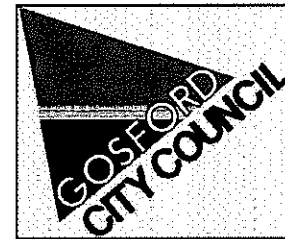


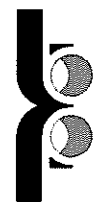
# GOSFORD CITY COUNCIL



## BALOO ROAD, MANNS ROAD & STOCKYARD PLACE WEST GOSFORD

### STREET PIPELINE / CULVERT UPGRADE & CHANNEL IMPROVEMENTS

PREPARED BY



**Boyden & Partners** PTY LTD  
Incorporated in New South Wales. A.C.N. 002 244 859

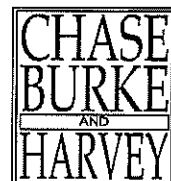
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SURVEYED BY



**SURVEYING & LAND DEVELOPMENT  
CONSULTANTS**

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40 YORK STREET, GOSFORD EAST NSW 2250  
P.O. BOX 34, GOSFORD, NSW 2250  
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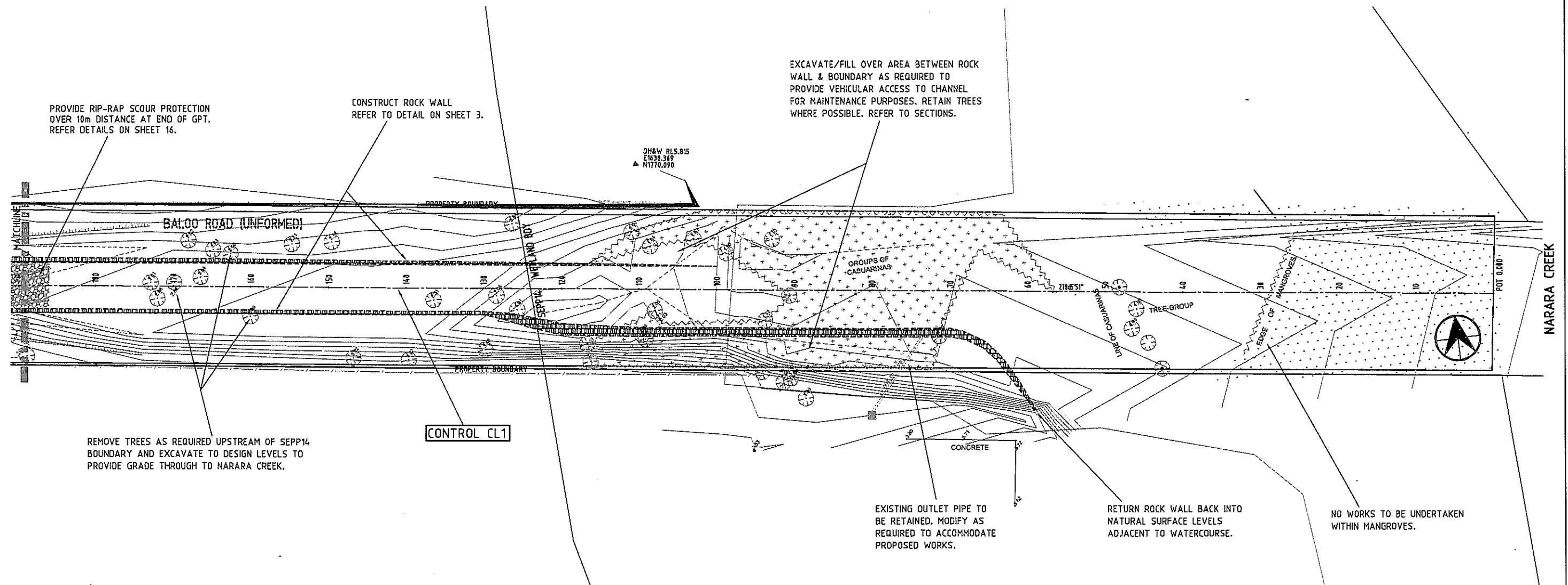
#### DRAWING SCHEDULE

| SHEET No | DESCRIPTION                                    | ISSUE No |
|----------|------------------------------------------------|----------|
| 00       | COVER SHEET                                    | A B      |
| 01       | GENERAL ARRANGEMENT PLAN (EASTERN)             | A B      |
| 02       | GENERAL ARRANGEMENT PLAN (NORTH WESTERN)       | A B      |
| 03       | CATCHMENT PLAN & HYDRAULIC/HYDROLOGICAL DATA   | A B      |
| 04       | CHANNEL CROSS SECTIONS ch00 - ch140            | A B      |
| 05       | CHANNEL CROSS SECTIONS ch150 - ch260           | A B      |
| 06       | CHANNEL CROSS SECTIONS ch270 - ch310           | A B      |
| 07       | PIPELINE LONGITUDINAL SECTIONS                 | A B      |
| 08       | PIPELINE LONGITUDINAL SECTIONS                 | A B      |
| 09       | BOX CULVERT BASE SLAB DETAILS                  | A B      |
| 10       | BOX CULVERT BASE SLAB DETAILS & CONCRETE NOTES | A B      |
| 11       | BOX CULVERT WINGWALL & HEADWALL DETAILS        | A B      |
| 12       | SPECIAL PIT DETAILS                            | A B      |
| 13       | GROSS POLLUTANT TRAP DETAILS                   | A B      |
| 14       | SEDIMENTATION & EROSION CONTROL PLAN           | A B      |
| 15       | SEDIMENTATION & EROSION CONTROL PLAN           | A B      |

**PROJECT No. 4371**



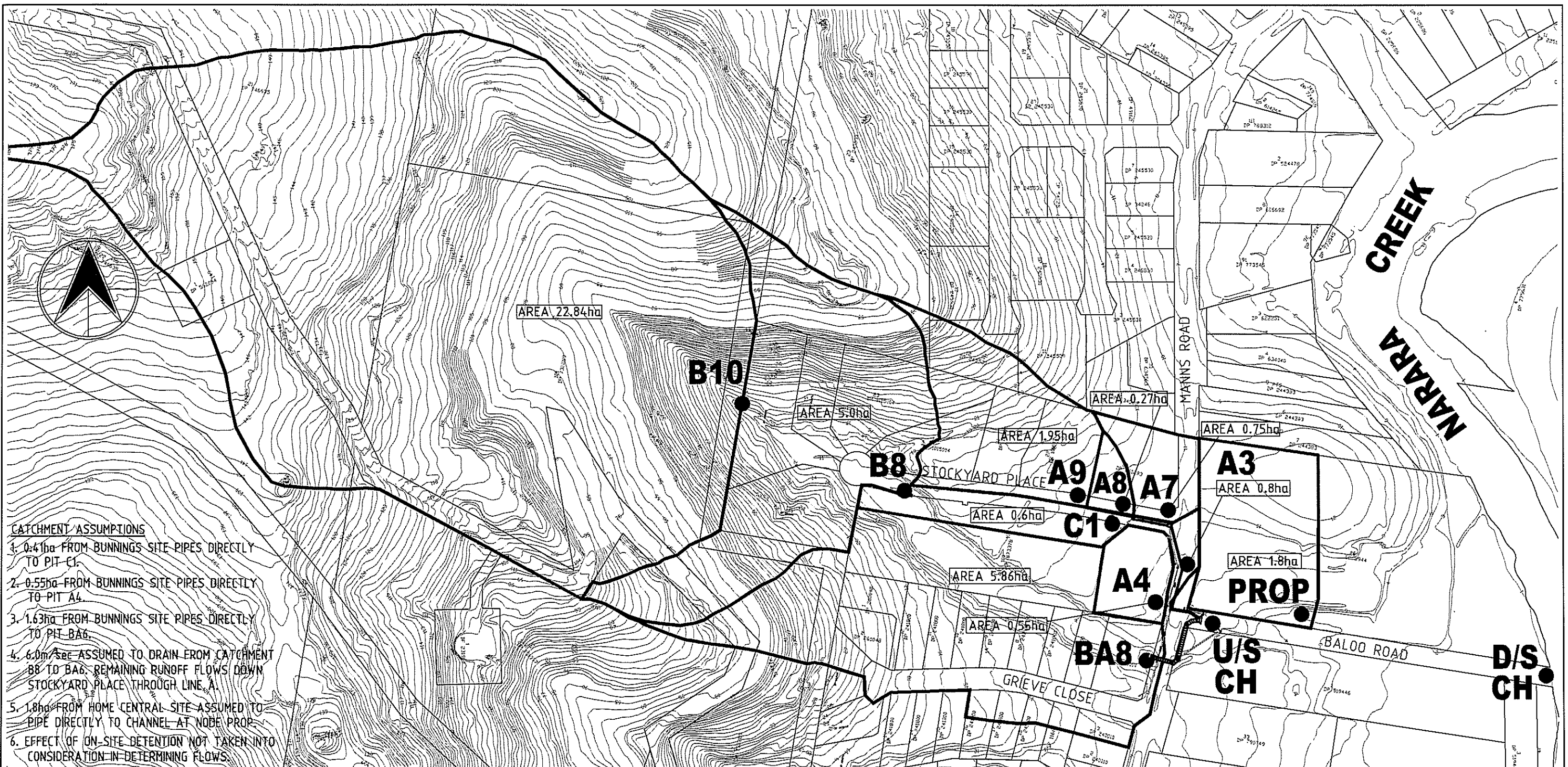
NO EXCAVATION WORKS TO BE UNDERTAKEN WITHIN MAIN CHANNEL BEYOND SEPP14 BOUNDARY (CH 125.0). WORKS TO BE LIMITED TO CLEARING OF UNDERSTOREY WEEDS & VEGETATION (TO DETAIL IN VMP BY OTHERS) AND CONSTRUCTION OF ROCK RETAINING WALLS & MAINTENANCE ACCESS TRACK. REFER TO SECTIONS FOR DETAILS. RETAIN AS MANY TREES AS POSSIBLE BETWEEN SEPP14 BOUNDARY AND MANGROVES.



| UTILITIES                |  | PLAN |  | SECT. |  | LEGEND                 |  | EXISTING |  | PROPOSED |  | DATE        |  | SURVEYED      |  | DRAWN                  |  | DATE             |  | RECOMMENDED |  | BAR SCALE        |  | GOSFORD CITY COUNCIL                     |  |  |  |
|--------------------------|--|------|--|-------|--|------------------------|--|----------|--|----------|--|-------------|--|---------------|--|------------------------|--|------------------|--|-------------|--|------------------|--|------------------------------------------|--|--|--|
|                          |  |      |  |       |  |                        |  |          |  |          |  |             |  |               |  |                        |  |                  |  |             |  |                  |  |                                          |  |  |  |
| WATERMAIN                |  | -W   |  | -W    |  | KEEP AND GUTTER        |  | =====    |  | =====    |  | A.H.D.      |  | 01.10.03      |  | 09.09.09               |  | DATE: 21/12/2004 |  | APPROVED    |  | 0 5 10 15 20 25m |  | BALOO ROAD, WEST GOSFORD                 |  |  |  |
| UNDERGROUND POWER CABLES |  | -P   |  | -P    |  | TABLE DRAIN            |  | =====    |  | =====    |  | SURVEY NAME |  | DRAWN         |  | S.B.                   |  | DATE: 21/12/2004 |  | APPROVED    |  | 1:250@A1         |  | CULVERT UPGRADE & CHANNEL IMPROVEMENTS   |  |  |  |
| UNDERGROUND AYC CABLES   |  | -Y   |  | -Y    |  | UNDERGROUND AYC CABLES |  | =====    |  | =====    |  | 04-060MG    |  | CHECKED       |  | GCC                    |  | DATE: 21/12/2004 |  | APPROVED    |  |                  |  | GENERAL ARRANGEMENT PLAN (LOWER CHANNEL) |  |  |  |
| UNDERGROUND AYC CABLES   |  | -Y   |  | -Y    |  | PIECED LINE            |  | =====    |  | =====    |  | 19990A      |  | DATABASE FILE |  | SRB Consulting Pty Ltd |  | DATE: 21/12/2004 |  | APPROVED    |  |                  |  |                                          |  |  |  |
| SIC POLES                |  | -P   |  | -P    |  | SIC POLES              |  | =====    |  | =====    |  |             |  |               |  |                        |  |                  |  |             |  |                  |  |                                          |  |  |  |
| SIC POLES                |  | -P   |  | -P    |  | SIC POLES              |  | =====    |  | =====    |  |             |  |               |  |                        |  |                  |  |             |  |                  |  |                                          |  |  |  |
| SEWERMAIN                |  | -S   |  | -S    |  | SEWERMAIN              |  | =====    |  | =====    |  |             |  |               |  |                        |  |                  |  |             |  |                  |  |                                          |  |  |  |
|                          |  |      |  |       |  |                        |  |          |  |          |  |             |  |               |  |                        |  |                  |  |             |  |                  |  |                                          |  |  |  |
|                          |  |      |  |       |  |                        |  |          |  |          |  |             |  |               |  |                        |  |                  |  |             |  |                  |  |                                          |  |  |  |
|                          |  |      |  |       |  |                        |  |          |  |          |  |             |  |               |  |                        |  |                  |  |             |  |                  |  |                                          |  |  |  |
|                          |  |      |  |       |  |                        |  |          |  |          |  |             |  |               |  |                        |  |                  |  |             |  |                  |  |                                          |  |  |  |
|                          |  |      |  |       |  |                        |  |          |  |          |  |             |  |               |  |                        |  |                  |  |             |  |                  |  |                                          |  |  |  |
|                          |  |      |  |       |  |                        |  |          |  |          |  |             |  |               |  |                        |  |                  |  |             |  |                  |  |                                          |  |  |  |
|                          |  |      |  |       |  |                        |  |          |  |          |  |             |  |               |  |                        |  |                  |  |             |  |                  |  |                                          |  |  |  |
|                          |  |      |  |       |  |                        |  |          |  |          |  |             |  |               |  |                        |  |                  |  |             |  |                  |  |                                          |  |  |  |
|                          |  |      |  |       |  |                        |  |          |  |          |  |             |  |               |  |                        |  |                  |  |             |  |                  |  |                                          |  |  |  |
|                          |  |      |  |       |  |                        |  |          |  |          |  |             |  |               |  |                        |  |                  |  |             |  |                  |  |                                          |  |  |  |
|                          |  |      |  |       |  |                        |  |          |  |          |  |             |  |               |  |                        |  |                  |  |             |  |                  |  |                                          |  |  |  |
|                          |  |      |  |       |  |                        |  |          |  |          |  |             |  |               |  |                        |  |                  |  |             |  |                  |  |                                          |  |  |  |
|                          |  |      |  |       |  |                        |  |          |  |          |  |             |  |               |  |                        |  |                  |  |             |  |                  |  |                                          |  |  |  |
|                          |  |      |  |       |  |                        |  |          |  |          |  |             |  |               |  |                        |  |                  |  |             |  |                  |  |                                          |  |  |  |
|                          |  |      |  |       |  |                        |  |          |  |          |  |             |  |               |  |                        |  |                  |  |             |  |                  |  |                                          |  |  |  |
|                          |  |      |  |       |  |                        |  |          |  |          |  |             |  |               |  |                        |  |                  |  |             |  |                  |  |                                          |  |  |  |
|                          |  |      |  |       |  |                        |  |          |  |          |  |             |  |               |  |                        |  |                  |  |             |  |                  |  |                                          |  |  |  |
|                          |  |      |  |       |  |                        |  |          |  |          |  |             |  |               |  |                        |  |                  |  |             |  |                  |  |                                          |  |  |  |
|                          |  |      |  |       |  |                        |  |          |  |          |  |             |  |               |  |                        |  |                  |  |             |  |                  |  |                                          |  |  |  |
|                          |  |      |  |       |  |                        |  |          |  |          |  |             |  |               |  |                        |  |                  |  |             |  |                  |  |                                          |  |  |  |
|                          |  |      |  |       |  |                        |  |          |  |          |  |             |  |               |  |                        |  |                  |  |             |  |                  |  |                                          |  |  |  |
|                          |  |      |  |       |  |                        |  |          |  |          |  |             |  |               |  |                        |  |                  |  |             |  |                  |  |                                          |  |  |  |
|                          |  |      |  |       |  |                        |  |          |  |          |  |             |  |               |  |                        |  |                  |  |             |  |                  |  |                                          |  |  |  |
|                          |  |      |  |       |  |                        |  |          |  |          |  |             |  |               |  |                        |  |                  |  |             |  |                  |  |                                          |  |  |  |
|                          |  |      |  |       |  |                        |  |          |  |          |  |             |  |               |  |                        |  |                  |  |             |  |                  |  |                                          |  |  |  |







**CATCHMENT ASSUMPTIONS**

- 0.4ha FROM BUNNINGS SITE PIPES DIRECTLY TO PIT C1.
- 0.55ha FROM BUNNINGS SITE PIPES DIRECTLY TO PIT A4.
- 1.63ha FROM BUNNINGS SITE PIPES DIRECTLY TO PIT BA6.
- 6.0m/sec ASSUMED TO DRAIN FROM CATCHMENT B8 TO BA6. REMAINING RUNOFF FLOWS DOWN STOCKYARD PLACE THROUGH LINE A.
- 1.8ha FROM HOME CENTRAL SITE ASSUMED TO PIPE DIRECTLY TO CHANNEL AT NODE PROP.
- EFFECT OF ON-SITE DETENTION NOT TAKEN INTO CONSIDERATION IN DETERMINING FLOWS.
- REFER TO ON-SITE DETENTION REPORT DATED JUNE 1997 BY MBK FOR DETAILS OF RUNOFF FROM BUNNINGS SITE.

**CATCHMENT PLAN**  
1:2000

| HYDRAULIC DATA & RESULTS - LINE BA |                 |               |                    |              |             |                         |                    |                |                  |            |                 |                   |               |                 |                   |                           |                |          |                |                |                |                |              |                      |                     |                     |           |            |   |   |   |   |   |   |
|------------------------------------|-----------------|---------------|--------------------|--------------|-------------|-------------------------|--------------------|----------------|------------------|------------|-----------------|-------------------|---------------|-----------------|-------------------|---------------------------|----------------|----------|----------------|----------------|----------------|----------------|--------------|----------------------|---------------------|---------------------|-----------|------------|---|---|---|---|---|---|
| UPSTREAM NODE                      | DOWNSTREAM NODE | CONDUIT SHAPE | NUMBER OF CONDUITS | CONDUIT DATA |             |                         |                    |                |                  |            |                 |                   |               |                 |                   | DATA AT UPSTREAM MANHOLE  |                |          |                |                |                |                |              |                      |                     |                     |           |            |   |   |   |   |   |   |
|                                    |                 |               |                    | TOTAL LENGTH | PIPE LENGTH | ROUGHNESS & (COL WHITE) | DIAMETER OR HEIGHT | HYDRAULIC AREA | NETTED PERIMETER | PIPE CLASS | UPSTREAM INVERT | DOWNSTREAM INVERT | CONDUIT GRADE | UPSTREAM H.G.L. | DOWNSTREAM H.G.L. | INTER-MANHOLE LOSS COEFF. | FRICTION GRADE | VELOCITY | MANHOLE LOSSES |                |                | INLET CAPACITY | INLET INFLOW | PONDLING LEVEL LIMIT | MANHOLE COVER LEVEL | WATER SURFACE LEVEL | FREEBOARD | LIMIT CODE |   |   |   |   |   |   |
|                                    |                 |               |                    |              |             |                         |                    |                |                  |            |                 |                   |               |                 |                   |                           |                |          | MANHOLE TYPE   | K <sub>u</sub> | K <sub>v</sub> |                |              |                      |                     |                     |           |            |   |   |   |   |   |   |
|                                    |                 |               |                    |              |             |                         |                    |                |                  |            |                 |                   |               |                 |                   |                           |                |          |                |                |                |                |              |                      |                     |                     |           |            |   |   |   |   |   |   |
| BA8                                | BA7             | circ          | 3                  | 16.000       | 14.450      | 0.60                    | 900.0              | 0.536          | 2.827            | 2          | 5.830           | 4.744             | 2.44          | 7.018           | 6.581             | 0.000                     | 0.937          | 5.789    | 3.033          | 99             | 0.7            | 0.7            | 10.000       | -                    | 7.350               | 7.550               | 7.346     | 0.204      | - | - | - | - | - | - |
| BA7                                | BA6             | nonc          | 1                  | 5.759        | 4.259       | 0.60                    | 900.0              | 3.240          | 9.000            | 2          | 4.890           | 4.508             | 4.27          | 6.059           | 6.035             | 0.000                     | 0.619          | 8.764    | 2.705          | 99             | 1.4            | 1.4            | 3.900        | -                    | 7.000               | 6.700               | 6.581     | 0.119      | - | - | - | - | - | - |
| BA6                                | BA5             | circ          | 1                  | 18.960       | 18.510      | 0.60                    | 750.0              | 0.446          | 2.354            | 2          | 5.526           | 4.888             | 3.88          | 6.274           | 6.035             | 0.000                     | 0.493          | 8.865    | 1.961          | 99             | 1.6            | 1.6            | 1.100        | -                    | 6.900               | 6.776               | 6.590     | 0.186      | - | - | - | - | - | - |
| BA5                                | BA4             | nonc          | 1                  | 16.481       | 15.389      | 0.60                    | 900.0              | 3.240          | 9.000            | 2          | 4.508           | 3.852             | 4.27          | 5.765           | 5.681             | 0.000                     | 0.594          | 9.630    | 2.972          | 99             | 0.6            | 0.6            | 0.600        | -                    | 6.700               | 6.600               | 6.485     | 0.185      | - | - | - | - | - | - |
| BA4                                | BA3             | nonc          | 1                  | 16.516       | 15.872      | 0.60                    | 900.0              | 3.240          | 9.000            | 2          | 3.802           | 3.770             | 0.05          | 5.411           | 5.100             | 0.000                     | 0.598          | 9.630    | 2.972          | 99             | 0.6            | 0.6            | 3.900        | -                    | 6.300               | 6.700               | 5.681     | 1.019      | - | - | - | - | - | - |

| 100-YEAR ARI HYDROLOGY DATA & RESULTS |                  |                |            |         |          |               |             |              |                 |           |             |              |               |                          |            |               |                     |                     |           |
|---------------------------------------|------------------|----------------|------------|---------|----------|---------------|-------------|--------------|-----------------|-----------|-------------|--------------|---------------|--------------------------|------------|---------------|---------------------|---------------------|-----------|
| NODE NAME                             | NODE DESCRIPTION | CATCHMENT DATA |            |         |          | RAINFALL DATA |             |              |                 | FLOWS     |             |              |               | DATA AT UPSTREAM MANHOLE |            |               |                     |                     |           |
|                                       |                  | TOTAL          | IMPERVIOUS | PERCENT | LINK NO. | INTENSITY     | EXCESS RAIN | INITIAL LOSS | CONTINUING LOSS | PEAK FLOW | PEAK INFLOW | PEAK OUTFLOW | PEAK VELOCITY | INLET CAPACITY           | INLET FLOW | PONDING LEVEL | MANHOLE COVER LEVEL | WATER SURFACE LEVEL | FREEBOARD |
| B10                                   | U/S H/W          | 22.84          | 10.00      | 43.8%   | 1.000    | 63.20         | 90          | 10.0         | 3.0             | 80.80     | 31.80       | 1.50         | 7.583         |                          |            |               |                     |                     |           |
| B8                                    | 15000 JN         | 5.078          | 80.00      | 30.0    | 0.022    | 1.001         | 63.20       | 90           | 5.0             | 1.0       | 88.40       | 30.00        | 2.70          | 8.942                    |            |               |                     |                     |           |
| BA4                                   | EXIST. PIT       | 5.864          | 90.00      | 12.0    | 0.016    | 1.002         | 63.20       | 90           | 5.0             | 1.0       | 88.40       | 30.00        | 0.10          | 9.628                    |            |               |                     |                     |           |
| A9                                    | EXIST. PIT       | 1.952          | 90.00      | 5.0     | 0.016    | 2.001         | 63.20       | 90           | 5.0             | 1.0       | 88.40       | 31.00        | 0.80          | 3.528                    |            |               |                     |                     |           |
| C1                                    | EXIST. PIT       | 0.602          | 100.00     | 2.5     | 0.016    | 3.000         | 63.20       | 90           | 5.0             | 1.0       | 88.40       | 27.00        | 0.40          | 0.3951                   |            |               |                     |                     |           |
| A7                                    | EXIST. PIT       | 0.928          | 90.00      | 3.0     | 0.016    | 2.002         | 63.20       | 90           | 5.0             | 1.0       | 88.40       | 31.00        | 0.80          | 3.936                    |            |               |                     |                     |           |
| A3                                    | EXIST. PIT       | 0.787          | 100.00     | 2.0     | 0.016    | 2.003         | 63.20       | 90           | 5.0             | 1.0       | 88.40       | 32.00        | 0.10          | 4.063                    |            |               |                     |                     |           |
| U/S CH                                | BALOO RD         | 0.001          | 0.00       | 1.0     | 0.085    | 1.003         | 63.20       | 90           | 10.0            | 10.0      | 71.67       | 30.00        | 0.75          | 13.253                   |            |               |                     |                     |           |
| PROP                                  | DISCHARGE        | 1.824          | 90.00      | 3.0     | 0.016    | 4.000         | 63.20       | 90           | 1.5             | 0.0       | 93.30       | 27.00        | 0.001         | 1.190                    |            |               |                     |                     |           |
| D/S CH                                | BALOO RD         | 0.001          | 0.00       | 0.001   | 0.085    | 1.004         | 63.20       | 90           | 10.0            | 3.0       | 80.80       | 31.80        | 0.00          | 13.935                   |            |               |                     |                     |           |

| HYDRAULIC DATA & RESULTS |                 |               |                    |              |        |             |                         |       |                    |   |                |                  |            |                 |                   |               |                 |                          |                           |                |          |                |       |        |        |        |       |
|--------------------------|-----------------|---------------|--------------------|--------------|--------|-------------|-------------------------|-------|--------------------|---|----------------|------------------|------------|-----------------|-------------------|---------------|-----------------|--------------------------|---------------------------|----------------|----------|----------------|-------|--------|--------|--------|-------|
| UPSTREAM NODE            | DOWNSTREAM NODE | CONDUIT SHAPE | NUMBER OF CONDUITS | CONDUIT DATA |        |             |                         |       |                    |   |                |                  |            |                 |                   |               |                 | DATA AT UPSTREAM MANHOLE |                           |                |          |                |       |        |        |        |       |
|                          |                 |               |                    | TOTAL LENGTH |        | PIPE LENGTH | ROUGHNESS & (COL WHITE) |       | DIAMETER OR HEIGHT |   | HYDRAULIC AREA | NETTED PERIMETER | PIPE CLASS | UPSTREAM INVERT | DOWNSTREAM INVERT | CONDUIT GRADE | UPSTREAM H.G.L. | DOWNSTREAM H.G.L.        | INTER-MANHOLE LOSS COEFF. | FRICTION GRADE | VELOCITY | MANHOLE LOSSES |       |        |        |        |       |
|                          |                 |               |                    | m            | ft     | m           | ft                      | m     | ft                 | m | ft             | m                | ft         | m               | ft                | m             | ft              | m                        | ft                        | m              | ft       | Ku             | Kw    | W      |        |        |       |
|                          |                 |               |                    |              |        |             |                         |       |                    |   |                |                  |            |                 |                   |               |                 |                          |                           |                |          |                |       |        |        |        |       |
| A9                       | A8              | circ          | 1                  | 19.710       | 64.710 | 0.00        | 675.0                   | 0.358 | 2.121              | 2 | 9.205          | 8.011            | 2.48       | 10.143          | 9.211             | 0.000         | 1.874           | 1.286                    | 3.593                     | 99             | 99       | 99             | 4.900 | 10.066 | 18.906 | 16.792 | 0.284 |
| C1                       | A8              | circ          | 1                  | 14.749       | 48.517 | 0.60        | 375.0                   | 0.101 | 1.178              | 2 | 8.378          | 8.016            | 2.49       | 9.594           | 9.211             | 0.000         | 2.558           | 0.321                    | 2.904                     | 99             | 99       | 99             | 1.000 | 9.056  | 9.856  | 7.852  | 0.004 |
| A8                       | A7C             | circ          | 2                  | 10.094       | 33.019 | 0.60        | 750.0                   | 0.442 | 2.354              | 2 | 8.011          | 7.699            | 3.57       | 8.987           | 8.924             | 0.000         | 0.625           | 1.952                    | 2.210                     | 99             | 99       | 99             | 0.350 | 9.148  | 9.688  | 9.211  | 0.339 |
| A7C                      | A7B             | circ          | 2                  | 8.992        | 29.092 | 0.60        | 750.0                   | 0.442 | 2.354              | 2 | 7.658          | 7.369            | 3.57       | 8.722           | 8.657             | 0.000         | 0.724           | 2.703                    | 2.380                     | 99             | 99       | 99             | 0.150 | 9.257  | 9.452  | 8.924  | 0.528 |
| A7B                      | A7A             | circ          | 2                  | 9.036        | 28.136 | 0.60        | 750.0                   | 0.442 | 2.354              | 2 | 7.331          | 7.044            | 3.58       | 8.429           | 8.350             | 0.000         | 0.832           | 2.254                    | 2.551                     | 99             | 99       | 99             | 0.150 | 9.204  | 9.384  | 8.857  | 0.547 |
| A7A                      | A7              | circ          | 2                  | 9.916        | 32.579 | 0.60        | 750.0                   | 0.442 | 2.354              | 2 | 7.015          | 6.744            | 3.58       | 8.085           | 7.991             | 0.000         | 0.947           | 2.407                    | 2.724                     | 99             | 99       | 99             | 0.150 | 8.738  | 8.938  | 8.350  | 0.588 |
| A6A                      | A6              | circ          | 1                  | 5.840        | 4.940  | 0.60        | 375.0                   | 0.101 | 1.178              | 2 | 7.299          | 7.220            | 1.27       | 7.819           | 7.786             | 0.000         | 0.585           | 1.750                    | 1.358                     | 99             | 99       | 99             | 0.150 | 8.650  | 8.662  | 8.054  | 0.680 |
| A7                       | A3              | nonc          | 1                  | 17.299       | 56.799 | 0.60        | 0.00                    | 0.000 | 3.300              | 2 | 6.894          | 5.700            | 1.84       | 7.444           | 6.548             | 0.001         | 0.575           | 2.400                    | 2.675                     | 99             | 99       | 99             | 0.800 | 8.650  | 8.596  | 7.991  | 0.605 |
| A6                       | A5              | circ          | 1                  | 19.903       | 26.848 | 0.60        | 900.0                   | 0.636 | 2.821              | 2 | 6.502          | 6.310            | 0.71       | 7.534           | 7.367             | 0.000         | 0.559           | 1.480                    | 2.340                     | 99             | 99       | 99             | 0.600 | 8.454  | 8.564  | 7.786  | 0.868 |
| A5                       | A4A             | circ          | 1                  | 19.810       | 19.233 | 0.60        | 900.0                   | 0.636 | 2.821              | 2 | 6.260          | 5.818            | 2.30       | 7.164           | 6.981             | 0.000         | 0.593           | 1.533                    | 2.410                     | 99             | 99       | 99             | 0.300 | 7.900  | 7.900  | 7.367  | 0.533 |
| A4A                      | A4              | circ          | 1                  | 19.590       | 18.587 | 0.60        | 900.0                   | 0.636 | 2.821              | 2 | 5.818          | 5.399            | 2.30       | 6.878           | 6.762             | 0.000         | 0.593           | 1.593                    | 2.410                     | 99             | 99       | 99             | 0.150 | 7.500  | 7.500  | 6.987  | 0.733 |
| A4                       | A3              | circ          | 1                  | 5.631        | 3.559  | 0.60        | 900.0                   | 0.636 | 2.821              | 2 | 5.360          | 5.100            | 6.56       | 6.575           | 6.540             | 0.000         | 0.624           | 1.572                    | 2.472                     | 99             | 99       | 99             | 0.150 | 7.368  | 7.568  | 6.782  | 0.860 |
| A3                       | A2A             | nonc          | 1                  | 13.052       | 11.665 | 0.60        | 900.0                   | 1.620 | 5.400              | 2 | 5.000          | 4.648            | 3.04       | 5.900           | 5.803             | 0.000         | 0.450           | 4.000                    | 2.506                     | 99             | 99       | 99             | 0.600 | 7.100  | 7.145  | 6.545  | 0.605 |
| A2A                      | A2              | nonc          | 1                  | 8.382        | 7.738  | 0.60        | 900.0                   | 1.620 | 5.400              | 2 | 4.644          | 4.471            | 3.04       | 5.707           | 5.669             | 0.000         | 0.450           | 4.000                    | 2.506                     | 99             | 99       | 99             | 0.150 | 7.100  | 7.568  | 5.803  | 1.765 |
| A2                       | A1              | nonc          | 1                  | 15.481       | 47.757 | 0.60        | 600.0                   | 1.620 | 6.300              | 2 | 4.381          | 4.180            | 1.77       | 5.189           | 5.103             | 0.000         | 0.577           | 3.850                    | 2.506                     | 99             | 99       | 99             | 0.250 | 6.727  | 9.271  | 5.609  | 1.528 |

| UTILITIES                | PLAN | SECT. | LEGEND                 | EXISTING | PROPOSED |
|--------------------------|------|-------|------------------------|----------|----------|
| WATERMAIN                | -W-  | -W-   | KORB AND GUTTER        | =====    | =====    |
| UNDERGROUND POWER CABLES | -P-  | -P-   | TABLE DRAIN            | =====    | =====    |
| GLS MAIN                 | -G-  | -G-   | UNDERGROUND ATC CABLES | =====    | =====    |
| UNDERGROUND ATC CABLES   | -A-  | -A-   | PPED DRAIN             | =====    | =====    |
| ATC POLES                | -P-  | -P-   | GULLY PIT              | =====    | =====    |
| SEWERMAIN                | -S-  | -S-   | JUNCTION PIT           | =====    | =====    |

| DATUM                                                                        | SURVEYED                                                      | QUICK BURST HARVEY                              | 01.10.03                           | RECOMMENDED      |
|------------------------------------------------------------------------------|---------------------------------------------------------------|-------------------------------------------------|------------------------------------|------------------|
| A.H.D. <td>DRAWN<td>R.F.<td>22.09.04<td>DATE: 21/09/2010</td></td></td></td> | DRAWN <td>R.F.<td>22.09.04<td>DATE: 21/09/2010</td></td></td> | R.F. <td>22.09.04<td>DATE: 21/09/2010</td></td> | 22.09.04 <td>DATE: 21/09/2010</td> | DATE: 21/09/2010 |
| SURVEY NAME                                                                  | CHECKED                                                       | T.B. <td>22.09.04<td>APPROVED</td></td>         | 22.09.04 <td>APPROVED</td>         | APPROVED         |
| 04-040MG 19090A                                                              | DESIGN NAME                                                   | Boyden & Partners                               |                                    | DATE: 21/09/2010 |
| DATABASE FILE                                                                |                                                               |                                                 |                                    |                  |

| REVISION DETAILS | DRAWN | APPR. | DATE |
|------------------|-------|-------|------|
|                  |       |       |      |

BAR SCALE

0 50 100 150 200m

1:2000@A1

GOSFORD CITY COUNCIL

BALOO ROAD, WEST GOSFORD

CULVERT UPGRADE & CHANNEL IMPROVEMENTS

CATCHMENT PLAN & HYDRAULIC/HYDROLOGIC DATA

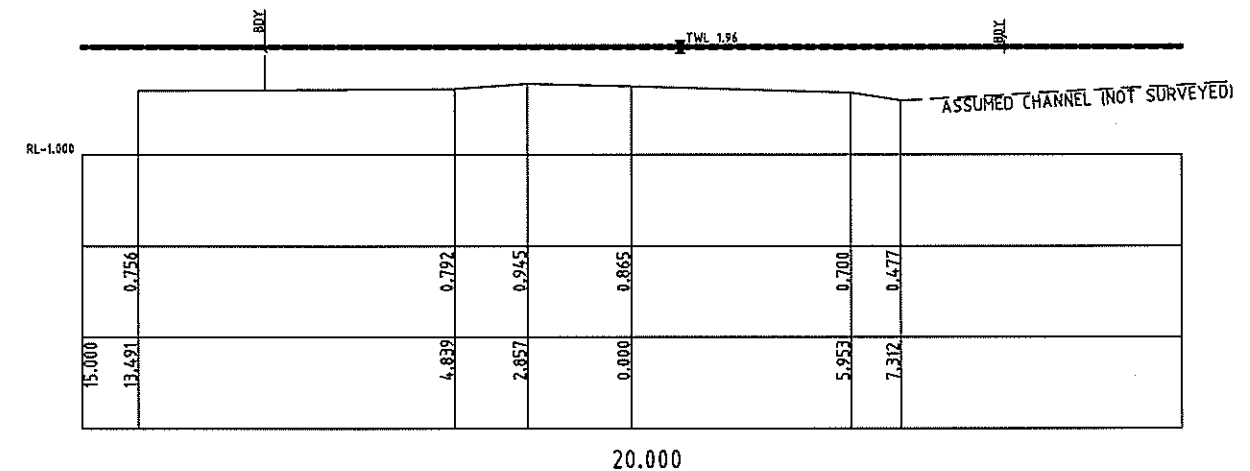
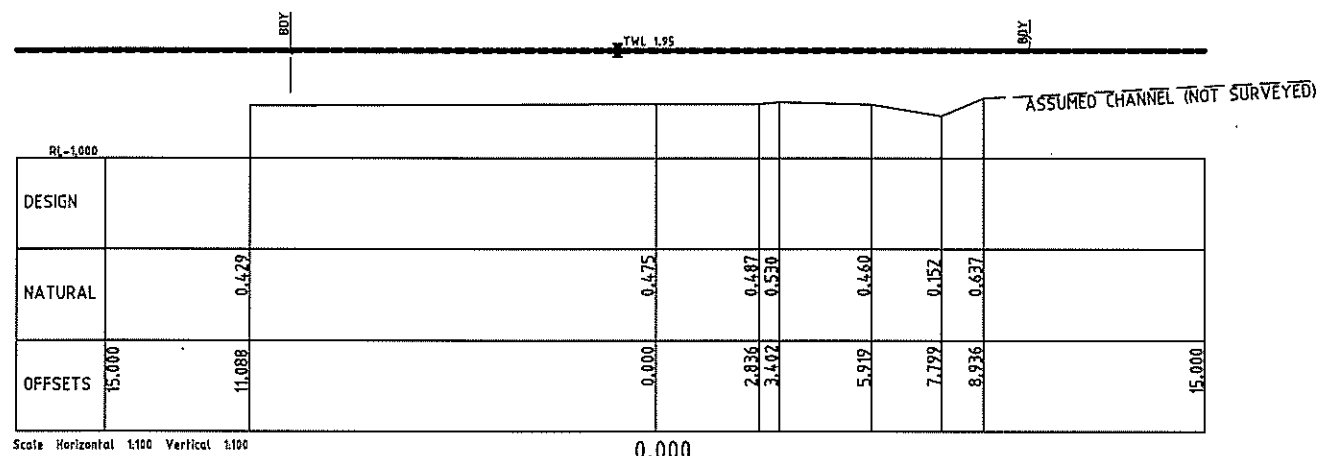
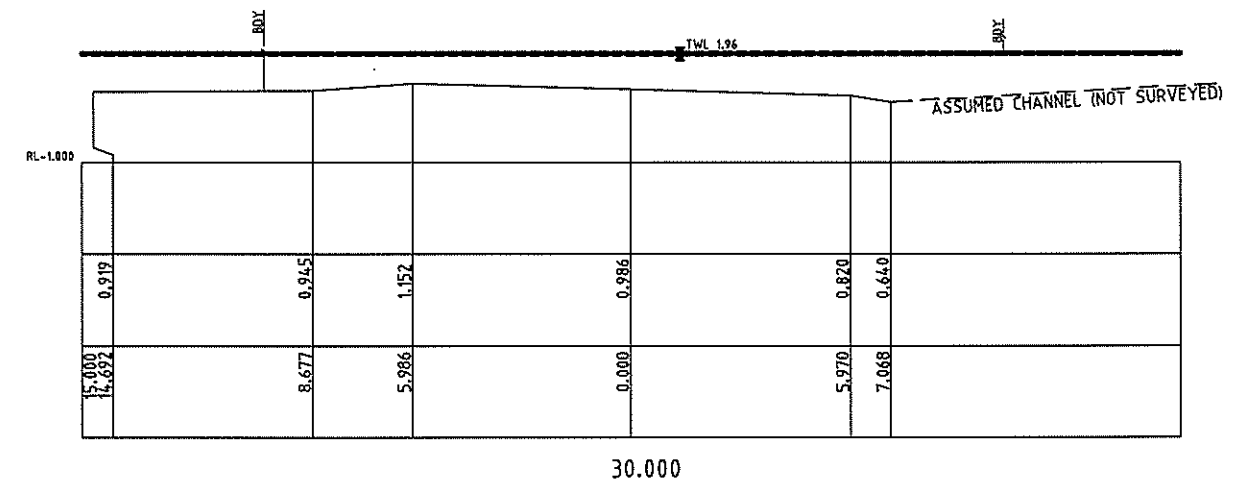
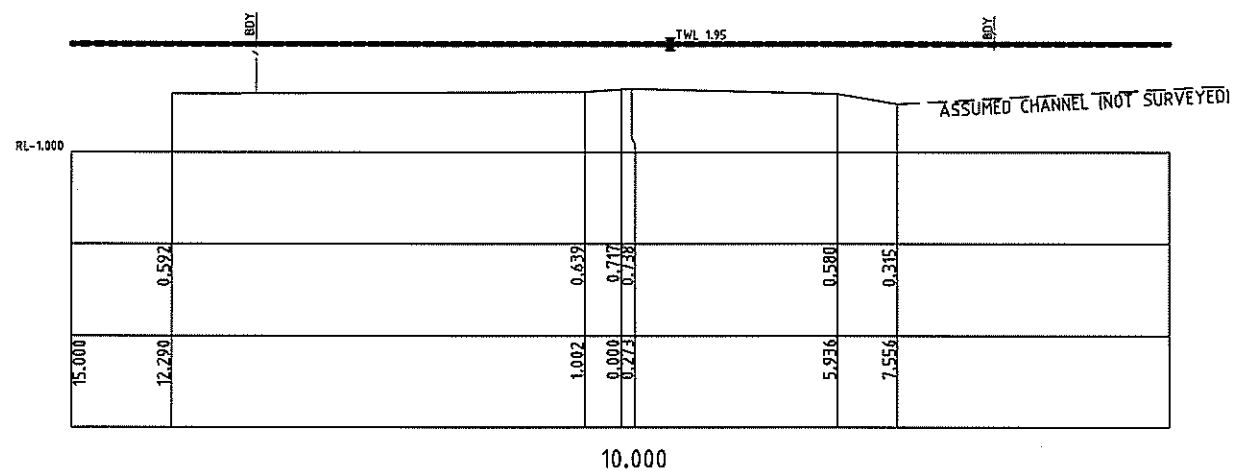
FILE No: .

DRAWING No: C4/209

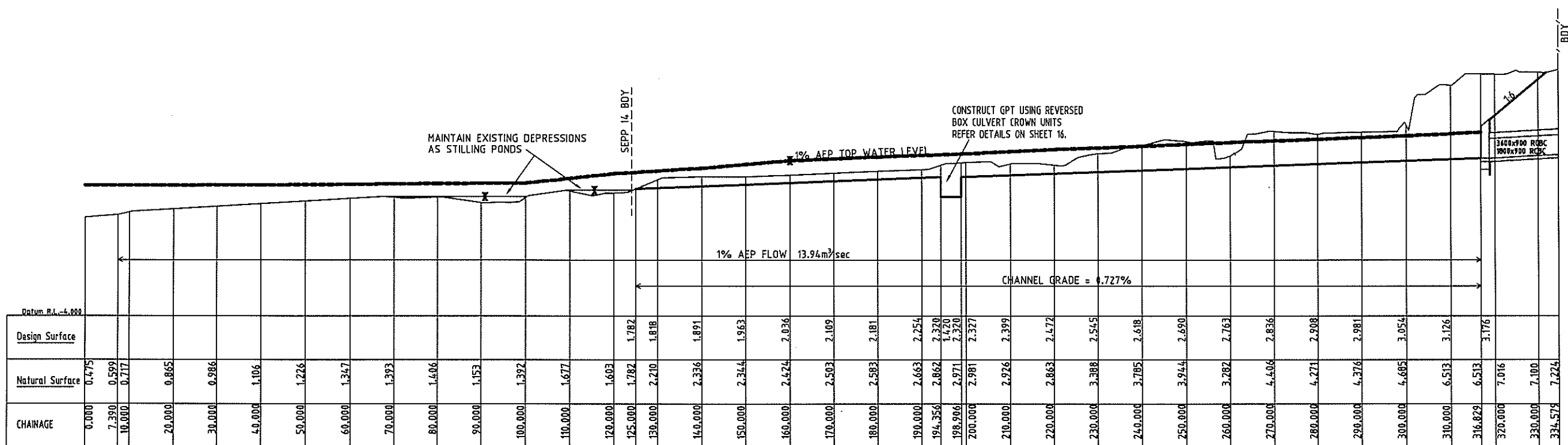
SHEET: 4

REV: \*

T.W.L INDICATES 100 YEAR - ARI LEVEL



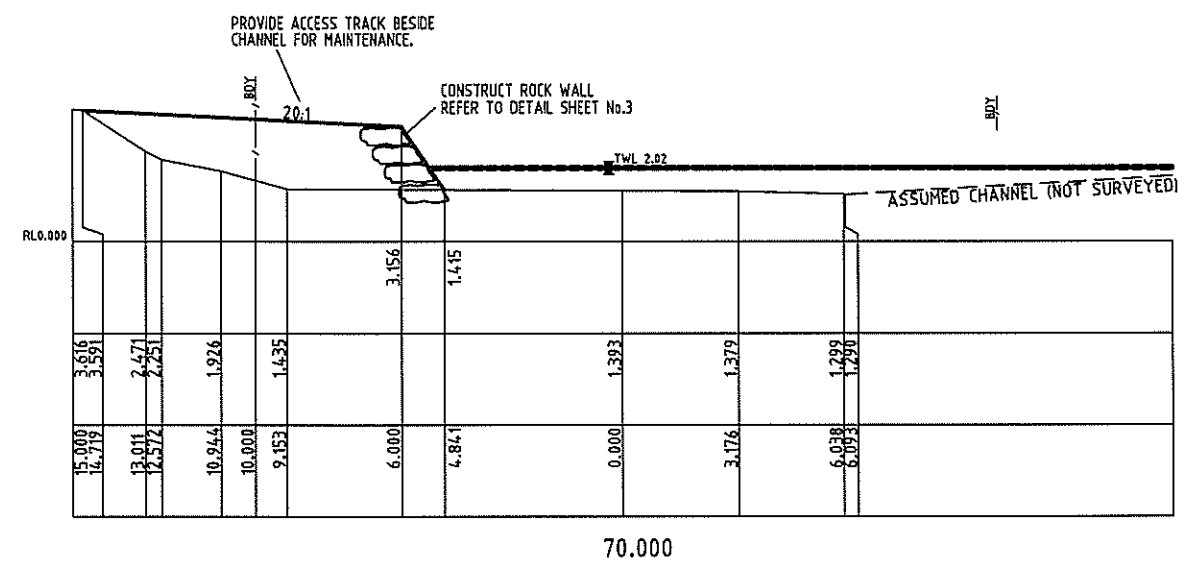
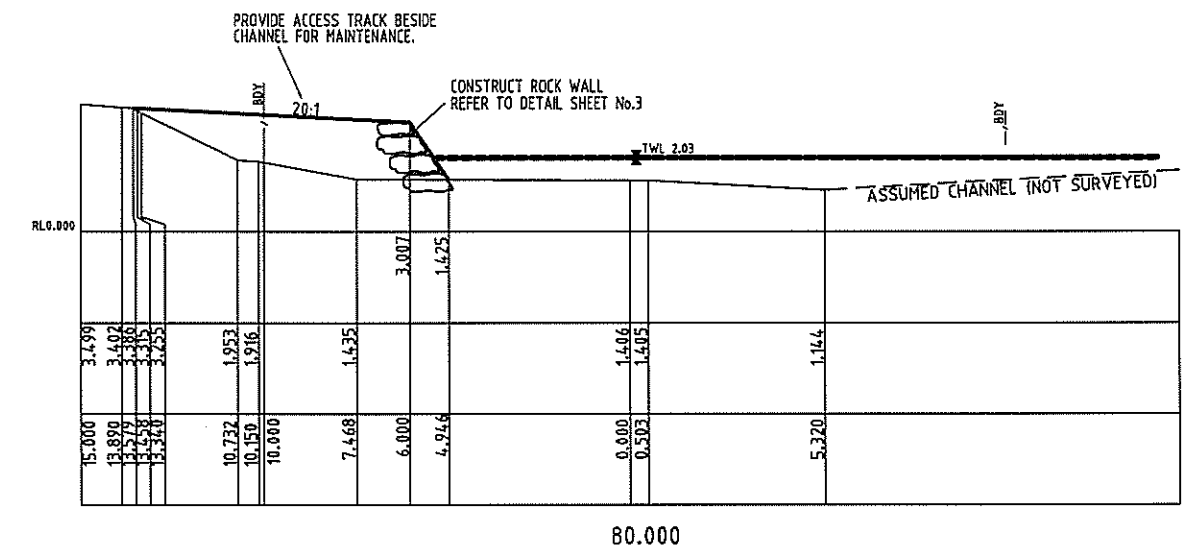
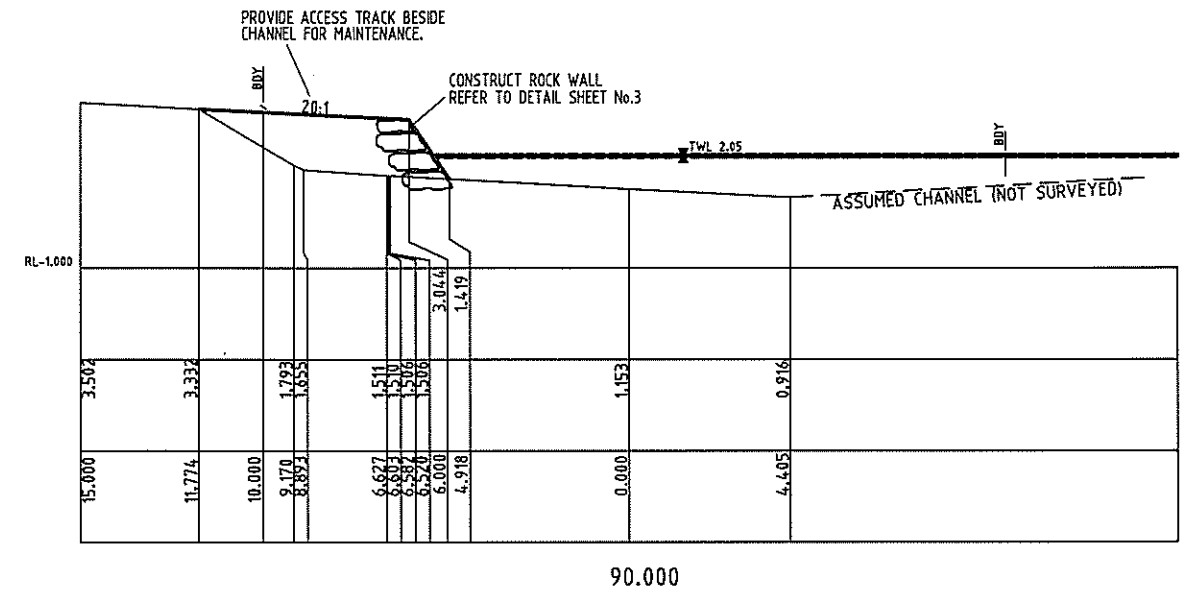
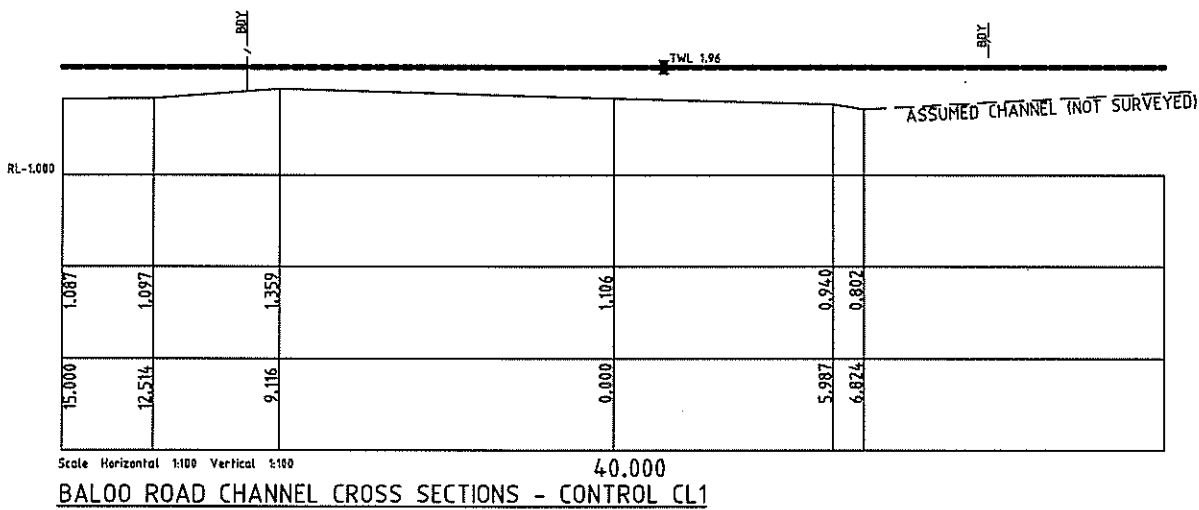
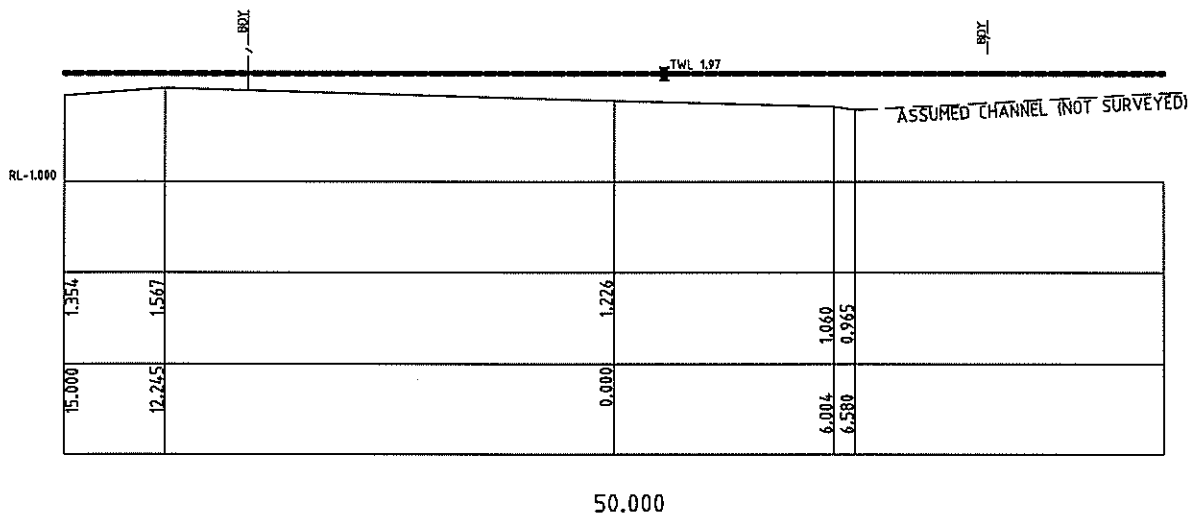
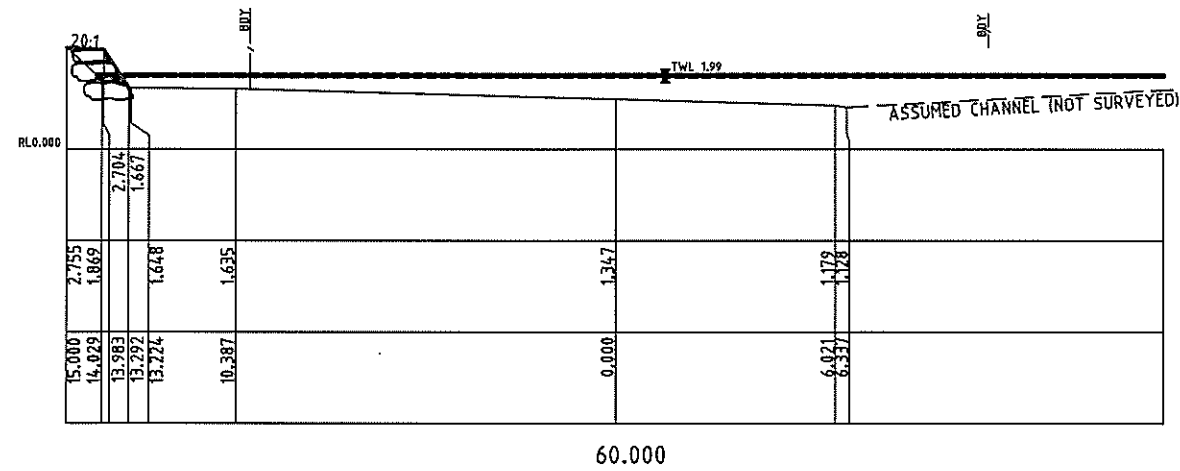
Scale Horizontal 1:100 Vertical 1:100  
BALOO ROAD CHANNEL CROSS SECTIONS - CONTROL CL1



Scale Horizontal 1:500 Vertical 1:100  
BALOO ROAD CHANNEL LONGITUDINAL SECTION  
CONTROL CL1

| UTILITIES |  | LEGEND |       |   |   | REVISION DETAILS |  |          |  | DRAWN    |  | APPR. |  | DATE |  | DATUM |  | SURVEYED |  | CHISEL BURR HARVEY<br>CABLE & CARRIER |  | 01.10.03 |  | RECOMMENDED |  | APPROVED         |  | DATE: 21/08/2010 |  | DATE: 01/08/2010 |  | BAR SCALE        |  | 0 2 4 6 8 10m    |  | 1:100@A1         |  | 0 10 20 30 40 50m |  | 1:500@A1         |  | GOSFORD CITY COUNCIL |  |                  |  | BALOO ROAD, WEST GOSFORD |  |                  |  | CULVERT UPGRADE & CHANNEL IMPROVEMENTS |  |                  |  | CHANNEL LONG SECTION & CROSS SECTIONS ch0 - ch30 |  |                  |  | FILE No: .       |  | DRAWING No: C4/209 |  | SHEET: 5         |  | REV: *           |  |                  |  |                  |  |                  |  |                  |  |                  |  |                  |  |                  |  |                  |  |                  |  |                  |  |                  |  |                  |  |                  |  |                  |  |                  |  |                  |  |                  |  |                  |  |                  |  |                  |  |                  |  |                  |  |                  |  |                  |  |                  |  |                  |  |                  |  |                  |  |                  |  |                  |  |                  |  |                  |  |                  |  |                  |  |                  |  |                  |  |                  |  |                  |  |                  |  |                  |  |                  |  |                  |  |                  |  |                  |  |                  |  |                  |  |                  |  |                  |  |                  |  |                  |  |                  |  |                  |  |                  |  |                  |  |                  |  |                  |  |                  |  |                  |  |      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| WATERMAIN |  | PLAN   | SECT. | W | W | KERR AND GUTTER  |  | EXISTING |  | PROPOSED |  |       |  |      |  |       |  | A.H.D.   |  | DRAWN                                 |  | S.B.     |  | 09.09.09    |  | DATE: 21/08/2010 |  | DATE: 01/08/2010 |  | DATE: 01/08/2010 |  | DATE: 01/08/2010 |  | DATE: 01/08/2010 |  | DATE: 01/08/2010 |  | DATE: 01/08/2010  |  | DATE: 01/08/2010 |  | DATE: 01/08/2010     |  | DATE: 01/08/2010 |  | DATE: 01/08/2010         |  | DATE: 01/08/2010 |  | DATE: 01/08/2010                       |  | DATE: 01/08/2010 |  | DATE: 01/08/2010                                 |  | DATE: 01/08/2010 |  | DATE: 01/08/2010 |  | DATE: 01/08/2010   |  | DATE: 01/08/2010 |  | DATE: 01/08/2010 |  | DATE: 01/08/2010 |  | DATE: 01/08/2010 |  | DATE: 01/08/2010 |  | DATE: 01/08/2010 |  | DATE: 01/08/2010 |  | DATE: 01/08/2010 |  | DATE: 01/08/2010 |  | DATE: 01/08/2010 |  | DATE: 01/08/2010 |  | DATE: 01/08/2010 |  | DATE: 01/08/2010 |  | DATE: 01/08/2010 |  | DATE: 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T.W.L INDICATES 100 YEAR - ARI LEVEL



| UTILITIES                |       | LEGEND   |          | REVISION DETAILS       |  | DRAWN |  | APPR. |  | DATE |  |
|--------------------------|-------|----------|----------|------------------------|--|-------|--|-------|--|------|--|
| PLAN                     | SECT. | EXISTING | PROPOSED |                        |  |       |  |       |  |      |  |
| WATERMAIN                | -W-   | -W-      | -W-      | WATER AND GUTTER       |  |       |  |       |  |      |  |
| UNDERGROUND POWER CABLES | -P-   | -P-      | -P-      | TABLE DRAIN            |  |       |  |       |  |      |  |
| GAS MAIN                 | -G-   | -G-      | -G-      | UNDERGROUND ATC CABLES |  |       |  |       |  |      |  |
| UNDERGROUND ATC CABLES   | -Y-   | -Y-      | -Y-      | PIPED DRAIN            |  |       |  |       |  |      |  |
| SEE POLES                | -S-   | -S-      | -S-      | QUALITY PIT            |  |       |  |       |  |      |  |
| ATC POLES                | -S-   | -S-      | -S-      | JUNCTION PIT           |  |       |  |       |  |      |  |
| SEWERMAIN                | -S-   | -S-      | -S-      |                        |  |       |  |       |  |      |  |

|                 |             |                        |          |             |                  |
|-----------------|-------------|------------------------|----------|-------------|------------------|
| DATUM           | SURVEYED    | DATE HAVE SURVEY       | 81.10.03 | RECOMMENDED | DATE: 01/08/2010 |
| A.H.D.          | DRAWN       | S.B.                   | 09.09.09 | APPROVED    | DATE: 01/08/2010 |
| SURVEY NAME     | CHECKED     | GCC                    | *        |             |                  |
| 04-040MG 19070A | DESIGN NAME | SRB Consulting Pty Ltd |          |             |                  |
| DATABASE FILE   |             |                        |          |             |                  |

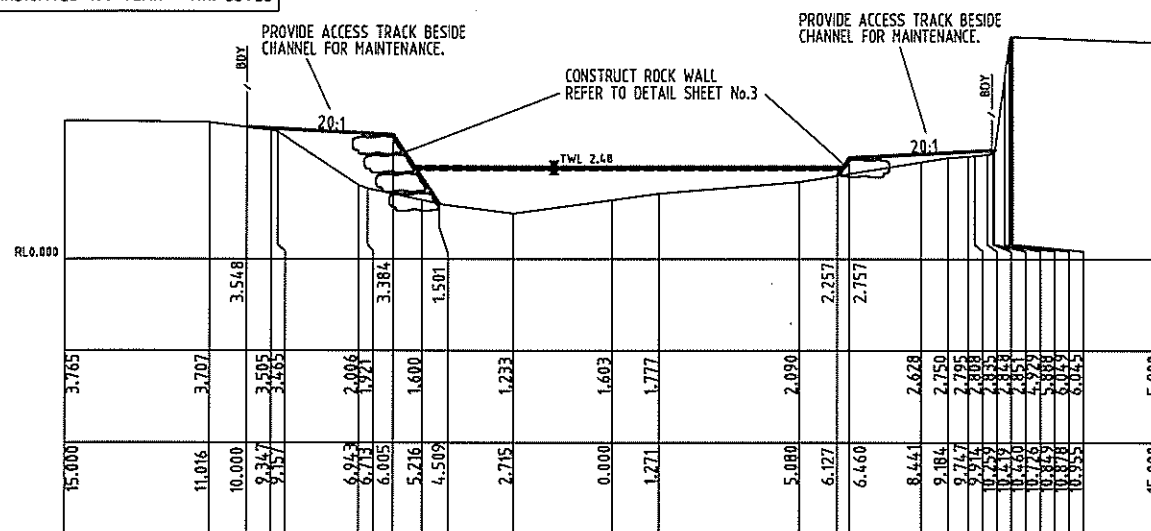
  

|            |               |
|------------|---------------|
| BAR SCALE  | 0 2 4 6 8 10m |
| 1:100 @ A1 |               |

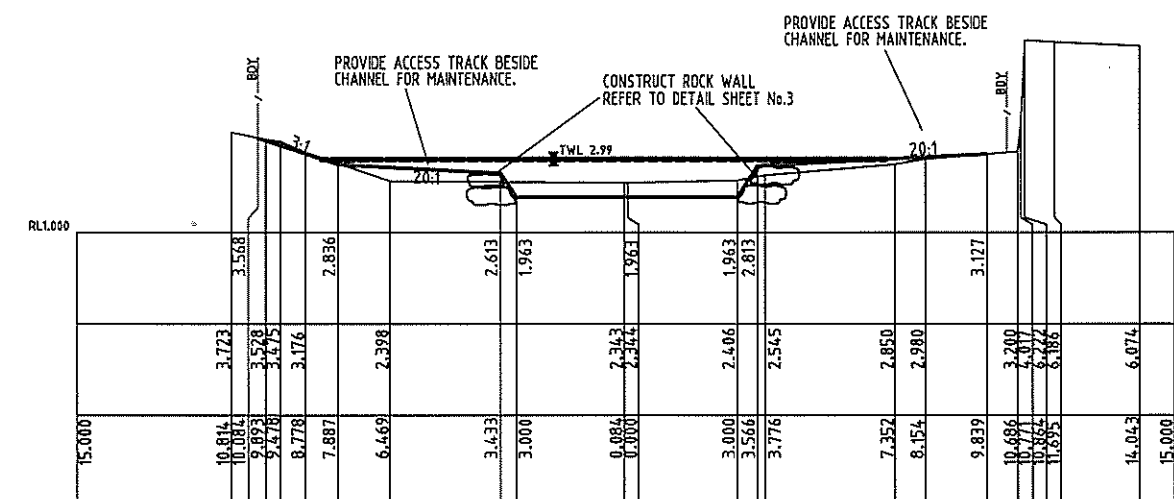
  

|                                        |                    |          |        |
|----------------------------------------|--------------------|----------|--------|
| GOSFORD CITY COUNCIL                   |                    |          |        |
| BALOO ROAD, WEST GOSFORD               |                    |          |        |
| CULVERT UPGRADE & CHANNEL IMPROVEMENTS |                    |          |        |
| CHANNEL CROSS SECTIONS ch40 - ch90     |                    |          |        |
| FILE No.:                              | DRAWING No: CL/209 | SHEET: 6 | REV: * |

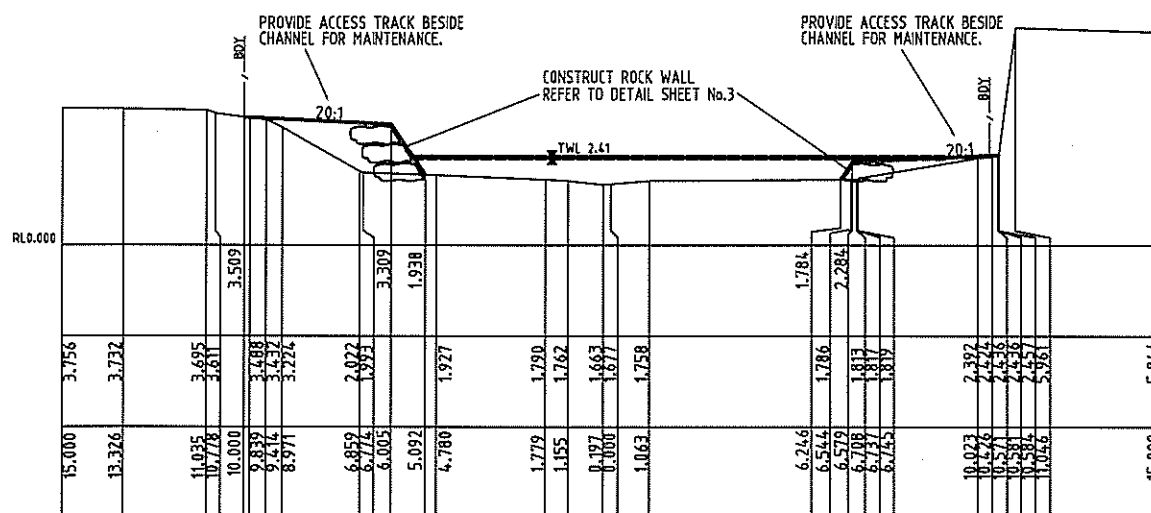
T.W.L INDICATES 100 YEAR - ARI LEVEL



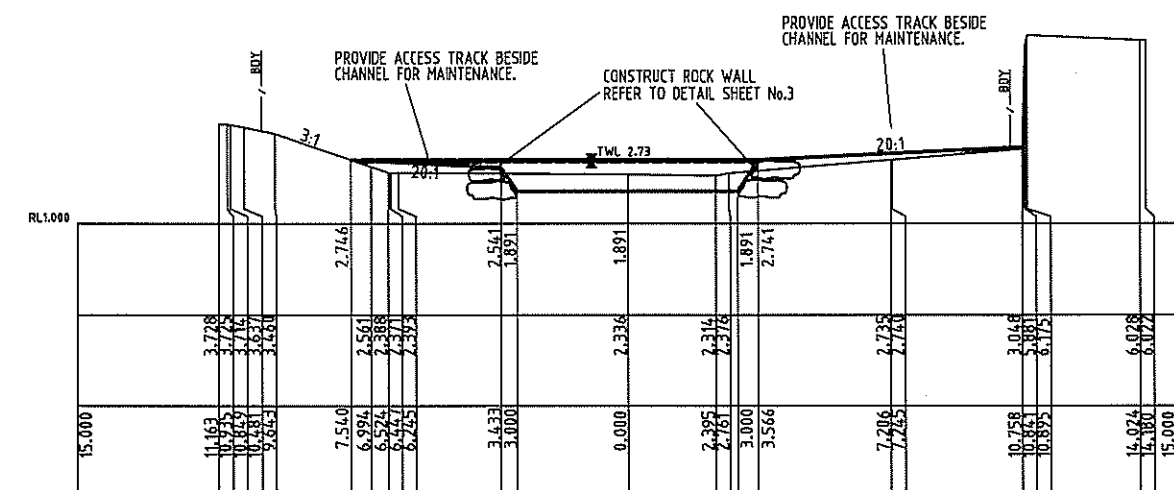
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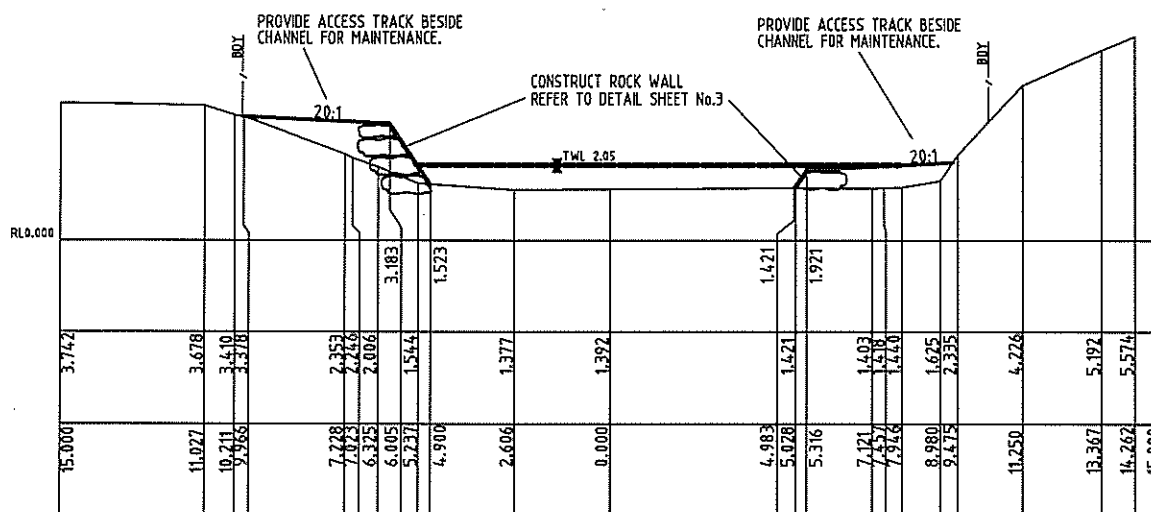
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110.000



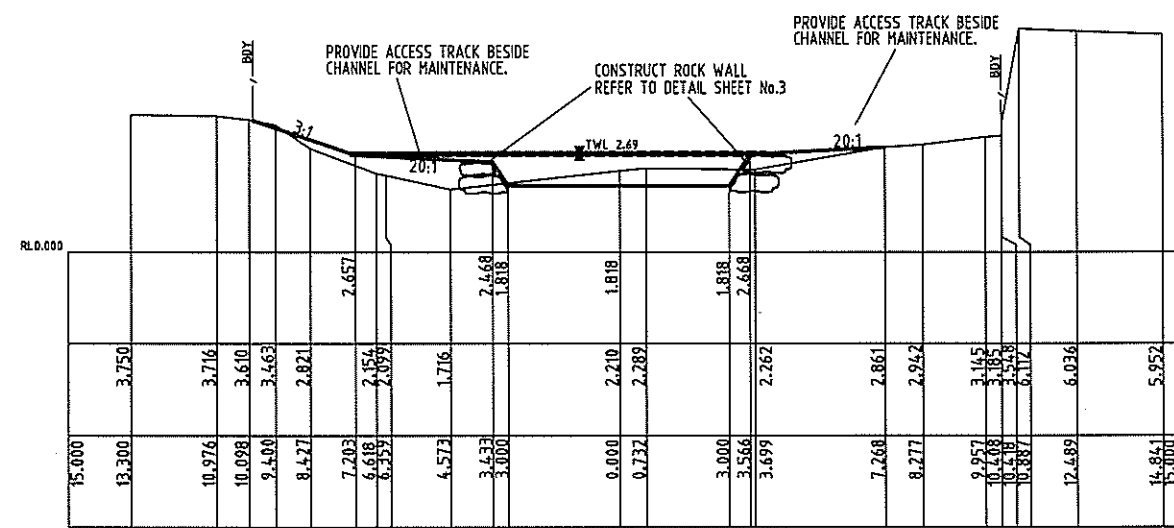
140,000



Scale Horizontal 1:100 Vertical 1:100

100.000

BALOO ROAD CHANNEL CROSS SECTIONS - CONTROL CL1

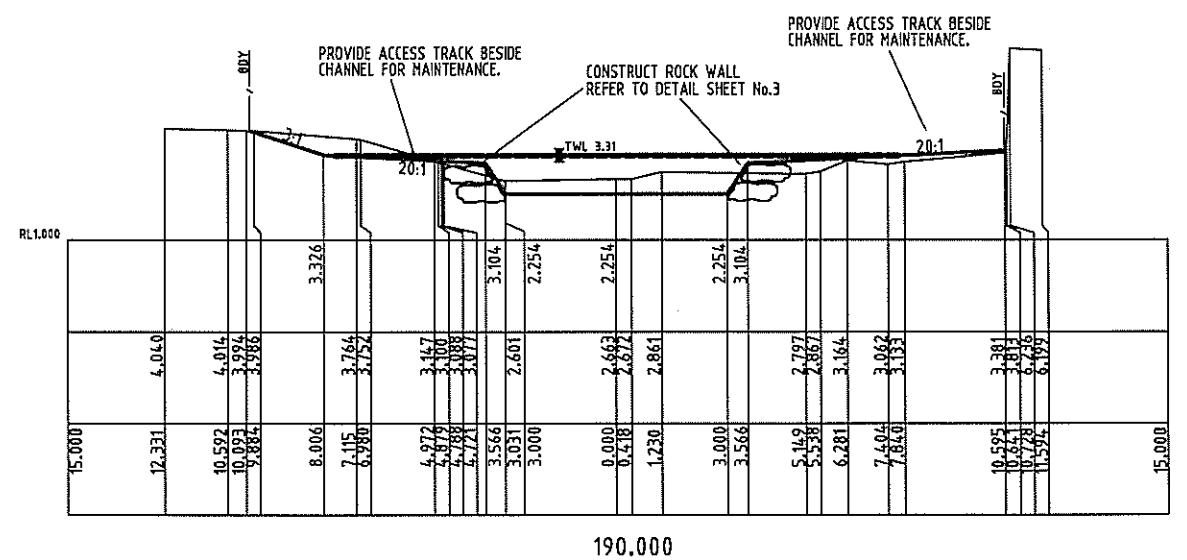
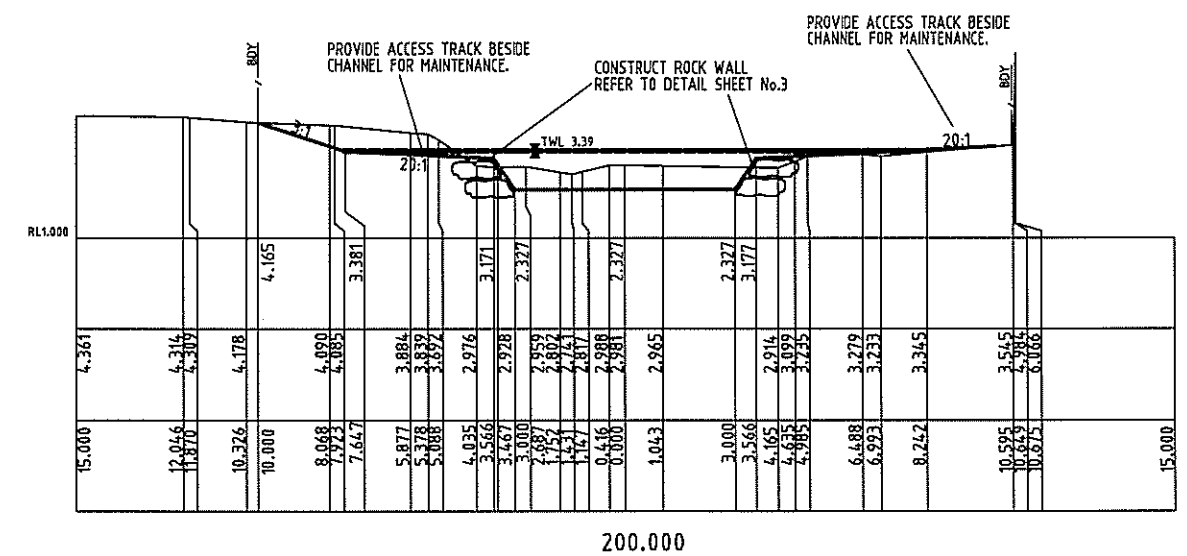
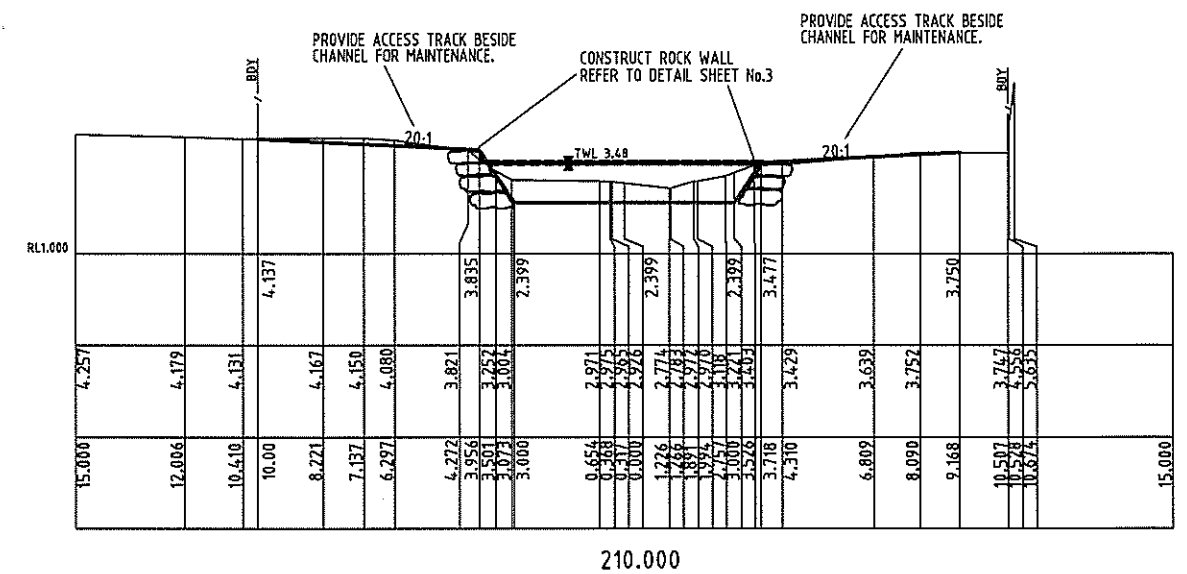
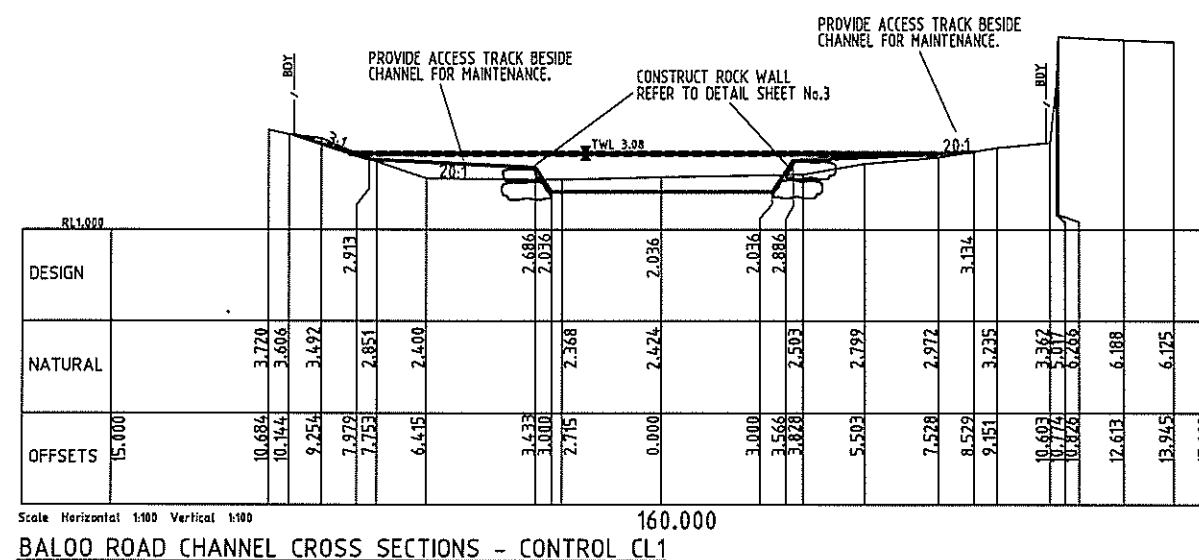
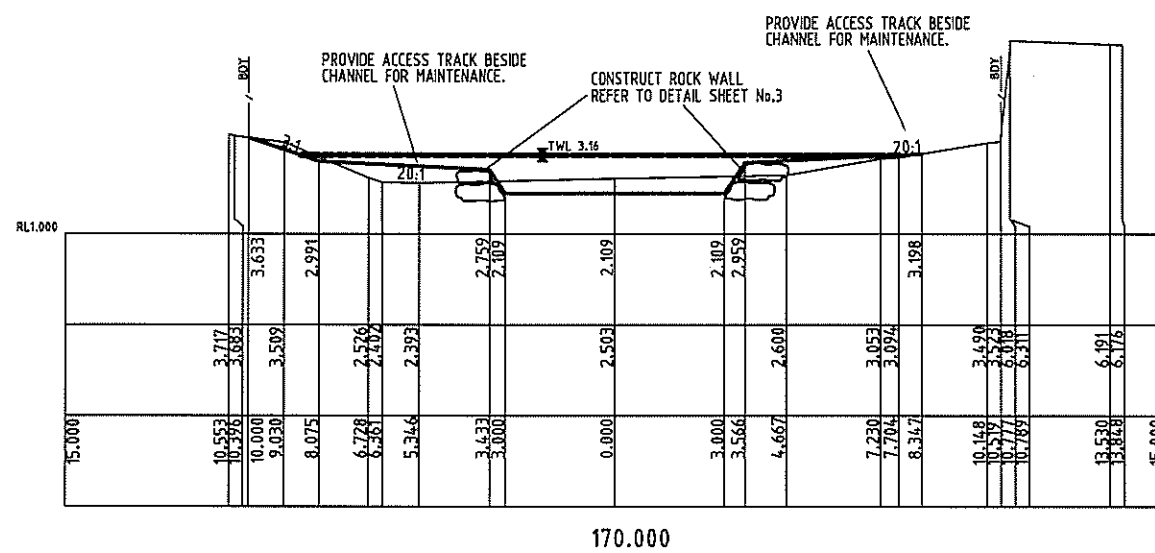
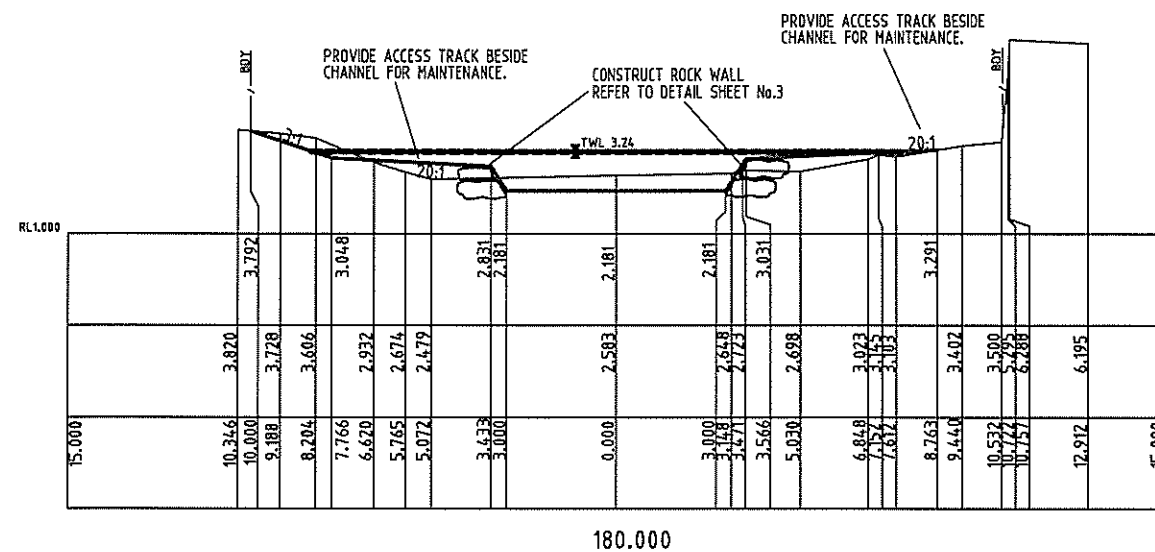


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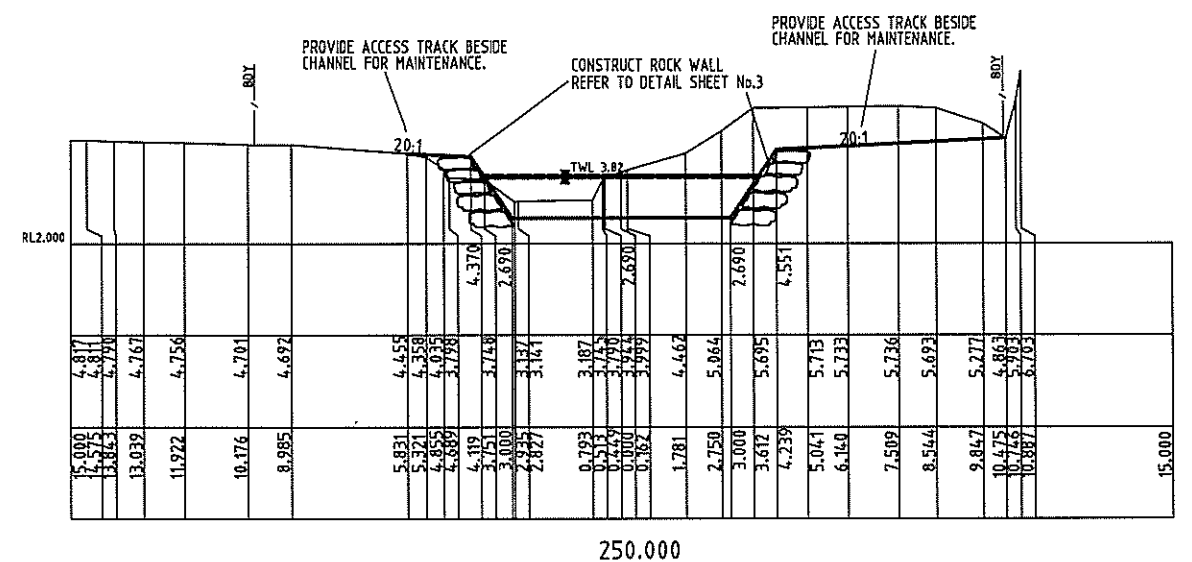
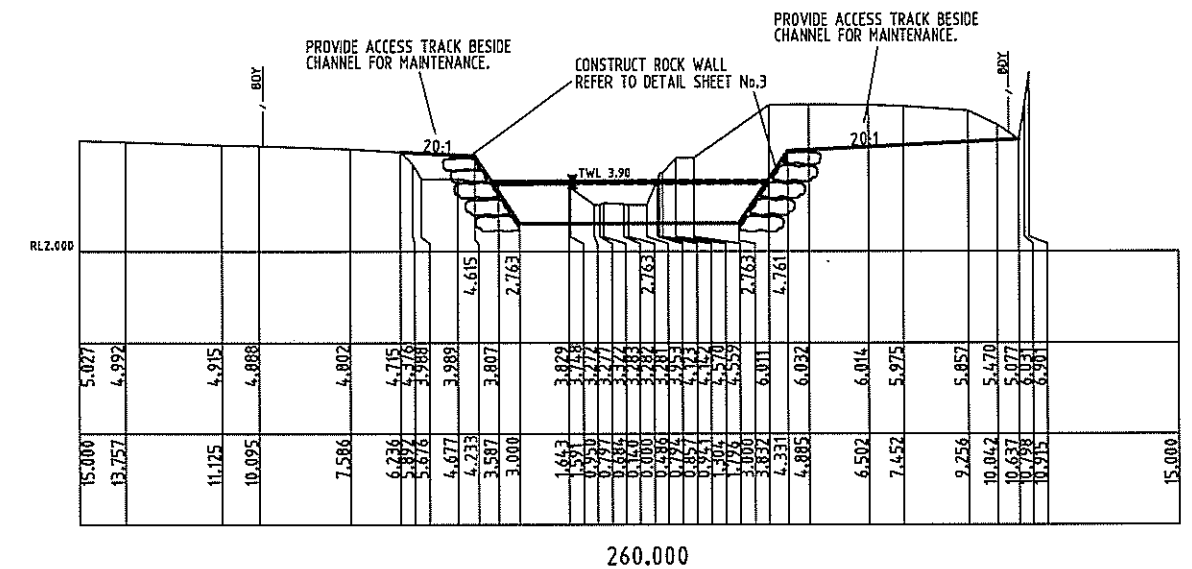
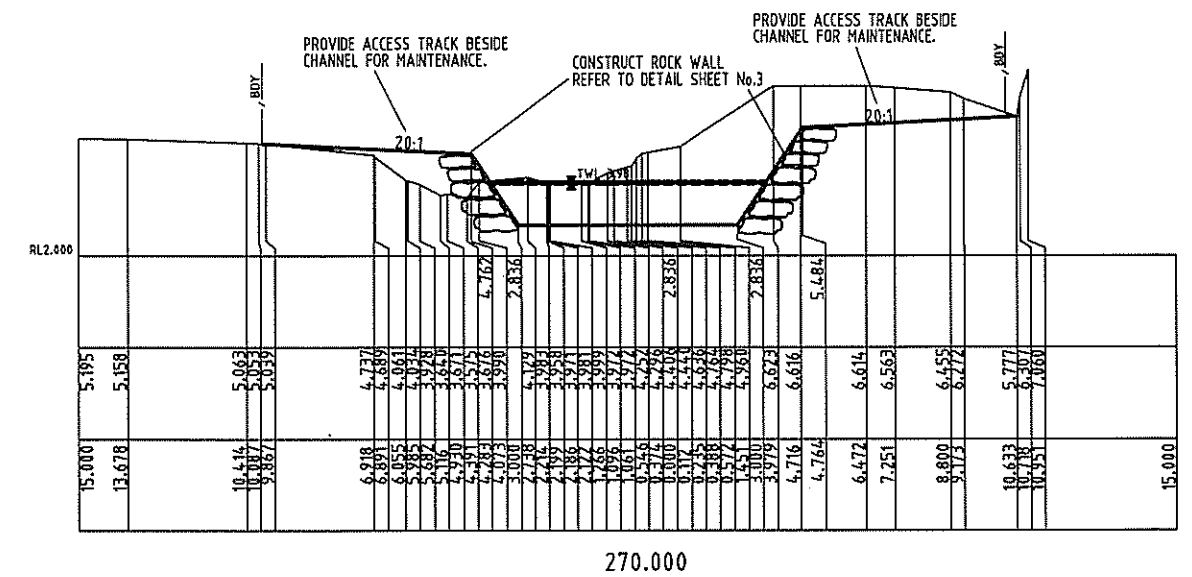
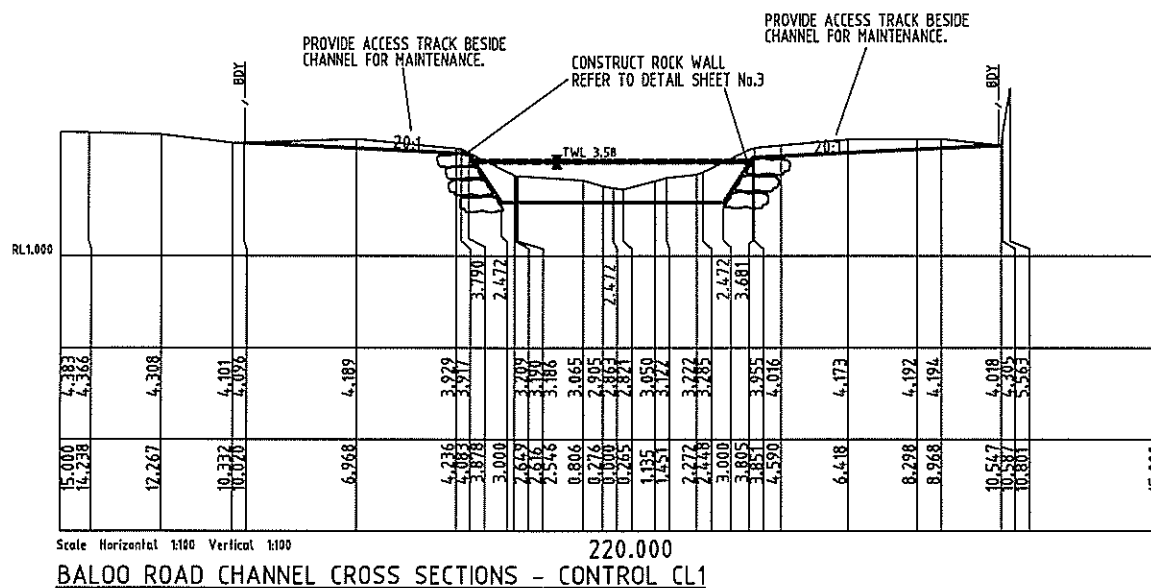
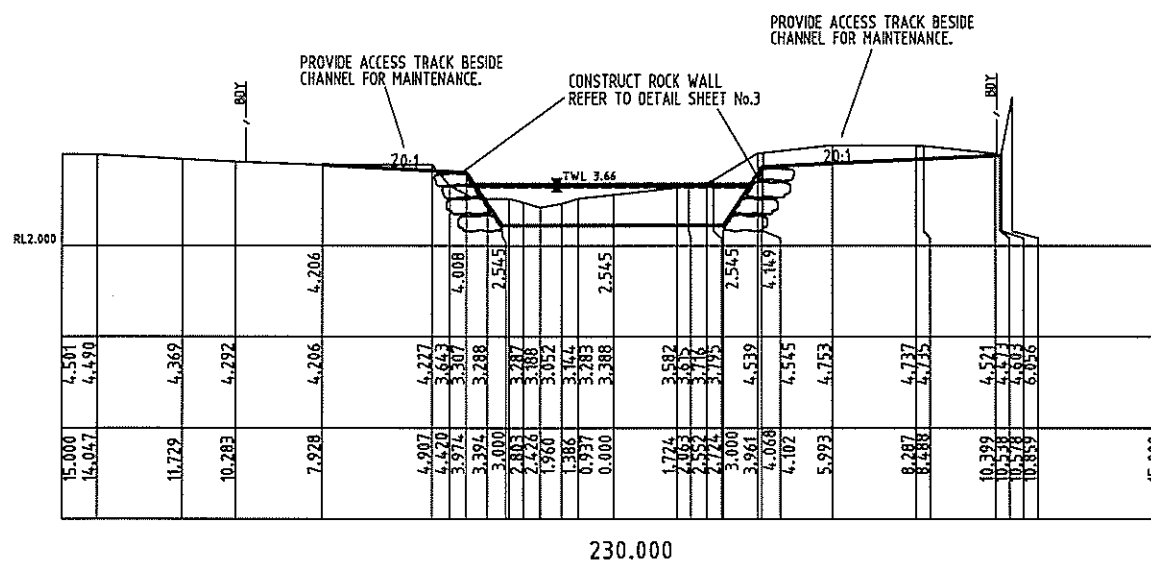
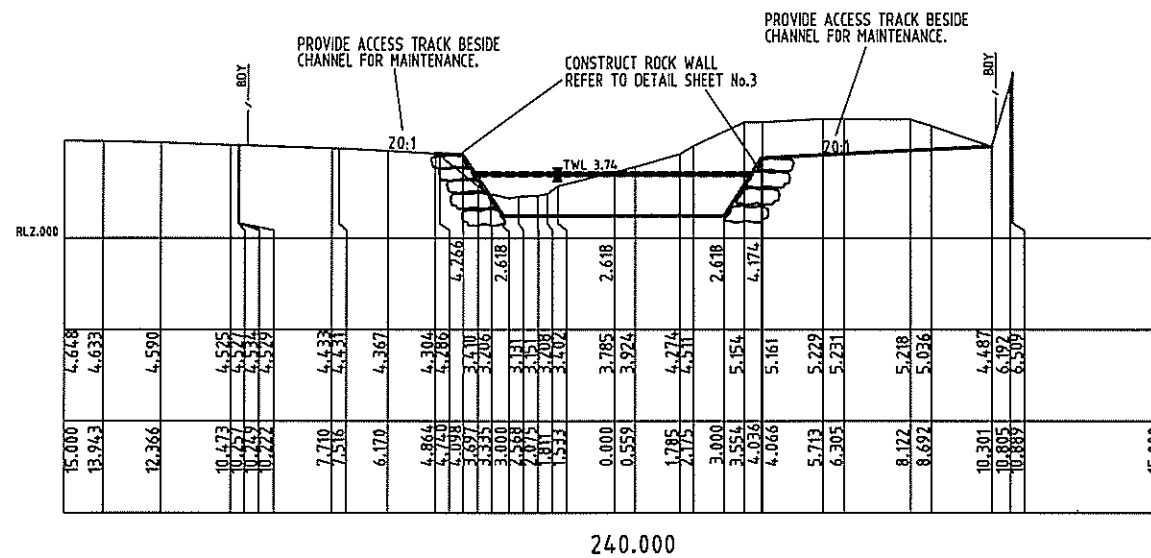
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T.W.L INDICATES 100 YEAR - ARI LEVEL

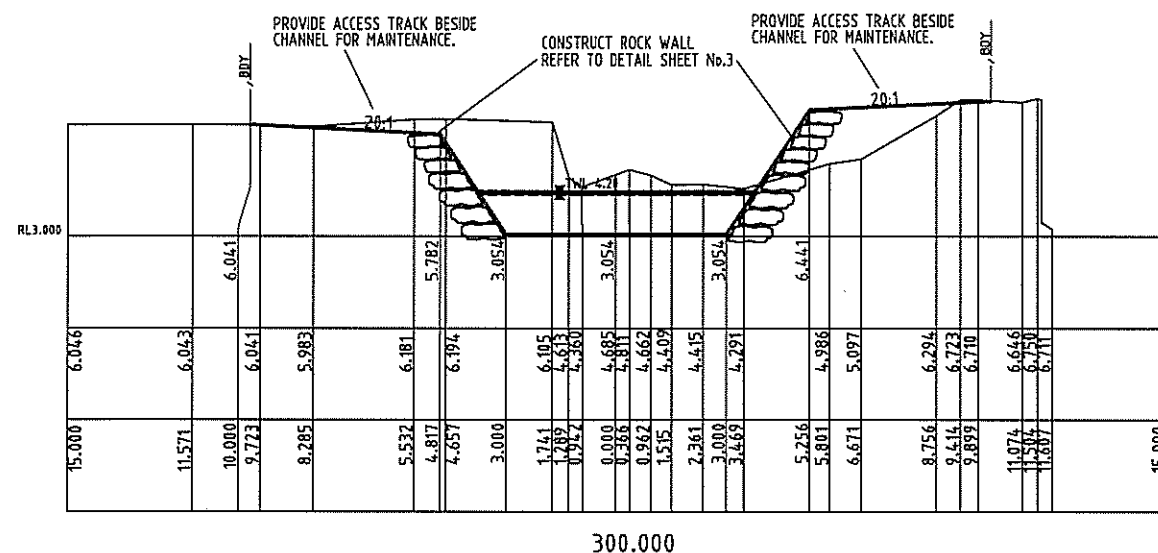
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T.W.L INDICATES 100 YEAR - ARI LEVEL

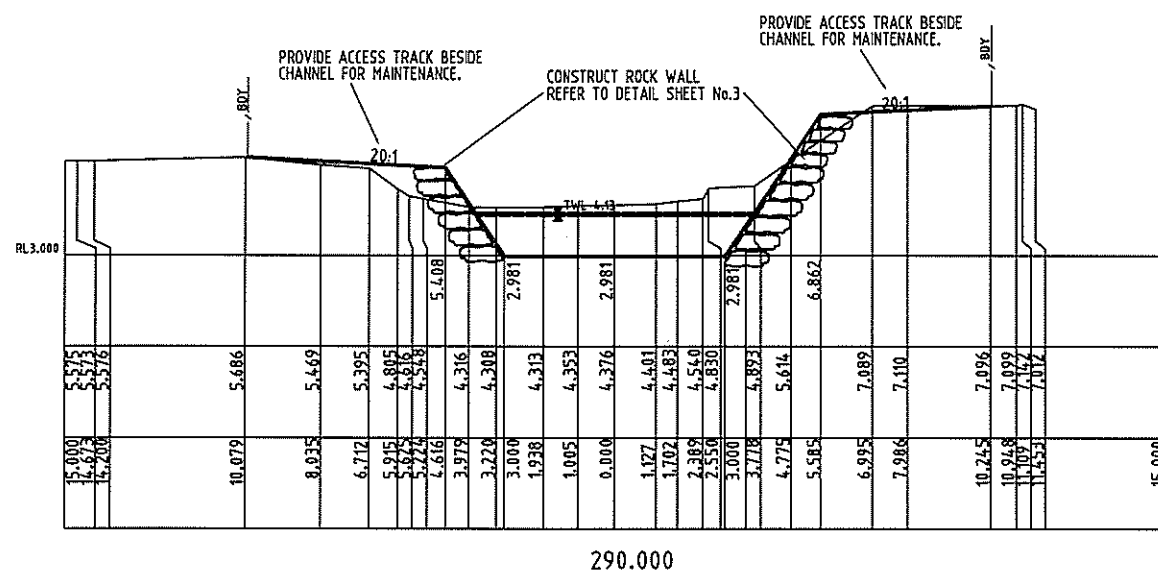


|                          |  |  |  |        |  |  |  |                        |  |  |  |          |  |  |  |             |  |      |  |             |  |           |  |      |  |                      |  |  |  |                                        |  |  |  |
|--------------------------|--|--|--|--------|--|--|--|------------------------|--|--|--|----------|--|--|--|-------------|--|------|--|-------------|--|-----------|--|------|--|----------------------|--|--|--|----------------------------------------|--|--|--|
| UTILITIES                |  |  |  | LEGEND |  |  |  |                        |  |  |  | DATUM    |  |  |  | SURVEYED    |  | DATE |  | RECOMMENDED |  | BAR SCALE |  |      |  | GOSFORD CITY COUNCIL |  |  |  |                                        |  |  |  |
| PLAN                     |  |  |  | SECT.  |  |  |  | EXISTING               |  |  |  | PROPOSED |  |  |  | A.H.D.      |  |      |  | DRAWN       |  | S.B.      |  | DATE |  | 0 2 4 6 8 10m        |  |  |  | BALOO ROAD, WEST GOSFORD               |  |  |  |
| WATERMAIN                |  |  |  | -N-    |  |  |  | KERB AND GUTTER        |  |  |  |          |  |  |  | SURVEY NAME |  |      |  | CHECKED     |  | GCC       |  | DATE |  | 1:100@A1             |  |  |  | CULVERT UPGRADE & CHANNEL IMPROVEMENTS |  |  |  |
| UNDERGROUND POWER CABLES |  |  |  | -P-    |  |  |  | TABLE DRAIN            |  |  |  |          |  |  |  | 01-040MG    |  |      |  |             |  |           |  | DATE |  | FILE No. :           |  |  |  |                                        |  |  |  |
| GAS MAIN                 |  |  |  | -S-    |  |  |  | UNDERGROUND ATC CABLES |  |  |  |          |  |  |  | 70906A      |  |      |  |             |  |           |  | DATE |  | DRAWING No: C4/209   |  |  |  |                                        |  |  |  |
| UNDERGROUND ATC CABLES   |  |  |  | -T-    |  |  |  | PEGGED LINE            |  |  |  |          |  |  |  |             |  |      |  |             |  |           |  | DATE |  | SHEET: 9             |  |  |  |                                        |  |  |  |
| SEWER MAIN               |  |  |  | -P-    |  |  |  | PIPED DRAIN            |  |  |  |          |  |  |  |             |  |      |  |             |  |           |  | DATE |  | REV: *               |  |  |  |                                        |  |  |  |
| SEWER MAIN               |  |  |  | -S-    |  |  |  | SEWERMAIN              |  |  |  |          |  |  |  |             |  |      |  |             |  |           |  | DATE |  |                      |  |  |  |                                        |  |  |  |
|                          |  |  |  |        |  |  |  |                        |  |  |  |          |  |  |  |             |  |      |  |             |  |           |  | DATE |  |                      |  |  |  |                                        |  |  |  |
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|                          |  |  |  |        |  |  |  |                        |  |  |  |          |  |  |  |             |  |      |  |             |  |           |  | DATE |  |                      |  |  |  |                                        |  |  |  |
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|                          |  |  |  |        |  |  |  |                        |  |  |  |          |  |  |  |             |  |      |  |             |  |           |  | DATE |  |                      |  |  |  |                                        |  |  |  |
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|                          |  |  |  |        |  |  |  |                        |  |  |  |          |  |  |  |             |  |      |  |             |  |           |  | DATE |  |                      |  |  |  |                                        |  |  |  |
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|                          |  |  |  |        |  |  |  |                        |  |  |  |          |  |  |  |             |  |      |  |             |  |           |  | DATE |  |                      |  |  |  |                                        |  |  |  |
|                          |  |  |  |        |  |  |  |                        |  |  |  |          |  |  |  |             |  |      |  |             |  |           |  | DATE |  |                      |  |  |  |                                        |  |  |  |
|                          |  |  |  |        |  |  |  |                        |  |  |  |          |  |  |  |             |  |      |  |             |  |           |  | DATE |  |                      |  |  |  |                                        |  |  |  |
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|                          |  |  |  |        |  |  |  |                        |  |  |  |          |  |  |  |             |  |      |  |             |  |           |  | DATE |  |                      |  |  |  |                                        |  |  |  |
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|                          |  |  |  |        |  |  |  |                        |  |  |  |          |  |  |  |             |  |      |  |             |  |           |  | DATE |  |                      |  |  |  |                                        |  |  |  |
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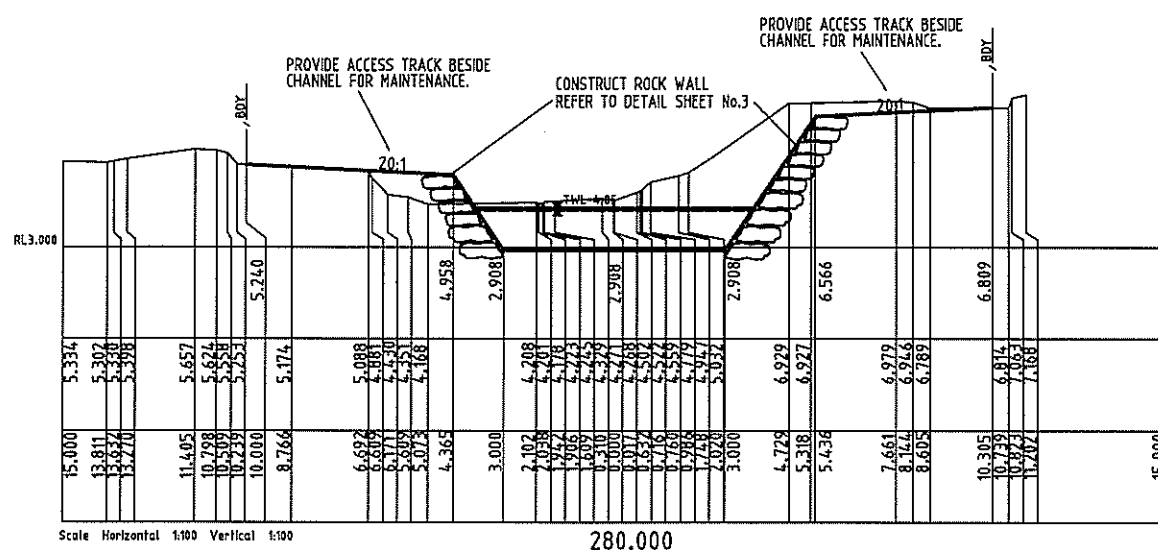
T.W.L INDICATES 100 YEAR - ARI LEVEL



300.000

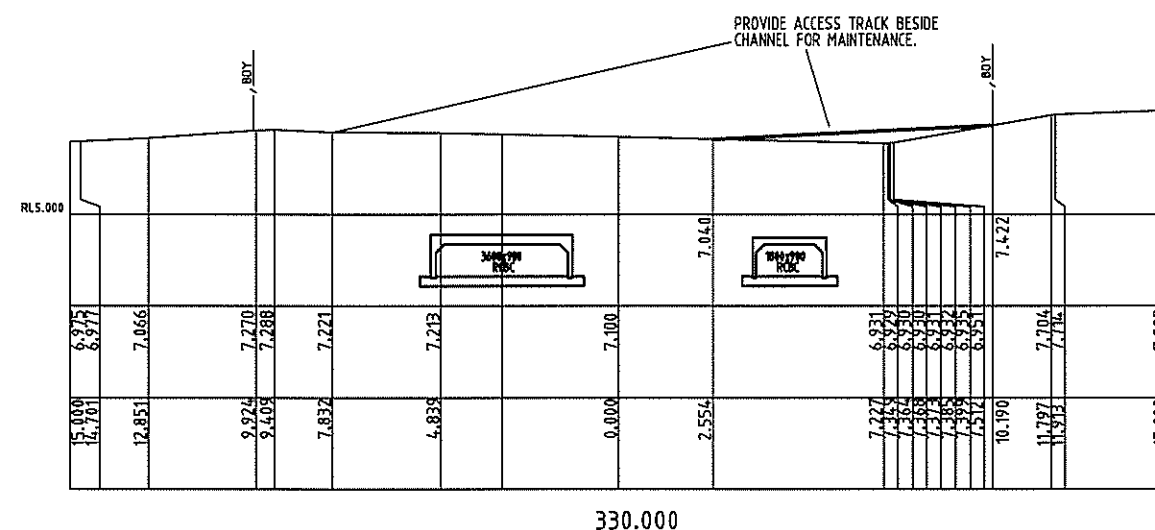


290.000

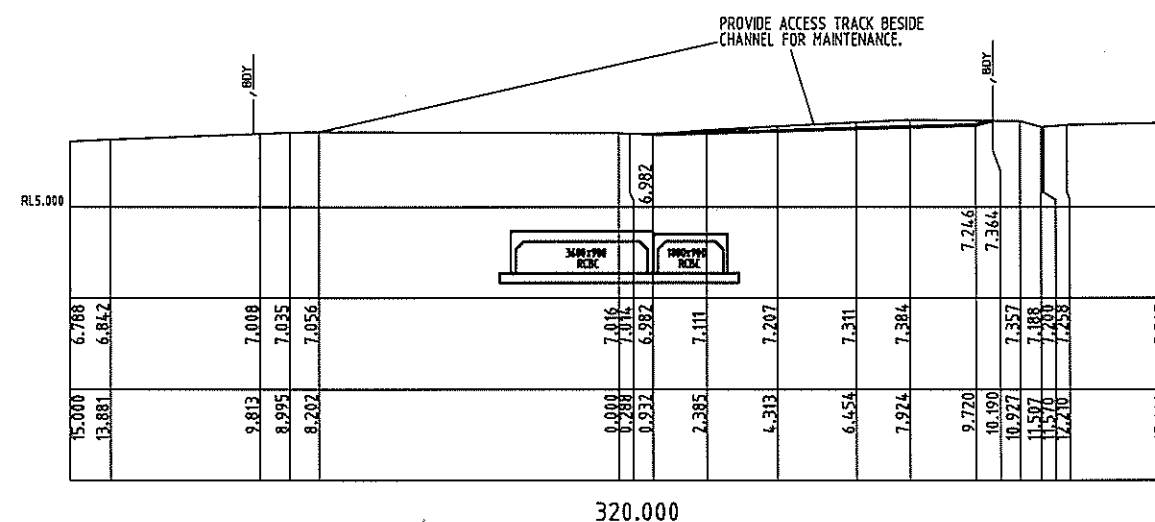


280.000

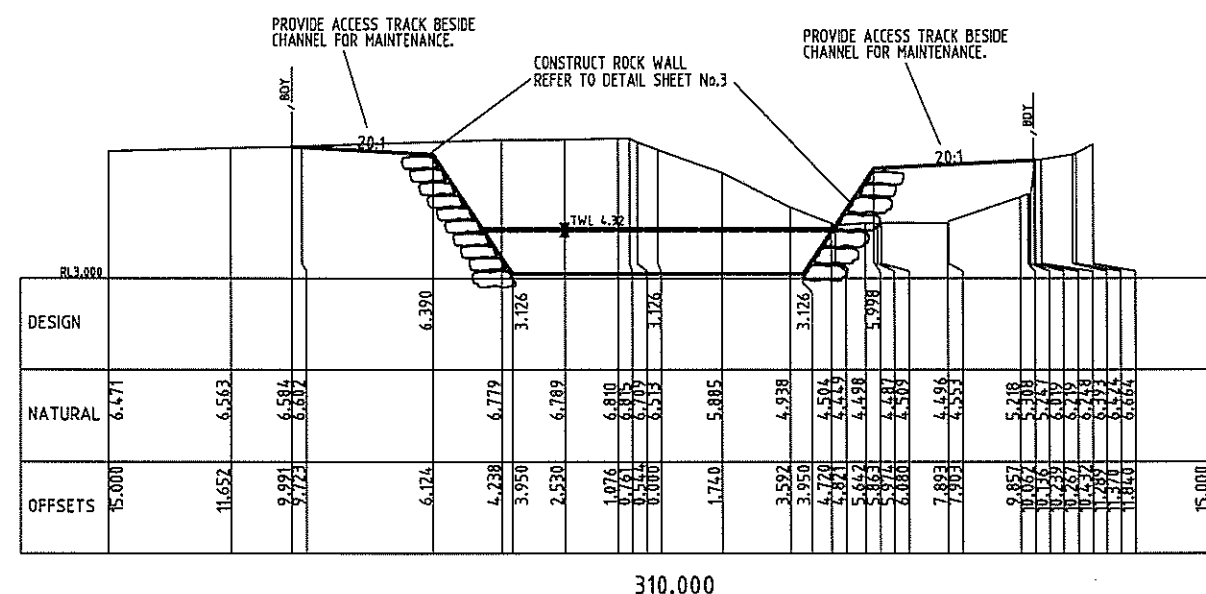
BALOO ROAD CHANNEL CROSS SECTIONS - CONTROL CL1



330.000

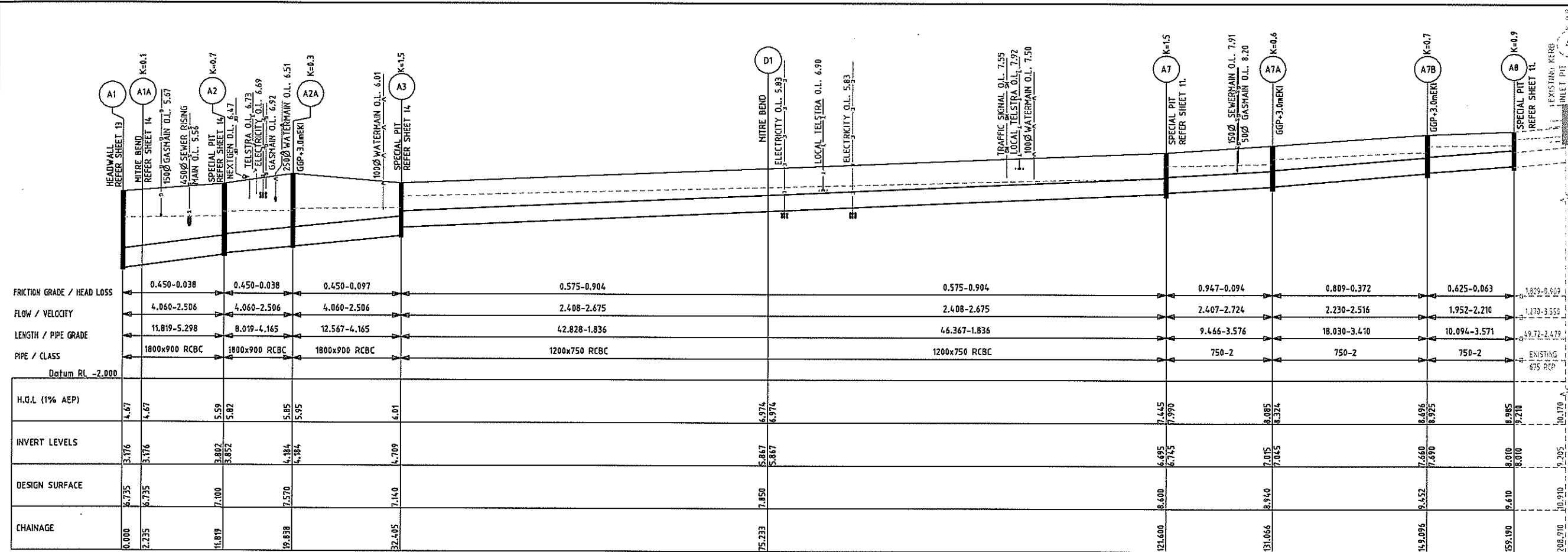


320.000

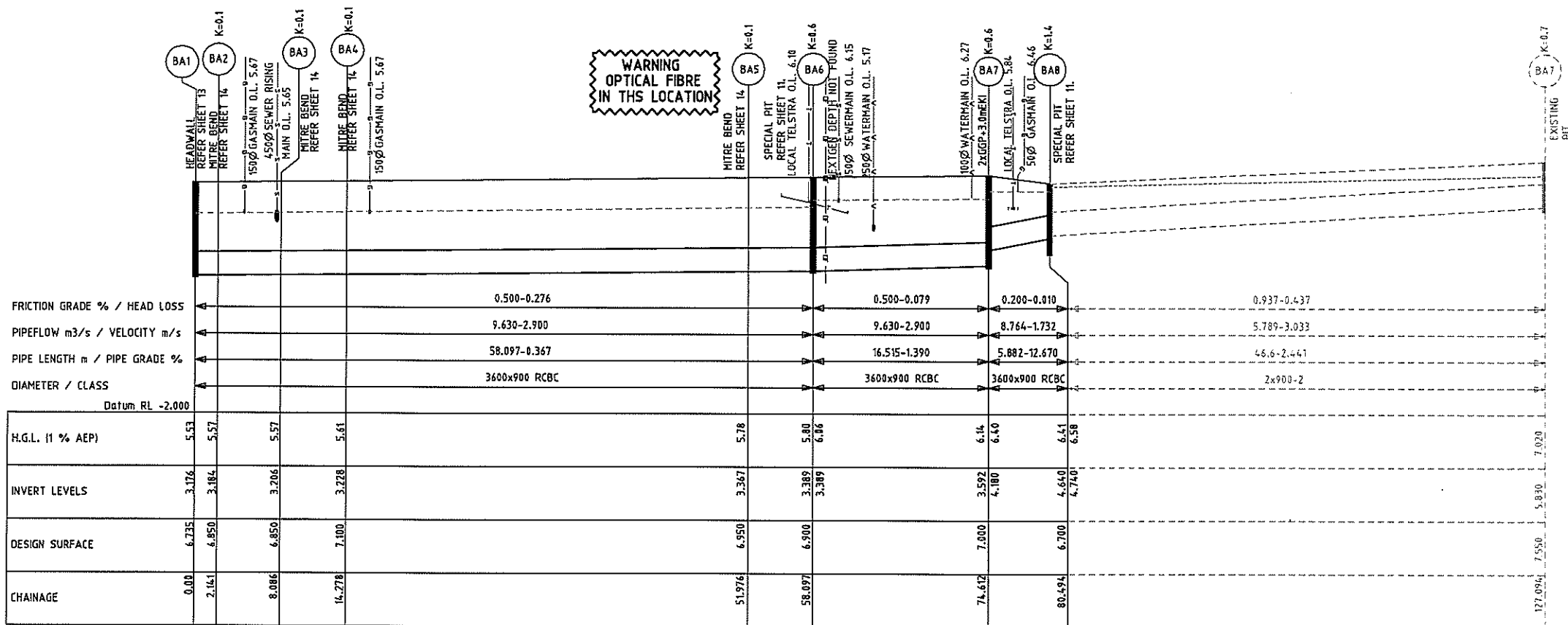


310.000

| UTILITIES                |       | LEGEND   |          |          |          | REVISION DETAILS |    |      |    | DATUM |    |                        |    | SURVEYED |    | DATE BORST MARKET<br>CROSS & LAMBERT |    | 01.10.03 |    | RECOMMENDED            |    | BAR SCALE |    | GOSFORD CITY COUNCIL   |    |      |    |      |    |
|--------------------------|-------|----------|----------|----------|----------|------------------|----|------|----|-------|----|------------------------|----|----------|----|--------------------------------------|----|----------|----|------------------------|----|-----------|----|------------------------|----|------|----|------|----|
| PLAN                     | SECT. | EXISTING | PROPOSED | EXISTING | PROPOSED | DATE             | BY | DATE | BY | DATE  | BY | DATE                   | BY | DATE     | BY | DATE                                 | BY | DATE     | BY | DATE                   | BY | DATE      | BY | DATE                   | BY | DATE | BY | DATE | BY |
| WATERMAIN                | 1     | 1        | 1        | 1        | 1        |                  |    |      |    |       |    |                        |    |          |    |                                      |    |          |    |                        |    |           |    |                        |    |      |    |      |    |
| UNDERGROUND POWER CABLES | 2     | 2        | 2        | 2        | 2        |                  |    |      |    |       |    |                        |    |          |    |                                      |    |          |    |                        |    |           |    |                        |    |      |    |      |    |
| GAS MAIN                 | 3     | 3        | 3        | 3        | 3        |                  |    |      |    |       |    |                        |    |          |    |                                      |    |          |    |                        |    |           |    |                        |    |      |    |      |    |
| UNDERGROUND ATC CABLES   | 4     | 4        | 4        | 4        | 4        |                  |    |      |    |       |    |                        |    |          |    |                                      |    |          |    |                        |    |           |    |                        |    |      |    |      |    |
| PIPELINE                 | 5     | 5        | 5        | 5        | 5        |                  |    |      |    |       |    |                        |    |          |    |                                      |    |          |    |                        |    |           |    |                        |    |      |    |      |    |
| ATC POLES                | 6     | 6        | 6        | 6        | 6        |                  |    |      |    |       |    |                        |    |          |    |                                      |    |          |    |                        |    |           |    |                        |    |      |    |      |    |
| ATC PILES                | 7     | 7        | 7        | 7        | 7        |                  |    |      |    |       |    |                        |    |          |    |                                      |    |          |    |                        |    |           |    |                        |    |      |    |      |    |
| SEWERMAIN                | 8     | 8        | 8        | 8        | 8        |                  |    |      |    |       |    |                        |    |          |    |                                      |    |          |    |                        |    |           |    |                        |    |      |    |      |    |
| JUNCTION PIT             | 9     | 9        | 9        | 9        | 9        |                  |    |      |    |       |    |                        |    |          |    |                                      |    |          |    |                        |    |           |    |                        |    |      |    |      |    |
|                          |       |          |          |          |          |                  |    |      |    |       |    | DESIGN NAME            |    |          |    | DESIGN NAME                          |    |          |    | DESIGN NAME            |    |           |    | DESIGN NAME            |    |      |    |      |    |
|                          |       |          |          |          |          |                  |    |      |    |       |    | SRB Consulting Pty Ltd |    |          |    | SRB Consulting Pty Ltd               |    |          |    | SRB Consulting Pty Ltd |    |           |    | SRB Consulting Pty Ltd |    |      |    |      |    |
|                          |       |          |          |          |          |                  |    |      |    |       |    | DATE: 21 / 08 / 2010   |    |          |    | DATE: 21 / 08 / 2010                 |    |          |    | DATE: 21 / 08 / 2010   |    |           |    | DATE: 21 / 08 / 2010   |    |      |    |      |    |
|                          |       |          |          |          |          |                  |    |      |    |       |    | FILE No: .             |    |          |    | DRAWING No: C4/209                   |    |          |    | SHEET: 10              |    |           |    | REV: *                 |    |      |    |      |    |



SCALES: HORIZONTAL 1:250 VERTICAL 1:100  
STORMWATER DRAINAGE LINE A - LONGITUDINAL SECTION



SCALES: HORIZONTAL 1:250 VERTICAL 1:100  
STORMWATER DRAINAGE LINE B - LONGITUDINAL SECTION

NOTE:  
UTILITIES LOCATED BY ELECTRONIC  
DETECTOR TO AVOID PAVEMENT DAMAGE.  
EXPOSE AND CONFIRM LOCATIONS PRIOR  
TO LAYING DRAINAGE SYSTEM.

| UTILITIES                |   | LEGEND |   | REVISION DETAILS |  | DRAWN |  | APPR. |  | DATE |  | DATUM |  | SURVEYED |  | CHECKED |  | DESIGN NAME |  | DATE |  | BAR SCALE |  | GOSFORD CITY COUNCIL |  |
|--------------------------|---|--------|---|------------------|--|-------|--|-------|--|------|--|-------|--|----------|--|---------|--|-------------|--|------|--|-----------|--|----------------------|--|
| WATERMAIN                | W | W      | W |                  |  |       |  |       |  |      |  |       |  |          |  |         |  |             |  |      |  |           |  |                      |  |
| UNDERGROUND POWER CABLES | U | U      | U |                  |  |       |  |       |  |      |  |       |  |          |  |         |  |             |  |      |  |           |  |                      |  |
| GAS MAIN                 | G | G      | G |                  |  |       |  |       |  |      |  |       |  |          |  |         |  |             |  |      |  |           |  |                      |  |
| UNDERGROUND ATC CABLES   | A | A      | A |                  |  |       |  |       |  |      |  |       |  |          |  |         |  |             |  |      |  |           |  |                      |  |
| STC POLES                | P | P      | P |                  |  |       |  |       |  |      |  |       |  |          |  |         |  |             |  |      |  |           |  |                      |  |
| ATC PILES                | S | S      | S |                  |  |       |  |       |  |      |  |       |  |          |  |         |  |             |  |      |  |           |  |                      |  |
| SEWERMAIN                | S | S      | S |                  |  |       |  |       |  |      |  |       |  |          |  |         |  |             |  |      |  |           |  |                      |  |

DATE: 21/08/2010

DATE: 21/08/2010

0 2 4 6 8 10m

0 5 10 15 20 25m

1:100 @ A1

1:250 @ A1

FILE No. :

DRAWING No: C4/209

SHEET: 11

REV: \*



BUTT JOINTS SHALL BE PACKED OR SEALED WITH CEMENT MORTAR OR GROUT.

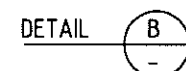
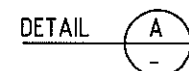
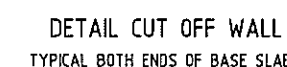
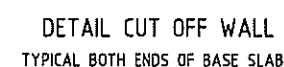
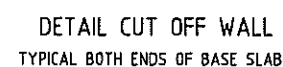
CROWN UNIT

CROWN UNIT

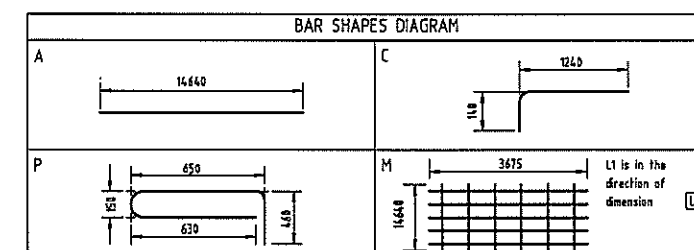
300

20 DIA. 230R TO AS1302 GALVANIZED DOWELS X 600 LONG AT 300 CENTRES SHALL BE WRAPPED IN PETROLEUM JELLY IMPREGNATED TAPE FOR A LENGTH OF 300MM FROM ONE END.

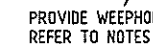
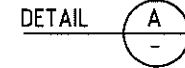
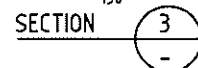
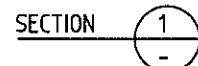
AT 15m MAX. CENTRES  
CONTRACTION JOINT SHALL BE LOCATED  
TO COINCIDE WITH JOINT AT CROWN UNITS



- NOTES :**
- DIMENSIONS SHOWN ON SHAPES DIAGRAM ARE MEASURED FROM OUTSIDE FACE OF BARS.
  - BAR SIZE IS NOMINAL DIAMETER IN MILLIMETRES
  - SIZE 12, 16, 20, 24 AND 28 BARS SHALL BE GRADE 400Y TO AS 1302.
  - PIN DIAMETER FOR BENDING
  - BAR SIZE            12    16    20    24    28
  - PIN DIAMETER    75    100    120    145    170
  - THE INCLUDED ANGLE OF ANY BEND SHALL BE A RIGHT ANGLE UNLESS OTHERWISE SHOWN.



| UTILITIES                |  |  |  | LEGEND |  |  |  |                        |  |  |  | DATE     |  |  |  | SURVEYED         |  |  |  | OUSE ROBE HARVEY<br>CABLE & LAMP |  |  |  | 01.10.03 |  |  |  | RECOMMENDED |  |  |  | BAR SCALE        |  |  |  | GOSFORD CITY COUNCIL                   |  |  |  |                          |  |  |  |
|--------------------------|--|--|--|--------|--|--|--|------------------------|--|--|--|----------|--|--|--|------------------|--|--|--|----------------------------------|--|--|--|----------|--|--|--|-------------|--|--|--|------------------|--|--|--|----------------------------------------|--|--|--|--------------------------|--|--|--|
| PLAN                     |  |  |  | SECT.  |  |  |  | EXISTING               |  |  |  | PROPOSED |  |  |  | A.H.D.           |  |  |  | DRAWN                            |  |  |  | S.B.     |  |  |  | 05.09.09    |  |  |  | DATE: 21/08/2010 |  |  |  |                                        |  |  |  | BALOO ROAD, WEST GOSFORD |  |  |  |
| WATERMAIN                |  |  |  | -W     |  |  |  | KIPP AND GUTTER        |  |  |  |          |  |  |  | SURVEY NAME      |  |  |  |                                  |  |  |  |          |  |  |  |             |  |  |  | APPROVED         |  |  |  | CULVERT UPGRADE & CHANNEL IMPROVEMENTS |  |  |  |                          |  |  |  |
| UNDERGROUND POWER CABLES |  |  |  | -P     |  |  |  | TABLE DRAIN            |  |  |  |          |  |  |  | 04-60MGN         |  |  |  | CHECKED                          |  |  |  | GCC      |  |  |  | *           |  |  |  | DESIGN NAME      |  |  |  | SRB Consulting Pty Ltd                 |  |  |  | FILE No. :               |  |  |  |
| GAS MAIN                 |  |  |  | -G     |  |  |  | UNDERGROUND A/C CABLES |  |  |  |          |  |  |  | 1909CA           |  |  |  |                                  |  |  |  |          |  |  |  |             |  |  |  |                  |  |  |  |                                        |  |  |  | DRAWING No: C4/209       |  |  |  |
| UNDERGROUND A/C CABLES   |  |  |  | -U     |  |  |  | PITTED LINE            |  |  |  |          |  |  |  |                  |  |  |  |                                  |  |  |  |          |  |  |  |             |  |  |  |                  |  |  |  | SHEET: 12                              |  |  |  |                          |  |  |  |
| SIL FOLDS                |  |  |  | -F     |  |  |  | PITTED DRAIN           |  |  |  |          |  |  |  |                  |  |  |  |                                  |  |  |  |          |  |  |  |             |  |  |  |                  |  |  |  | REV: *                                 |  |  |  |                          |  |  |  |
| A/C CABLES               |  |  |  | -C     |  |  |  | GULLY PIT              |  |  |  |          |  |  |  |                  |  |  |  |                                  |  |  |  |          |  |  |  |             |  |  |  |                  |  |  |  |                                        |  |  |  |                          |  |  |  |
| SEWERMAIN                |  |  |  | -S     |  |  |  | JUNCTION PIT           |  |  |  |          |  |  |  |                  |  |  |  |                                  |  |  |  |          |  |  |  |             |  |  |  |                  |  |  |  |                                        |  |  |  |                          |  |  |  |
|                          |  |  |  |        |  |  |  |                        |  |  |  |          |  |  |  | REVISION DETAILS |  |  |  | DRAWN                            |  |  |  | APPR.    |  |  |  | DATE        |  |  |  |                  |  |  |  |                                        |  |  |  |                          |  |  |  |
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|                          |  |  |  |        |  |  |  |                        |  |  |  |          |  |  |  |                  |  |  |  |                                  |  |  |  |          |  |  |  |             |  |  |  |                  |  |  |  |                                        |  |  |  |                          |  |  |  |
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- \* BASED ON ROCLA DATA SHEET.  
QUANTITIES ARE FOR 4 WINGWALLS AND 2 HEADWALLS

NOTES :

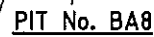
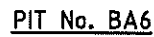
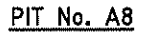
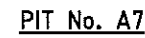
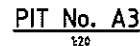
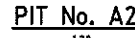
- DIMENSIONS SHOWN ON SHAPES DIAGRAM ARE MEASURED FROM OUTSIDE FACE OF BARS.
- BAR SIZE IS NOMINAL DIAMETER IN MILLIMETRES
- SIZE 12, 16, 20 AND 24 BARS SHALL BE GRADE 400Y TO AS 1002
- PIN DIAMETER FOR BENDING

| BAR SIZE     | 12 | 16  | 20  | 24  |
|--------------|----|-----|-----|-----|
| PIN DIAMETER | 75 | 100 | 120 | 145 |

- THE INCLUDED ANGLE OF ANY BEND SHALL BE A RIGHT ANGLE UNLESS OTHERWISE SHOWN

[illegible]



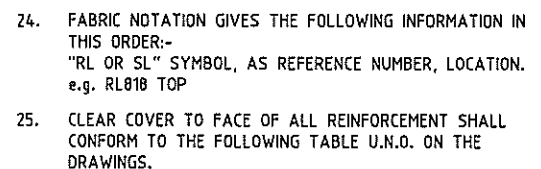


1. ALL DIMENSIONS IN mm UNLESS OTHERWISE SHOWN
2. MINIMUM 28 DAY COMPRESSIVE STRENGTH OF CONCRETE SHALL BE N32
3. CLEAR COVER TO THE OUTER REINFORCEMENT SHALL BE 40mm, 60mm WHEN CAST AGAINST GROUND.
4. PIT SIDE WALLS > 1500 HIGH  
1500-2700 - 2 LAYERS N12@200 EACH FACE  
> 2700 - 2 LAYERS N16@200 EACH FACE
5. BASE SLABS - GROUND CAPACITY 150KPa
6. GRATE - HEAVY DUTY GAL. IRON, 900mmx900mm FLUSH MOUNTED UNLESS OTHERWISE NOTED.
7. HANDHOLE ACCESS TO BE PROVIDED WHERE SPECIFIED. REFER TO TYPICAL SECTION THROUGH OPENING DETAIL
8. ALL CORNERS TO BE FILLETED 20mm AND ALL EXPOSED EDGES TO BE CHAMFERED 20mm
9. WEEPHOLES 50mm Ø SHALL BE PROVIDED IN THE WINGWALLS AT 1.5m CENTRES AND LOCATED 150mm ABOVE GROUND LEVEL
10. CAST 100mmØ PENETRATION INTO WALL OF PIT TO ENABLE CONNECTION OF SUBSOIL DRAINAGE LINE.
11. STEP IRONS TO BE PLACED IN ALL PITS OVER 1.2m DEEP

[illegible]

1. ALL WORKMANSHIP AND MATERIALS SHALL BE IN ACCORDANCE WITH AS 3600 2001 AND OTHER RELEVANT AUSTRALIAN CODES.
2. NO ADMIXTURES SHALL BE USED IN CONCRETE UNLESS APPROVED IN WRITING.
3. PROJECT CONTROL TESTING SHALL BE CARRIED OUT IN ACCORDANCE WITH AS 3600.
4. ALL REINFORCEMENT SHALL BE FIRMLY SUPPORTED ON MILD STEEL PLASTIC TIPPED CHAIRS, PLASTIC CHAIRS OR CONCRETE CHAIRS AT NOT GREATER THAN 1 METRE CENTRES BOTH WAYS, BARS SHALL BE TIED AT ALTERNATE INTERSECTIONS. IN EXPOSURE CONDITIONS GREATER THAN B1 USE ONLY PLASTIC CHAIRS.
5. CONCRETE DIMENSIONS SHOWN DO NOT INCLUDE THICKNESSES OF APPLIED FINISHES.
6. FOR CHAMFERS, DRIP GROOVES, FILLETS ETC REFER TO ARCHITECTS DETAILS, MAINTAIN COVER TO REINFORCEMENT AT THESE DETAILS.
7. NO HOLES, CHASES OR EMBEDMENT OF PIPES OTHER THEN THOSE SHOWN ON THE STRUCTURAL DRAWINGS SHALL BE MADE IN CONCRETE MEMBERS WITHOUT THE PRIOR WRITTEN APPROVAL OF THE SUPERINTENDENT.
8. CONSTRUCTION JOINTS WHERE NOT SHOWN SHALL BE LOCATED TO THE APPROVAL OF THE SUPERINTENDENT.
9. THE FINISHED CONCRETE SHALL BE A DENSE HOMOGENEOUS MASS, COMPLETELY FILLING THE FORMWORK THOROUGHLY EMBEDDING THE REINFORCEMENT AND FREE OF STONE POCKETS. ALL CONCRETE INCLUDING SLABS ON GROUND AND FOOTINGS SHALL BE COMPACTED WITH MECHANICAL VIBRATORS.
10. CURING OF ALL CONCRETE SHALL BE ACHIEVED BY KEEPING SURFACES CONTINUOUSLY WET FOR A PERIOD OF 3 DAYS, AND PREVENTION OF LOSS OF MOISTURE FOR A TOTAL OF 7 DAYS FOLLOWED BY A GRADUAL DRYING OUT. APPROVED SPRAYED ON CURING COMPOUNDS MAY BE USED WHERE NO FLOOR FINISHED ARE PROPOSED. POLYTHENE SHEETING OR WET HESSIAN MAY BE USED IF PROTECTED FROM WIND AND TRAFFIC.
11. CONSTRUCTION SUPPORT PROPPING SHALL BE LEFT IN PLACE WHERE NEEDED TO AVOID OVERSTRESSING THE STRUCTURE DUE TO CONSTRUCTION LOADING.
12. THE SUPERINTENDENT SHALL BE GIVEN A MINIMUM OF 24 HOURS NOTICE FOR REINFORCEMENT INSPECTION AND CONCRETE SHALL NOT BE DELIVERED UNTIL FINAL APPROVAL OBTAINED.
13. REINFORCEMENT IS REPRESENTED DIAGRAMMATICALLY AND NOT NECESSARILY IN TRUE PROJECTION.
14. SLAB REINFORCEMENT SHALL EXTEND AT LEAST 65 mm ONTO MASONRY SUPPORT WALLS AND 50 PERCENT OF BOTTOM REINFORCEMENT SHALL BE COGGED TO ACHIEVE ANCHORAGE AT SIMPLY SUPPORTED ENDS.
15. SPLICES IN REINFORCEMENT SHALL BE MADE ONLY IN POSITION SHOWN OR OTHERWISE APPROVED IN WRITING BY THE SUPERINTENDENT. LAPS SHALL BE IN ACCORDANCE WITH AS 3600 AND NOT LESS THAN THE DEVELOPMENT LENGTH FOR EACH BAR UNO.
16. WELDING OF REINFORCEMENT SHALL NOT BE PERMITTED UNLESS SHOWN ON THE STRUCTURAL DRAWINGS OR APPROVED BY THE ENGINEER.
17. JOGGLES TO BARS SHALL BE 1 BAR DIAMETER OVER A LENGTH OF 12 BAR DIAMETERS UNO.
18. FABRIC SHALL BE LAPPED 2 TRANSVERSE WIRES PLUS 50 mm. BUNDLED BARS SHALL BE TIED TOGETHER AT 30 BAR DIAMETER CENTRES WITH 3 WRAPS OF THE WIRE.
19. WHERE TRANSVERSE TIE BARS ARE NOT SHOWN PROVIDE Y12-400 SPLICED WHERE NECESSARY AND LAP WITH MAIN BARS 400 mm UNO.
20. A BOND BREAKING MATERIAL SHALL BE PLACED BETWEEN CONTACTING SURFACES AT CONTRACTION JOINTS. REINFORCEMENT SHALL NOT BE CONTINUOUS THROUGH CONTRACTION JOINTS.
21. AT PENETRATIONS IN SLABS UNLESS OTHERWISE DETAILED REINFORCEMENT SHALL NOT BE CUT BUT SHALL BE GATHERED EQUALLY TO EACH SIDE OF PENETRATION AND EXTRA REINFORCEMENT PROVIDED BETWEEN THE PENETRATIONS AS DIRECTED BY THE ENGINEER.
22. REINFORCEMENT TYPE AND GRADE.

23. BAR NOTATION GIVES THE FOLLOWING INFORMATION IN THIS ORDER:-  
No. OF BARS, TYPE, BAR SIZE (mm), SPACING (mm), LAYER  
e.g. 20 (Y OR N)16-200 T1.

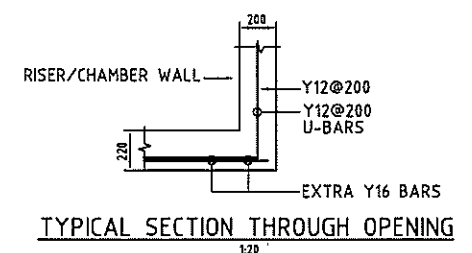
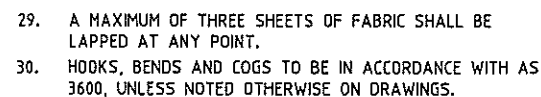


26. COVER SPECIFIED ALSO APPLIES LOCALLY AT RECESSES, DRIP GROOVES etc..
27. LAP REINFORCEMENT ONLY AT LOCATIONS SHOWN ON THE DRAWINGS OR AS APPROVED.  
UNLESS OTHERWISE NOTED, LAP BARS AS TABULATED BELOW.

| COMPRESSION LAP SPLICE LENGTH |     |     |     |      |      |      |
|-------------------------------|-----|-----|-----|------|------|------|
| N12                           | N16 | N20 | N24 | N28  | N32  | N36  |
| 450                           | 600 | 750 | 900 | 1050 | 1200 | 1350 |

LAP LENGTH SHOWN IN BRACKETS APPLY TO HORIZONTAL BARS WITH MORE THAN 300 mm OF CONCRETE CAST BELOW THE BAR.

28. FABRIC SHALL BE LAPPED SUCH THAT THE TWO OUTERMOST WIRES OF ONE SHEET OVERLAP THE TWO OUTERMOST WIRES OF THE OTHER SHEET BY 25 mm MINIMUM.

[illegible]

CONSTRUCT OPEN GROSS POLLUTANT TRAP AS SHOWN.  
PROVIDE 3.5m WIDE ROADBASE MAINTENANCE PAD EITHER  
SIDE OF GPT TO FACILITATE REMOVAL OF SEDIMENT &  
RUBBISH.

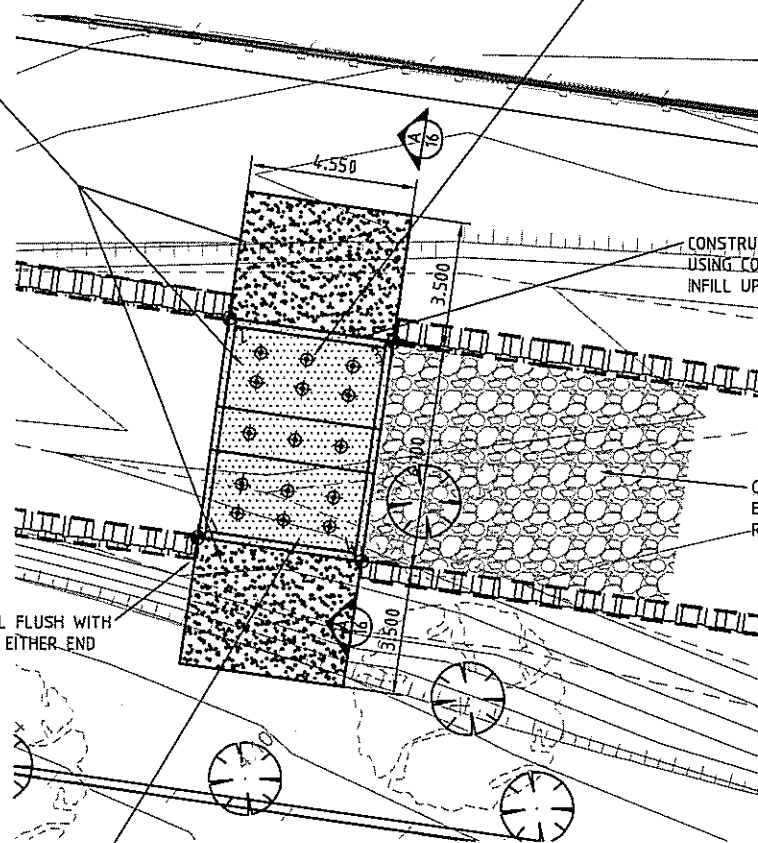
PROVIDE PRESSURE RELIEF DRAINS  
AS PER DETAIL GENERALLY AS  
INDICATED THROUGH CROWN UNITS.

CONSTRUCT SIDE WALLS AT EITHER SIDE OF CHANNEL  
USING CONCRETE INFILL BETWEEN CROWN UNITS. EXTEND  
INFILL UP TO MAINTENANCE PAD LEVEL (RL 3.15)

CONSTRUCT RIP RAP SCOUR PROTECTION  
EXTENDING 10m DOWNSTREAM OF TRASH  
RACK. REFER TO SEPARATE DETAIL.

FINISH RETAINING WALL FLUSH WITH  
MAINTENANCE PAD AT EITHER END  
OF GPT AS INDICATED.

PROVIDE 2x2.45m & 1x1.2m LENGTHS OF  
4200x900 RCBC LAID ACROSS CHANNEL  
TO FORM GPT BASE AND END WALLS.

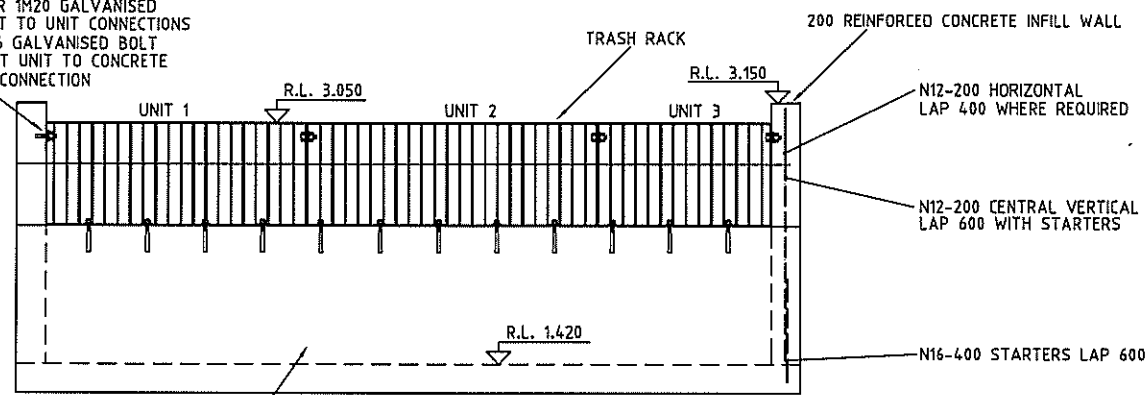


PLAN  
Scale 1:100

#### GPT SETOUT POINTS

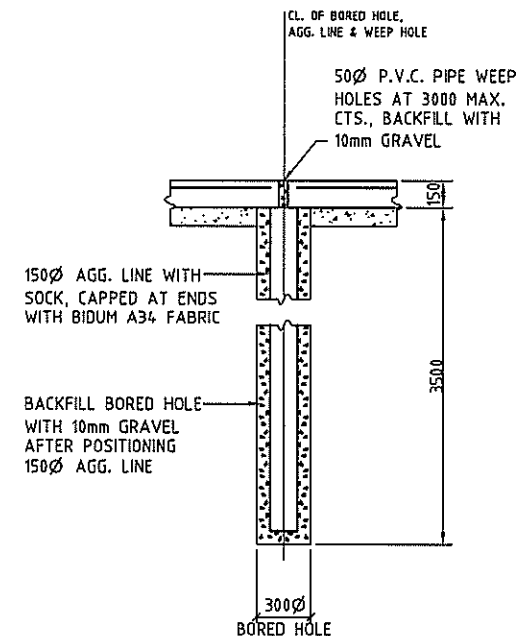
| No. | RL    | EASTING    | NORTHING   |
|-----|-------|------------|------------|
| 1   | 2.320 | E 1548.158 | N 1763.552 |
| 2   | 2.320 | E 1549.017 | N 1769.591 |
| 3   | 2.320 | E 1553.522 | N 1768.950 |
| 4   | 2.320 | E 1552.663 | N 1762.911 |

22Ø HOLE IN EACH UNIT END  
VERTICAL FOR 1M20 GALVANISED  
BOLT AT UNIT TO UNIT CONNECTIONS  
AND 1M20 4.6 GALVANISED BOLT  
& WASHER AT UNIT TO CONCRETE  
INFILL WALL CONNECTION



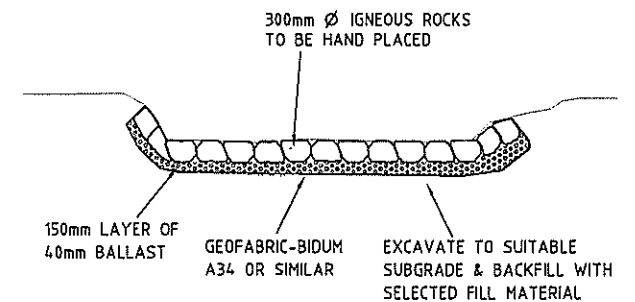
SECTION  
SCALE NTS

A  
16



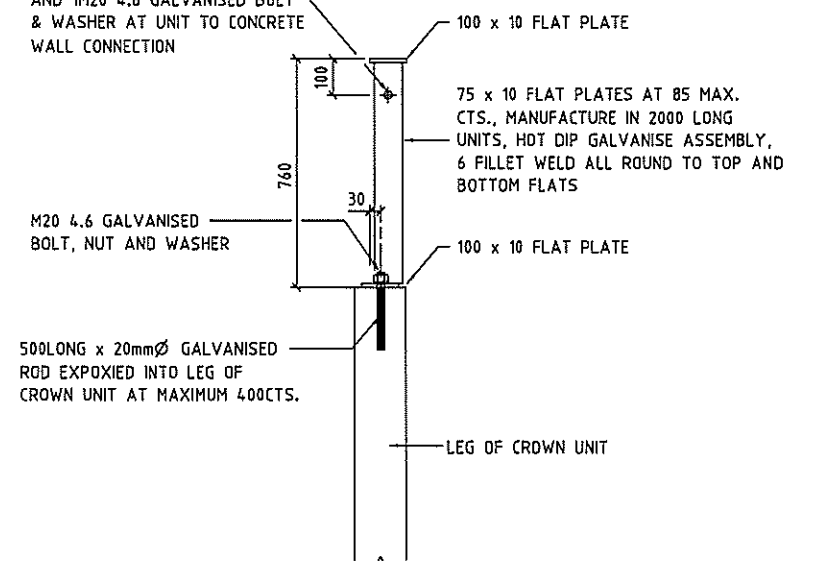
PRESSURE RELIEF DRAIN DETAIL  
SCALE 1:20

LOCATED THUS ON SHEET 1.



ROCK SCOUR PROTECTION  
N.T.S.

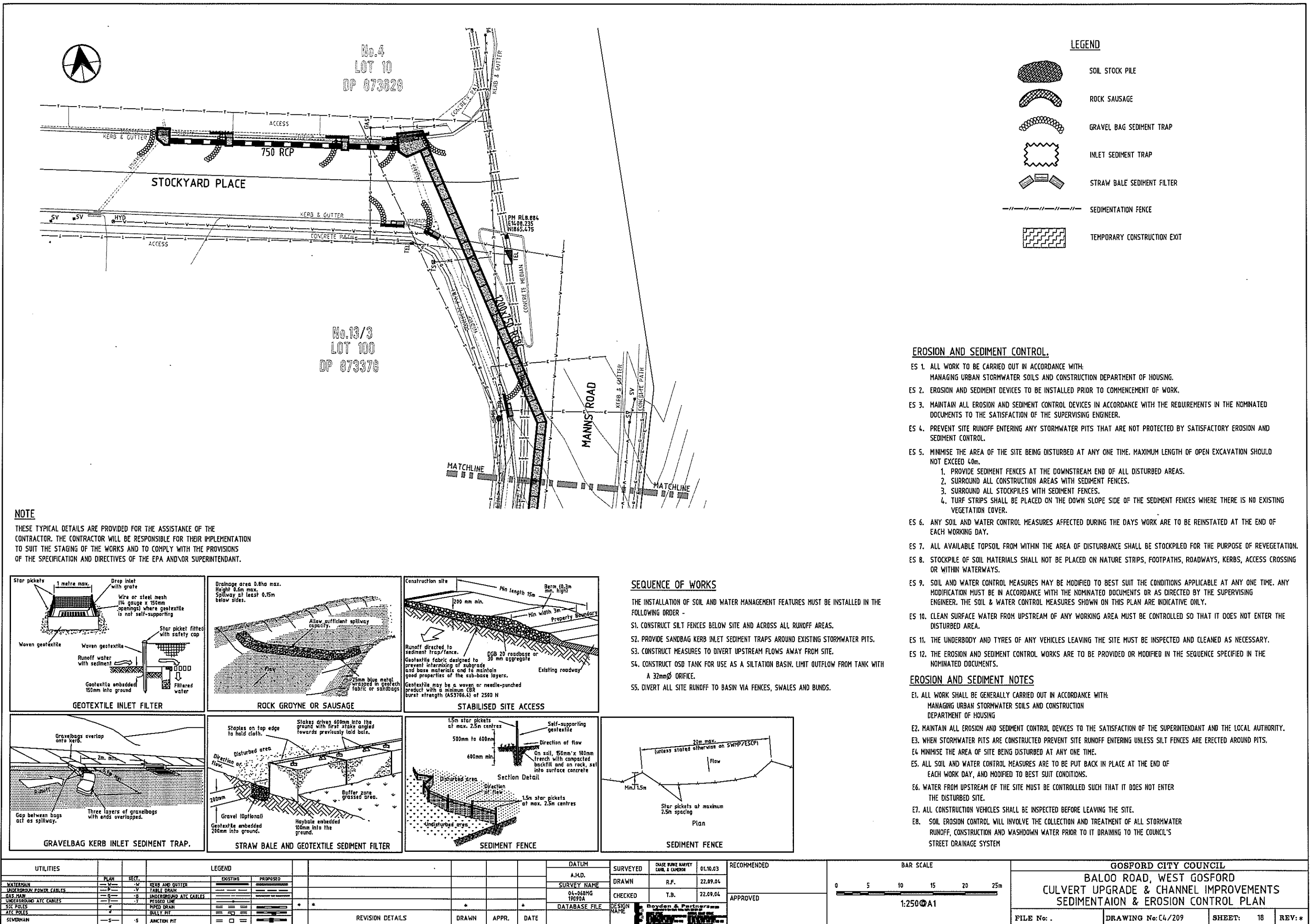
22Ø HOLE IN EACH UNIT END  
VERTICAL FOR 1M20 GALVANISED  
BOLT AT UNIT TO UNIT CONNECTIONS  
AND 1M20 4.6 GALVANISED BOLT  
& WASHER AT UNIT TO CONCRETE  
WALL CONNECTION



SECTION  
TYPICAL TRASH RACK DETAIL  
SCALE 1:10

| UTILITIES                |      | LEGEND |          | DATUM    |                 | SURVEYED    |      | CHASE BUREAU HARVEY |          | RECOMMENDED     |                 | BAR SCALE |  | GOSFORD CITY COUNCIL                   |  |
|--------------------------|------|--------|----------|----------|-----------------|-------------|------|---------------------|----------|-----------------|-----------------|-----------|--|----------------------------------------|--|
| WATERMAIN                | PLAN | SECT.  | EXISTING | PROPOSED | A.H.D.          | DRAWN       | S.B. | 01.10.03            | 09.09.09 | DATE 21/08/2010 | APPROVED        |           |  | BALOO ROAD, WEST GOSFORD               |  |
| UNDERGROUND POWER CABLES | PLAN | SECT.  | EXISTING | PROPOSED | SURVEY NAME     | CHECKED     | GCC  | *                   | *        | DATE 01/08/2010 | DATE 01/08/2010 |           |  | CULVERT UPGRADE & CHANNEL IMPROVEMENTS |  |
| GAS MAIN                 | PLAN | SECT.  | EXISTING | PROPOSED | 04-060MG 19990A | DATE        |      |                     |          |                 |                 |           |  | GROSS POLLUTANT TRAP DETAILS           |  |
| UNDERGROUND ATC CABLES   | PLAN | SECT.  | EXISTING | PROPOSED | DATABASE FILE   | DESIGN NAME |      |                     |          |                 |                 |           |  | FILE No: .                             |  |
| SEWER MAIN               | PLAN | SECT.  | EXISTING | PROPOSED |                 |             |      |                     |          |                 |                 |           |  | DRAWING No: C4/209                     |  |
| ATC POLES                | PLAN | SECT.  | EXISTING | PROPOSED |                 |             |      |                     |          |                 |                 |           |  | SHEET: 16                              |  |
| SEWER MAIN               | PLAN | SECT.  | EXISTING | PROPOSED |                 |             |      |                     |          |                 |                 |           |  | REV: *                                 |  |

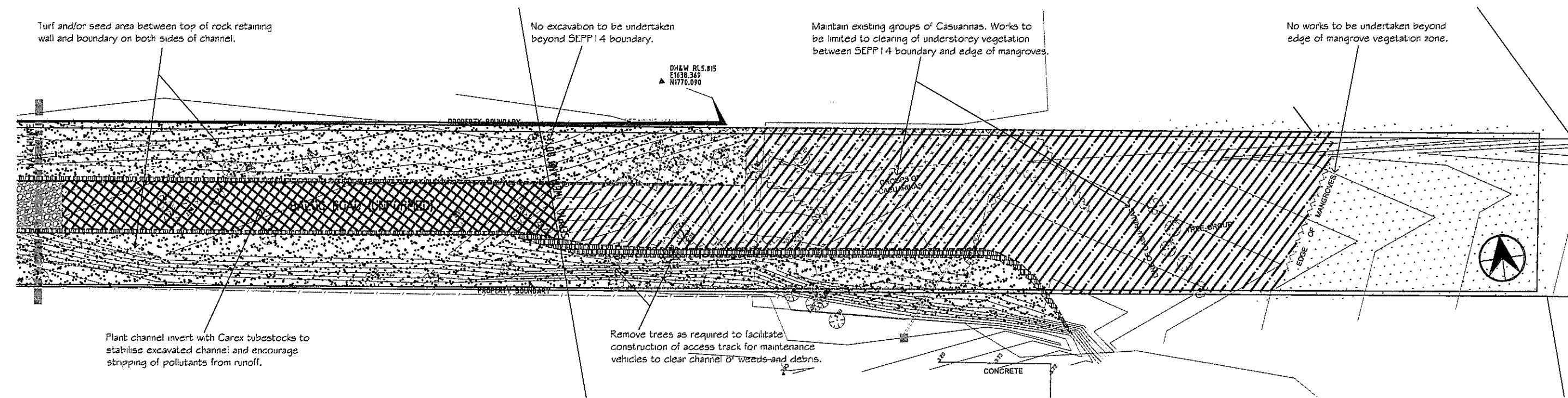
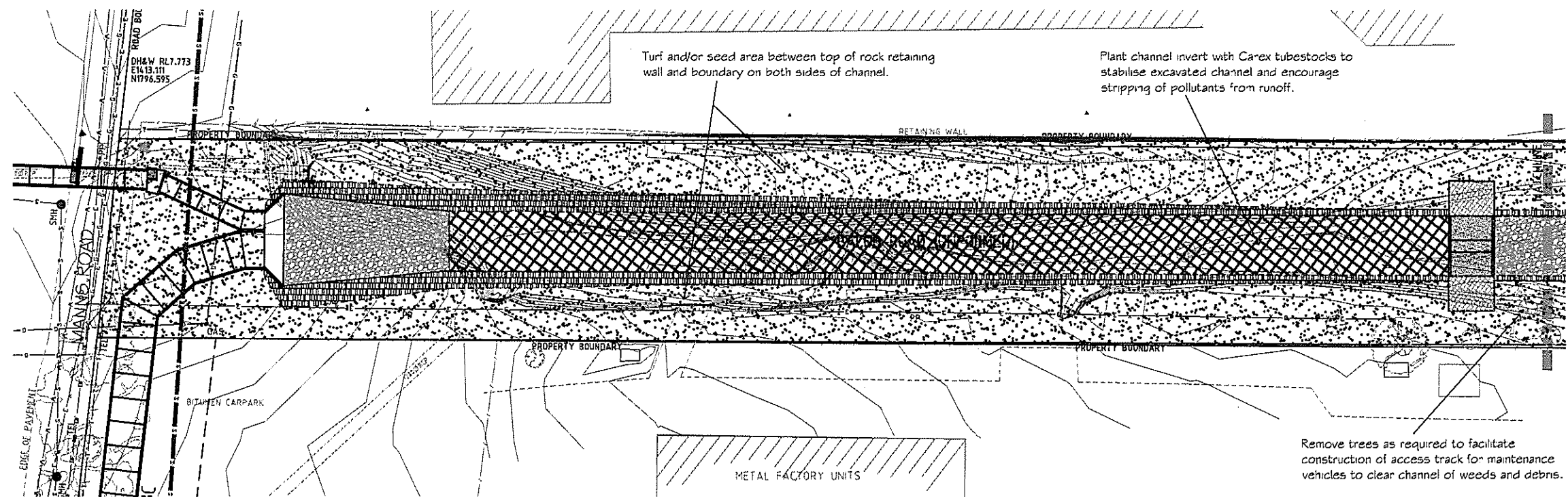






Legend

- Existing Contours
- Proposed Rock Retaining Walls
- Proposed Rock Rip Rap
- Proposed Turf Areas - 3150m<sup>2</sup>  
Turf or seed subject to client's selection
- Existing group of Casuarinas -  
To be retained where possible
- Vegetation Protection Zone - Works to  
be limited to clearing of understorey  
shrubs and groundcovers. Maintain trees.
- Carex Appressa (Graceful Sedge) planted  
within channel invert at 1 plant / 1 m<sup>2</sup>.  
Total area = 1000m<sup>2</sup> = 1000 plants
- Existing Mangrove vegetation. No works  
to be undertaken in this area.



| UTILITIES                |     | LEGEND |      | REVISION DETAILS      |          | DRAWN    |  | APPR. |  | DATE |  | DATUM       |  | SURVEYED |  | CHECKED  |  | APPROVED         |  | BAR SCALE        |  | GOSFORD CITY COUNCIL                                  |  |  |  |
|--------------------------|-----|--------|------|-----------------------|----------|----------|--|-------|--|------|--|-------------|--|----------|--|----------|--|------------------|--|------------------|--|-------------------------------------------------------|--|--|--|
| WATER MAIN               | —W— | PLAN   | SEC. | ASPP AND GUTTER       | EXISTING | PROPOSED |  |       |  |      |  | A.M.D.      |  | 01.10.03 |  | 09.09.08 |  | DATE: 21/08/2010 |  | 0 5 10 15 20 25m |  | BALOO ROAD, WEST GOSFORD                              |  |  |  |
| UNDERGROUND POWER CABLES | —P— |        |      | TARLE DRAIN           |          |          |  |       |  |      |  | SURVEY NAME |  | S.B.     |  |          |  | APPROVED         |  | 1:250@A1         |  | CULVERT UPGRADE & CHANNEL IMPROVEMENTS LANDSCAPE PLAN |  |  |  |
| GAS MAIN                 | —G— |        |      | UNDERGROUND ATC CABLE |          |          |  |       |  |      |  | 04-06-08    |  | GCC      |  |          |  |                  |  |                  |  | FILE No: .                                            |  |  |  |
| UNDERGROUND ATC CABLES   | —T— |        |      | REGGIO LINE           |          |          |  |       |  |      |  | 19090A      |  |          |  |          |  |                  |  |                  |  | DRAWING No: C4/209                                    |  |  |  |
| SEC. POLES               | —S— |        |      | TURF SEAM             |          |          |  |       |  |      |  |             |  |          |  |          |  |                  |  |                  |  | SHEET: 19                                             |  |  |  |
| ATC POLES                | —A— |        |      | CURLY PT              |          |          |  |       |  |      |  |             |  |          |  |          |  |                  |  |                  |  | REV: *                                                |  |  |  |
| SEWER MAIN               | —S— |        |      | JUNCTION FIT          |          |          |  |       |  |      |  |             |  |          |  |          |  |                  |  |                  |  |                                                       |  |  |  |