
KINHILL

**FLOODPLAIN MANAGEMENT PLAN FOR
WYOMING CREEK**

FINAL REPORT

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SUMMARY

Wyoming Creek is a tributary of Lower Narara Creek and has a total catchment area of 2.5 km². The majority of the creek flows are contained within the channel, but there are sections of the creek where the undersized culverts or restrictive channel cross-sections have caused flooding. This flooding is compounded by the high downstream water levels in Narara Creek.

The study area for Wyoming Creek has been divided into five distinct regions. The regions are:

- Renwick Street and Glencoe Avenue floodway and channel improvement area (Area WY1);
- Alan Davidson Park floodway and dissipator area (WY2);
- Bourbon Street and Day Street floodway and channel (Area WY3);
- Chamberlain Road floodway and channel improvement area (Area WY4);
- Giselle Avenue floodway and channel improvement area (WY5).

Figure WY1 indicates the location of these regions.

In addition, a catchment based strategy has been considered for Wyoming Creek (WY6) and for the future development areas (WY7).

Various flood mitigation options were examined in order to provide a basis for the formulation of the Wyoming Creek Floodplain Management Plan and these have been discussed in detail in the Floodplain Management Study.

Key features of the plan are:

- by the formalizing of channels and culvert upgrades, no buildings in habitable areas will be flooded by the designated flood;
- provision for limited development on flood fringe land subject to strict controls;
- lands within the floodway will be maintained in perpetuity for the passage of flood water and a drainage easement dedicated where appropriate;

- a staging of works;
- controls for future development of the upstream catchment.

The recommended works for the plan are shown on Figure WY1 and the Management Plan is shown in Figure WY2 (Council Drawings 4/108/A1 and 4/109/A1). The flood contours shown on the plan are for existing conditions. Flood contours at the completion of proposed works are shown in Figure WY3 (Council Drawings 4/110/A1 and to 4/111/A1). Typical channel cross-sections are shown in Figure WY4.

Benefit-cost ratios have been calculated and included where possible. Where the proposed works do not specifically prevent flooding of houses, rather solve other problems such as scour and erosion of the creek bed, benefit-cost ratios cannot be calculated.

**WY1 RENWICK STREET AND GLENCOE AVENUE
FLOODWAY AND CHANNEL IMPROVEMENT AREA****WY1.1 DESCRIPTION OF THE PROBLEM**

The existing twin cell 2.1 m by 2.1 m box culvert under the Pacific Highway overtops by 800 mm in a 1% AEP event. This culvert is undersized for the 1% AEP discharge, a problem that is exacerbated by the high tailwater level in Narara Creek.

Upstream, the section of creek between the Pacific Highway and Glencoe Avenue comprises an incised channel that passes along the backs of the properties in Renwick Street and Glencoe Avenue. Some sections of the creek have been lined with concrete blocks to prevent scour and erosion; however, some of these blocks have moved and slipped into the creek bed.

There is no dedicated drainage easement in the area and four properties are flood liable.

WY1.2 RECOMMENDATIONS

In order to reduce the flooding problem, it is recommended that the capacity of the Pacific Highway culverts is doubled and the creek be lined from the Pacific Highway to Chainage 280, just upstream of Glencoe Avenue. As a result of these works, the design flood levels would be sufficiently reduced to ensure that no houses are flood liable during a 1% AEP event. However, low lying land will still be inundated by a 1% AEP event.

Concrete is the preferred lining material due to the restrictions in available land. Typical cross-sections for the lining work are shown in Figure WY4. The batter for the proposed concrete channel is approximately 1:1.5 vertical–horizontal. Escape-stairways should be incorporated in the channel walls at safe intervals.

The benefits of this culvert amplification and creek lining cannot be achieved unless the section of Wyoming Creek downstream of the Pacific Highway has been improved. Under the Lower Narara Creek Floodplain Management Plan, it has been recommended that the creek be realigned to create a more direct floodway between the Pacific Highway and the railway line. These works significantly lower the flood levels in this section of the creek.

The estimated cost of these works is \$520,000.

WY1.3 CONCISE DESCRIPTION OF THE PLAN

- Double the capacity of the Pacific Highway culverts.
- Line the creek and regrade the channel between the Pacific Highway and Alan Davidson Park.
- Approval from landowners is to be received before works can proceed.
- Existing exposed and covered sewers need to be protected.
- Works identified under the Lower Narara Creek Floodplain Management Plan for the downstream creek must be completed prior to the works at the Pacific Highway.
- Future buildings should be constructed to an appropriate Council specified minimum floor level.

WY2 ALAN DAVIDSON PARK FLOODWAY AND DISSIPATOR AREA

WY2.1 DESCRIPTION OF THE PROBLEM

Wyoming Creek passes through Alan Davidson Park between Day Street and Glencoe Avenue. The park is a large passive and active recreation area with short, well maintained grass cover. The grassed banks form a natural floodplain and therefore no channel formalization is required. However, sections of the creek are eroding on the outside of the bends and bank protection works would be required there.

Just downstream of the concrete channel at Chainage 696, the creek flow regime changes from supercritical to subcritical flow. This transition has caused erosion and scour.

WY2.2 RECOMMENDATIONS

The recommended proposal is to provide gabion or sandstone rock protection works at eroding areas and to construct an energy dissipation structure at the discharge point of the existing concrete channel. This work should be undertaken as erosion becomes severe. Every attempt should be made to retain significant trees. The estimated cost is \$160,000.

WY2.3 CONCISE DESCRIPTION OF THE PLAN

- Provide gabion or sandstone rock bank protection works at eroding sections of the creek.
- Construct an energy dissipator using rock, gabions or concrete impact blocks.
- Landscaping is required after completion of all protection works.
- Retain significant trees after construction.

WY3 BOURBON STREET AND DAY STREET FLOODWAY AND CHANNEL

WY3.1 DESCRIPTION OF THE PROBLEM

Upstream of Alan Davidson Park and downstream of Day Street, Wyoming Creek is contained in a concrete channel. Several footbridges and an access bridge span the channel which is sometimes used for skateboarding.

The blockage caused by washed-away bridges lodging at the skateboard ramp at Chainage 797 was the major cause of the flooding in February 1990 to properties adjoining the channel. Three houses adjoining the lined drain would be liable to flooding in a 1% AEP event, if the obstruction reoccurred. The lined drain has the capacity to convey the 1% AEP discharge under supercritical flow with minimal freeboard, but for this to happen, the channel must be free of any obstructions or likely blockages during high flow.

WY3.2 RECOMMENDATIONS

The recommended work for this section of the creek is for the skateboard ramp at Chainage 797 to be maintained so that it provides minimal flow resistance or it is removed entirely. Any footbridges designed in the future should be subjected to a rigorous hydraulic analysis. Currently, each of the lots adjoining the drain has a simply supported timber bridge for access to the opposite bank which could wash away during high flow. Such crossings should be raised or reconstructed to have a minimum clearance of 500 mm above the 1% AEP flood level and be a single span structure.

The estimated cost of this work is \$40,000.

WY3.3 CONCISE DESCRIPTION OF THE PLAN

- Remove skateboard ramp.
- Raise footbridges and access bridges.
- No future obstructions such as service crossings are to be allowed in the flow area unless detailed analysis has been done to assess their impact on the flow regime.

**WY4 CHAMBERLAIN ROAD FLOODWAY AND CHANNEL
IMPROVEMENT AREA**

WY4.1 DESCRIPTION OF THE PROBLEM

Upstream of Day Street, Wyoming Creek meanders through a public reserve up to Chainage 1077 before passing through the frontage of some properties on Chamberlain Road. Between Chainage 885 and Chainage 1077 the creek is overgrown and ill defined, and there are some sections where bank erosion is undermining the property boundaries.

Upstream of Chainage 1077, the creek passes through private properties. However, the floodplain has been well maintained and is generally covered in short grass.

No houses are flood-affected along this section of the creek.

WY4.2 RECOMMENDATIONS

As no houses are flood liable, only localised bank protection works with an estimated cost of \$59,000 are recommended. These are required just upstream of the Day Street culvert.

WY4.3 CONCISE DESCRIPTION OF THE PLAN

- Bank protection required just upstream of Day Street.
- Bank protection to be properly designed to withstand scour and undermining.
- Future buildings should be constructed to an appropriate Council specified minimum floor level.

WY5 GISELLE AVENUE FLOODWAY AND CHANNEL IMPROVEMENT AREA

WY5.1 DESCRIPTION OF THE PROBLEM

The house immediately upstream of the Chamberlain Road culvert is liable to flooding in a 1% AEP event under existing conditions because of:

- high tailwater levels downstream of the Chamberlain Road culvert;
- the reduction of the culvert capacity by a tree on the western bank, immediately upstream of the culvert;
- the already restricted culvert entrance.

The owner of the lot upstream of the culvert has also fenced the property and, in doing so has created a restriction for the overflowing water. The vehicular guard rail and mesh railing over the culvert are also potential flow obstructions.

Further upstream of the Chamberlain Road culvert, up to Chainage 1531, bank erosion is also gradually undermining property boundaries.

WY5.2 RECOMMENDATIONS

The recommended works for this section of the creek are to improve the inlet conditions of the Chamberlain Road culvert and upgrade the culvert. At the inlet to the culverts, the creek would need to be widened and the obstructing tree removed. In addition the vehicular guard rail and mesh railing above the culvert should be replaced with railings that offer minimal obstruction to flows.

It is also proposed to upgrade the existing pipe culverts under Chamberlain Road to twin cell 3.6 m x 1.5 m box culverts. As a result of these works and the channel works recommended downstream, the house at No. 1 Giselle Avenue becomes flood free for the 1% AEP event.

Upstream of the culvert, localised bank protection works are proposed.

The estimated cost of these works is \$243,000. The benefit cost ratio is approximately 0.2.

WY5.3 CONCISE DESCRIPTIONS OF THE PLAN

- Widen and line creek section in Lots 108, 199, 200 and adjacent to Lots 101 and 502.
- Remove obstructing tree to improve entrance condition to the Chamberlain Road culvert.
- Provide localised bank protection upstream of Chamberlain Road.
- Upgrade existing culverts under Chamberlain Road by box culverts.
- Future buildings should be constructed to an appropriate Council specified minimum floor level.

WY6 WYOMING CREEK FLOODWAY**WY6.1 DESCRIPTION OF THE PROBLEM**

Wyoming Creek is a reasonably well defined creek that discharges into Narara Creek. The majority of the creek flows are contained within the channel but there are sections of the creek where undersized culverts or restrictive channel cross-sections have caused flooding. Mitigation measures to alleviate these problem areas are discussed in other sections; however the maintenance of the creek as a whole is described here.

A major problem associated with flooding in the Narara Creek tributaries is the heavy vegetation within the creek and the dense bush on the floodplains, resulting in higher than normal flood levels. Removing vegetation and obstructions from the channel can often improve the conveyance of the stream, thus reducing design flood levels. However, any channel clearing and maintenance works should be carefully undertaken so that erosion of channel banks is minimized.

Another common problem in the Narara Creek tributaries is the erosion and scour that occurs. This results from the rapid directional change of the narrow creek as it runs off the steep catchment.

Wyoming Creek floodway can generally be defined as the full extent of the flood liable land. Land use in floodways must also be carefully controlled to ensure that the conveyance of the floodway is not reduced. Neither buildings nor hazardous uses, obstructions or operations likely to impede floodwaters should be permitted in floodways: only land use that is flood compatible or likely to enhance floodway capacity should be allowed.

Floodways may need to be crossed by service installations, such as water, sewer, power, and gas mains. These should be permitted in the floodway provided they are investigated adequately and designed in a manner that does not significantly affect flood flow capacity or flood levels. They should also be designed so as to reduce potential damage to the services to the absolute minimum.

WY6.2 RECOMMENDATIONS

A regular maintenance programme is to be established for the creek to ensure that there is no reduction in the conveyance of the creek and in consequence an increase in flood levels. Also the creeks should be regularly inspected to detect any signs of increasing erosion.

The floodway is to be permanently maintained so that there would be no significant development within the floodway to reduce the future capacity of the floodway.

WY6.3 CONCISE DESCRIPTION OF THE PLAN

The proposed plan for the Wyoming Creek floodway is as follows:

- No work that would impair the passage of floodwaters or increase flood levels so as to adversely affect adjoining properties would be permitted in the floodway.
- Fences of rigid paling, chain wire or similar construction likely to collect debris and/or impair floodwaters would not be permitted.
- All land uses are to be flood compatible.
- A regular creek maintenance programme would be established.
- Proposals to cross the floodway with services would be permitted provided that the proposals were adequately investigated and designed in a manner that did not significantly affect flood flow capacity and levels.

WY7 FUTURE DEVELOPMENT**WY7.1 GENERAL**

One of the main findings in this study indicates that the present creek system will not be able to sustain any significant increase in flow volumes generated by future developments in the upstream areas. As a result, all future development applications must incorporate suitable water detention facilities before such developments will be approved by Council.

The design of detention facilities requires input of the stage-storage-discharge relationship into an overall established hydrologic model for the whole creek system. The normal method of stipulating that peak developed discharge must not exceed pre-developed discharge may not be entirely applicable for all cases as it does not take into consideration the effect of time. Also, depending on the complexity of the network of basins in a catchment, the positive effects of one basin may be partially or completely neutralised by another basin instead of complementing each other. It is recommended that detention facilities are to be designed by experienced hydrologic and hydraulic professionals in order to realise the full benefits of a network of basins within a catchment.

WY8 PRIORITIES OF WORK

WY8.1

The proposed staging of works is consistent with the provision of a reduced flood hazard and implementation of the plan while being conscious of financial constraints. The proposed priority of works is given in Table WY1. This table is given as a guide—should Council have money available at any time then the lower priority works could be undertaken to make use of the financial resources available.

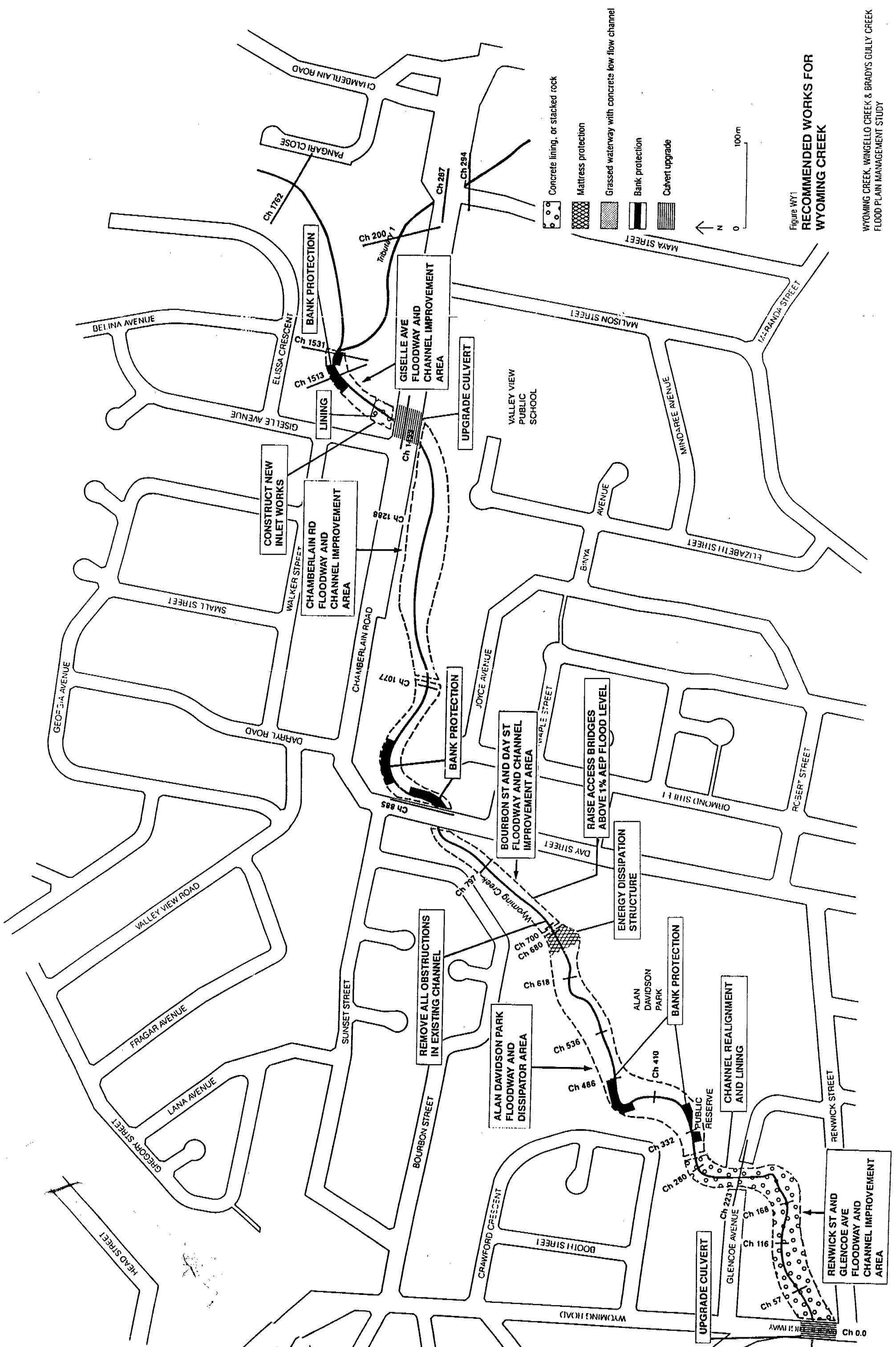
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Table WY1

Recommended works and priority ranking for Wyoming Creek

Location	Description	Cost	Priority
Renwick St and Glencoe Ave floodway and channel improvement area	Lined channel from Ch0 to Ch280	\$430,000	3
	Pacific Highway culvert doubled	\$90,000	2
Alan Davidson Park floodway and dissipator area (Ch280 To Ch690)	Energy dissipator downstream of concrete channel in Alan Davidson Park	\$140,000	6
	Selective bank protection between Ch280 to Ch690	\$20,000	5
Bourbon St and Day St floodway and channel (Ch700 To Ch867)	Remove skateboard ramp and timber bridges in lined drain and raise footbridges and access bridges	\$40,000	Completed 1992
Chamberlain Rd floodway and channel improvement area (Ch885 To Ch1418)	Selective bank protection between Ch885 to Ch1077	\$59,000	4
Giselle Ave floodway and channel in improvement area (Ch1432 To Ch1531)	Convert Chamberlain Rd pipe culvert to twin cell RCBC Construct new headwalls upstream and downstream to Chamberlain Road culvert and channel protection works to Ch1513	\$243,000	1

The upgrading of the Pacific Highway culverts and the lining of the channel in the Renwick and Glencoe Avenue area is not to proceed before the works downstream of the Pacific Highway have been completed



Legend for Recommended Works:

- Concrete lining, or stacked rock
- Matress protection
- Grassed waterway with concrete low flow channel
- Bank protection
- Culvert upgrade

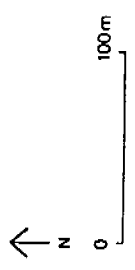
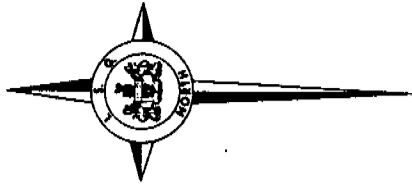


Figure WY1
RECOMMENDED WORKS FOR WYOMING CREEK

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NOTES

- FLOOD LEVELS HAVE BEEN CALCULATED AT CROSS SECTION LOCATIONS ONLY.
- EXISTING FLOOD LEVELS ARE SHOWN AS DOTTED LINES.
- FLOOD LEVELS ARE APPROXIMATELY 0.5 METRES ABOVE THE FLOOD LEVELS SHOWN ON THIS PLAN.
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- FLOOD LEVELS ARE APPROXIMATELY 0.5 METRES ABOVE THE FLOOD LEVELS SHOWN ON THIS PLAN.

LEGEND

- 1% AEP Flood extent
- CS 50 Flood contour at survey cross section
- 6.6 Flood contour interpolated between cross sections
- 5.7 House floor levels

212A	212B	213A
212C	212D	213C
228A	228B	229A
228C	228D	229C

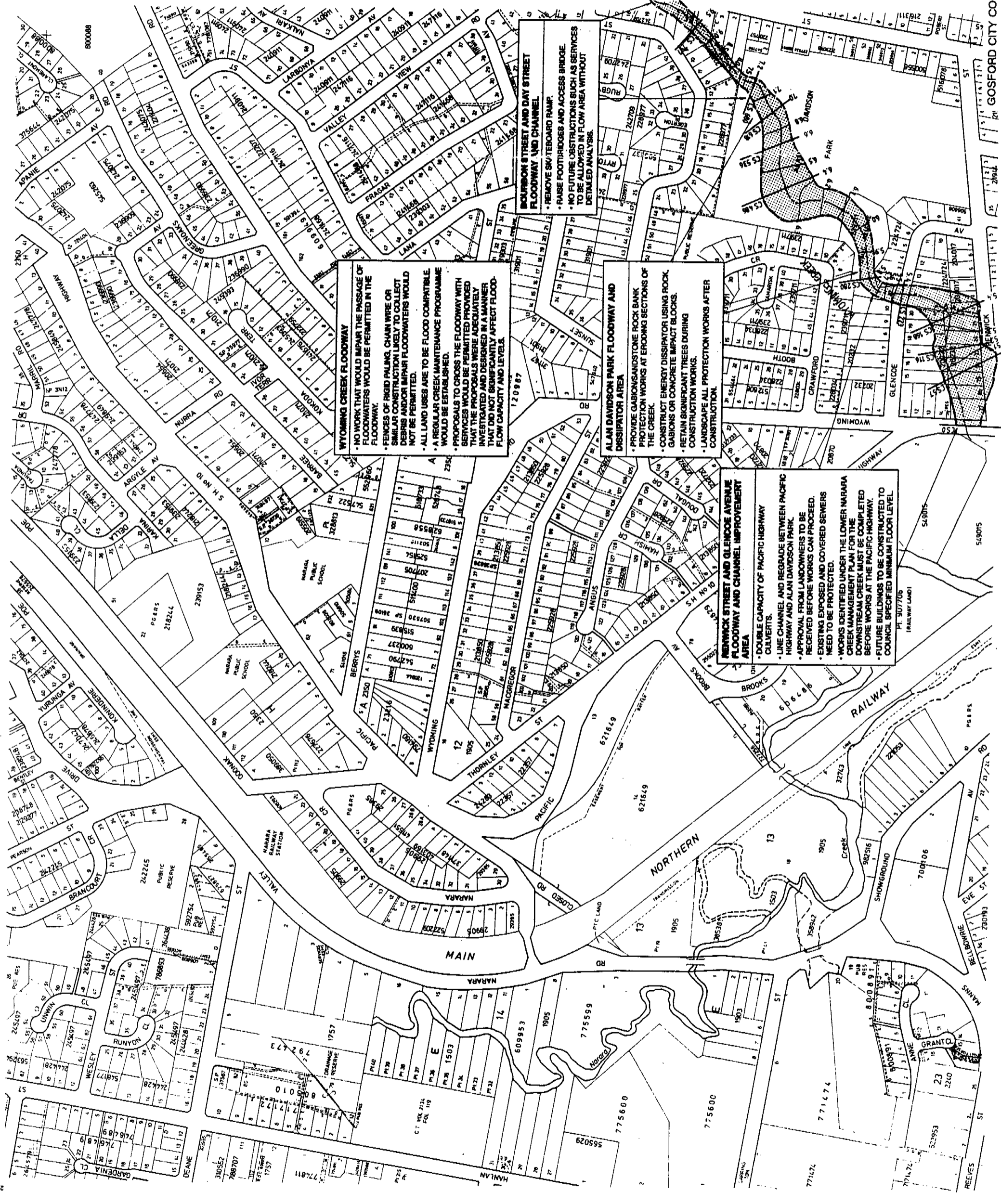
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 Central Mapping Authority
 Map Reference: GOSFORD U2787 - 24

FLOODPLAIN MANAGEMENT PLAN OVERLAY
 Produced for
 GOSFORD CITY COUNCIL - Revised January 1993
 Consulting Engineers - KIRKALL ENGINEERS
 Consulting Surveyors - JTS RYAN FRITH & CO

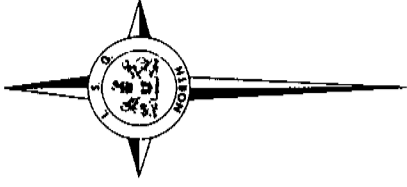
FLOODPLAIN MANAGEMENT PLAN FOR WYOMING, WINGELLO AND BRADYS GULLY CREEKS

MANAGEMENT PLAN FOR WYOMING CREEK - EXISTING CONDITIONS CONTOUR

SHEET 1 of 2 Figure WY2



GOSFORD CITY COUNCIL



NOTES

- 1 FLOOD LEVELS HAVE BEEN CALCULATED AT CROSS SECTION LOCATIONS ONLY.
- 2 FLOODING FLOOD CONTOURS BETWEEN CROSS SECTIONS HAVE BEEN LINEARLY INTERPOLATED.
- 3 FLOOD CONTOURS DEPICT APPROXIMATE WIDTHS OF FLOODING ONLY. FLOOD LIABILITY SHOULD BE VERIFIED BY GROUND SURVEY.
- 4 FLOOD LEVELS ARE GIVEN IN METRES TO AIRTELINUM HEIGHT DATUM. SIZES SHOWN ON THIS PLAN ARE APPROXIMATE ONLY AND DETAILS SHOULD NOT BE SCALED FROM THIS DRAWING FOR DETAILED DESIGN PURPOSES.

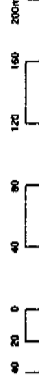
LEGEND

- 1% AEP Flood extent
- 6.5 Flood contour at survey cross section
- 6.6 Flood contour interpolated between cross sections
- House floor levels

212A	212B	213A
212C	212D	213C
228A	228B	229A
228C	228D	229C

KEY TO ADJOINING SHEETS

Control Authority: GOSFORD U2787 - 33
Map Reference: GOSFORD U2787 - 33



FLOODPLAIN MANAGEMENT PLAN OVERLAY

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FLOODPLAIN MANAGEMENT PLAN FOR WYOMING, WINGELLO AND BRADYS GULLY CREEKS

MANAGEMENT PLAN FOR WYOMING CREEK - EXISTING CONDITIONS CONTOURS
SHEET 2 of 2 Figure WY2

GOSFORD CITY COUNCIL DRAWING NUMBER 4/109/A1



WYOMING CREEK FLOODWAY

- NO WORK THAT WOULD IMPAIR THE PASSAGE OF FLOODWATERS WOULD BE PERMITTED IN THE FLOODWAY.
- FENCES OF RIGID PALING, CHAIN WIRE OR SIMILAR CONSTRUCTION LIKELY TO COLLECT DEBRIS AND/OR IMPAIR FLOODWATERS WOULD NOT BE PERMITTED.
- ALL LAND USES ARE TO BE FLOOD COMPATIBLE.
- A REGULAR CREEK MAINTENANCE PROGRAMME WOULD BE ESTABLISHED.
- PROPOSALS TO CROSS THE FLOODWAY WITH SERVICES WOULD BE PERMITTED PROVIDED THAT THE PROPOSALS WERE ADEQUATELY INVESTIGATED AND DESIGNED IN A MANNER THAT DID NOT SIGNIFICANTLY AFFECT FLOOD-FLOW CAPACITY AND LEVELS.

GIBELLE AVENUE FLOODWAY AND CHANNEL IMPROVEMENT AREA

- WIDEN AND LINE CREEK SECTION IN LOTS 108, 199, 200 AND ADJACENT LOTS 101 AND 502.
- REMOVE OBSTRUCTING TREE TO IMPROVE ENTRANCE CONDITION TO CHAMBERLAIN ROAD CULVERTS.
- UPGRADE EXISTING CHAMBERLAIN ROAD CULVERTS TO BOX CULVERTS.
- PROVIDE LOCALIZED BANK PROTECTION UPSTREAM OF CHAMBERLAIN ROAD.

CHAMBERLAIN ROAD FLOODWAY AND CHANNEL IMPROVEMENT AREA

- BANK PROTECTION REQUIRED JUST UPSTREAM OF DAY STREET.
- BANK PROTECTION TO BE PROPERLY DESIGNED TO WITHSTAND SCOUR AND UNDERMINING.
- FUTURE BUILDINGS TO BE CONSTRUCTED TO COUNCIL SPECIFIED MINIMUM FLOOR LEVEL.

BOURBON STREET AND DAY STREET FLOODWAY AND CHANNEL

- REMOVE SKATEBOARD RAMP.
- RAISE FOOTBRIDGES AND ACCESS BRIDGE.
- NO FUTURE OBSTRUCTIONS SUCH AS SERVICES TO BE ALLOWED IN FLOW AREA WITHOUT DETAILED ANALYSIS.

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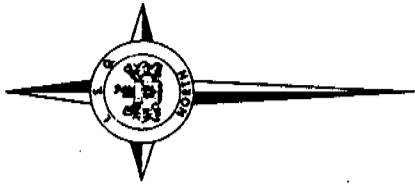
PUBLIC RESERVE 632312

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- NOTES**
- FLOOD LEVELS HAVE BEEN CALCULATED AT CROSS SECTION LOCATIONS ONLY.
 - HOUSE LEVELS AND FLOOD CONTOUR BETWEEN CROSS SECTIONS HAVE BEEN INTERPOLATED.
 - FLOOD CONTOUR EFFECT APPROXIMATE WIDTH OF FLOODING ONLY. FLOOD LIABILITY SHOULD BE VERIFIED BY SURVEY.
 - FLOOD LEVELS ARE GIVEN IN METRES TO AUSTRALIAN HEIGHT DATUM. DIMENSIONS SHOWN ON THIS PLAN ARE APPROXIMATE ONLY AND DETAILS SHOULD NOT BE SCALED FROM THIS DRAWING FOR DETAILED DESIGN PURPOSES.

- LEGEND**
- 1:5 AEP flood extent
 - CS 530 Flood contour at survey cross section
 - Flood contour interpolated between cross sections
 - House floor levels

212A	212B	213A
212C	212D	213C
228A	228B	228A
228C	228D	228C

KEY TO ADJOINING SHEETS
 Contract Authority: GOSFORD U2797 - 24
 Map Number:

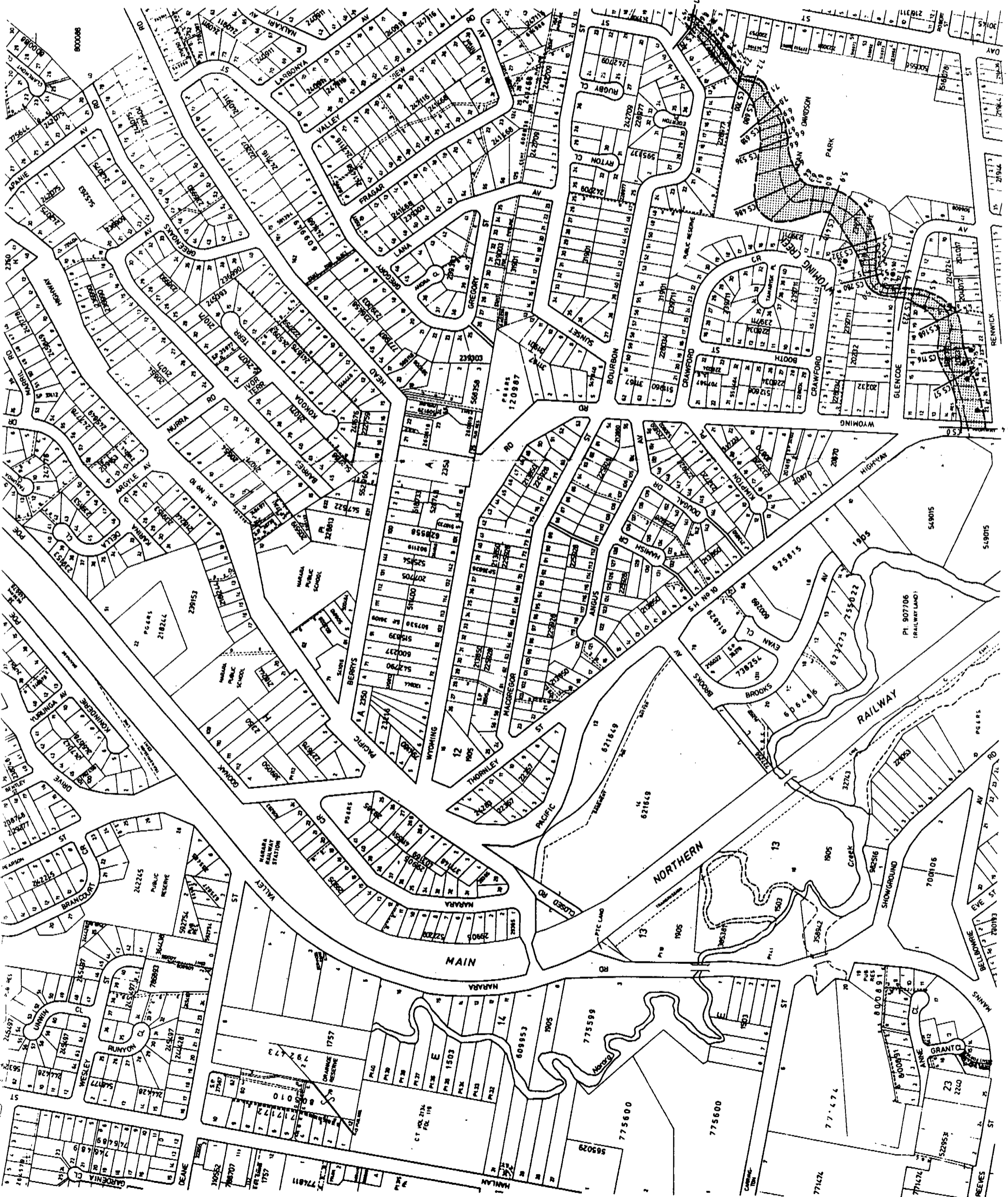


FLOODPLAIN MANAGEMENT PLAN OVERLAY
 Produced by:
 GOSFORD CITY COUNCIL - Revised January 1993
 Consulting Engineers - KIRKILL ENGINEERS
 Consulting Surveyors - JTS RYAN FIRTH & CO

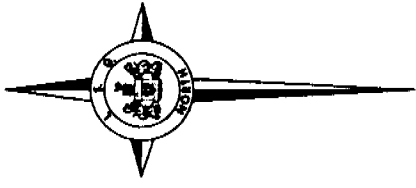
FLOODPLAIN MANAGEMENT STUDY FOR WYOMING, WINGELLO AND BRADYS GULLY CREEKS

FLOOD CONTOURS AT COMPLETION OF
 PROPOSED WORKS FOR WYOMING CREEK

SHEET 1 of 2 Figure WY3



GOSFORD CITY COUNCIL



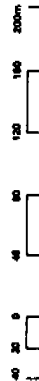
- NOTES**
1. FLOOD LEVELS HAVE BEEN CALCULATED AT CROSS SECTION LOCATIONS ONLY.
 2. FLOOD LEVELS AND FLOOD CONTOURS BETWEEN CROSS SECTIONS HAVE BEEN LINEARLY INTERPOLATED.
 3. FLOOD CONTOURS REPRESENT APPROXIMATE WIDTHS OF FLOODING ONLY.
 4. FLOOD LIABILITY SHOULD BE VERIFIED BY GROUND SURVEY.
 5. FLOOD LEVELS ARE GIVEN IN METRES TO AERIAL HEIGHT DATUM.
 6. FLOOD CONTOURS ARE APPROXIMATE ONLY AND DETAILS SHOULD NOT BE TAKEN FROM THIS DRAWING FOR PRELIMINARY DESIGN PURPOSES.

LEGEND

- 1% AEP Road extent
- CS 50 Flood contour at survey cross section
- 6.6 Flood contour Interpolated between cross sections
- House floor levels

212A	212B	213A
212C	228A	228B
228C	229A	229C

KEY TO ADJOINING SHEETS
 Council Mapping Authority GOSFORD U2797 - 33
 Map Reference



FLOODPLAIN MANAGEMENT PLAN OVERLAY
 Produced for
 GOSFORD CITY COUNCIL - Revised January 1993
 Consulting Engineers - WATKINS ENGINEERS
 Consulting Surveyors - JTS RYAN FRITH & CO

FLOODPLAIN MANAGEMENT STUDY FOR WYOMING, WINGELLO AND BRADYS GULLY CREEKS

FLOOD CONTOURS AT COMPLETION OF
 PROPOSED WORKS FOR WYOMING CREEK

SHEET 2 of 2 Figure WY3

GOSFORD CITY COUNCIL DRAWING NUMBER 4/11/1A1



RENWICK STREET AND GLENCOE AVENUE FLOODWAY
AND CHANNEL IMPROVEMENT AREA

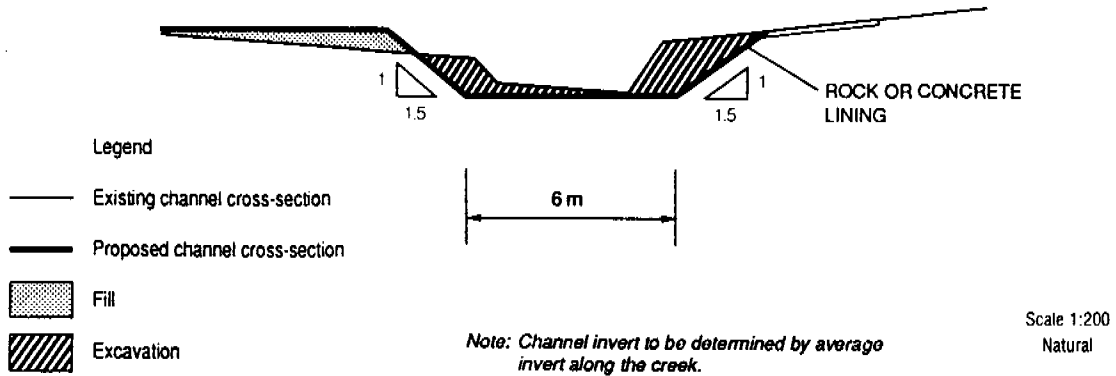


Figure WY4
TYPICAL CROSS-SECTION FOR
WYOMING CREEK

WYOMING CREEK, WINGELLO CREEK & BRADYS GULLY CREEK
FLOOD PLAIN MANAGEMENT STUDY

End of Report