Cremorne Street

Cremorne Street Reconstruction constructed 2003

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Project Title
Cremorne Street Reconstruction

Year
2003/04

Location
Cremorne Street, Richmond.
(Melway 44 D12)

Responsible Authority
Yarra City Council

Water Sensitive Urban Design Tool
Bio-retention basins

Aim
To trap sediment, litter, nutrients and other pollutants from road run off near their source and prevent them being washed into conventional drainage system and eventually into the Yarra River.

Project Description
This project has been included as a case study because it is important being the first example of Water Sensitive Urban Design (WSUD) in such a built up area.
The difference in height between the pavement and bio-retention bed is due to the blue stone pavers used and a conservative design to prevent flooding.
It is envisaged that the drop would be significantly smaller in future designs.

The challenge of this project was to incorporate WSUD into an extremely confined inner urban area that is predominantly commercial industry with heavy vehicle traffic. A series of bio-retention basins have been built along the street in traffic outstands (landscaped sections). Stormwater flows from the kerb into the bio-retention basins, filters through a porus medium and enters the conventional underground concrete pipe system.

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Project Description (cont.)

Details of the works are:

- The outstands are constructed of an imported filtration medium with a specified permeability to ensure adequate infiltration of frequently occurring runoff events.
- The outstands are designed so that the stormwater flows along the kerb and channel and into the vegetated outstand area through gaps in the kerb.
- Rocks are placed at the kerb entry points to distribute flows evenly across the bio-retention basin and prevent erosion.
- The water slowly permeates through the filtration medium to a series of slotted pvc pipes located at the base of the basin. The slotted pvc pipes discharge the filtered water to the existing drain under the kerb and channel.
- A high flow bypass drainage pit (raised ~50mm to 100mm above the base of the basin) is located in every system to divert floodwaters directly into the existing main drain. The inlet point to the Drainage Pit is lower than the kerb entry point

Photos

Note: Click thumbnail to view full plan.

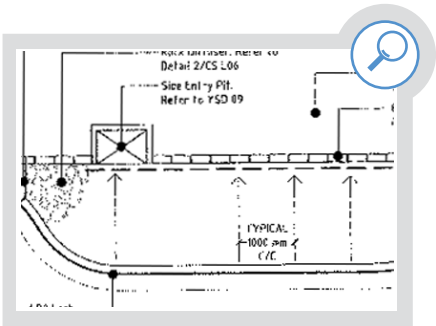
Cremorne St interpretive signage

Established vegetation at Cremorne St

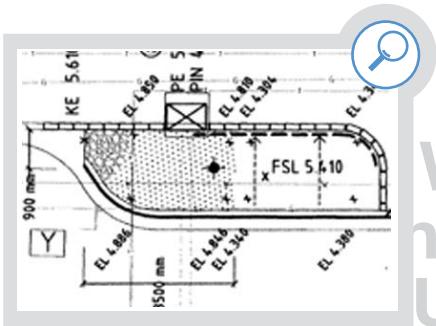
Bioretention cells can be used to define parking bays

Plans

Note: Click thumbnail to view full plan.



Cremorne Street cross sections



Cremorne Street plan view

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Maintenance Requirements

The bio-retention basins also act as litter traps and maintenance crews will remove this litter as part of regular street cleaning. The works were handed over to council in June 2004 so information about the required maintenance is not currently available.

Community Education

Interpretive signage has been erected.

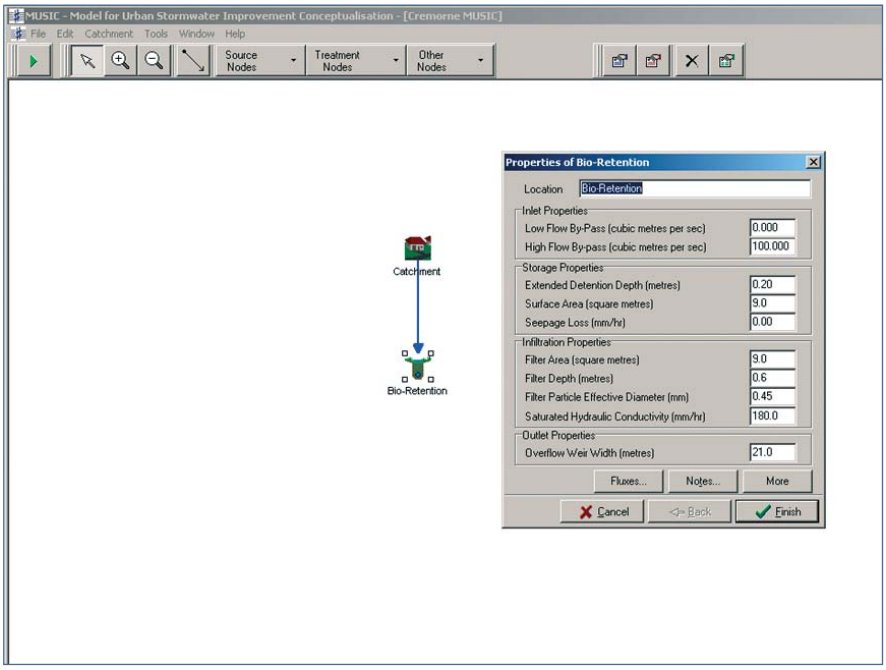
Costs

Yarra City Council matched an EPA VSAP grant of $143,000, making each of the 29 bio-retention basins approximately $9,860.

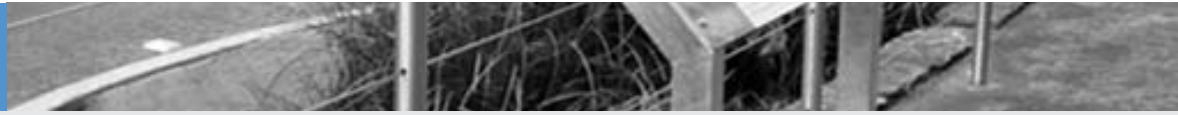
Music Modelling Results

The Co-operative Research Centre for Catchment Hydrology's program "MUSIC" was used to assess the performance of the systems. There are slight differences in each basin because of services, therefore a typical design has been used for the modelling. The average catchment is 0.02Ha, including a section of roadpavement and one property. The assumptions for the bio-retention basin are displayed. The model is conservative, assuming no seepage loss and using a saturated hydraulic conductivity of 180mm/hr.

The performance of each basin exceeds the Victorian stormwater management targets of 80% retention of total suspended solids and 45% retention of total nitrogen and total phosphorus.



Water Sensitive Urban Design



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The results from the MUSIC model are:

	% Reduction
Total Suspended Solids (kg/yr)	**98**
Total Phosphorus (kg/yr)	**83**
Total Nitrogen (kg/yr)	**52**

Contact

Yarra City Council
9205 5555

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Cremorne St interpretive signage

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Established vegetation at Cremorne St

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Bioretention cells can be used to define parking bays

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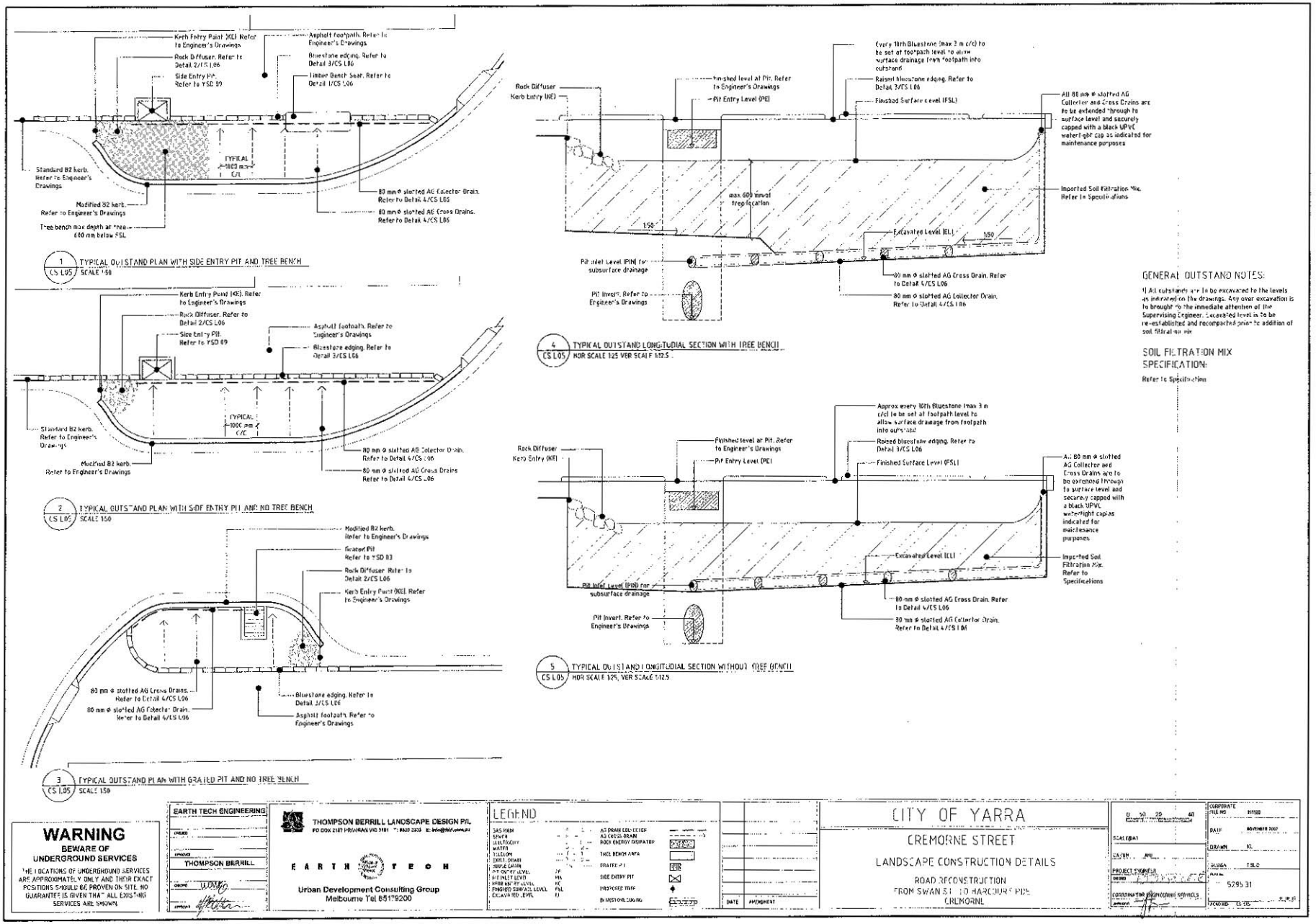
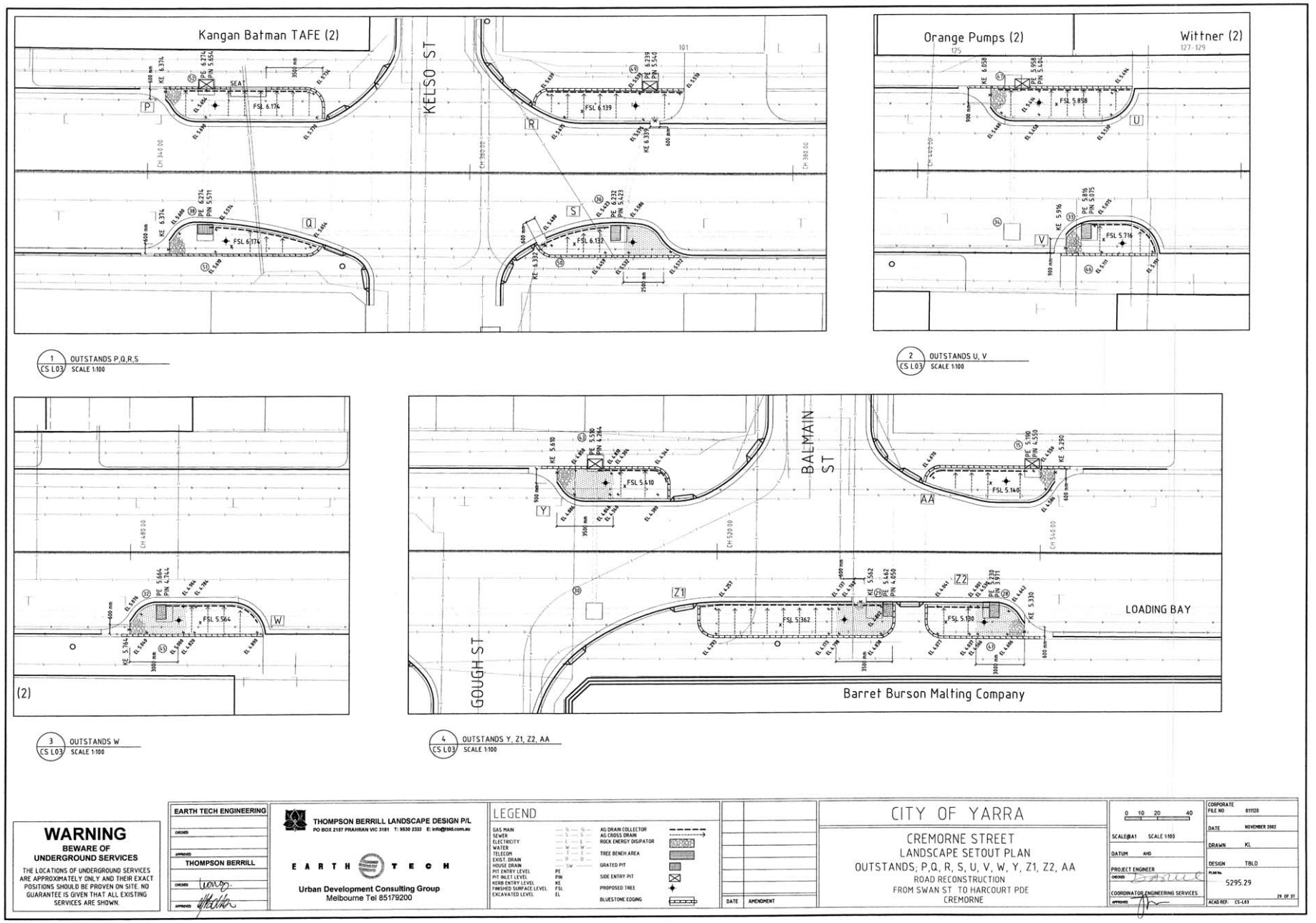

1 CS L05 TYPICAL OUTSTAND PLAN WITH SIDE ENTRY PIT AND TREE BENCH SCALE 1:50
2 CS L05 TYPICAL OUTSTAND PLAN WITH SIDE ENTRY PIT AND NO TREE BENCH SCALE 1:50
3 CS L05 TYPICAL OUTSTAND PLAN WITH GRATED PIT AND NO TREE BENCH SCALE 1:50
4 CS L05 TYPICAL OUTSTAND LONGITUDIAL SECTION WITH TREE BENCH HOR SCALE 1:25 VER SCALE 1:12.5
5 CS L05 TYPICAL OUTSTAND LONGITUDIAL SECTION WITHOUT TREE BENCH HOR SCALE 1:25, VER SCALE 1:12.5
GENERAL OUTSTAND NOTES:
SOIL FILTRATION MIX SPECIFICATION:
Refer to Specifications
WARNING
BEWARE OF UNDERGROUND SERVICES
EARTH TECH ENGINEERING
THOMPSON BERRILL LANDSCAPE DESIGN P/L
Urban Development Consulting Group
Melbourne Tel 85179200
LEGEND
CITY OF YARRA
CREMORNE STREET
LANDSCAPE CONSTRUCTION DETAILS
ROAD RECONSTRUCTION
FROM SWAN ST TO HARCOURT PDE
CREMORNE


Kangan Batman TAFE (2)
KELSO ST
Orange Pumps (2)
Wittner (2)
1 CS L03 OUTSTANDS P,Q,R,S SCALE 1:100
2 CS L03 OUTSTANDS U, V SCALE 1:100
BALMAIN ST
GOUGH ST
LOADING BAY
Barret Burson Malting Company
(2)
3 CS L03 OUTSTANDS W SCALE 1:100
4 CS L03 OUTSTANDS Y, Z1, Z2, AA SCALE 1:100
WARNING
BEWARE OF UNDERGROUND SERVICES
THE LOCATIONS OF UNDERGROUND SERVICES ARE APPROXIMATELY ONLY AND THEIR EXACT POSITIONS SHOULD BE PROVEN ON SITE. NO GUARANTEE IS GIVEN THAT ALL EXISTING SERVICES ARE SHOWN.
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THOMPSON BERRILL
THOMPSON BERRILL LANDSCAPE DESIGN P/L
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EARTH TECH
Urban Development Consulting Group
Melbourne Tel 85179200
LEGEND
CITY OF YARRA
CREMORNE STREET
LANDSCAPE SETOUT PLAN
OUTSTANDS; P,Q, R, S, U, V, W, Y, Z1, Z2, AA
ROAD RECONSTRUCTION
FROM SWAN ST TO HARCOURT PDE
CREMORNE
SCALE@A1 SCALE 1:100
DATUM AHD
PROJECT ENGINEER
COORDINATOR ENGINEERING SERVICES
CORPORATE FILE NO 011120
DATE NOVEMBER 2002
DRAWN KL
DESIGN TBLD
5295.29
ACAD REF: CS-L03