

## Appendix E      Structure site information summary

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### Notes

1. This summary, together with accompanying drawings and documents, contains the basic data needed for the start of detailed design action for the proposed structure.
  2. Both the scheme plan and the site plan shall accompany the structure site information summary.
  3. Section 2 can be omitted in its entirety for road and railway overbridges and underpasses.
  4. The 'designated person' referred to at the start of sections 1 to 5 below would typically be:
 

Section 1	Basic Information:	An engineering consultant familiar with the site.
Section 2	River data: 2.1 to 2.4:	An engineering consultant familiar with the site.
	2.5 to 2.8:	Regional council or territorial authority.
Section 3	Site investigations:	A site investigator.
Section 4	Recommendations:	A senior professional engineer.
Section 5	Approvals:	A senior professional engineer.
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**Section 1: Basic information**

To be completed by the designated person

1.1	General	
.01	Name of bridge, culvert or other structure	
.02	State highway number and section, or other route definition	
.03	Route position, ie reference station plus displacement	
.04	Name of river to be bridged or name and position of road or railway to be crossed	
.05	Roads district	
.06	Local authorities Regional council and/or territorial authority	
.07	Scheme plan: a. Number b. Date of submission to the NZ Transport Agency (NZTA) c. NZTA approval date	
.08	Site plan number	
.09	Level datum used for: a. Scheme plan b. Site Plan	
.10	Map reference (LINZ Topo50 series) Map number Date  Coordinates of the site of the structure	East                      North
.11	Photographic references a. NZTA state highway aerial strip: <ul style="list-style-type: none"> <li>• photographs</li> <li>• survey number</li> <li>• run number</li> <li>• photograph number</li> </ul> b. Supply site photographs with date(s) taken	

1.2	Existing structure	
.01	Details <ol style="list-style-type: none"> <li>a. Plan number</li> <li>b. Where held</li> <li>c. When built</li> <li>d. Bridge deck level or reference level on deck using site plan datum / culvert or subway diameter or height</li> <li>e. Bridge soffit level / culvert or subway invert level</li> </ol>	
.02	Where drawings are not available, provide brief description of existing structure	
.03	Overload rating <ol style="list-style-type: none"> <li>a. Bridge classification</li> <li>b. Deck grading</li> </ol>	
.04	Bridge posting limits <ol style="list-style-type: none"> <li>a. Wheel base load</li> <li>b. Axle load</li> <li>c. Speed restriction</li> </ol>	
.05	Foundations <ol style="list-style-type: none"> <li>a. Type</li> <li>b. Has performance been adequate?</li> <li>c. Any known problems during construction?</li> <li>d. Append detailed information if available, eg pile size, length, penetration, driving records, borelogs, design bearing values or other, as appropriate.</li> <li>e. Do existing foundations restrict the location of new piers and abutments?</li> <li>f. Should they be removed?</li> <li>g. To what level?</li> <li>h. Why?</li> </ol>	
.06	Are there special problems at the site of the existing structure, eg: <ol style="list-style-type: none"> <li>a. Scour</li> <li>b. Settlement</li> <li>c. Fill stability</li> <li>d. Floating debris</li> <li>e. Corrosion</li> <li>f. Other - specify (provide report as appropriate)</li> </ol>	

1.3		Factors to be considered during design				
.01	Nature and volume of present traffic					
.02	Vehicle route importance category Level of serviceability to traffic Is this different from the recommended value If yes, specify	YES/NO				
.03	Nature and extent of stock traffic					
.04	Is stock or other access required under the bridge or through the structure?					
.05	Services to be carried on the structure	Side of bridge	Number	Nominal Diameter	Diameter Over Joints	Fixing Methods
	a. Sewer mains					
	b. Telecom cables					
	c. Water mains					
	d. Gas mains, state high or low pressure					
	e. Power cables					
	f. Other services					
.06	Has each authority been informed of the NZTA's policy for cost sharing?					
.07	Lighting requirements					
.08	Extreme shade temperatures °C					
.09	Has an environmental impact assessment been prepared? If so, attach copy					
.10	Does the appearance of the structure in elevation warrant special consideration?					
.11	Preferred construction materials					
.12	Preferred deck surface material and finish					
.13	Restrictions on transport and access to site					
.14	Construction restraints at the site, eg flash floods, dewatering					
.15	Other factors to be considered					
.16	Waterway recommendation. Suggested length of bridge for consistency with:					
	a. The existing channel, or					
	b. Any existing or planned river training works					
.17	Flood clearance recommendation from natural flood stage to underside of superstructure, and any requirement for minimum waterway area.					

.18	<p>Clearances for tidal and navigable waterways</p> <ol style="list-style-type: none"> <li>a. Type of craft, eg yachts, jet boats, barges</li> <li>b. Recommend the highest water level at the site above which navigational clearance should be provided. Use site plan datum. Give reasons for choice</li> <li>c. What is the minimum clearance and width restriction imposed by: <ol style="list-style-type: none"> <li>i. Existing bridge</li> <li>ii. Other nearby structures</li> </ol> </li> <li>d. From the local knowledge, what is the recommendation for the navigational channel(s): <ol style="list-style-type: none"> <li>i. Vertical clearance</li> <li>ii. Centreline location and width of navigation channel</li> </ol> </li> </ol>	
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### Certification

#### Section 1

Prepared by:

Designation:

Certified by:

Designation:

Date

**Section 2: River data**

To be completed by the designated person and the regional council or territorial authority as appropriate

2.1		Catchment topography
.01	a. Area of catchment above site b. How was area obtained?	
.02	General slope (eg flat, gently rolling, rolling, hilly, mountainous)	
.03	Range of heights above sea level	
.04	Shape of catchment (eg long, circular, pear, fan)	
.05	Surface soil and subsoil (eg pumice, clay, loam, sand, rock). Give approximate percentage of catchment area for each type	
.06	Percentage cover: a. In bush, scrub or forest b. In pasture c. In cultivation d. Cleared but reverting e. In urban development	
.07	Are these percentages likely to vary in the life of the structure?	
.08	Any general comments on catchment characteristics?	
2.2		Water levels
.01	a. Normal water level, ie water level exceeded for 30% of the time, using site plan datum b. Mean velocity and orientation of this flow (show on diagram) c. How was this assessed?	
.02	a. Lowest known water level using site plan datum b. Date c. How was value obtained?	
.03	a. List highest known flood levels using site plan datum b. Orientation of flow (show on diagram) c. Date(s) d. How were values obtained?	
.04	Tidal sites: Levels at the site in terms of site plan datum. Give as many of the following levels as possible and state how data were obtained, including tide gauge reference: a. Highest known tide and data b. Lowest known tide and data c. Mean high water spring tide d. Mean high water neap tide e. Mean low water neap tide f. Mean low water spring tide	
.05	What is the approximate maximum wave height at the site?	
.06	Is water level affected by wind? Give details	

.07	Maximum size of driftwood carried at high flood flow	
.08	Bed gradient/Length over which measurements were taken	
.09	Gradient of water surface at proposed site for: <ul style="list-style-type: none"> <li>a. Low to medium flow, specify water level at site when gradient obtained</li> <li>b. High flow, specify water levels at site when gradient obtained</li> <li>c. Gradients measured over what length of channel?</li> <li>d. Is length of floodway straight? If not, provide details</li> </ul>	
.10	<ul style="list-style-type: none"> <li>a. Are there differences between low and high water surface slopes?</li> <li>b. If so, what are they and what are the reasons?</li> </ul>	
<b>2.3</b>	<b>Waterway</b>	
.01	<ul style="list-style-type: none"> <li>a. Waterway area to highest known flood level at existing or nearby structure on same stream, normal to flow</li> <li>b. Has this proved adequate? Give wetted perimeter</li> <li>c. Is flood gradient at this site similar to that in 2.2.09(b)? If not, specify</li> </ul>	
.02	<ul style="list-style-type: none"> <li>a. Cross-section area of channel to highest known flood level at site of new structure</li> <li>b. Is cross-section at proposed site typical of channel and floodway over a length up and downstream of at least five times width of flood waterway in each direction?</li> <li>c. If not, comment on variation and supply typical sections with the site drawings</li> </ul>	
.03	Bed material at structure site (eg silt, sand, fine or coarse gravel), provide typical grading of bed materials	
.04	Preliminary estimate of Mannings $n$ for <ul style="list-style-type: none"> <li>a. Channel</li> <li>b. Berm</li> <li>c. How were values obtained?</li> </ul>	
.05	<ul style="list-style-type: none"> <li>a. Summarise measurements or records of local scour measured from general bed level with corresponding location, water levels and general bed level in terms of site plan datum</li> <li>b. How were values obtained?</li> </ul>	
.06	Is the depth of scour affected by: <ul style="list-style-type: none"> <li>a. Direction of flow?</li> <li>b. Local riverbed shape?</li> <li>c. Other local effects (specify)?</li> </ul>	
.07	Are moderate flood conditions critical for scour? For example, with the main channel at bank full flow	

2.4 Channel stability and river works	
.01	Is the river channel braided, meandering, incised?
.02	<ul style="list-style-type: none"> <li>a. Are the banks stable over a length of 1km upstream and downstream of structure site (erosion, slumping, slips, etc)?</li> <li>b. Are the banks stable at the existing structure site (erosion, slumping, slips etc)?</li> <li>c. Is there any existing protection or riverbed control work affecting conditions at the proposed site?</li> <li>d. Is bank/abutment protection suggested? If so, indicate type of protection</li> </ul>
.03	Is there any possibility of river tending to cut off approaches?
.04	Is there any escape of floodwaters upstream and is there any possibility of this being reduced or prevented in future by a river control scheme? Give appropriate details
.05	Give details of current and/or projected extraction of riverbed material
.06	Is the riverbed aggrading, degrading or stable? Give results of measurements or estimates, the period involved and indicate how results were obtained
.07	Describe the influence of any future river improvement or catchment control or development works or other activities likely to affect structure location, area of waterway, flood stages, scour depths, layout etc.
2.5 Rainfall and water level records	
.01	Indicate variability of rainfall distribution expressed as a percentage of the average over the entire catchment.
.02	<ul style="list-style-type: none"> <li>a. Location and map reference for the nearest rain gauge</li> <li>b. Length of time that records have been taken</li> <li>c. Type of gauge</li> <li>d. Relationship of records to catchment average intensity</li> </ul>
.03	<p>Maximum recorded or known rainfall in mm</p> <ul style="list-style-type: none"> <li>a. In 1 hour</li> <li>b. In 2 hours</li> <li>c. In 12 hours</li> <li>d. In 24 hours</li> <li>e. Above to catchment average intensity. How were records obtained?</li> <li>f. Corresponding return period</li> </ul>
.04	<ul style="list-style-type: none"> <li>a. Where is the nearest staff gauge or recorder station on this river?</li> <li>b. What is its number?</li> <li>c. Period over which water level records have been kept</li> <li>d. Supply stage/discharge stage/velocity and stage/area curves if available</li> </ul>



2.6		Flood discharge	
.01	Is discharge affected by: a. Snow on catchment? b. Ponding upstream? c. Overflow from other catchments? d. Backwater from major river downstream or from lake, sea or beach barrier?		
.02	Estimated time of concentration at the site (for rational method)		
.03	For flood levels given in 2.2.03: a. Flood discharge b. Flood velocity c. Orientation of flow (show on diagram) d. Method used, ie estimate, timing debris, special measurements, rating curve, calculation e. Give estimate of reliability of results f. Average recurrence interval (ARI) of flood		
2.7		Design floods	
.01	Design rainfall in mm per hour for the time of concentration (2.6.02) on the basis of catchment average intensity. Specify standard deviation if possible		
.02	<u>Total waterway design flood</u> Design flood at the site with the recommended structure in place: a. Discharge b. Average recurrence interval (ARI) c. Mean velocity d. Water level in terms of site plan datum e. Orientation of flow (show on diagram)	Non tidal sites	Tidal sites
			MHWST
.03	<u>Level of serviceability to traffic design flood</u> Design flood to be passed without interruption to traffic: a. Discharge b. Average recurrence interval (ARI) c. Mean velocity d. Water level in terms of site plan datum e. Orientation of flow (show on diagram)	Non tidal sites	Tidal sites
			MHWST

.04	<p><u>Serviceability limit state design flood</u></p> <p>Design flood to be used for the serviceability limit state of the structure:</p> <ol style="list-style-type: none"> <li>Discharge</li> <li>Average recurrence interval (ARI)</li> <li>Mean velocity</li> <li>Water level in terms of site plan datum</li> <li>Orientation of flow (show on diagram)</li> </ol>	Non tidal sites	Tidal sites	
			MHWST	MLWST
.05	<p><u>Ultimate limit state design flood</u></p> <p>Design flood to be used for the ultimate limit state of the structure:</p> <ol style="list-style-type: none"> <li>Discharge</li> <li>Average recurrence interval (ARI)</li> <li>Mean velocity</li> <li>Water level in terms of site plan datum</li> <li>Orientation of flow (show on diagram)</li> <li>How was the estimate of the ultimate limit state design flood obtained? Attach calculations</li> </ol>	Non tidal sites	Tidal sites	
			MHWST	MLWST
	<p>Design flood to be used for the ultimate limit state of the bridge when the bridge deck level is overtopped by 200mm</p> <ol style="list-style-type: none"> <li>Discharge</li> <li>Average recurrence interval (ARI)</li> <li>Mean velocity</li> <li>Water level in terms of site plan datum</li> <li>Orientation of flow (show on diagram)</li> <li>Detail the nature of any elements of the bridge likely to cause retention of debris at overtopping of the deck Attach calculations</li> </ol>			
.06	<p>State the calculated level of general scour at the proposed site (in terms of the site plan datum) under the design flood conditions assuming that the proposed structural elements constrict flow less than 10%. In addition, for cases where proposed approaches and fills are likely to constrict flow, the effects of these constrictions are to be calculated. Attach calculations and sketches</p>			
.07	<p>State the calculated levels of local and abutment scour at the proposed site (in terms of the site plan datum) under the design flood conditions. Calculations are to take into account the effect at constrictions. Attach calculations and sketches</p>			
.08	<p>Are the estimates of scour for the design floods appropriate for the site and the nature of the recommended structure? Should a more conservative level of scour be considered? Specify</p>			

.09	General comments on the determination of scour and bank stability	
.10	Describe the anticipated levels of scour under Ultimate Limit State design floods Is the structure overtopped at a lower ARI flood than the Ultimate Limit State design flood? Describe the anticipated levels of scour under the overtopping design flood	
<b>2.8</b>	<b>General</b>	
.01	a. Are resource consents required? b. If so, what is the status of the application?	
.02	Any general comments on river characteristics or problems?	

Certification	
Section 2	
Prepared by:	<input type="text"/>
Designation:	<input type="text"/>
Certified by:	<input type="text"/>
Designation:	<input type="text"/>
Date	<input type="text"/>

**Section 3: Site investigations**

To be completed by the designated person

3.0	Site investigations	
.01	Where some investigations have been carried out on the site <ol style="list-style-type: none"> <li>a. Type of investigations:               <ol style="list-style-type: none"> <li>i. Walkover survey</li> <li>ii. Test pits</li> <li>iii. Penetrometer tests</li> <li>iv. Bores</li> <li>v. Test piles</li> <li>vi. Other, specify</li> </ol> </li> <li>b. Show locations on site plan and provide a record of number, locations, depths, results, interpretation and conclusions</li> <li>c. Outline further investigations proposed</li> </ol>	
.02	Where no investigations have been carried out at the site: <ol style="list-style-type: none"> <li>a. Describe the surface and anticipated subsurface conditions at the site for design report purposes</li> <li>b. What investigations are proposed?</li> </ol>	
.03	What is the depth of scourable material in the riverbed?	
.04	<ol style="list-style-type: none"> <li>a. Are atmospheric, water and soil conditions likely to be aggressive to construction materials?</li> <li>b. If so, state details</li> </ol>	
.05	Position of abutments to provide safety against failure of banks caused by superimposed loading	
.06	Recommended safe batter slopes for approach earthworks (with allowance for seismic conditions)	
.07	Is consolidation or differential settlement likely at the bridge or approaches? If so, give details	
.08	Density of concrete made from local materials	
.09	Probable abrasive effect of material transported by the river on concrete and steel	
.10	Comment on presence of active geological faults	

**Certification****Section 3**

Prepared by:

Designation:

Certified by:

Designation:

Date

## Section 4: Recommendations

To be completed by the designated person

4.0	Recommendations	
.01	State any specific environmental (including aesthetic) considerations which should be allowed for in the design	
.02	Is a landscape design required? If so, who will be responsible?	
.03	Length of bridge or size of culvert	
.04	Clearance from natural flood stage to soffit of superstructure	
.05	State the preferred construction material and structural form	
.06	Do site conditions indicate specific pier or abutment locations? If so, show on site plan and state reasons	
.07	Suggested structure foundations: <ol style="list-style-type: none"> <li>Type</li> <li>Depth</li> <li>Capacity</li> <li>General comments</li> </ol>	
.08	<ol style="list-style-type: none"> <li>Preferred type of surface drainage layout for bridge and approaches</li> <li>Type, size, location of channels</li> <li>Preferred type and size of kerb</li> <li>Preferred type and size of side protection. Provide sketches as appropriate</li> </ol>	
.09	General comment	

## Section 5: Approvals obtained

To be completed by the designated person

5.0	Approvals	
.01	Have proposals been discussed in detail with: <ol style="list-style-type: none"> <li>Regional council</li> <li>Territorial authority. Specify</li> <li>Other interested parties. Specify</li> </ol>	
.02	Give file reference and date of the agreement or approval: <ol style="list-style-type: none"> <li>Regional council</li> <li>Territorial authority. Specify.</li> <li>Other interested parties. Specify.</li> </ol>	
.03	<ol style="list-style-type: none"> <li>Where over tidal or navigable waters have details been submitted to the Maritime Safety Authority for marine approval?</li> <li>Has marine approval in fact been granted?</li> </ol>	
.04	General comments and factors arising from 5.01 and 5.02 which should be considered in the design	

**Certification**

**Sections 4 and 5**

Prepared by:

Designation:

Certified by:

Designation:

Date