

8. MAIN ROAD - 3 LANING

General Manager responsible:	General Manager, City Environment Group, DDI 941 8608
Officer responsible:	Unit Manager, Transport and Greenspace
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PURPOSE OF REPORT



1. The purpose of this report is to request the Hagley/Ferrymead Community Board recommendation that Council approve the proposed addition of a third lane (inbound) on Main Road between McCormacks Bay Road (at the western end of the causeway) and Ferrymead Bridge, and authorise that the project proceed to final design, tender and construction.

EXECUTIVE SUMMARY

2. The proposal involves the addition of a third lane on Main Road from the western end of the causeway at McCormacks Bay Road to just east of St Andrews Hill Road, linking in with the Ferrymead Bridge widening project. The additional traffic lane will be installed in the westbound (towards town) direction on Main Road.
3. The aim of the project is to improve the capacity of this section of Main Road, in particular at the intersections of Main Road with McCormacks Bay Road and Mt Pleasant Road, while maintaining or improving safety for all road users especially cyclists.
4. The project proposal includes intersection enhancements and changes, removal of all parking except two inset parking bays, additional right turning bays with raised median islands, the relocation of some bus stops, and the closure of the western entrances to The Brae and Scott Park Street lighting and signage will be upgraded. Facilities for cyclists and pedestrians will be improved.
5. It also includes the rebuilding of the seawall (due to earthquake damage as well as aging) for 660 metres in the area of the project extending from the from the car park in Scott Park to just past the intersection of McCormacks Bay Road and Main Road, at the western end of the causeway, a length of approximately 660 metres. The proposed design will provide a shared pathway for cyclists and pedestrians on top of the upper end. The seawall proposal consists of a rock rip rap wall, approximately three metres wide on top, and sloping away from the roadway for a distance of several metres. Although the costs of this proposed extended length of rebuild exceed the repair costs anticipated at the outset of the project in 2010, the proposed rip rap design can achieve robust and sustainable repairs as well as a shared path for much less cost than that of the alternative erect stone wall design. Although a shared path had been mooted in the Estuary Green Edge Master Plan introduced in 2010, it was thought that it would be many years before it could be manifested, or funding found.
6. The proposed seawall design also provides additional protection for the road and underground infrastructure should more earthquakes and/or sea level rise or tidal surges occur in future. An indicative diagram of the proposed rock rip rap wall is shown in **Attachment 3**.
7. Extensive local consultation was carried in November/December 2010, and many different issues were raised by residents. 81 submissions were received, of which 42 specified support of the proposal and 15 did not support the proposal. These are summarised in paragraphs 31 to 36 of this report, and detailed more fully in **Attachment 2**.
8. Key issues raised at this time related to expectations of an increased difficulty turning right across Main Road in either direction. Concerns were also expressed about the third lane being 'car centric' and not encouraging the use of public transport or alternative modes of transport. There were also some environmental concerns raised relating to trees and to bird life.
9. The project team recommends several changes to the original plan in response to the community feedback. The recommended plan is detailed in paragraphs 59 to 67 of this report, and shown in **Attachment 1**.

10. When proposals were drafted in September 2011 for this seawall rebuild along the length of the project, further discussions were held with local residents' associations, the Ihutai Estuary Trust, The Christchurch Estuary Organisation, Mt Pleasant Yacht Club, windsurfers and rowing representatives and Mahaanui Kurataiao Ltd (MKT). Their comments are summarised in Paragraphs 37 to 41 of this report and detailed more fully at the end of **Attachment 2**.
11. Earthquake repair works to the road itself are also required. These will be completed by the Stronger Christchurch Infrastructure Rebuild Team (SCIRT) as part of this project but the funding will come from a different budget. These will include full pavement rehabilitation, with replacement of the kerb and smoothing and re-surfacing of the footpath on the southern side of the carriageway.
12. The design provides for future bus priority if required, but it is considered that the changes in themselves will be effective in improving bus efficiency along this piece of road.
13. Other capital projects in this area are the widening and strengthening of Ferrymead Bridge, Summer Bus Priority, the Causeway culvert renewal, and (since the earthquakes) the realignment of the sewer main in McCormacks Bay, along the Main Road and through Scott Park.
14. The proposed plan has been safety audited.
15. The project was planned to start construction in January 2012 and finish in December 2012 to work in with the completion of the Ferrymead Bridge work. It is anticipated that construction will be completed during the 2012/13 financial year, and that it will be carried out by SCIRT together with their completion of earthquake repairs to the seawall and the Main Road itself.

FINANCIAL IMPLICATIONS

16. Council has a budget of \$2,317,969 for the construction of the Main Road Three Laning project. The estimate to complete the project at the end of the scheme design phase is \$2,180,892. This includes a construction contingency of 20%. The New Zealand Transport Agency (NZTA) funding has been approved for the parts of this project that comply with the NZTA funding requirements. Total design, consenting, and supervision fees are estimated at \$492,078 which is 23% of the project estimate.

Year	Budget	Actual to date
2009/10 and earlier	47,523	47,685
2010/11	144,010	144,010
2011/12	2,126,274	30,391
2012/13		
Total	2,317,807	222,086

17. In addition to this it is estimated that the earthquake repairs to the road, drainage, and seawall will cost another \$2,271,054. This will be funded as an earthquake repair rather than from the project budget.
18. The additional cost to the project to achieve a three metre wide shared path along the length of Main Road described in this report is \$117,000 and included in the project construction estimate.

Do the Recommendations of this Report Align with 2009-19 LTCCP budgets?

19. Funding for the Main Road 3 Laning project is programmed in the 2011/12 Annual Plan.
20. The current project cost estimates indicate there is sufficient budget allocated in the 2011-12 Annual Plan to implement and complete the project. Construction is programmed to commence in the 2011/12 financial year, it is likely that this funding will need to be carried forward until the 2012/13 financial year.

21. Funding for this project is provided within the Transport and Greenspace Unit Capital Programme as outlined above.

LEGAL CONSIDERATIONS

22. There are no Notable or Heritage trees shown in the City Plan or on the Council mapping system. There is one Heritage building, the Cob Cottage, which is located on the northern side of Main Road at the western end of the project area. As part of the Ferrymead Bridge project an Archaeological Authorisation has been applied for, for working close to the Cob Cottage. It is assumed this will cover the work being completed for the Main Road project, as this is the point where the two projects connect. No other consents are expected to be required.
23. The existing stone wall along the front of the reserve at the bottom of The Brae is a heritage wall. The heritage team will be consulted during the detailed design phase for changes to and adjacent to this structure.

Consent Issues

24. A resource consent will be required for the work on the seawall. The proposed work is considered to be within the ambit of the Canterbury Earthquake (Resource Management Act) Order 2011 because extensive lengths of the road adjacent to the location of the intended rip rap wall are now unstable. Preparation for this consent process is underway.

Bylaw changes

25. A number of traffic resolutions will require amendment or addition to the Christchurch City Traffic and Parking Bylaw 2008. These are detailed later in this report in the Staff Recommendations section. Council resolutions are required to approve these.

Have you considered the legal implications of the issue under consideration?

26. Yes, as above.

ALIGNMENT WITH LTCCP AND ACTIVITY MANAGEMENT PLANS

27. This project is identified in the Annual Plan, Section 1, Page 35 as having been brought forward to coincide with the completion of work on the Ferrymead Bridge.

Do the recommendations of this report support a level of service or project in the 2009-19 LTCCP?

28. Yes, as above.

ALIGNMENT WITH STRATEGIES

29. This project aligns with the Council parking strategy, road safety strategy, cycling strategy and pedestrian strategy.

Do the recommendations align with the Council's strategies?

30. Yes, as above.

CONSULTATION FULFILMENT

31. No external initial issues consultation was carried out, as there had recently been consultation relating to the bus priority proposal in the area.

32. The proposed plan was presented to the community in November 2010, during which a leaflet with drawings and descriptions of the various components of the project proposal was distributed to all households along Main Road from Ferrymead Bridge to McCormacks Bay Road, up the adjoining streets Te Awakura Terrace, The Brae, Rangitira Terrace and Mt Pleasant Road, and along McCormacks Bay Road to Soleares Avenue. Copies of the leaflet were sent to residents' groups, libraries and service centres in the area, other clubs and societies including the Mt Pleasant Yacht Club, Avon Heathcote Estuary Ihutai Trust and the Estuary Association. In addition, a link to the Council Have Your Say website pages about this project was emailed to a list of people and organisations who had previously expressed interest in the Ferrymead Bridge project. A community drop in session was held on Wednesday 1 December 2010 at the Mt Pleasant Community Centre and staff met with residents of The Brae, and also with representatives of SPOKES. 81 submissions were received, of which 42 specified support of the proposal and 15 did not support the proposal.
33. General comments praised the design but expressed concerns that it is car centric, could give more attention to buses, pedestrians and cyclists, that 3 laning is dangerous, will work in the morning but not evening, and will not solve the congestion problem. Several causes of the problem were suggested including the signals at Ferrymead, school timetables, Redcliffs roads, the drivers who allow others to enter the flow. Others were concerned about the Council spending money on this road when there is earthquake damage in other places.
34. Specific problems articulated by submitters included the difficulty of crossing two lanes, both in a vehicle turning on to or off Main Road, and three lanes as a pedestrian; concern about use of stop signs instead of give way signs; loss of greenspace; worries about noise affecting the kindergarten. A roundabout was suggested, and a call was made for driver education to encourage drivers not to stop for vehicles entering from the side roads. Several residents requested a right hand turn facility for east bound vehicles turning in to The Brae, a right turn lane out of The Brae toward Sumner and for parking on Main Road and in the Brae Reserve area. Lack of street parking around Scott Park was noted, and one person suggested moving the Cob Cottage to Ferrymead. There were several requests for a shared cycle pedestrian pathway along the estuary edge to be included in this project, and for separated cycle lanes (using a rumble strip) on Main Road, and several asked for the proposed new third lane to be restricted to buses. Others were concerned about the bus stops being placed in the cycle lanes. Environmental concerns were mainly about bird life, and asked for the retention of the Macrocarpa tree, and of specific rocks in the estuary and the gravel edge strip for gulls to roost and nest. One requested a pipe under the road for Paradise Shell ducks and their families. Flooding concerns centred round the Brae Reserve, and there were a few requests for undergrounding of cables.
35. A full summary along with staff comments is attached to this report as **Attachment 2**.

Changes to the plan as a result of the consultation

36. The project team reviewed the feedback received on the proposed option and agreed to make the following changes to the scheme in January 2011 to take into account some of the consultation responses:
 - (a) A right turn bay will be installed for traffic turning into The Brae. A pedestrian refuge will also be installed to provide a crossing point to the bus stop adjacent to The Brae. To accommodate the inclusion of the right turn bay the existing footpath will be relocated to behind the existing stone wall and Norfolk pines. The bus stop on the southern side of the carriageway will also be relocated further west into the area where the second leg of The Brae currently joins Main Road. This access will be closed to allow for the relocated bus stop and to force vehicles to use the upgraded intersection further east to improve safety. The stone wall will require some modification at the western end to accommodate the bus stop and also to provide gaps for the footpath. This proposed work has been discussed with the Council Heritage team.

- (b) The bus stop located on the southern side of the carriageway just east of Ferrymead Bridge will now be partially indented due to feedback received from the safety auditor on the previous un-indented option. Due to space limitations in this location a fully indented bus stop was not achievable. To minimise the risk of cyclists getting squeezed between the bus and vehicles in the through lane, it is proposed to narrow both west bound lanes to 3.2 metres in this location and make some adjustments to the curve leading off Ferrymead Bridge in the eastbound direction so the northern kerb is pushed slightly north to provide 1.6 metres width between the bus and vehicles if a bus is stopped.
 - (c) The previously proposed off road section of path for cyclists on the west side of McCormacks Bay Road intersection will be removed and replaced with a shared path south of the proposed parking area to provide a more direct route between McCormacks Bay Road and Main Road. This will involve the footpath being widened to 2 metres to allow for the one way cycle movement. Additional markings and signage will be installed where the path crosses over the main footpath along Main Road and joins with the on road cycle lane to minimise the risk of cyclists colliding with pedestrians at this cross over point.
 - (d) The no stopping restriction will be extended on McCormacks Bay Road around the new curve due to expected parking congestion in this area during drop off and pick up at the pre-school close by.
37. These changes have been reviewed by the safety auditor and no additional comments were provided regarding these changes. The only suggestions were in relation to road markings at the bus stops, which have been adjusted.

Further feedback on seawall rebuild proposals

38. As the revised proposal for rebuilding of the seawall differs significantly from the plan that was consulted upon in 2010, further discussions were held in September 2011 with Mt Pleasant, Redcliffs and Sumner residents' associations, the Ihutai Estuary Trust, The Christchurch Estuary Organisation, Mt Pleasant Yacht Club and Pleasant Point Yacht Club, windsurfers and rowing representatives and Mahaanui Kurataiao Ltd (MKT). These involved a site visit and meeting at the Mount Pleasant Yacht club premises followed by emailed information for Yacht Club committee members and for those who could not attend the site visit, and other meetings with the Estuary Association and Ihutai Estuary Trust. Those attending the meetings seemed generally happy with the proposal although the Estuary Association expressed concern about encroachment on the estuary.
39. Subsequent correspondence from the stakeholders raised the following concerns:
- (a) Encroachment into the estuary - 'the thin end of the wedge' – concern that this solution may apply in other parts of the estuary edge resulting in unacceptable reduction of sailing area.
 - (b) Danger to sailors from underwater rocks.
 - (c) Impact on tidal flows and viable sailing areas – exacerbating the already reducing sailing areas due to changing tidal patterns due to the earthquake having changed the levels of the estuary floor, and the apparent moving of the channel gradually closer to the causeway.
 - (d) Lack of modelling of effects.
 - (e) Lack of full consultation about this specific change.

40. There was support given as follows:

- (a) Mt Pleasant Memorial Community Centre & Residents' Association Inc gave support in principle for the shared path but reiterated their non-support of the 3 laning project itself.
- (b) Individuals from Redcliffs and Sumner Residents' Associations indicated support for the proposal.

STAFF RECOMMENDATION

It is recommended that the Hagley/Ferrymead Community Board recommend that the Council:

- (a) Approve the proposed Main Road 3 Laning project to proceed to final design, tender and construction, as shown in the plans for Board approval at Attachment 1 (TP323501 and TP323502).
- (b) Approve the following traffic resolutions as shown in the plans for Board approval at Attachment 1 (TP323501 and TP323502), refer to corresponding Roman numeral listed on attachment:
 - (i) That all existing parking restrictions on the northern side and western side of Main Road between a point 53 metres north east of the Bridle Path Road intersection and extending in a northerly and easterly direction for a distance of 850 metres, be revoked.
 - (ii) That all existing parking restrictions on the southern and eastern side of Main Road between a point 58 metres north east of the Bridle Path Road intersection and extending in a northerly and easterly direction for a distance of 820 metres, be revoked.
 - (iii) That all existing parking restrictions on the north east side of Mt Pleasant Road commencing at its intersection with Main Road and extending in a south easterly direction for a distance of 20 metres be revoked.
 - (iv) That all existing parking restrictions on the south west side of Mt Pleasant Road commencing at its intersection with Main Road and extending in a south easterly direction for a distance of 55 metres be revoked.
 - (v) That all existing parking restrictions on the east side of The Brae commencing at its intersection with Main Road (at its eastern intersection) and extending in a southerly direction for a distance of nine metres be revoked.
 - (vi) That all existing parking restrictions on the west side of The Brae commencing at its intersection with Main Road (at its eastern intersection) and extending in a southerly direction for a distance of nine metres be revoked.
 - (vii) That the stopping of vehicles be prohibited at any time on the south side of Main Road, commencing at its intersection with Mt Pleasant Road and extending in an easterly direction for a distance of 30 metres.
 - (viii) That a bus stop be created on the south side of Main Road, commencing at a point 30 metres east of the Mt Pleasant Road intersection and extending in an easterly direction for a distance of 14 metres.
 - (ix) That the stopping of vehicles be prohibited at any time on the south side of Main Road, commencing at a point 44 metres east of the Mt Pleasant Road intersection and extending in an easterly direction for a distance of 107 metres.
 - (x) That the stopping of vehicles be prohibited at any time on the south east side of Main Road, commencing at its intersection with Te Awakura Terrace and extending in a south westerly direction for a distance of 112 metres.

- (xi) That a bus stop be created on the south east side of Main Road commencing at a point 112 metres south west of its intersection with Te Awakura Terrace and extending in a south westerly direction for a distance of 14 metres.
- (xii) That the stopping of vehicles be prohibited at any time on the south east side of Main Road, commencing at a point 126 metres south west of its intersection with Te Awakura Terrace and extending in a south westerly direction of 30 metres.
- (xiii) That the stopping of vehicles be prohibited at any time on the south east side of Main Road, commencing at its intersection with Te Awakura Terrace and extending in a north easterly direction for a distance of 73 metres.
- (xiv) That the stopping of vehicles be prohibited at any time on the south east side of Main Road, commencing at a point 90 metres north east of its intersection with Te Awakura Terrace and extending in a north easterly direction for a distance of 17 metres.
- (xv) That the stopping of vehicles be prohibited at any time on the south side of Main Road, commencing at a point 131 metres north east of its intersection with Te Awakura Terrace and extending in an easterly direction for a distance of 46 metres.
- (xvi) That a bus stop be created on the south side of Main Road, commencing at a point 177 metres north east of its intersection with Te Awakura Terrace and extending in an easterly direction for a distance of 14 metres.
- (xvii) That the stopping of vehicles be prohibited at any time on the south side of Main Road, commencing at a point 191 metres north east of its intersection with Te Awakura Terrace and extending in an easterly direction to its intersection with Mt Pleasant Road.
- (xviii) That the stopping of vehicles be prohibited at any time on the north west side of Main Road commencing at a point 53 metres north east of its intersection with Bridle Path road and extending in a north easterly direction for a distance of 59 metres.
- (xix) That a bus stop be created on the north east side of Main Road, commencing at a point 112 metres north east of its intersection with Bridle Path Road and extending in a north easterly direction for a distance of 14 metres.
- (xx) That the stopping of vehicles be prohibited at any time on the north west side of Main Road commencing at a point 126 metres north east of its intersection with Bridle Path road and extending in a north easterly direction for a distance of 281 metres.
- (xxi) That a bus stop be created on the north side of Main Road, commencing at a point 407 metres north east of its intersection with Bridle Path Road and extending in an easterly direction for a distance of 14 metres.
- (xxii) That the stopping of vehicles be prohibited at any time on the north side of Main Road commencing at a point 421 metres north east of its intersection with Bridle Path road and extending in an easterly direction for a distance of 350 metres.
- (xxiii) That a bus stop be created on the north side of Main Road, commencing at a point 771 metres north east of its intersection with Bridle Path Road and extending in a easterly direction for a distance of 14 metres.
- (xxiv) That the stopping of vehicles be prohibited at any time on the north side of Main Road commencing at a point 785 metres north east of its intersection with Bridle Path road and extending in an easterly direction for a distance of 119 metres.

- (xxv) That the stopping of vehicles be prohibited at any time on McCormacks Bay Road at, or adjacent to its intersection with Main Road (the intersection closest to the Mt Pleasant Road intersection), and including that portion of McCormacks Bay Road which will be created as a no exit section, due to the realignment of the intersection, as illustrated on the **Attachment 1** (TP323502).
- (xxvi) That the parking of vehicles be restricted to 90 degree angle parking on that "no exit" portion of McCormacks Bay road, as illustrated on **Attachment 1** (TP323502)
- (xxvii) That the stopping of vehicles be prohibited (at any time) on north east side of Mount Pleasant Road, commencing at its intersection with Main Road and extending in a south easterly direction for a distance of 14 metres.
- (xxviii) That the stopping of vehicles be prohibited (at any time) on south west side of Mount Pleasant Road, commencing at its intersection with Main Road and extending in a south easterly direction for a distance of 30 metres.
- (xxix) That the stopping of vehicles be prohibited (at any time) on east side of The Brae, commencing at its intersection with Main Road and extending in a southerly direction for a distance of 9 metres.
- (xxx) That the stopping of vehicles be prohibited (at any time) on west side of The Brae, commencing at its intersection with Main Road and extending in a southerly direction for a distance of nine metres.

Changes to intersection controls:

- (xxvii) That the Give Way control on Mt Pleasant Road at its approach to Main Road be revoked.
- (xxviii) That a Stop control be installed on Mt Pleasant Road at its approach to Main Road.
- (xxix) That the Give Way control on McCormacks Bay Road at its approach to Main Road (at the western end of the Causeway) be revoked.
- (xxx) That a Stop control be installed on McCormacks Bay Road at its approach to Main Road (at the western end of the Causeway, but at the realigned position of McCormacks Bay Road as illustrated on **Attachment 1** (TP323502).

CHAIRPERSON'S RECOMMENDATION

For discussion.

BACKGROUND (THE ISSUES)

41. The proposal involves the addition of a third lane on Main Road from the western end of the causeway at McCormacks Bay Road to just east of St Andrews Hill Road, linking in with the Ferrymead Bridge widening project. The additional traffic lane will be installed in the westbound (towards town) direction on Main Road.
42. Main Road and Mt Pleasant Roads are classified in the City Plan as Minor Arterial roads. McCormacks Bay Road and St Andrews Hill Road are classified as collector roads.
43. The aim of the project is to improve the capacity of this section of Main Road, while maintaining or improving safety for all road users. In the past, congestion has resulted when city bound drivers stop on Main Road to allow drivers from McCormacks Bay Road and Mt Pleasant Road to enter the Main Road traffic. This not only caused congestion back toward Redcliffs, but also created an unsafe situation for cyclists approaching the intersections from the east. Several serious injury crashes and other near misses have occurred when drivers made a right turn across the stationary city bound traffic queue, not seeing a cyclist behind the row of cars. The design provides for future bus priority if required, but it is considered that the changes in themselves will be effective in improving bus efficiency along this piece of road.
44. It should be noted that it was agreed at the start of the project by the project team that any consideration of tidal traffic movement for the third lane is excluded in the scope of this project, as congestion currently does not occur in eastbound direction and is not anticipated to be a significant issue in the future for this part of Main Road.

Seawall and road repairs

45. The causeway was constructed in 1907 and originally carried only a single tram line. It was widened in 1937 to accommodate vehicular traffic. The total length of the estuary seawall is approximately 1700 metres, running from the car park in Scott Park to the intersection of Main Road and Beachville Road.
46. The deterioration of the seawall poses a threat to road users and the existing services located in the road shoulder, in particular the Orion power cables and the brittle asbestos cement water mains which are located closest to the back of the estuary seawall. The processes leading to the deterioration of the seawall will be on-going and are likely to continue resulting in further collapse and subsidence. Structural analysis undertaken in 2004 by City Solutions also showed that the current state of the estuary seawall does not have sufficient capacity to resist traffic loading. Therefore repair/replacement works are strongly recommended.
47. Seawall repairs were always going to be part of this project, but the Christchurch earthquakes caused significant damage and the seawall now requires replacement along the full length of the Main Road adjacent to the proposed 3 laning (and further, which is outside the scope of this project).
48. The extent of the estuary seawall affected by the works and therefore consequently included within this report is from the car park in Scott Park to just past the intersection of McCormacks Bay Road and Main Road, at the western end of the causeway, a length of approximately 660 metres.
49. It was previously proposed to use a precast concrete wall for the 120 metres of wall that required replacement. However following the earthquakes it is considered that a rip rap wall would be more appropriate in this location and will provide better protection for underground services as well as for the roadway itself, if another significant event occurred. This type of structure can be repaired, if damaged by any quake in future, simply by moving rocks back into place. Also, if another earthquake event caused seawall damage, any slumping would be far enough away from the traffic lanes that vehicles should still be able to use the road.

50. The issue of sea level rise and wave surges was also part of the original project. Now that the whole length of seawall needs replacing, it is planned that the road surface be raised by around 200 millimetres on average over the project length in order to build the centre line of the road at RL11.6 metres on average for future sea level rise. The drainage requirements associated with this change will be detailed further during the design phase but a 1.5 metre 'service strip' has been provided adjacent to the cycle lane on the northern side of the carriageway to cater for any drainage requirements. This strip will also provide separation between the vehicle lanes and the shared pathway.
51. As well as adjusting for sea level rise, we now have an opportunity to install a three metre wide shared off road path at the top of the wall as part of the construction. Some of the width of this path will be on the existing road shoulder wherever possible. This path allows for future walking and cycling connections around this part of the estuary and also provides additional protection to Main Road and its services.
52. Earthquake repair works to the road itself are also required. These will be completed by SCIRT as part of this project but the cost will come from a different budget. The repairs will include:
 - (a) Full pavement rehabilitation.
 - (b) Replacement of the kerb on the southern side of the carriageway.
 - (c) Smoothing and re-surfacing of the footpath on the southern side of the carriageway.
53. An allowance has also been included for the replacement of a number of drainage pipes that cross over Main Road within the project area. Currently seven pipes cross over Main Road within the project area and it is considered that up to half of these could have sustained significant damage during the earthquake events and have been included in the cost estimate.
54. Other capital projects in this area are the widening and strengthening of Ferrymead Bridge, Sumner Bus Priority, the Causeway culvert renewal, and (since the earthquakes) the realignment of the sewer main in McCormacks Bay, along the Main Road and through Scott Park.
55. The proposed plan has been safety audited.
56. The project was planned to start construction in January 2012 and finish in December 2012 to work in with the completion of the Ferrymead Bridge work. It is anticipated that construction will be completed during 2012/13 financial year, and that it will be carried out by SCIRT on their completion of earthquake repairs to the seawall and the Main Road itself.

THE OBJECTIVES

57. Project objectives are:
 - (a) To improve capacity through this section of Main Road by installing a third traffic lane on the south side, for westbound traffic.
 - (b) To maintain or improve safety for all road users through this section of Main Road.
 - (c) To ensure that the design can incorporate future bus priority needs.

THE OPTIONS

The 'Do Minimum Option

58. The do minimum option is that no changes are made to the current layout and design of the Main Road corridor in the study area.

Option 1

59. Option 1 was the preferred option for consultation and is detailed fully here. Option 1 includes three traffic lanes (two inbound and one outbound) along the section of Main Road from the proposed new location of the intersection of McCormacks Bay Road and Main Road, to the Ferrymead Bridge. All three lanes will be typically 3.4 metres wide, except for approximately 120 metres adjacent to the right turn bay into the Scott Park car park where space is particularly limited and the lanes reduce to 3.3 metres. The westbound lane widths are also reduced for a short section adjacent to the bus stop near 10A Main Road to provide extra space between a stopped bus and vehicle for cyclists. The lanes will reduce to 3.2 metres for this short section, and some adjustments will be made to the curve leading off Ferrymead Bridge in the eastbound direction so the northern kerb is pushed slightly north providing more space (1.6 metres) for a cyclist between a stopped bus and a passing vehicle. The original Option 1 for consultation did not include the right turn lane at The Brae, but this has been included now at the request of local residents.
60. This option retains the existing footpath, kerb and flat channel on the south side of Main Road, and also retains the footpath and kerb and flat channel on the north side of the carriageway adjacent to the Bowling Club to the Scott Park car park. This footpath will connect at its western end with the proposed 'off road' footpath being constructed as part of the Ferrymead Bridge project, and at its eastern end with the proposed shared path on top of the proposed rebuilt seawall (see paragraphs 84 of this report onward).
61. Existing cycle lanes will remain but the south side cycle lane will now be located kerbside rather than adjacent to the parking. New green surfacing will be provided across all intersections and main access points (such as the access to the Scott Park car park). A three metre wide off road shared path will be provided along the top of the new seawall for use by recreational cyclists and pedestrians. This path will not be sealed but will be surfaced adequately to cater for pedestrians and cyclists. Cyclists will be able to reach this stretch of path by utilising the refuges along the project length.
62. The footpath at The Brae will be relocated to behind the stone wall and pram crossings provided when the footpath crosses The Brae. Tactile pavers will be installed at all crossing points for visually impaired pedestrians.
63. All on street parking will be removed except the two existing parking bays outside 30 and 32 Main Road and yellow no stopping lines will be installed along the full length as part of the installation of the cycle lanes. Overall this means a loss of approximately 50 parking spaces. As off street parking is provided within the Scott Park car park, and a new area with 22 car parks will be created in the road space left over once McCormacks Bay Road is diverted, it is considered that the current low demand for parking will be well met. With the inclusion of drainage and a shared path on the northern side of the carriageway adjacent to the seawall, there will be no space for any informal parking, which currently occurs in some locations.
64. All the existing bus stops will remain within the project area, with a small relocation of the eastbound bus stop outside the Bowling Club and some safety improvements at the stops on the north side of Main Road. The westbound bus stop just east of Mt Pleasant Road will be tidied up as part of the improvements in this area, including lengthening to meet the current standards. The bus stop outside The Brae Reserve on the southern side of the carriageway will be relocated further west into the area where the second leg of The Brae currently joins Main Road. This access will be closed to allow for the relocated bus stop and to force vehicles to use the upgraded intersection further east to improve safety. The stone wall will require some modification at the western end to accommodate the bus stop and also to provide gaps for the footpath.
65. Landscaping including new grass, low landscaping and new trees is included in the scheme and shown on **Attachment 1**. The planting of new trees will mitigate the removal of a number of trees, particularly around the Bowling Club and McCormacks Bay Road.
66. Some new signage will be installed as part of the project, and street lighting will be upgraded.

Intersection/Access Changes proposed in Option 1

67. A number of changes are proposed for various accesses and intersections along the corridor to improve safety for all road users. Each is discussed in detail below.

- (a) The western access to the Scott Park complex, located just west of the bowling club, will be closed to improve safety in this area. Visibility from this access to the west is restricted due to the horizontal curvature of the carriageway. Although this closes access to one of the parking areas, this area can still be reached by using the eastern access to the complex and the internal road provided.
- (b) The access to the Scott Park car park (and now the only access to the full complex) will be relocated approximately 20 metres west to provide more space for the right turn bay into the complex and also provide better visibility for vehicles entering and exiting the site. The proposed access will remain at 10 metres wide and wide kerb radii will be provided for ease of access for cars and boat trailers.
- (c) A flush median will be provided for right turning traffic into Te Awakura Terrace. This flush median is provided as an extension of the right turn bay into the Scott Park car park and the raised pedestrian refuge provided just east of Te Awakura Terrace. The south side footpath will be narrowed from three metres to approximately 2.3 metres for a short section to allow for this refuge and median. One power pole will also need to be relocated.
- (d) A right turn bay will be installed for traffic turning into The Brae. A pedestrian refuge will also be installed to provide a crossing point to the bus stop adjacent to The Brae. The existing footpath will be relocated to behind the existing stone wall and Norfolk pines to allow space for this. The south side bus stop will be relocated further west into the area where the second leg of The Brae currently joins Main Road. This access will be closed to allow for the relocated bus stop and to force vehicles to use the upgraded intersection further east to improve safety. The stone wall will require some modification at the western end to accommodate the bus stop and also to provide gaps for the footpath.
- (e) The Mt Pleasant Road intersection will be narrowed down significantly to slow traffic coming down the hill entering Main Road and also to reduce the crossing distance for pedestrians. The crossing distance will be reduced further by the installation of a central raised island. Two short turning lanes, approximately 12m long, are provided for vehicles exiting Mt Pleasant Road. This provides space for two vehicles to queue to turn left or right without blocking the other movement. A short kerbside cycle lane will be provided at the intersection on Mt Pleasant Road so cyclists are not blocked by queuing traffic. A flush median will be placed on Main Road east of Mt Pleasant Road to provide access to the bus stop on the northern side of the carriageway. In this location kerbing and a footpath will be provided around the bus stop to provide a clear path for any visually impaired users using the bus stop.
- (f) The existing Give Way control at the newly aligned intersections of Main Road with McCormacks Bay Road and Mt Pleasant Road will be replaced by a Stop control to provide improved safety for cyclists travelling along Main Road. After stopping, all left turning vehicles exiting McCormacks Bay Road and Mt Pleasant Road will turn into the proposed new left lane.
- (g) The right turn bay provided on Main Road for traffic turning into Mt Pleasant Road will remain and will be widened from 2.5 metres to three metres.

- (h) The McCormacks Bay Road intersection will be relocated approximately 80 metres east of the current intersection to provide better separation between McCormacks Bay Road and Mt Pleasant Road. This will make it easier for buses to access the bus stop just east of Mt Pleasant Road once the two lanes are operating. This relocation will all occur within the current road reserve, which is currently a grassed area with some small trees that will require removal.
- (i) A raised central island will be installed on McCormacks Bay Road, at its intersection with Main Road, to reduce the crossing distance for pedestrians. A left and right turn lane will be provided on McCormacks Bay Road, providing space for around seven vehicles to queue without impeding the other movement. The radii on the left turn out of McCormacks Bay Road will be quite tight so vehicles are forced to slow down for the Stop control.
- (j) Under this arrangement, through traffic will not be able to enter the new kerbside lane until further downstream of the McCormacks Bay Road intersection. A no overtaking yellow line will be installed at the start of the proposed new lane to reinforce to through traffic on Main Road that they cannot cross into this lane until further downstream to reduce any potential conflict between through traffic and left turning traffic on McCormacks Bay Road.
- (k) A right turn bay will be provided for traffic entering McCormacks Bay Road from Main Road. This will form a flush median from the Mt Pleasant Road intersection to McCormacks Bay Road. The flush median will taper out approximately 60 metres east of McCormacks Bay Road, at the eastern extent of the project.

Option 2

- 68. In Option 2 the new westbound traffic lane commences approximately 50 metres east of the McCormacks Bay Road intersection rather than commencing at the intersection. All other changes to the intersection as proposed in Option 1 would occur, for example it being moved eastwards from its current position and installing the central pedestrian island.
- 69. In the original Option 2 proposal, a right turn bay into The Brae was considered and rejected due to the low demand for this movement. However, feedback from the public consultation included strong demand from local residents of The Brae for this facility so it has now been included in Option 1.

Option 3

- 70. In Option 3 the new westbound traffic lane commences approximately 30 metres west of the McCormacks Bay Road intersection rather than commencing at the proposed newly located intersection. This option was developed as it was considered to be safer for cyclists than Options 1 and 2, as they would not have to cross over a new lane at McCormacks Bay Road.

Other Options Considered

- 71. A number of other options were considered.
 - (a) Closing the western access to The Brae. This was initially not considered beneficial as there was no crash history to warrant this and the traffic movements in and out of it are very low. However, consultation feedback showed a demand for a right turn bay for The Brae, and this has been included in Option 1. Thus Option 1 now also includes the proposal to close the western access to The Brae.

- (b) An off road cycle link from Mt Pleasant Road to Main Road through the new narrowed area was considered but not taken further as there was concern around pedestrian safety at the point where a cycle path would cross the Main Road footpath to join with Main Road. Cyclists would be travelling at high speeds down the hill and pedestrians may not be aware of cyclists coming down a path and a high speed collision could occur between a pedestrian and cyclist. This idea has now been replaced with the proposal outlined in paragraph 64 above, for a shared pedestrian cycle path south of the proposed parking area.
- (c) Stopping the footpath on the northern side near Scott Park at the western end of the bus stop due to restrictions in space next to the bowling club. This idea was rejected and instead, minor change to traffic lane widths were made in this section to fit the footpath.
- (d) Installing kerb and channel along the northern side of the carriageway adjacent to the estuary. This was not considered further due to the significant cost of installing new kerb and channel for the full length, new drainage required and the likely full reconstruction that would be required to achieve suitable cross falls and the like.
- (e) Installing a flush median for the full length of the project. This was not considered further as in Option 1 and 2 flush medians were proposed where they were considered necessary. It was not considered that a flush median would provide any other benefits in the other areas.

ASSESSMENT OF OPTIONS

Assessment of the 'Do Minimum' Option

72. The Do Minimum option has not been selected as the preferred option, as it does not meet the aims and objectives for the project.

Assessment of Option 1

73. This is the preferred option.

Benefits of Option 1

74. The transport modelling showed that there were significant travel time benefits for this option as the inclusion of the westbound traffic lane reduced queuing and delays on both Main Road and at the side road intersections. The main benefits occurred during the morning peak period. There was little change in delays during the interpeak and evening peak periods.
75. With Option 1 the queuing that was common prior to the February earthquake and now still occurs along Main Road in the morning peak period will no longer occur. Thus the 'reverse priority' phenomenon will disappear, thus improving safety for cyclists. Installation of Stop controls at these intersections is also expected to improve cycle safety. Pedestrian safety will also be improved through the installation of two new pedestrian refuges and the narrowing down of both the Mt Pleasant Road intersection and McCormacks Bay Road intersections.
76. The proposed design will significantly improve bus travel times through this section of the bus corridor, to the extent that it is envisaged that additional bus priority measures may not be required in the future as bus travel times will be significantly improved. However the design does not preclude additional measures being incorporated in the future.

Shortfalls of Option 1

77. It is expected that approximately 50 on street car parks will be lost, but this will be supplemented by the inclusion of around 22 to 27 car parks in the new parking area off McCormacks Bay Road.

78. Approximately 340 metres of existing kerb and flat channel will be removed under this Option, 110 metres due to the installation of the pedestrian refuge and flush median at Te Awakura Terrace and 230 metres on the northern side of Main Road outside the bowling club to allow space for the road widening.

Assessment of Option 2

79. Option 2 is the same as Option 1 except for the proposal to move the start of the third lane west slightly. Option 2 therefore brings the same benefits as Option 1, including similar travel times.
80. Moving the start of the third lane east would compromise cycle and motor vehicle safety at the McCormacks Bay Road intersection as now right turning vehicles would have two lanes of traffic to cross. Also sight lines of vehicles turning out of McCormacks Bay Road may be compromised by vehicles moving into the developed lane blocking traffic staying in the central lane. Option 2 was not considered further.

Assessment of Option 3

81. When compared to Options 1 and 2 the transport modelling completed for Option 3 showed significant delays and queuing on McCormacks Bay Road and therefore this option was not considered further.

SEAWALL OPTIONS ASSESSMENT

82. Various options were considered for the replacement of the seawall along the seaward side of the road between the Bowling Club and McCormack's Bay Road. These options could still be suitable for the remaining length of the road as ground conditions and the height of the existing rock wall appear similar, although earthquake damage is likely to be a consideration in many other areas of the estuary edge.
83. The options considered fall into two wall types:
- (a) a vertically faced precast concrete cantilever panel wall or
 - (b) a sloping rock rip rap wall.

Seawall Option 1

84. The precast wall concept was originally developed (before the earthquake) to keep the footprint of the new wall within the footprint of the existing wall and so minimise encroachment into the estuary. The consequence of this is that in order to build it, the edge of the road must be excavated, putting a number of key services at risk. Other erect precast seawalls around the estuary have performed poorly in recent earthquakes. The estimated cost of this option is approximately three times that of Option 2. Thus Option 1 is now considered uneconomical and has not been considered further.

Seawall Option 2

85. This option has been adopted as the preferred option for this project.
86. A conceptual view of the rock rip rap or rock armour wall is shown in **Attachment 3**. The appearance of the wall would be similar to that of the walkway and shore in McCormacks Bay between the stone bus shelter and the Christchurch Yacht Club.
87. The main components of the wall are:
- (a) The toe, which would be just below the seabed level to prevent erosion underneath the seawall. It is designed to be long enough to reach the expected lowest seabed scour level and still protect the wall.

- (b) The main slope of the wall, which would break incoming waves, dissipating their energy. This would be covered with rocks of a size that is sufficient to remain in place under the design wave conditions. Repairs are effected by moving displaced rock and adding more rock to restore the design profile.
 - (c) The crest of the wall, the height of which would be set to control the amount of wave overtopping that occurs. The height of the wall is therefore an economic decision, based on the effect of some overtopping under storm conditions.
88. The rock rip rap wall option has a larger footprint than Option 1 but it has a number of advantages.
- (a) The rock rip rap option provides far greater seismic capacity than any other option considered.
 - (b) It is significantly less costly to build and maintain than an erect wall. Estimates of the cost to build this option over the 660 metres length now needing replacement are approximately the same as the cost of the 120 metres of erect precast wall originally proposed prior to the earthquakes.
 - (c) In the event of another earthquake it will be inherently easier to repair.
 - (d) This type of wall will not require disturbance of the existing road formation.
 - (e) The top of the proposed rip rap wall can be made wide enough to provide a shared pedestrian cycle path, at comparatively low cost. Such a path has been requested by the community.

Seawall repair/replacement options considered earlier

89. The following list indicates the main alternative seawall options considered. A cost comparison of the various options was not undertaken. In addition it was earlier considered that a patch repair technique could possibly be used in some areas.
90. Prior to the revised road realignment being completed eight possible options were identified to fully reconstruct the estuary seawall. These were:
- (a) Grouted rock, using existing rock where possible, and reinforced concrete capping beam.
 - (b) Precast reinforced concrete units, possibly with pile foundations, and with the top of the wall shaped to deflect wave splash. This option would involve excavation of the carriageway, closure of traffic lanes and exposure of existing services.
 - (c) Rock gabions, which would also require excavation of the carriageway and labour intensive construction.
 - (d) Precast retaining block wall, which would be easy to construct but would possibly require piled foundations, and would require excavation of the carriageway.
 - (e) Machine placed armour rock which would minimise the likelihood of damaging the existing services, but would require acquisition of land in front of the retaining wall – potentially requiring a regional consent from ECan.
 - (f) Hand placed rock, which is similar to the previous with similar benefits and draw backs, more manual labour intensive, and possibly requiring pile foundations, but able to be achieved with a steeper slope and therefore less encroachment on the estuary.

- (g) Rock Reno Mattress – similar to the above and requiring fewer rocks.
- (h) Interlocking concrete slabs - similar to the above but the concrete finish may not be preferred.