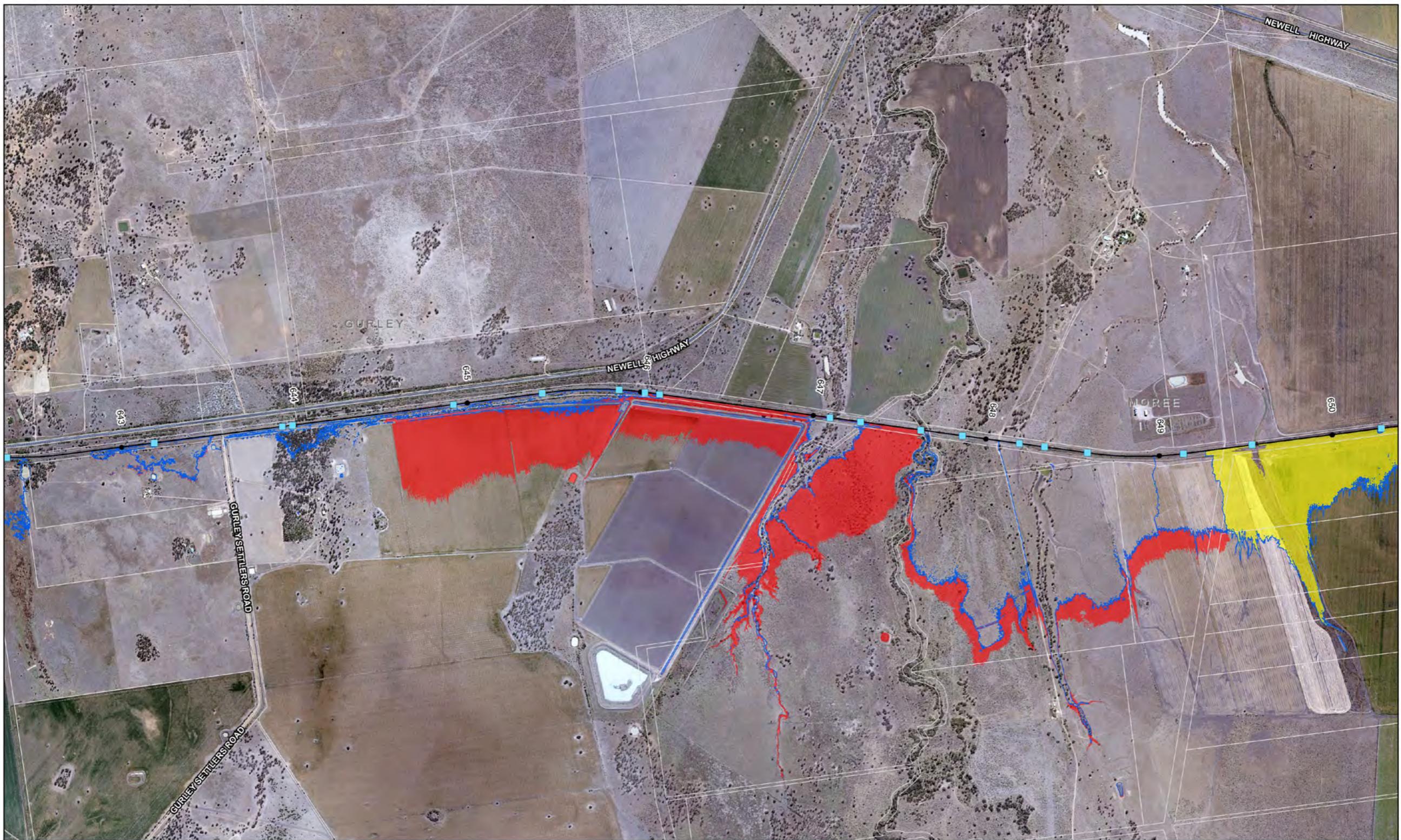
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Detailed Changes to 1% AEP Local Catchments
Flood Level Impact Extents Around Moree

Figure L-9

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LEGEND

- Culvert / underbridge location
- Increase in local flood extent
- Cadastre
- Reduction in local flood extent
- Existing 1% AEP local flood extent
- Increase in regional flood extent
- Existing 1% AEP regional flood extent
- Reduction in regional flood extent

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 55

NORTH STAR
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Inland Rail - Narrabri to North Star

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Detailed Changes to 1% AEP Local Catchments
Flood Level Impact Extents Around Moree

Figure L-10

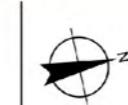
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Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 55



LEGEND

- Culvert / underbridge location
- Increase in local flood extent
- Cadastre
- Reduction in local flood extent
- Existing 1% AEP local flood extent
- Increase in regional flood extent
- Existing 1% AEP regional flood extent
- Reduction in regional flood extent

NORTH STAR
MOREE
NARRABRI



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Inland Rail - Narrabri to North Star

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Detailed Changes to 1% AEP Local Catchments Flood Level Impact Extents Around Moree

Figure L-11

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Metres



LEGEND

- Culvert / underbridge location
- Cadastre
- Existing 1% AEP local flood extent
- Existing 1% AEP regional flood extent
- Increase in local flood extent
- Reduction in local flood extent
- Increase in regional flood extent
- Reduction in regional flood extent



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Detailed Changes to 1% AEP Local Catchments Flood Level Impact Extents Around Moree

Figure L-12

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Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 55



LEGEND

- Culvert / underbridge location
- Increase in local flood extent
- Cadastre
- Reduction in local flood extent
- Existing 1% AEP local flood extent
- Increase in regional flood extent
- Existing 1% AEP regional flood extent
- Reduction in regional flood extent



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Inland Rail - Narrabri to North Star



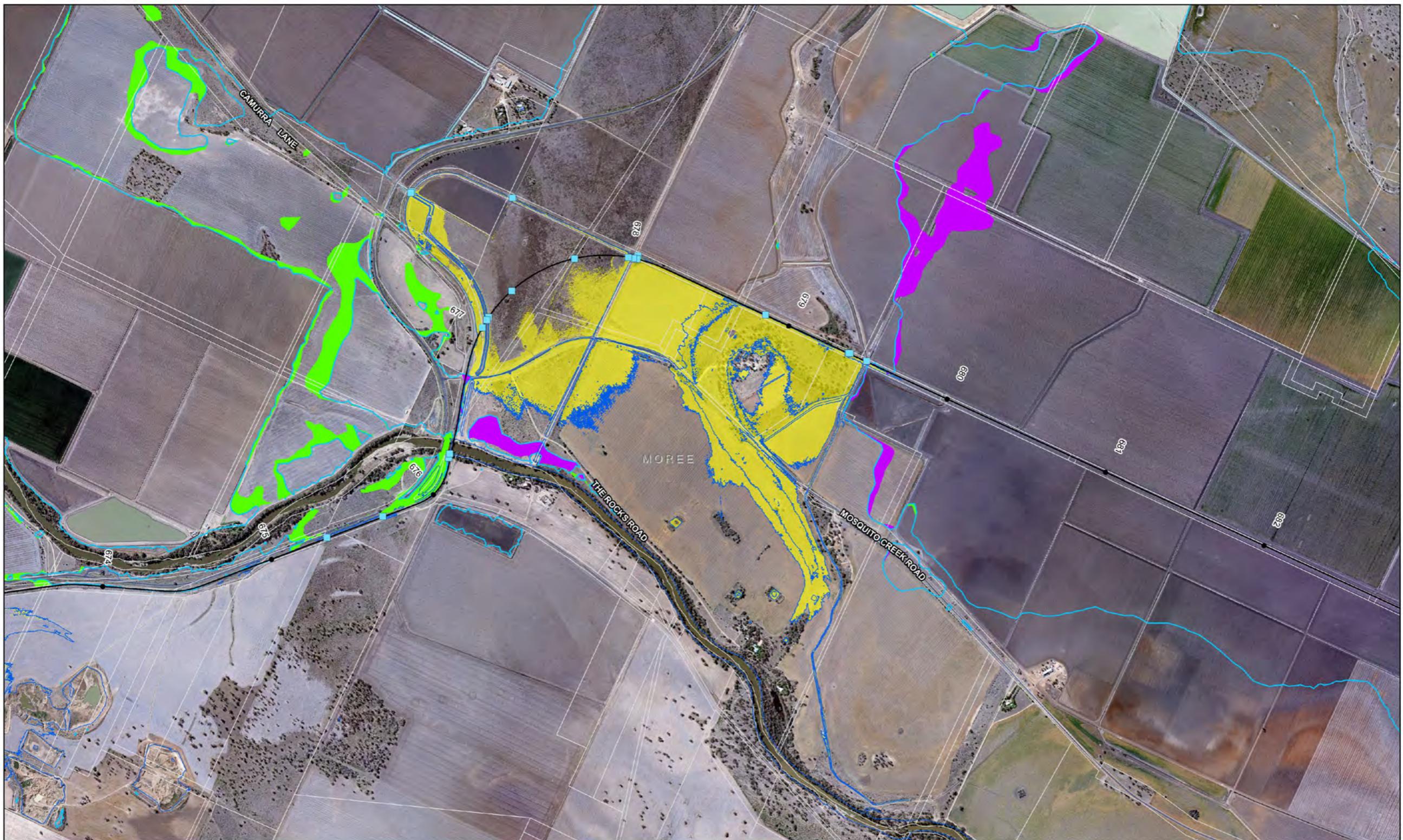
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Detailed Changes to 1% AEP Local Catchments
Flood Level Impact Extents Around Moree

Figure L-13

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Metres



LEGEND

- Culvert / underbridge location
- Increase in local flood extent
- Cadastre
- Reduction in local flood extent
- Existing 1% AEP local flood extent
- Increase in regional flood extent
- Existing 1% AEP regional flood extent
- Reduction in regional flood extent

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 55



Australian Rail Track Corporation
Inland Rail - Narrabri to North Star



Job Number | 22-17916
Revision | 1
Date | 16 Aug 2017

Detailed Changes to 1% AEP Local Catchments Flood Level Impact Extents Around Moree

Figure L-14

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Data source: ARTC, aerial imagery, 2014; LP; DCDB/DTDB, 2012. Created by: gmcdarmid, kparcha



Paper Size A3
0 100 200 400 600 800
Metres



LEGEND

- Culvert / underbridge location
- Cadastre
- 🕒 Existing 1% AEP local flood extent
- 🕒 Existing 1% AEP regional flood extent
- 📍 Increase in local flood extent
- 📍 Reduction in local flood extent
- 📍 Increase in regional flood extent
- 📍 Reduction in regional flood extent

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 55



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Inland Rail - Narrabri to North Star

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Detailed Changes to 1% AEP Local Catchments Flood Level Impact Extents Around Moree

Figure L-15

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LEGEND

- Culvert / underbridge location
- Increase in local flood extent
- Cadastre
- Reduction in local flood extent
- Existing 1% AEP local flood extent
- Increase in regional flood extent
- Existing 1% AEP regional flood extent
- Reduction in regional flood extent

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 55



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Detailed Changes to 1% AEP Local Catchments Flood Level Impact Extents Around Moree

Figure L-16

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Metres



LEGEND

- Culvert / underbridge location
- Cadastre
- 🕒 Existing 1% AEP local flood extent
- 🕒 Existing 1% AEP regional flood extent
- ✚ Increase in local flood extent
- ✚ Reduction in local flood extent
- ✚ Increase in regional flood extent
- ✚ Reduction in regional flood extent

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 55

NORTH STAR
MOREE
NARRABRI



Australian Rail Track Corporation
Inland Rail - Narrabri to North Star

Job Number | 22-17916
Revision | 1
Date | 16 Aug 2017

Detailed Changes to 1% AEP Local Catchments Flood Level Impact Extents Around Moree

Figure L-17

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Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 55

LEGEND

- Culvert / underbridge location
- Cadastre
- 🕒 Existing 1% AEP local flood extent
- 🕒 Existing 1% AEP regional flood extent
- 🕒 Increase in local flood extent
- 🕒 Reduction in local flood extent
- 🕒 Increase in regional flood extent
- 🕒 Reduction in regional flood extent

NORTH STAR
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NARRABRI



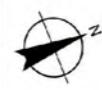
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Inland Rail - Narrabri to North Star

Job Number | 22-17916
Revision | 1
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Detailed Changes to 1% AEP Local Catchments
Flood Level Impact Extents Around Moree Figure L-18



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LEGEND

- Culvert / underbridge location
- Increase in local flood extent
- Cadastre
- Reduction in local flood extent
- Existing 1% AEP local flood extent
- Increase in regional flood extent
- Existing 1% AEP regional flood extent
- Reduction in regional flood extent

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 55

NORTH STAR
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Inland Rail - Narrabri to North Star

Job Number 22-17916
Revision 1
Date 16 Aug 2017

**Detailed Changes to 1% AEP Local Catchments
Flood Level Impact Extents Around Moree** Figure L-19

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LEGEND

- Culvert / underbridge location
- Increase in local flood extent
- Cadastre
- Reduction in local flood extent
- Existing 1% AEP local flood extent
- Increase in regional flood extent
- Existing 1% AEP regional flood extent
- Reduction in regional flood extent



Australian Rail Track Corporation
Inland Rail - Narrabri to North Star



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Detailed Changes to 1% AEP Local Catchments
Flood Level Impact Extents Around Moree

Figure L-20

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LEGEND

- Culvert / underbridge location
- Increase in local flood extent
- Cadastre
- Reduction in local flood extent
- Existing 1% AEP local flood extent
- Increase in regional flood extent
- Existing 1% AEP regional flood extent
- Reduction in regional flood extent

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Detailed Changes to 1% AEP Local Catchments Flood Level Impact Extents Around Moree

Figure L-21



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Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 55



LEGEND

- Culvert / underbridge location
- Cadastre
- Existing 1% AEP local flood extent
- Existing 1% AEP regional flood extent
- Increase in local flood extent
- Reduction in local flood extent
- Increase in regional flood extent
- Reduction in regional flood extent

NORTH STAR
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Detailed Changes to 1% AEP Local Catchments
Flood Level Impact Extents Around Moree

Figure L-22

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LEGEND

- Culvert / underbridge location
- Increase in local flood extent
- Cadastre
- Reduction in local flood extent
- Existing 1% AEP local flood extent
- Increase in regional flood extent
- Existing 1% AEP regional flood extent
- Reduction in regional flood extent

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 55

NORTH STAR
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NARRABRI



Australian Rail Track Corporation
Inland Rail - Narrabri to North Star

Job Number 22-17916
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Date 16 Aug 2017

Detailed Changes to 1% AEP Local Catchments Flood Level Impact Extents Around Moree

Figure L-23

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Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 55

LEGEND

- Culvert / underbridge location
- Cadastre
- Existing 1% AEP local flood extent
- Existing 1% AEP regional flood extent
- Increase in local flood extent
- Reduction in local flood extent
- Increase in regional flood extent
- Reduction in regional flood extent

NORTH STAR
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NARRABRI



Australian Rail Track Corporation
Inland Rail - Narrabri to North Star

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Detailed Changes to 1% AEP Local Catchments
Flood Level Impact Extents Around Moree

Figure L-24

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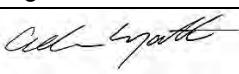
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		Name	Signature	Name	Signature	Date
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