

# STATE HIGHWAY THREE YEAR PLAN INSTRUCTIONS MANUAL – Addendum A

## 4.2 Bridges and Other Significant Highway Structures

### General

Submissions should follow the general principles of chapters 2 and 3. Submissions for structures should reflect the 21/24 request for all non-NOC and NOC requests.

All requests for bridges and other significant highway structures maintenance and renewals must be submitted by NOC area. Network Managers must liaise with regional Structures Management Consultants (SMCs) and NOC contractors to incorporate these programmes.

In general submissions should:

- include a draft outline programme for each work element with specific projects identified where possible across all three years, based on lifecycle management plans (LCMPs) and the three-year NLTP request submitted in 19/20 and updated knowledge obtained since then
- apply optimisation techniques, where possible, by including medium priority works with high priority works for specific projects to reduce road user impacts and take advantage of establishment costs
- include placeholders for each work element for the remaining balance of the three-year allocations to cover future items that cannot be formally justified now
- include *Structures annual plan request* forms (SAPRs), as detailed in the following, for all works over \$20k for the 21/22 year. This includes works estimated to be worth over \$20k where only design is proposed for 21/22 even if the design fee is less than \$20k
- provide *Preliminary present value end of life (PVEOL) analysis* forms for bridges and structures approaching condition end of life for which replacement is proposed.

As allocations for the 21/24 NLTP have yet to be finalised requests need to consider the reduction to funding scenario detailed in section 3.4. Projects shall be nominated for deferment or reduced scope (see section 2.1).

In reality, the reduction to funding scenario will likely require you to identify works proposed for 21/22 that can be deferred until 22/23 and some long-range programme items (such as bridge painting) may have to be pushed outside of the 21/24 NLTP funding block.

If a reduced scenario to 75% funding cannot be safely achieved, then this should be noted in the submission.

If the 21/24 NLTP allocation is ultimately between the full and reduced funding scenarios then the Performance Team, in conjunction with the Technical Services Structures Team, post Plan submission, will populate items back into each plan, on a priority basis (this will happen, once the final funding has been confirmed, after February 2021 moderation).

# Submission requirements

## General

Submissions shall be made on the Excel template (request spreadsheet) provided. Works under each category shall be listed in priority and year order, with the highest priority items listed first (see details in the works justification following).

Where significant both NOC and Non-NOC inputs for work elements are anticipated (eg 114A, 114E, 215G), there are separate tables for these inputs. Otherwise there is a single table for both NOC and Non-NOC inputs for work elements and a cell entry is required to identify which party is responsible for undertaking the works. (Note that works being procured through the NOC contractor by the SMC is still considered Non-NOC work.)

Wherever possible, the funding request shall be based on specifically identified maintenance projects to meet specified or implied performances standards. *Structures annual plan request* forms (SAPRs) shall be completed for all projects which exceed \$20,000 and where one has been completed this shall be identified on the request spreadsheet. (For the purposes of justifying funding requests, a 'project' is considered to be a work item on an individual structure, collated work items of similar nature on an individual structure, or collated work items of the same nature on multiple structures.)

These request forms include the justification method discussed in appendix A1 and an assessment of the residual risks for various options considered. Projects that are less than \$20,000 shall be justified following the same principles but need only be assigned a single priority. Lump sum items such as NOC contract payments (eg WE 114A) and SMC contract payments under WC 151 do not require SAPRs and shall be identified as such on the request spreadsheets.

If full justification of work is not possible (eg because inspections have not been completed at the time of completing the request) judgement can be used to request funds for work not yet programmed and for longer-term high value works (such as those identified in LCMPs). Otherwise placeholders such as 'works yet to be identified' shall be inserted to ensure there is a request against all allocated funds.

A *Preliminary present value end of life (PVEOL) analysis* form shall be completed for all bridges and structures approaching condition end of life for which replacement is proposed. If associated improvements have been identified for any replacements (eg widening, walking/cycling facilities) the costs shall be indicated if known.

## Advance design works

Design works may be identified ahead of construction as programme and budgets allow. SAPRs shall be prepared, when required for design works planned ahead, based on the value of the physical works.

## Backlog

Under the three year programme all urgent/high priority works identified shall be listed showing the year in which they will be funded. It is anticipated that any current urgent/high priority works will be funded within the three-year window. In the unlikely event there are such works that will not be funded then these shall be identified individually by adding the item but not entering a year for the works and inserting the estimated value of the works in the 'comments' cell.

Backlog items (urgent/high priority works that are not funded in the next year) shall be identified by the Technical Service Structures Team during moderation.

An estimate of the current work bank (medium priority works identified but without funding requested) shall be entered on the submission by not entering a year for the works and inserting the estimated value of the works in the 'comments' cell.

Future works, any backlog and work bank totals will be monitored over time at regional and national level to identify any trends that may be indicators of future changes in demand and funding.

### *RAPT reviews*

The Technical Services structures team will not be performing structures RAPT reviews in the same manner of recent years. A replacement process that facilitates technical approval of works in a rolling programme is under development. In essence the process will include:

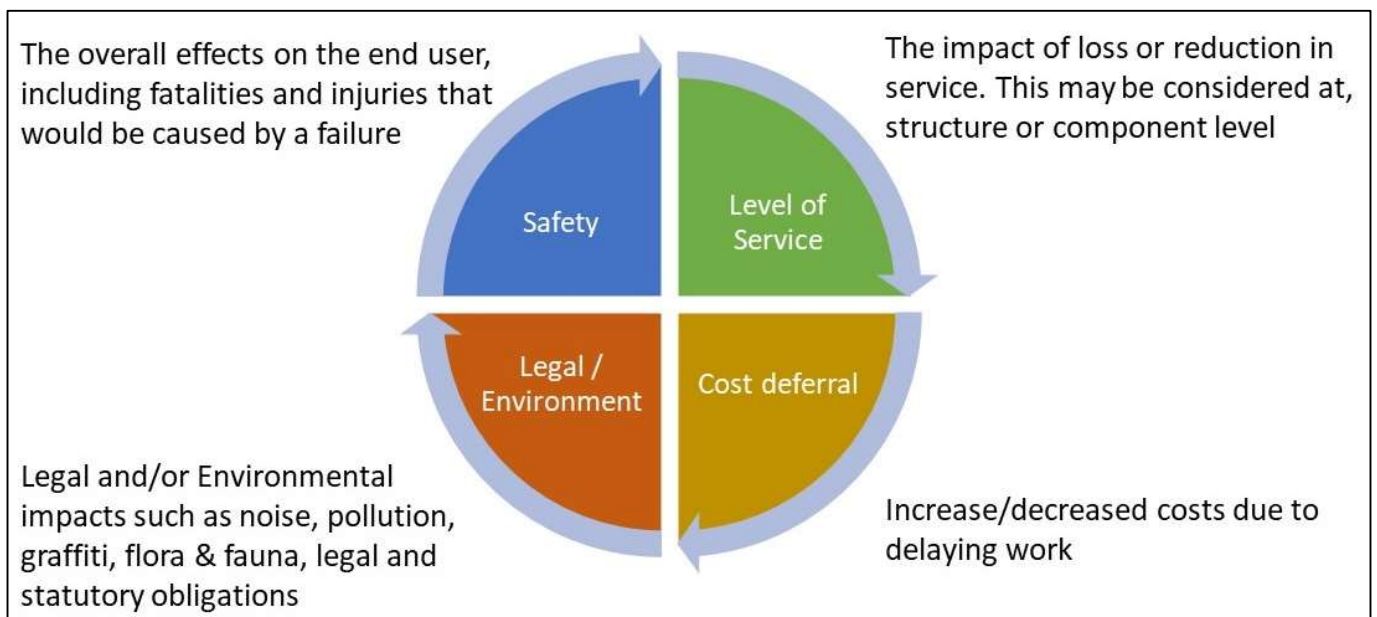
- production of SAPR forms for works proposals (or updates of the request spreadsheet for minor works) as needs are identified
- SAPR approval meetings where the maintenance requirements and proposed interventions will be discussed, works progress will be tracked and the priority of projects will be reevaluated if necessary
- annual technical/asset management review meetings, where issues like compliance, risk, backlog, LCMP, lessons learned and general asset management of structures in the region will be discussed.

Review and moderation of the initial submissions made for the Three-Year Plan will be made in a similar manner and in accordance with the general principles of chapters 2 and 3.

# Appendix A1 – Work justification for WC 114 and WC 215

There are several key intervention criteria that provide the justification for maintenance/renewal works as shown in figure A1.

**Figure A1: Justification criteria**



Where SAPR forms are required, specific intervention levels of urgent, high, medium or low are required for each of the criteria as follows:

- Urgent items need to be undertaken within the current year – these are likely to require attention, commencing with implementation, as soon as they are identified.
- High priority items are those that need to be completed in the next year.
- Medium priority items are works requiring intervention in the next 2–4 years, i.e. within the three-year plan.
- Low priority are items in the 5 years plus bracket, i.e. beyond the scope of this current request within the timeframe of a 10-year forecast, unless there are key benefits in bringing the work forward (e.g. other work to the same structure, package of similar work to adjacent structures).

Intervention levels shall be determined for each of the four categories, as per the matrices shown in tables A1 to A4 (and reproduced on the SAPR template) and shall be entered into the request spreadsheet. This will help in the moderation process for determining which structures will receive funding and when across the three-year programme.

Where no SAPR has been produced priority for the works shall be assessed similarly and entered into the ‘General/Safety’ cell on the request spreadsheet.

Where relevant, works shall be listed in decreasing priority on the request spreadsheet in the following order:

- contract items (these shall be identified on the spreadsheet as such)
- works with any prioritisation category that is urgent
- works with all four prioritisation categories that are high
- works with any three prioritisation categories that are high
- works with any two prioritisation categories that are high
- works with any one prioritisation category, other than cost deferral, that is high (including high priority works where no SAPR has been produced)
- works that have a prioritisation category that is high only for cost deferral
- any medium priority works.

**Table A1: Safety justification matrix**

		Likelihood					
		Rare	Unlikely	Possible	Likely	Almost certain	
		< once in 100 years	Several times per 100 years	Several times per 10 years	Once every 2 to 10 years	> once every 2 years	
Consequence	Loss of life, permanent disability or injury, or multiple serious injuries.	Extreme	Low	Medium	High	High	Urgent
	Serious injury (injuries) requiring specialist medical treatment or lost time greater than three weeks	Severe	Low	Medium	High	High	High
	Injury requiring medical treatment or lost time of 1 day to three weeks	Moderate	Low	Medium	Medium	High	High
	Injury requiring short term medical treatment and workplace absence less than one day	Minor	Low	Low	Medium	Medium	Medium
	Injury requiring short-term first-aid care and no absence from the workplace	Insignificant	Low	Low	Low	Low	Low

**Table A2: Level of service justification matrix**

	Priority
Partial or full closure to live loading	Urgent
Impose weight limit below current levels of service	High
Reduce the number of available lanes	High
Impose speed limit across the structure	Medium

**Table A3: Cost justification matrix**

<b>Cost next year Cost this year</b>	<b>≥1.2</b>	<b>1.1-1.2</b>	<b>&lt;1.1</b>
<b>Priority</b>	<b>High</b>	<b>Medium</b>	<b>Low</b>

**Table A4: Legal & environment justification matrix**

<b>Issue</b>	<b>Potential consequences</b>				
<b>Noise and graffiti</b>	National / international media coverage, minister intervention, inquiry instigated	Weeks of media coverage, possible ministerial intervention	Days of media coverage or 3rd party investigation	1-5 days of local media coverage, official information request. Negative feedback from minister	Local media coverage 1day
	<b>Urgent</b>	<b>High</b>	<b>High</b>	<b>Medium</b>	<b>Low</b>
<b>Flora &amp; fauna and Pollution</b>	Permanent pollution damage or other environmental damage	Significant and widespread pollution or other environmental damage, with long term effects	Pollution or other environmental damage at a localised level, with medium term effects	Minimum pollution or other environmental damage. Short term effects only	Small scale pollution or other environmental damage is localised with no resultant effects. Contained locally
	<b>Urgent</b>	<b>High</b>	<b>High</b>	<b>Medium</b>	<b>Low</b>
<b>Legal/ compliance and Heritage</b>	High profile prosecution(s) with potential for custodial sentence	Individual prosecution	Breach with legal rebuke /abatement notice/restrictions	Breach with letter from authority requesting action	Breach managed at a regional level
	<b>Urgent</b>	<b>High</b>	<b>High</b>	<b>High</b>	<b>High</b>

## Appendix A2 – Work element definitions

Table A5 shows high-level roles in determining structures funding application by work element and how these are typically funded within the Three Year Plan.

For the effective management of expenditure, Structures Maintenance (WC 114) has been split into the following work elements:

- 114A (routine bridge maintenance)
- 114B (structural bridge maintenance)
- 114C (other significant highway structures maintenance excluding tunnels)
- 114D (guardrail maintenance – on bridges)
- 114E (tunnel maintenance)
- 114F (highway guardrail maintenance – not on bridges)

For the effective management of expenditure, Structures Component Replacements (WC 215) has been split into the following work elements:

- 215A (routine bridge component replacements)
- 215B (structural bridge component replacements)
- 215C (other significant highway structures component replacements excluding tunnels)
- 215D (guardrail component replacements – on bridges)
- 215E (professional services for component replacements)
- 215F (highway guardrail component replacements – not on bridges)
- 215G (tunnel component replacements)

Work category 216 has been introduced and provides for the like for like replacement of bridges and structures which are at the end of their serviceable life for condition reasons.

**Table A5: Roles and responsibilities**

Work element	Lead role	In consultation with	With input from	Funding arrangement
114A	Network Manager	NOC contractor	SMC	Generally NOC
114B	SMC	Network Manager		Non-NOC
114C	SMC	Network Manager	NOC contractor	Generally non-NOC
114D	SMC	Network Manager	NOC contractor	Generally non-NOC
114E	Network Manager / Tunnel Manager	SMC	NOC contractor	Both
114F	Network Manager	NOC contractor		NOC
215A	SMC	Network Manager	NOC contractor	Non-NOC
215B	SMC	Network Manager		Non-NOC
215C	SMC	Network Manager	NOC contractor	Generally non-NOC
215D	SMC	Network Manager	NOC contractor	Generally non-NOC
215E	SMC	Network Manager		Non-NOC
215F	Network Manager	NOC contractor		NOC
215G	Network Manager / Tunnel Manager	SMC	NOC contractor	Both
216	SMC	Network Manager		Non-NOC

Note that work to alter any bridge level of service (e.g. bridge widening, bridge strengthening, and guardrail improvements) cannot be funded from work categories 114 or 215.

Tables A6 and A7 show typical structures maintenance and structures component replacement projects and corresponding work elements.

**Table A6: Bridge work element definitions**

Work description	Work element	Work description	Work element
<b>Bridges (including bridges, stock underpasses, pedestrian underpasses and culverts with waterway area &gt;3.4m<sup>2</sup>)</b>			
Clean components	114A	Maintain timber decks	114A
Remove detritus from decks, drainage systems, bearings and joints	114A	Maintain drainage systems on structures	114A
Remove debris and vegetation from structure	114A	Maintain deck joints, bearings, linkages	114A
Clear debris and vegetation from waterway	114A	Maintain river control works (around abutments & piers)	114A
Concrete repairs Steel repairs	114B	Repair damaged guardrails, handrails and barriers on bridges	114D
Paint handrails and barriers	114D	Reinstate lost scour protection works (around abutments & piers)	215A
Bridge signage replacements	215A	Paint structural members	215B
Replace beams	215B	Underpin piers/abutments	215B
Upgrade river control works such as gabions and rock rip rap (around bridges)	215B	Culvert concrete invert replacement or new invert	215B
Replace deck joints, bearings, linkages	215B	Replace timber running planks/timber decks	215B
Replace barriers due to deterioration	215D	Professional services for component replacements (WC 215)	215E
Maintain signs, lighting, deck surfacing	Other categories (e.g. 111, 122, 212)	Bridge (and other structures) renewal (like for like)	216
Graffiti control/removal	121	Widen bridge Strengthen bridge	Capital project (322)
Replace bridge barriers to improve performance	Minor safety (341)	Major culvert renewals	Capital project (322)

**Notes for tables A6 and A7**

- a. W/E 114A and W/E 215A are ‘routine’ in the sense that they do not require design input.
- b. W/E 114B and W/E 215B are ‘structural’ in the sense that they require design input.
- c. Professional services for WC 114 shall be included in WC 151.



**Table A7: Other significant highway structures work element definitions**

Work description	Work element	Work description	Work element
<b>Other significant highway structures</b>			
<u>Retaining walls</u> Routine maintenance Anchor system testing/refurbishment Underpinning	114C 215C 215C	<u>Noise walls</u> Maintenance Renewals	114C 222
<u>Footbridges (separate from highway bridge)</u> Routine maintenance Component replacement	114C 215C	<u>River and slope protection works (separate from bridges)</u> Maintenance Extension of protection works	114C 215C
<u>Redundant bridges</u> Maintenance Removal	114C As part of capital project	<u>Coastal protection works</u> Maintenance Replacement of existing components Extension of rock/groynes	114C 215C 215C
<u>Tunnels</u> Operations (surveillance/dangerous goods, ventilation systems operation, fire control and emergency response preparedness) Maintenance (cleaning, lighting, ventilation systems etc.) Maintenance (concrete repairs etc.) Energy costs Structural repairs Upgrade services (ventilation, deluge, etc.) Software updates Traffic management equipment renewals (VMS, CCTV, traffic control etc.)	123	<u>Critical small culverts</u> Maintenance Renewals	114C 213
	114E	<u>Large sign gantries/cantilever signs</u> Maintenance Component replacement Renewals	114C 215C 222
	114E	<u>Highway barriers (incl guardrails) not on bridges</u> Maintenance Component replacement Full replacement to improve performance	114F 215F 341
	114E		
	215G		
	215G		
	123		
222			
<u>Large lighting columns/CCTV masts</u> Maintenance Replacement	114C 222	<u>Large drainage structures</u> Maintenance Renewals	114C 213
<u>Bailey bridges</u> Hire and maintenance	114C	<u>Professional services for component replacements (WC 215)</u>	215E
<u>Graffiti control/removal</u>	121	<u>Debris fences</u> Maintenance Debris clearance	114C 121