STANDARD SYMBOLS

SURVEY LINES • 0 25 50 75 100
LAND BOUNDARIES

NEW WATERMAINS (BLUE) • 150φ
EXISTING WATERMAINS • W 150φ W

HYDRANTS • DIA 2mm
VALVES & METERS • MINI MH
NEW SEWER (RED) • 150φ

EXISTING GRAVITY • S 225φ
EX. SWALLOWS OR PRESSURE • P 450φ
EX. RISING OR PUMPING • RM
EX. MANHOLE • S 150φ

NEW STORMWATER (GREEN) • SW 450φ SW
EXISTING MAIN • SW MH SW
EX. MANHOLE •/open drains
OPEN DRAINS

CABLES

TELEPHONE • UNDERGROUND T
OVERHEAD • T TP T
LINEWEIGHT 0.35/0.5mm
DIA 2mm

ELECTRICITY • UNDERGROUND LP E E
OVERHEAD • E LP PP E
LINEWEIGHT 0.25mm
DIA 2mm

KERB & CHANNEL

SUMPS • SIDE ENTRY SE
YARD • 2.0m HIGH 1.2m HIGH
RETAINING WALLS • ANNOTATED e.g. CRIBWALL
LINEWEIGHT 0.5mm

TYPICAL SIGNATURE BLOCK

NELSON CITY COUNCIL

SITE CONTOURS 1:1000 1:500 1:250 1:200
STREETS KERB & CHANNEL AND
FOOTPATHS

PLAN 1:500 1:250 1:200
LONGITUDINAL SECTION :
HORIZONTAL 1:500 1:250 1:200
VERTICAL 1:50 1:25 1:20

CROSS SECTIONS
HORIZONTAL 1:50
VERTICAL 1:100 1:50 1:20

ANY VARIATION FROM THESE SCALES AS
SHOWN SHALL HAVE THE PRIOR
APPROVAL OF THE COUNCIL

SHEET SIZES: A1 594mm x 841mm
A2 420mm x 594mm

SOIL & STORMWATER SEWERS

PLAN 1:500 1:250 1:200
LONGITUDINAL SECTION :
HORIZONTAL 1:500 1:250 1:200
VERTICAL 1:50 1:100
DETAILS 1:20 1:10 1:5

SERVICES GENERAL

PLAN 1:500 1:250 1:200
CROSS SECTIONS 1:50

MAIN SHEETS REQUIRED:
1. ROADING
2. SEWERS-STORMWATER-KERBS
3. WATER-TELEPHONE-POWER-KERBS

ALL INKS AND LETTERING USED SHOULD BE SUITABLE FOR SCANNING REPRODUCTION.

NELSON CITY COUNCIL

DRAWING SYMBOLS & SCALES

INFRASTRUCTURAL ASSETS

APPROVED

29/07/2010

SD 201

NELSON CITY COUNCIL

DRAWING SYMBOLS & SCALES

INFRASTRUCTURAL ASSETS

APPROVED

29/07/2010

SD 201

NELSON CITY COUNCIL

DRAWING SYMBOLS & SCALES

INFRASTRUCTURAL ASSETS

APPROVED

29/07/2010

SD 201
# Longitudinal Section

## Roads

<table>
<thead>
<tr>
<th>Description</th>
<th>Symbol</th>
</tr>
</thead>
<tbody>
<tr>
<td>H.A.D (N.C.C.)</td>
<td>![H.A.D Symbol]</td>
</tr>
<tr>
<td>Other Levels (E.G. Existing Services)</td>
<td>![Other Levels Symbol]</td>
</tr>
<tr>
<td>Top Of Kerb Level R.H. Side</td>
<td>![Top Of Kerb Level R.H. Side Symbol]</td>
</tr>
<tr>
<td>Top Of Kerb Level L.H. Side</td>
<td>![Top Of Kerb Level L.H. Side Symbol]</td>
</tr>
<tr>
<td>Ground Level Peg Level</td>
<td>![Ground Level Peg Level Symbol]</td>
</tr>
<tr>
<td>Horizontal Distance</td>
<td>![Horizontal Distance Symbol]</td>
</tr>
<tr>
<td>Gradient R.H Side (% or 1 in ...)</td>
<td>![Gradient R.H Side Symbol]</td>
</tr>
<tr>
<td>Gradient L.H Side</td>
<td>![Gradient L.H Side Symbol]</td>
</tr>
<tr>
<td>Horizontal Curve</td>
<td>![Horizontal Curve Symbol]</td>
</tr>
</tbody>
</table>

## Sewer & Stormwater

<table>
<thead>
<tr>
<th>Description</th>
<th>Symbol</th>
</tr>
</thead>
<tbody>
<tr>
<td>H.A.D (N.C.C.)</td>
<td>![H.A.D Symbol]</td>
</tr>
<tr>
<td>Other Levels (E.G. Services Crossing The Line)</td>
<td>![Other Levels Symbol]</td>
</tr>
<tr>
<td>Hydraulic Grade Level (If Applicable)</td>
<td>![Hydraulic Grade Level Symbol]</td>
</tr>
<tr>
<td>Ground Level Peg Level</td>
<td>![Ground Level Peg Level Symbol]</td>
</tr>
<tr>
<td>Cut (Ground Level To Invert)</td>
<td>![Cut Symbol]</td>
</tr>
<tr>
<td>Sewer Invert</td>
<td>![Sewer Invert Symbol]</td>
</tr>
<tr>
<td>Sewer Distance (True Horizontal Distance Along Sewer)</td>
<td>![Sewer Distance Symbol]</td>
</tr>
<tr>
<td>Gradient (% or 1 in ...)</td>
<td>![Gradient Symbol]</td>
</tr>
<tr>
<td>Diameter (Millimeters Internal) &amp; Pipe Type/Material</td>
<td>![Diameter Symbol]</td>
</tr>
</tbody>
</table>

## Colour Code

- **Filling:** Green Symbol = ![Filling Symbol]
- **Cutting:** Red Symbol = ![Cutting Symbol]
- **Replacement Gravel:** Brown Symbol = ![Replacement Gravel Symbol]
- **Basecourse:** Blue Symbol = ![Basecourse Symbol]
- **Earth (Topsoil):** Symbol = ![Earth Symbol]

## Note

1. All levels in terms of height above NCC datum in metres.
2. All distances in metres.
3. Ground or peg levels shown on sections are to be those on the line of the sewer.
4. Pipelines designed to operate under pressure shall include the hydraulic grade line, its levels and gradients.
5. Blocks may be extended to allow "As Built" data to be added. E.G.: As Built Sewer Invert as Built Distance as Built Gradient.
6. Lowest level on longitudinal section on LHS.

## Colour Code

Colour code primarily for use on white paper. All inks used should be suitable for dyeline photocopying and reproduction.

Symbol is for when colours are to be reproduced in black.
A. **PROPORTION OF BROKEN ROCK:**
   The percentage by weight of material in each of the fractions between the 19mm and 4.75mm sieves having two or more broken faces shall not be less than 70%.

B. **CRUSHING RESISTANCE:**
   The crushing resistance shall not be less than 130kN.

C. **WEATHERING RESISTANCE:**
   The aggregate shall fall into one of the following weathering resistance categories: AA AB AC BA BB CA.

D. **SAND EQUIVALENT:**
   The sand equivalent shall not be less than 40 when the aggregate is tested according to NZS 4407: 1991.

---

**NELSON CITY COUNCIL**

**20mm BASECOURSE AGGREGATE**

**INFRASTRUCTURAL ASSETS**

**APPROVED**

**29/07/2010**

**SD 401**
A. **PROPORTION OF BROKEN ROCK:**
The percentage by weight of material in each of the four fractions between the 37.5mm and 4.5mm sieves having two or more broken faces shall not be less than 70%.

B. **CRUSHING RESISTANCE:**
The crushing resistance shall not be less than 130kN.

C. **WEATHERING RESISTANCE:**
The aggregate shall fall into one of the following weathering resistance categories: AA, AB, AC, BA, BB, CA.

D. **SAND EQUIVALENT:**
The sand equivalent shall not be less than 40 when the aggregate is tested according to NZS 4407: 1991.
A. **PROPORTION OF BROKEN ROCK:**
   The percentage by weight of material in each of the four fractions between the 63.5mm and 4.5mm sieves having two or more broken faces shall not be less than 70%.

B. **CRUSHING RESISTANCE:**
   The crushing resistance shall not be less than 110kN.

C. **WEATHERING RESISTANCE:**
   The aggregate shall fall into one of the following weathering resistance categories: AA AB AC BA BB CA.

D. **SAND EQUIVALENT:**
   The sand equivalent shall not be less than 40 when the aggregate is tested according to NZS 4407: 1991.
EXAMPLE: (SHOWN IN DOTTED LINE)
RESIDENTIAL ROAD
OBSERVED DEFLECTIONS 3.6mm ADDITIONAL DEPTH OF METALCOURSE REQUIRED = 210mm

NOTE: MINIMUM M/4 AP40 BASECOURSE LAYER REQUIRED IS 100mm FOR CONCRETE FOOTPATHS, 150mm FOR ASPHALTIC CONCRETE FOOTPATHS & RESIDENTIAL ROW’s, 200mm FOR ROADS & COMMERCIAL/INDUSTRIAL PRIVATE WAY
NOTE: MINIMUM M/4 AP40 BASECOURSE LAYER REQUIRED IS 100mm FOR CONCRETE FOOTPATHS, 150mm FOR ASPHALT CONCRETE FOOTPATHS & RESIDENTIAL PRIVATE WAY’s, 200mm FOR ROADS & COMMERCIAL/INDUSTRIAL PRIVATE WAY’s
NOTE: MINIMUM M4:AP140 BASECOURSE LAYER REQUIRED IS 100mm FOR CONCRETE FOOTPATHS & RESIDENTIAL PRIVATE WAYS, 200mm FOR ROADS & COMMERCIAL/INDUSTRIAL PRIVATE WAYS.
*NOTE*
For local roads where the vehicle design speed is 40km/hr or less, and the footpath is adjacent the kerb, then full height mountable kerb must be used.

SD 408
NELSON CITY COUNCIL
INFRASTRUCTURAL ASSETS
APPROVED
SENIOR EXECUTIVE INFRASTRUCTURE
DATE

SD 408
STANDARD KERB & CHANNEL CROSSINGS

*SEE NOTE*
FOOTPATH SECTION

100mm TOPSOIL

100mm CONCRETE 25MPa (US FINISH TO NZS 3114) OR ASPHALT, SEE 21/304 SHEET 2

100mm COMPACTED AP40 BASECOARSE ON SUBGRADE WITH CBR ≥ 6 EXTENDED BASECOARSE 100MM BEYOND EDGES OF FOOTPATH

CHAMFER ALL EDGES AND CONSTRUCTION JOINTS WITH EDGING TOOL

15 MIN

(See Table 4-3 & 4-4)

GRASS BERM 2% CROSSFALL

KERB

FOOTPATH SECTION

3.0 MIN

EXTEND SLAB TO BOUNDARY

CONSTRUCTION JOINT

REINFORCED / THICKENED ENTRANCE SLAB

FOOTPATH

3.5-6.0 RESIDENTIAL

5.0-7.0 COMMERCIAL

6.0-8.0 INDUSTRIAL

KERB CUTOFF

BERM

BERM

K & C

TAPER

TAPER

0.5

0.5

VEHICLE ENTRANCE PLAN

1.5m WIDE FOOTPATH OFFSET FROM KERB

NELSON CITY COUNCIL

INFRASSTRUCTURAL ASSETS

APPROVED

29/07/2010

SD 409

COMMERCIAL VEHICLE ENTRANCE

200mm DEPTH CONCRETE, 30MPa REINFORCED WITH ONE LAYER 655 WWF WITH 50mm COVER FROM UNDERSIDE OF CONCRETE SURFACE.

INDUSTRIAL VEHICLE ENTRANCE

300mm THICK CONCRETE, 30MPa WITH 2 LAYERS OF 655 WWF REINFORCING. WWF SHALL HAVE 200mm SEPARATION AND 50mm COVER.

*NB
NOTE:
1. FOR LOCAL ROADS WHERE THE VEHICLE DESIGN SPEED IS 40km/hr or LESS, AND THE FOOTPATH IS ADJACENT THE KERB, THEN FULL HEIGHT MOUNTABLE KERB & CHANNEL MUST BE USED.
2. VEHICLE ENTRANCE & FOOTPATH TRANSITION MUST COMPLY WITH FIGURE 15.1 & TABLE 15.2 OF THE LAND TRANSPORT NZ 'PEDESTRIAN PLANNING & DESIGN GUIDE.'
STORMWATER CONTROL
BREAKOVER HEIGHT = 45mm
FROM THE TOP OF THE KERB CROSSING

DIMENSIONS OF STORMWATER BREAKOVER CONTROL FOR ACCESSES BELOW THE ROAD

START OF ACCESS

HEIGHT OF STANDARD KERB

CARRIAGeway

KERB CROSSING

SEE FIGURE ABOVE FOR DETAIL OF STORMWATER BREAKOVER CONTROL

GRADIENT = 1:9 (MAX)
DISTANCE = 2 METRES (MIN)

GRADIENT = 1:4 (MAX)

ANY CHANGE IN GRADE DIRECTION ALONG THE ACCESS MUST COMPLY WITH 90% ILE CAR APPROACH DEPARTURE AND BREAKOVER DIMENSIONS

GRADIENT OF ACCESS AND BREAKOVER ANGLES FOR ACCESS TO SITES WHERE THERE IS NO EXISTING OR PROPOSED FOOTPATH

NELSON CITY COUNCIL

ACCESS BREAKOVER ANGLES WHERE NO PROPOSED FOOTPATH

INFRASTRUCTURAL ASSETS

APPROVED
29/07/2010
SD 411

SENIOR EXECUTIVE INFRASTRUCTURE DATE
NOTE: FOR LAYOUT and INSTALLATION OF TACTILE PAVING & DIRECTIONAL INDICATORS, SEE SECTION 4.3.12.8
Nelson City Council

Infrastructural Assets

Typical Cross Section Carriageway

Width varies according to road type (see Table 4-3 & 4-4)

For cross fall to carriageway, see Camber Table SD 420

Wearing Surface (Asphaltic concrete or 2 coat chipseal)

Kerb & Channel

AP40 Basecourse - TNZ M/4 2006 (Nelson)

Subgrade (natural ground or bulk fill material)

Subbase (where required by pavement design)

Subsoil drain (where required to specific design)

 Depths of basecourse and subbase (where required) to be as detailed in specific pavement design for each individual street
1. SERVICES BERM CAN BE REDUCED TO 0.5m WHERE SERVICES ARE UNDER THE FOOTPATH PROVIDED THEY DO NOT PRECLUDE THE INTRODUCTION OF STREET TREES

2. THE DEPTH OF CABLES MAY VARY. SEE SECTION 10 FOR POWER, & SECTION 11 FOR COMMUNICATION CABLE RETICULATION

3. SEE SECTION 4.4.15.3 REGARDING ALTERNATIVE OPTIONS TO GRASS SURFACES & PLANTING WITHIN LANDSCAPE AREAS
NOTE:

1. SERVICES BERM CAN BE REDUCED TO 0.5m WHERE SERVICES ARE LOCATED UNDER THE FOOTPATH PROVIDED THEY DO NOT PRECLUDE THE INTRODUCTION OF STREET TREES

2. THE DEPTH OF CABLES MAY VARY. SEE SECTION 10 FOR POWER, & SECTION 11 FOR COMMUNICATION CABLE RETICULATION

3. SEE SECTION 4.4.15.3 REGARDING ALTERNATIVE OPTIONS TO GRASS SURFACES & PLANTING WITHIN LANDSCAPE AREAS
*NOTES:

BATTER SLOPES MAY BE REPLACED BY RETAINING WALLS TO SPECIFIC DESIGN WHERE APPROVED BY THE COUNCIL. RETAINING WALLS WHICH ARE NOT FOR SUPPORTING THE ROAD CARRIGEWAY or FOOTPATH MUST BE LOCATED OUTSIDE LEGAL ROAD RESERVE.

THE 1.0m DISTANCE FROM BACK OF FOOTPATH/KERB MAY BE INCREASED WHERE THE AREA IS REQUIRED AS SERVICE STRIPS BY TABLE 4.3 & 4.4.
NOTE:
1. Depth of subbase determined by individual pavement design for each street/road.
2. Drainage channel size and spacing of stormwater culverts, subject to specific design.
3. For shoulder widths, see Table 4-5, Section 4 of the Land Development Manual.
TYPICAL DRAINAGE FOR ROADSIDE SWALES & LOW IMPACT STORMWATER

NOTE:
SUBSOIL DRAIN TO BE INCLUDED IN ROAD FORMATION WHERE A HIGH WATER TABLE & NON FREE DRAINING SUBGRADE MATERIALS EXIST.

SUBSOIL DRAIN FILTER DETAIL (WHEN IN CUT)

ROADSIDE SWALE DRAINS – SUBJECT TO SITE CONDITIONS
NOTE:–
1. NO KERBSIDE PARKING WITHIN THE TURNING CIRCLE
2. FOR RESIDENTIAL DEVELOPMENT ON STEEP HILLSIDE, THE CUL-DE-SAC RADIUS CAN BE REDUCED TO 7.0m OR A ‘FISH-TAIL’ OR ‘HAMMERHEAD’ DESIGN PROVIDED THE TURNING AREA PERMITS A 90 PERCENTILE 2 AXLE TRUCK TO UNDERTAKE A 3 POINT TURN
3. THIS DRAWING IS AN EXAMPLE ONLY AND THERE ARE OTHER COMPLYING DESIGNS FOR CUL-DE-SAC TURNING HEADS

*(SPECIFIC DESIGN REQUIRED)*
CROSSFALL FOR ROADWAY 3%-4% (1 IN 33 - 1 IN 25)

Crown Table

Offset Crown

Minimum Fender-Crown High Side 1.0m

Offset Distance

Fender

H1

H2

Fender

OFFSET CROWN

NOTE:
CARRIAGeway Camber on Either Side of Offset Crown Should Be Balanced in Terms of the Above Camber Tables.
CARRIAGEWAY THRESHOLDS
(LONGITUDINAL SECTION)

65mm MINIMUM INTERLOCKING CONCRETE BLOCKS IN 45° HERRINGBONE PATTERN

PART BRICKS MUST BE NO SMALLER THAN HALF A BRICK (50%)

CONCRETE SEPARATING STRIP UNDER SEAL

NOTES:

1. CONCRETE BLOCKS SHALL COMPLY WITH NZS 3116: 1981

2. LAYING OF BLOCKS SHALL COMPLY WITH THE CEMENT AND CONCRETE ASSOCIATION OF NZ "INTERLOCKING CONCRETE BLOCK ROAD PAVEMENTS" (SEPT 1988)

3. COLOUR OF BRICKS TO BE NOMINATED ON ENGINEERING DRAWINGS AND APPROVED BY COUNCIL

IN HIGH TRAFFIC AREAS (COLLECTOR ROAD CATEGORY OR HIGHER) THE BLOCKS SHALL BE LAID ON 150mm DEPTH OF REINFORCED CONCRETE AS DETAILED ON SD 423

NELSON CITY COUNCIL
CARRIAGEWAY THRESHOLDS (CONCRETE BLOCKS)
INFRASTRUCTURAL ASSETS
APPROVED 29/07/2010
SD 421
SECTION
FOR STANDARD ROAD SITUATION
3.70m SPEED CONTROL RAMP

CARRIAGEWAY WIDTH AS REQUIRED
1m TAPER

SECTION-SPEED CONTROL RAMP PROFILE
FOR KERB AND CHANNEL
STANDARD ROAD SITUATION

25mm ASPHALTIC CONCRETE WEARING COURSE
DIRECTION OF TRAFFIC
KERB (FOR STANDARD ROAD SITUATION)
ROAD SURFACE
SEGMENT OF CIRCLE
DEPTH VARIES
LENGTH 3.700

SETTING OUT PROFILE
FOR SECTION (ALL CASES)

NELSON CITY COUNCIL
SPEED CONTROL DETAILS
INFRASTRUCTURAL ASSETS
APPROVED
29/07/2010
SD 422
BRICKS LAID IN 45° HERRINGBONE PATTERN ON 150mm OF CONCRETE (30 MPa) AND 665 MESH. BRICKS TO BE SECURED TO CLEAN SCABBLED CONCRETE WITH AN APPROVED EPOXY BEDDING MORTAR.

1. RAMP HAS MONO CAMBER
2. ONE ROW OF RED PAVERS IN SOLDIER PATTERN TO FACE EACH CONCRETE RAMP
3. JOINTING SAND SHALL BE 'PAVELOCK' OR SIMILAR APPROVED SAND
4. THE MINIMUM SIZE FOR PART BLOCKS/PAVERS SHALL BE 50% OF FULL SIZE

30MPa CONCRETE RAMP WITH 665 MESH MINIMUM THICKNESS 200mm

SAW CUT EXISTING ROAD SURFACE

1.50  5.00  1.50

7.6%  7.6%

STREET CARRIGEWAY

EXISTING AC UNDER RAMP TO BE STRIPPED TO BASECOURSE LEVEL. BASECOURSE TO BE RIPPED

150mm MINIMUM AP40 COMPACTED BASECOURSE

ONE CONSTRUCTION JOINT MUST BE FORMED CENTRALLY IN CONCRETE RAMP
TYPICAL ELEVATION

NOTE:
1. MAXIMUM OPENING SPACE
   OF THE CHAIN LINK SHALL
   BE 35mm OR 50mm DIAMETER
2. SEE SECTION 4.4.12.4
NOTE:
BALUSTRADE TO BE JURALCO VIKING BALUSTRADE (FULL HEIGHT BALUSTRADES) POWDERCOATED ALUMINIUM (INTERPON GHOST GREY) or SIMILAR APPROVED, PROVIDED ALTERNATIVE MEETS REQUIREMENTS B1, B2, & F4 OF THE BUILDING CODE

NOTES:
1. MINIMUM COVER TO D10 REINFORCING FROM EXPOSED SURFACE SHALL BE 50mm
2. FOR TIMBER WALL FIXING DETAIL, SEE TYPE 'C' ON SD 424
3. SEE SECTION 4.4.12.4

NOTE:
BALUSTRADE TO BE JURALCO VIKING BALUSTRADE (FULL HEIGHT BALUSTRADES) POWDERCOATED ALUMINIUM (INTERPON GHOST GREY) or SIMILAR APPROVED, PROVIDED ALTERNATIVE MEETS REQUIREMENTS B1, B2, & F4 OF THE BUILDING CODE

NOTES:
1. MINIMUM COVER TO D10 REINFORCING FROM EXPOSED SURFACE SHALL BE 50mm
2. FOR TIMBER WALL FIXING DETAIL, SEE TYPE 'C' ON SD 424
3. SEE SECTION 4.4.12.4
PLASTER CAP PERMANATELY AFFIXED WITH DOWEL STARTER AND PAINTED WHITE.

300mm OF 140mmØ GALVANISED PIPE, 4mm THICK, INSERTED AND PERMANATELY AFFIXED INTO 150mmØ GALVANISED PIPE.

PADLOCK BRACKET (SEE DETAIL BELOW)

150mm GALVANISED PIPE 4mm THICK

FINISHED SURFACE

150

D12 STIRRUP

4 - D12 BARS MIN 50mm FROM PIPE MIN COVER 50mm

600mm x 500mm DEEP 28 MPa CONCRETE FOUNDATION.

ELEVATION

NOTES:
1. ALL STEELWORK SHALL BE PRIMED AND PAINTED WHITE WITH REFLECTORISED STRIPS VISIBLE FROM BOTH WAYS
2. PADLOCK TO BE POSITIONED FACING DIRECTION OF CYCLE TRAFFIC

NELSON CITY COUNCIL

REMOVABLE CYCLE BOLLARD

INFRASTRUCTURAL ASSETS

APPROVED

SD 426

SENIOR EXECUTIVE INFRASTRUCTURE

29/07/2010

DATE
PLASTER CAP PERMANATELY
AFFIXED WITH DOWEL
STARTER AND PAINTED
WHITE.

150mmØ GALVANISED PIPE,
4mm THICK

FINISHED SURFACE

D12 STIRRUP

4 - D12 BARS
MIN 50mm FROM PIPE
MIN COVER 50mm

600mm x 500mm
DEEP 28 MPa
CONCRETE FOUNDATION.

NOTES:

* ALL STEELWORK SHALL BE PRIMED AND PAINTED WHITE
  WITH REFLECTORISED STRIPS VISABLE FROM BOTH WAYS

NELSON
CITY
COUNCIL

STANDARD CYCLE BOLLARD

INFRASTRUCTURAL ASSETS

APPROVED

29/07/2010

SD 427

SENIOR EXECUTIVE INFRASTRUCTURE DATE
HEIGHT OF RAIL TO BE 1.0m ABOVE ADJACENT CYCLE PAVEMENT AREA.

50mm DIA. GALVANISED PIPE PAINTED WHITE WITH APPROVED (EPOXY OR POWDER COATING) SYSTEMS

NOTE: USE THIS DETAIL WHEN RAILS ARE OUTSIDE CARRIAGeway AREA AND SEEN BY CYCLISTS.

100mm HI-RED REFLECTIVE TAPE (SEE DETAILS)

NOTE: USE THIS DETAIL WHEN RAILS ARE WITHIN CARRIAGeway AREA AND SEEN BY MOTOR VEHICLES.

300mm OF 40mmØ GALVANISED PIPE, INSERTED AND PERMANENTLY AFFIXED INTO 50mmØ GALVANISED PIPE.

1. RAIL TO BE PLACED AT EDGE OF CYCLEWAY PAVEMENT OR 300mm FROM EDGE OF PEDESTRIAN REFUGES.

2. TOP RAIL SHALL BE 1.0m RED ABOVE ADJACENT PAVEMENT

HOLD RAILS TO BE FREE FROM FOOTPATH TO PREVENT OBSTRUCTING PEDESTRIANS

PLAN

GIVE WAY LINE IF DESIRED

250 / 100 / 100 / 100

500

NOTES

GALVANISED BOLT BRACKET WITH M10 GALVANISED NUT & BOLT

GIVE WAY LINE IF DESIRED

300 MAX

MIN 75

KERB OR EDGE OF SEAL

VAKRES 600MIN - 1500MAX

VAKRES 300-600 325

50

200mm Ø CONCRETE SURROUND

50

50

400

50

600

900

R=250mm

HEIGHT OF RAIL TO BE 1.0m ABOVE ADJACENT CYCLE PAVEMENT AREA.

50mm DIA. GALVANISED PIPE PAINTED WHITE WITH APPROVED (EPOXY OR POWDER COATING) SYSTEMS

NOTE: USE THIS DETAIL WHEN RAILS ARE OUTSIDE CARRIAGeway AREA AND SEEN BY CYCLISTS.

100mm HI-RED REFLECTIVE TAPE (SEE DETAILS)

NOTE: USE THIS DETAIL WHEN RAILS ARE WITHIN CARRIAGeway AREA AND SEEN BY MOTOR VEHICLES.

300mm OF 40mmØ GALVANISED PIPE, INSERTED AND PERMANENTLY AFFIXED INTO 50mmØ GALVANISED PIPE.

1. RAIL TO BE PLACED AT EDGE OF CYCLEWAY PAVEMENT OR 300mm FROM EDGE OF PEDESTRIAN REFUGES.

2. TOP RAIL SHALL BE 1.0m RED ABOVE ADJACENT PAVEMENT

HOLD RAILS TO BE FREE FROM FOOTPATH TO PREVENT OBSTRUCTING PEDESTRIANS

PLAN

GIVE WAY LINE IF DESIRED

250 / 100 / 100 / 100

500

NOTES

GALVANISED BOLT BRACKET WITH M10 GALVANISED NUT & BOLT

GIVE WAY LINE IF DESIRED

300 MAX

MIN 75

KERB OR EDGE OF SEAL

VAKRES 600MIN - 1500MAX

VAKRES 300-600 325

50

200mm Ø CONCRETE SURROUND

50

50

400

50

600

900

R=250mm

INFRASTRUCTURAL ASSETS

APPROVED

SENIOR EXECUTIVE INFRASTRUCTURE DATE

NELSON CITY COUNCIL

CYCLE HOLDING RAIL

SD 428
NOTE:

THE PEDESTRIAN/CYCLE ACCESS IS TO BE USED TO LINK A ROAD TO A ROAD OR ROAD TO RESERVE. FOR SHARED ACCESSWAYS THAT ARE ON A MAIN ROUTE & WILL HAVE A HIGH USE, THEN THE SEALED PATHWAY SHALL BE 3.0m & SUBJECT TO SPECIFIC DESIGN. SEE TABLE 4–15 WITH WALKWAYS ORIENTED EAST/WEST PLANT TREES ON THE NORTHERN SIDE OF THE FOOTPATH.

IF STEPS ARE REQUIRED FOR GRADES GREATER THAN 1:5 THEN STREET LIGHTING SHALL BE PROVIDED AS WELL AS A HANDRAIL TO ONE SIDE. ALSO, A HALF-ROUND OPEN CONCRETE CHANNEL SHALL BE FORMED ADJACENT THE STEPS TO ASSIST CYCLE MOVEMENT,

STEPS SHALL BE NO NARROWER THAN 300mm TREAD WITH 150–180 RISER. A LANDING SHALL BE PROVIDED EVERY 20 STEPS. NO LESS THAN 3 STEPS SHALL BE PROVIDED IN ANY ONE AREA.

FOR BOLLARD DETAILS SEE SD 426 & SD 427
**Formula**

\[ t = \frac{107n\sqrt{L}}{\sqrt{S}} \text{ MINUTES} \]

**Where**
- \( t \) = TIME OF TRAVEL OVER SURFACE IN MINUTES
- \( n \) = HORTON'S VALUES FOR THE SURFACE
- \( L \) = LENGTH OF FLOW IN METRES
- \( S \) = SLOPE OF SURFACE IN %

**Example**

LENGTH OF OVERLAND FLOW = 120m
AVERAGE SLOPE OF SURFACE = 2% POORLY GRASSED SURFACE

\[ \therefore \text{ TIME OF TRAVEL} = 16.3 \text{ MINUTES} \]
RAINFALL INTENSITY CURVES

REVISED JULY 2008, BASED ON HIGH INTENSITY
RAINFALL ANALYSIS FOR NELSON URBAN AREA
(NIWA PROJECT ELF09211)
FIGURES INCLUDE 16% INCREASE TO ALLOW FOR
CLIMATE CHANGE TO 2100.

<table>
<thead>
<tr>
<th>CURVE</th>
<th>%</th>
<th>Yr FREQUENCY STORM</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>1%</td>
<td>100</td>
</tr>
<tr>
<td>B</td>
<td>2%</td>
<td>50</td>
</tr>
<tr>
<td>C</td>
<td>5%</td>
<td>20</td>
</tr>
<tr>
<td>D</td>
<td>6.67%</td>
<td>15</td>
</tr>
<tr>
<td>E</td>
<td>10%</td>
<td>10</td>
</tr>
<tr>
<td>F</td>
<td>50%</td>
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</tbody>
</table>

MINUTES

INTENSITY mm / Hr

10  20  30  40  50  60  70  80  90  100  110  120

0

NELSON CITY COUNCIL
INFRASTRUCTURAL ASSETS
APPROVED
29/07/2010
SD 502

CURVE

A

B

C

D

E

F

PROBABILITY OF OCCURRING ANNUALLY
NOTES
1. SKewed AND/OR VERY STEEP approach INLETS WILL require DETAIL design based on this standard.
2. REINFORCING IS minimum AND retaining wall must be Designed for individual circumstances.
3. ALL REINFORCEMENT TO BE PLACED CENTRALLY IN WALLS AND FLOOR AND TO BE CONTINUOUS BETWEEN WALLS AND BETWEEN FLOOR AND WALLS.
4. AT LEAST 2 HORIZONTAL bars TO BE PLACED OVER THE PIPE IN THE END WALL.
5. GRADE OF APRON TO BE NOT LESS THAN GRADE OF PIPE.
6. DIMENSIONS OF GRILL TO BE FULLY DETAIL FOR EACH CASE.
7. FULL HEADWALLS AND SIDEWALLS TO BE PROVIDED AS CASE REQUIRES IN ADDITION TO minimum REQUIREMENT shown.
8. THIS STANDARD SHOWS minimum REQUIREMENTS : THE DETAILS OF CHANNEL APPROACH : DEPTH, STABILITY, STAIR, ETC. AND OTHER FACTORS IN EACH CASE MUST BE TAKEN INTO ACCOUNT IN THE DESIGN.

ALTERNATIVE TO SOCKET END OF PIPE

PIECE INLET SCHEDULE

<table>
<thead>
<tr>
<th>nominal PIPE Dia</th>
<th>300</th>
<th>375</th>
<th>450</th>
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</tbody>
</table>

APPROVED PRECAST INLET STRUCTURES MAY BE USED

NELSON CITY COUNCIL

TYPICAL STORMWATER INTAKE STRUCTURE

INFRASSTRUCTURAL ASSETS

APPROVED

29/07/2010

SENIOR EXECUTIVE INFRASTRUCTURE DATE

SD 503
REINFORCED CONCRETE INTAKE STRUCTURE

WINGWALL

GRILL REFER SD 505

REMOVABLE 1m HIGH HANDRAIL WITH NETTING 50mm MAX MESH

DEBRIS GRILL

3m WIDE x 150mm COMPACTED BASECOURSE FORMED ACCESS ON ONE SIDE

OPENINGS

REMOVABLE HANDRAIL IN SECTION

RAILWAY IRON TRASH RACK 300mm CRS

(CLANES UPSTREAM TO PREVENT BLOCKAGE)

CATCHPIT VOLUME TO SUIT SPECIFIC SITE CONDITIONS

REINFORCED CONCRETE STRUCTURE REQUIRING SPECIFIC DESIGN.

NOTES
1. TYPES A, B, C AS SHOWN ARE GENERAL EXAMPLES – EACH CASE WILL REQUIRE DESIGN TO SUIT THE SITE WITH REGARD TO PEAK FLOWS AND ANTICIPATED DEBRIS. FINAL DETAILS SHALL BE SUBMITTED TO THE ENGINEER FOR APPROVAL.

SEE SD 503 FOR ALTERNATIVE

NELSON CITY COUNCIL

STORMWATER INTAKE STRUCTURES WITH DEBRIS TRAPS

SD 504
PLAN

50 x 10 AT 100 CENTRES
(50 CENTRES WHEN IN PEDESTRIAN AREAS)

SECTION

50 x 10 HOOP

1200mm DIA FLUSH JOINT R.C PIPE

DEBRIS TRAP GRILL

NELSON CITY COUNCIL

INFRASTRUCTURAL ASSETS

APPROVED

29/07/2010

SD 505

SENIOR EXECUTIVE INFRASTRUCTURE DATE
SECONDARY INTAKE DEBRIS GRILL

NELSON CITY COUNCIL

INFRASSTRUCTURAL ASSETS

APPROVED 29/07/2010

SD506

SENIOR EXECUTIVE INFRASTRUCTURE DATE
NOTES
1. FOR PIPES OVER 1050 DIA, MANHOLES ARE TO BE A SPECIFIC DESIGN.

2. TABLE OF DIMENSIONS

<table>
<thead>
<tr>
<th>M.H (DIA)</th>
<th>L (MIN)</th>
<th>T (MIN)</th>
<th>D (MAX)</th>
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<tr>
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<td>150</td>
<td>450</td>
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</table>

3. PRECAST CONCRETE MANHOLE RISERS SHALL COMPLY WITH THE REQUIREMENTS FOR CLASS 2 PRECAST CONCRETE PIPES TO AS/NZS 4058.

4. FOR MANHOLE FINISHING OFF DETAILS E.G. HAUNCHING, MAX. DEPTH OF LID, ETC SEE SD 602

TYPICAL SECTION A–A

TYPICAL SECTION B–B

TYPICAL JUNCTION MANHOLE.

CAST IRON COVER

PRECAST COVER SLAB

MIN 75 AND MAXIMUM 100mm CONC UNDER CAST IRON FRAME

OPENING TO BE OFFSET DIRECTLY OVER THE OFFSET OPENING IN THE LOWER PRECAST COVER SLAB

FOR MANHOLES OVER 2700 TO UNDERSIDE OF MANHOLE RING EXTEND WITH STD REINF 1050 DIA RING

PRECAST CONC COVER SLAB (DESIGNED FOR 1050 DIA EXTENSION IF REQUIRED) WITH OFFSET OPENING IF IS REQUIRED.

OPENING TO BE OFFSET RISER REQUIRED.

MIN 75 AND MAXIMUM 100mm CONC UNDER CAST IRON FRAME

CONC BENCHING TO RADIUS CURVE

CONC BENCHING

CONC BENCHING

FLOW 45' max

FLOW

FLOW

TYPICAL SECTION B–B

TYPICAL SECTION B–B

TYPICAL SECTION B–B
SPECIAL SHALLOW SECTION OF TOOTHED CONNECTOR

PRECAST KERB

1 IN 6

GROUTING HOLES

4-R12 BARS, 2140 LONG

NO CONSTRUCTION
JOINT HERE WHEN UNREINFORCED

PLAIN END PIPES
225φ

R12 STIRRUPS AT 225 C/C

525

75

SPECIAL SHALLOW SECTION OF TOOTHED CONNECTOR

PRECAST KERB

SLOPE 1H:12V

GROUTING HOLES

C.J.

PLAIN END PIPES
225φ

525

110

50

75

525

WELDED REINFORCEMENT BASKET
OF R12 STIRRUPS AT 225 C/C,
AND R12 BARS 2140 LONG

STANDARD INTAKE SECTION OF TOOTHED CONNECTOR

NOTE
REINFORCING STEEL TO BE USED WHEN REQUIRED BY THE ENGINEER
NOTES
1. SEE SHEETS 21/207 SHEET 3 FOR DETAILS OF STD GRATING AND FRAME
2. INSITU CONCRETE TO BE 20 MPa AFTER 28 DAYS
3. NO REINFORCING REQUIRED FOR CAST INSITU BACK ENTRY UNIT
4. WHERE SUMP IS CONCRETE TO INTERCEPT K & C AT DISTINCT GRADE THE ENTRY UNIT SHALL BE INCLINED ON THE INSITU PAD EXTENDED OVER THE SUMP WALL WIDTH

SECTION

PLAN

ELEVATION

GRATE AND FRAME NOT SHOWN

NELSON CITY COUNCIL

BACK ENTRY SUMP IN STANDARD KERB & CHANNEL

INFRASTRUCTURAL ASSETS

APPROVED 29/07/2010

SENIOR EXECUTIVE INFRASTRUCTURE DATE

SD 510
SUMMARY

Mass concrete inside face to be shaped and smoothed off.

NOTES

1. See sheets 21/207 sheet 3 for details of std grating and frame.
2. Insitu concrete to be 20 MPa after 28 days.
3. No reinforcing required for cast insitu back entry unit.
4. Where sump is constructed to intercept K & C at distinct grade the entry unit shall be inclined on the insitu pad extended over the sump wall width.

SECTION

BACK ENTRY SUMP IN STANDARD MOUNTABLE KERB & CHANNEL

NELSON CITY COUNCIL

INFRASTRUCTURAL ASSETS

APPROVED 29/07/2010

SENIOR EXECUTIVE INFRASTRUCTURE DATE

SD 511
STANDARD SUMP - FRAME

TACK WELD ALL JOINTS

STANDARD SUMP - GRATING

NOTE: FRAME AND GRILL TO BE MILD STEEL
NOTE
DIMENSIONS ARE FOR BACK FACE.
NOTE
DIMENSIONS ARE FOR BACK FACE.
** ALTERNATIVELY FOR VEHICLE LOADING 150mm THICK REINFORCED CONCRETE COVER SLAB WITH A PICTON TOP CAST IN MAY BE USED. THE REINFORCEMENT SHALL BE TO A SPECIFIC DESIGN**
TYPICAL PLAN SECTION

NOTE
PRIME ALL STEELWORK SURFACES
WITH CORROLESS RUST STABILISER "S2"
USE RESCUE STEEL ON ALL BOLTS

TYPICAL ELEVATION SECTION

FLOAT CAGE & SUPPORT DETAIL

FLOAT CAGE DETAIL

NELSON CITY COUNCIL
INFRASTRUCTURAL ASSETS
APPROVED 29/07/2010
SD 516
NOTE
WHERE PIPE DEPTH REQUIRES SUMP DEPTH IN EXCESS OF 900mm A STANDARD 940 x 460 mm SUMP SHALL BE PROVIDED.
CYCLE FRIENDLY SUMP – GRATING

NOTES:

1) LOCATION OF CYCLE FRIENDLY SUMP GRILL IS AT THE COUNCILS DISCRETION

2) GRILL TO BE MILD STEEL

3) DRAWING NOT TO SCALE
CYCLE FRIENDLY SUMP – GRATING

NOTES:

1) LOCATION OF CYCLE FRIENDLY SUMP GRILL AT COUNCIL’S DISCRETION

2) THE SUMP GRATE IS A STANDARD SUMP GRATE AS PER DRAWING 21/207 SHEET 3 WITH THE ADDITION OF 8 LATERAL BARS

3) FRAME AND GRILL TO BE MILD STEEL

4) DRAWING NOT TO SCALE

NELSON CITY COUNCIL

CYCLE FRIENDLY SUMP GRATE
Modification of Standard Sump Grate

INFRASTUCTURAL ASSETS
APPROVED 29/07/2010
SD 519

SENIOR EXECUTIVE INFRASTRUCTURE DATE
NOTE:
1. THE STANDARD SILT & OIL TRAP IS DESIGNED TO SERVE SMALL INSTALLATIONS SUCH AS TRUCK DEPOTS ETC. (MAJOR INSTALLATIONS WILL REQUIRE SPECIFIC DESIGN.)
2. SILT & OIL TRAP IS MADE UP OF FOUR STANDARD PRECAST SUMP UNITS.
3. LIDS TO BE PRECAST REINFORCED CONCRETE LID MASS APPROXIMATELY 226kg.
4. OIL CAPACITY 390 LITRES. SILT VOLUME 0.1m³
5. DRAIN PIPE WORK MIN 100MM DIA PVC.
6. VENT PIPE WORK MIN 40mm DIA PVC, ABOVE GROUND VENTS MAY BE GALVANISED STEEL IF IN AN EXPOSED POSITION.
7. A CONTINUOUS MORTAR PAD MINIMUM THICKNESS 10mm, SHALL BE LAID ROUND THE TOP OF EACH SUMP UNIT TO ALLOW FOR SHAPING TO THE REQUIRED FINISHED GROUND LEVEL.
8. WHERE A STEAM CLEANING OPERATION OR DETERGENTS OR DEGREASER ARE USED:
   * AN APPLICATION FORM TO DISCHARGE TRADE WASTE FROM A SILT & OIL TRAP TO THE SEWERAGE SYSTEM SHALL BE SUBMITTED TO THE ENGINEERING MANAGER FOR HIS/HER APPROVAL.
   * STORMWATER SHALL NOT BE ALLOWED TO DISCHARGE TO THE SEWERAGE SYSTEM.
9. BUNDED AREAS AROUND FUEL STORAGE AREAS SHOULD DISCHARGE TO THE STORMWATER VIA A SUITABLY DESIGNED OIL INTERCEPTOR WITH AN APPROPRIATE SHUT-OFF VALVE INSTUT.
10. BUND TO BE 200mm HIGH AROUND SITE.
NOTE:

1. SOAK PITS SHALL BE SITED AWAY FROM SERVICES BY 2m AND AWAY FROM BUILDING FOUNDATIONS BY 45' TO PIT BASE AS MINIMUM.

2. SILT TRAPS SHALL BE CONSTRUCTED WITH EVERY SOAKPIT WHERE DRAINING SURFACE WATER. (SEE NCC 21/207 SHT 1)

3. SOAKPITS MAY ONLY BE ALLOWED:
   A) ON FLAT LAND IN THE WOOD AREA, BROOK VALLEY AND STOKE.
   B) WHERE REASONABLE GROUND SOAKAGE CAN BE PROVEN BY TESTING TO THE ENGINEERS SATISFACTION IE. FOR RESIDENTIAL BUILDINGS 4500L IN 20 MINUTES.
   GARAGE OR ACCESSORY BGLS. 200L IN 4 MINUTES.
   C) ON EXISTING RESIDENTIAL LOTS FOR NEW BUILDINGS OR EXTENSIONS OVER 10m².
   D) IN NEW SUBDIVISIONS WHERE ONLY ONE NEW LOT IS BEING CREATED.

4. WHERE POSSIBLE AND PRACTICAL AN OVERFLOW CONNECTION IS REQUIRED FROM A SOAKPIT TO AN APPROVED OUTFALL.

5. SOAK PIT WILL EVENTUALLY SILT UP AND WILL REQUIRE ONGOING MAINTENANCE. OWNERS SHOULD BE MADE AWARE OF THIS.
Nominal 100 mm inlet

Concrete base

Cast iron swing grate in cast iron frame, round or square

300 ID CONCRETE PIPE OR PIT. STANDARD 800MM DEEP. CAN BE CUT TO SUIT SITE.

NOTES:
1. FINISHED FLOOR LEVEL MUST NOT BE LESS THAN 150mm HIGHER THAN LID LEVEL OF SUMP
2. SUMP IN ROADWAY MAY BE PERMITTED WHERE NOT POSSIBLE TO POSITION IN DRIVEWAY OR BERM

ALTERNATIVE LOCATION

PREFERRED LOCATION OF SUMP IN VEHICLE CUTDOWN

LONGITUDINAL SECTION

FLOW

1 in 120 min

STORMWATER PIPE

450 Min

700 Min

500 Min

300 Min

800mm x 300 ID CONCRETE CHAMBER FOR 100Ø OUTLET

SEE NOTE 2 ABOVE

Nelson City Council

INFILL BUBBLE—UP SUMP LOCATION

Infrastructure Division

Approved 29/07/2010

Senior Executive Infrastructural Assets Date

SD 522
PIPE BEDDING for CONCRETE PIPES

AP20 OR as per AS/NZS 3725:2007

x = 100mm if D ≤ 1500
x = 150mm if D > 1500

NELSON CITY COUNCIL
INFRASTRUCTURAL ASSETS
APPROVED
29/07/2010
SD 523
SENIOR EXECUTIVE INFRASTRUCTURAL ASSETS
DATE
1) Special design required for:
   Main pipes other than reinforced concrete, more than one connection per main.

2) Direct connections of this type are not permitted on plastic mains.

3) Outside edge of main pipe cut-in hole shall be not less than 300mm from collar or end of pipe.

4) Maximum diameter of cut-in hole shall be less than two thirds of the internal diameter of main pipe.

5) Epoxy mortar shall be applied strictly according to the manufacturer’s recommendation and shall be fully cured before the surround is poured and the sideline laid.

6) Main pipe surface shall be roughened and grout coated before concrete surround is poured.

7) Direct connections must be approved by the engineer, and normally shall only be used where the side line is less than 10m long, and access for cleaning the sideline is easily obtainable at the upstream end. That is the sideline shall terminate with a manhole, LHCE or sump.

8) Diameter of sideline pipe shall be less than half the internal diameter of the main pipe.

### Table: Square Radial Direct Connections

<table>
<thead>
<tr>
<th>Nominal Sideline Diameter</th>
<th>Minimum Main Pipe Diameter</th>
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<tbody>
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<td>975</td>
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<tr>
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</table>
CONCRETE ENCASED OUTFALL. 1m LONG x DIA PLUS 200mm SQ. (TRIM ENDS TO MATCH BANK FACE.)

CREATE SHADING i.e. UPTURNED TREE STUMP ON OUTSIDE EDGE OF STREAM

OVERHANGING SHRUBS

PLANT UP SLOPE

CUT BACK PIPE TO BANK PROFILE

OUTLET SET BACK FROM MAIN CHANNEL TO CREATE EDDY

MEANDERING LOW FLOW CHANNEL

REGRADED BANK INCREASES FLOOD CAPACITY

LOW FLOW CHANNEL

ORIGINAL BANK PROFILE

GENTLY SLOPING BANKS WILL BECOME INUNDATED DURING FLOOD FLOWS, ENABLING THE DISSIPATION OF FLOW ENERGY THAT WOULD OTHERWISE CONTRIBUTE TO CHANNEL DAMAGE. ENSURE FLOOD WATERWAY CAPACITY IS MAINTAINED WHERE THERE IS HEAVY VEGETATION.

POOL

THALWEG RIFFLE

SHOAL

WATERWAY MEANDER

ROCK/TREE STUMP OVERHANG PROTECTION

OVERHANGING VEGETATION PROVIDES A FOOD SOURCE, SHADE & COVER

SHALLOW BANK PROVIDES EASY ACCESS

ROCKS

LOGS

UNDERCUT BANK & IRREGULAR STREAMBED PROVIDES A VARIETY OF HABITAT

NELSON CITY COUNCIL

OUTFALL DETAILS & DRAINAGE WATERWAY CONCEPTS

INFRASTRUCTURAL ASSETS

APPROVED

29/07/2010

SD 525

SENIOR EXECUTIVE INFRASTRUCTURE DATE
NELSON CITY COUNCIL

LOW IMPACT DESIGN CONCEPTS
(SPECIFIC DESIGN REQUIRED)

INFRASTRUCTURAL ASSETS

APPROVED
29/07/2010
SENIOR EXECUTIVE INFRASTRUCTURE DATE

SD 526

<table>
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<th>IMPERVIOUS AREA = ROOF + PAVED AREA</th>
<th>VOLUME NEEDED FOR STORMWATER RETENTION</th>
<th>RAIN GARDEN m² = 8% OF IMPERVIOUS SURFACE</th>
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<tbody>
<tr>
<td>150m²</td>
<td>4200 LITRES</td>
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<tr>
<td>500m²</td>
<td>14000 LITRES</td>
<td>40m²</td>
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</table>
THE COUNCIL ACCEPTS RESPONSIBILITY FOR ANY SEWER LINE MORE THAN 15m FROM THE BOUNDARY OF THE LAST PROPERTY SERVED (CROSS LEASED UNITS ARE CONSIDERED ONE PROPERTY)

PUBLIC SEWER

PRIVATE SEWER

LHCE INSPECTION 'T'
(100mm 'T' JUNCTION VERTICAL INSPECTION PIPE. SEE NCC STD DWG 21/205 SHEET 4.)

NELSON CITY COUNCIL

DEFINITION OF PUBLIC SEWER

INFRASTRUCTURAL ASSETS

APPROVED 29/07/2010

SD 601
PRECAST MANHOLE DETAIL

NOTES

1. ALL "INSITU" CONCRETE TO BE VIBRATED
2. CONCRETE CRUSHING STRENGTH TO BE 20 MPa AFTER 28 DAYS
3. MAX. SIZE OF PIPE TO BE 450 mm DIA FOR 1050mm MANHOLE
4. PRECAST CONCRETE MANHOLE RISERS SHALL COMPLY WITH THE REQUIREMENTS FOR CLASS 2 PRECAST CONCRETE PIPES TO AS/NZS 4058, 2007
5. MAXIMUM GRADIENT FOR HAUNCHING THROUGH MANHOLES SHALL BE 1 in 3
6. HYDROPHILIC SEALANT SHALL BE USED WHERE THERE IS A HIGH GROUNDWATER LEVEL OR WHERE DRAINAGE OF THE TRENCH IS NOT POSSIBLE. THIS SHALL BE USED FOR ALL WASTEWATER MANHOLES, AS PER 21/204 Sth8 (UNLESS APPROVED OTHERWISE BY COUNCIL).

SEALANT TO BE ADEKA ULTRA SEAL P-201, (or similar) WATER SWELLING ELASTIC SEALANT 10mm MIN. THICKNESS AROUND THE PIPE AT PUDDLE FLANGE CURED BEFORE PLACING EPOXY MORTAR IN LINEAR JOINT. MIN. COVER TO SEALANT FROM FREE EDGE OF INSITU CONCRETE IS 75mm

PRECAST OR INSITU CONC BASE

MIN. DEPTH TO UNDERSIDE OF PIPE = 150mm

OFFSET OPENING
CAST IRON COVER

MIN 75 CONC UNDER CI FRAME

PRECAST RING
NOT TO BE BROKEN OUT BELOW PIPE UNDER SIDE.

HAUNCHING TO BE Poured IN ONE.
12-18mm THICK PLASTER, STEEL TROWELLED FINISH.
SLOPE 1 in 12 MIN, 1 in 8 MAX

OUTSIDE Ø + 300

1050

TYPICAL PLAN

FLEXIBLE JOINTS AT MANHOLES

EXTERNAL DROP MANHOLE DETAIL PVC 150Ø

1050Ø PRECAST MANHOLE FOR PIPELINES UP TO AND INCL. 450Ø

NELSON CITY COUNCIL

INFRASERSTRUCTURAL ASSETS

APPROVED

SENIOR EXECUTIVE INFRASTRUCTURE DATE

SD 602

29/07/2010
CASE OF DROP OF 400-600 mm

CASE OF DROP OF 300-400 mm

NOTES
1. HYDROPHILIC SEALANT as per NCC STANDARD DRAWING 21/204-1

DROP MANHOLE DETAIL PVC 150 Ø
(FOR DROPS MORE THAN 600mm SEE 21/204 SHEET 1)
INTERNAL DROP MANHOLE DETAIL PVC 150 Ø

TO BE USED IN SPECIAL CASES AT ENGINEERS DIRECTION
FOR EXISTING MANHOLES ONLY

GENERAL APPROACH
POSITION RELATED
TO MANHOLE -1 ONLY

NOTES
1. HYDROPHILIC SEALANT as per
NCC STANDARD DRAWING 21/204-1

IN CASES WHERE TURN OUT
IS RESTRICTED A 45° BEND
MAY BE SUBSTITUTED

BREAK OUT EXISTING HAUNCHING
BED NEW INLET IN EPOXY MORTAR
AND RENSTATE FORMING SMOOTH
CHANNEL AT EXISTING INVERT LEVEL
1. Approved pre-formed plastic inspection chambers may be used as mini-manholes for pipe sizes 100mm Ø & 150mm Ø suitable for sewer & stormwater sewers.

2. Mini-manholes are not to be assumed to replace the standard manhole.

3. Mini-manholes shall not be used in areas subject to vehicular traffic, except in formed residential driveways or rights of ways for light domestic vehicles.

4. The use of mini-manholes is to be limited, and at the discretion of Council:
   A) Manholes less than 1m deep
   B) The maximum pipe sizes of 150mm Ø for sewers & 225mm Ø for stormwater drains
   C) Manholes at the head of a line
   D) Straight through manholes
   E) Changes of grade

5. Concrete mini-manholes as detailed are not to be used in sewers at:
   A) Junctions
   B) Deflections greater than 45 degrees.

6. Cover & frame shall be cast iron or ductile iron to Class C strength to AS996/Class & Standard to be stamped of frame & lid.

7. Cover must have 2 separate recessed slots to facilitate lifting & removal of cover, and must be water tight to prevent SW ingress.

8. Covers must have anti-skid pattern embossed on top with the words WASTEWATER or STORMWATER. All font to be Gothic, 15mm height raised 2.5mm.

9. Any other wording, such as the suppliers & manufacturers name, shall be placed on the underside of the cover (not on the top).
NOTES:

1. HYDROPHILIC SEALANT TO BE ADEKA ULTRASEAL P-201 (OR SIMILAR) WATER SWELLING ELASTIC SEALANT 10mm MIN. THICKNESS AROUND THE PIPE CURED BEFORE PLACING IN-SITU CONCRETE.

2. DETAIL APPLIES TO ALL WASTEWATER MANHOLES WHERE THE WASTEWATER PIPELINE MAY BE DEEPER THAN THE WATER TABLE &/or WHERE TRENCH DRAINAGE (NCC 21/212) IS NOT POSSIBLE.

3. WRAP EACH INCOMING & OUTGOING PIPE WITH HYDROPHILIC SEALANT PRIOR TO CONCRETE POUR.

4. HYDROSTATIC WATER TEST EACH SEALED MANHOLE PRIOR TO BACKFILLING MANHOLES.

5. ALL WORKS TO BE INSPECTED BY NCC PRIOR TO PLACING OF IN-SITU CONCRETE.
NOTE:

ALL WORKS TO BE INSPECTED BY NCC BEFORE CONCRETE ANCHOR BLOCK HAS BEEN POURED
PLAN - COVER + FRAME
(PATTERN OMITTED)

PLAN - COVER
(WITH PATTERN SHOWN)

NOTES:

1. TO BE USED ON ALL STANDARD 1050# MANHOLES OR LARGER
2. MATERIAL DUCTILE IRON TO AS 1831:2007
3. ALL DIMENSIONS ARE IN mm
4. FRAME and COVER SHALL BE CERTIFIED TO MEET CLASS D STRENGTH CLASSIFICATION to AS 3996 (THE CLASS STRENGTH and STANDARD MUST BE STAMPED ON UNDERSIDE OF THE COVER)
5. COVER TO HAVE AT LEAST 2 SEPARATE RECESSED SLOTS TO FACILITATE LIFTING AND REMOVAL OF COVER
6. THE LIFTING HOLES FOR THE WASTERWATER COVER MUST BE SEALED TO PREVENT STORMWATER INGRESS
7. SEATS OF COVER AND FRAME TO BE FINISHED BY MACHINING OR OTHERWISE, SO THAT THE CENTRE SEATS EVENLY AND COMPLETELY COVER THE FULL CIRCUMFERENCE IN ANY POSITION IN THE FRAME
8. COVERS MUST HAVE NCC PATTERN FORMED INTO TOP OF COVER AS 5mm DEPTH RAISED LINWORK
9. ALL FONT TO BE CENTURY GOTHIC, 15mm HEIGHT RAISED 2.5mm
10. THE FOLLOWING INFORMATION SHALL BE PLACED ON THE UNDERSIDE OF THE COVER:
   SUPPLIERS NAME & PRODUCT CODE
   BATCH NUMBER, DATE OF MANUFACTURE

NELSON CITY COUNCIL

NCC STANDARD PATTERN for 600mmØ
(NOMINAL) D.I. FRAME AND COVER

INFRASTRUCTURAL ASSETS

APPROVED

SD 608

29/07/2010

SENIOR EXECUTIVE INFRASTRUCTURE
PLAN

3 x D10 Studs into Predrilled holes at 120° around Perimeter of Lid Frame

CENTRALLY LOCATED D10 HOOP Min. 50mm COVER.

FRAME

100mm MIN

PRECAST MH COVER SLAB

CONCRETE SURROUND

SECTION

STANDARD PRECAST LID RINGS

PREFORMED HOLE AT D10 STUD LOCATED AT 120° AROUND PERIMETER 50mm COVER

NELSON CITY COUNCIL

MANHOLE FRAME & COVER FIXING

INFRASTRUCTURAL ASSETS

APPROVED

29/07/2010

SD 609

SENIOR EXECUTIVE INFRASTRUCTURE DATE
1. RODING POINTS MAY BE USED IN LIEU OF MANHOLES IN ANY OR ALL OF THE FOLLOWING CIRCUMSTANCES:

A) AT CHANGE OF DIRECTION or GRADE. (BURIED, PRE-FORMED BENDS MAY BE USED IN LIEU OF RODING POINT WHERE THE CHANGE ON DIRECTION or GRADE IS CLOSER THAN 20m FROM A RODING POINT or MANHOLE)

B) AT THE HEAD OF A WASTEWATER SYSTEM

C) AT THE TOP OF STEEP BANKS WHERE A STANDARD MANHOLE WOULD BE IMPRACTICAL

FOR TRAFFIC LOADED RODING POINTS REFER TO STANDARD DRAWING 21/205 SHEET 2.

NOTES
1. RODING POINTS MAY BE USED IN LIEU OF MANHOLES IN ANY OR ALL OF THE FOLLOWING CIRCUMSTANCES:
   A) AT CHANGE OF DIRECTION or GRADE. (BURIED, PRE-FORMED BENDS MAY BE USED IN LIEU OF RODING POINT WHERE THE CHANGE ON DIRECTION or GRADE IS CLOSER THAN 20m FROM A RODING POINT or MANHOLE)
   B) AT THE HEAD OF A WASTEWATER SYSTEM
   C) AT THE TOP OF STEEP BANKS WHERE A STANDARD MANHOLE WOULD BE IMPRACTICAL

NOTES
NOTES

1. IF USED IN AREAS SUBJECT TO VEHICULAR TRAFFIC, THEN USE A TRAFFIC LOADED LID DESIGN, AS PER 21/205 SHEET 2

2. INSPECTION T’s SHALL BE POSITIONED 150mm ON THE ROAD RESERVE SIDE OF THE BOUNDARY
COMPACTED BACKFILL AS DETAILED ON DRAWINGS 21/700 SHEET 1 & 2

NOTES:
1. SEE SD 617 & SD 523 FOR TRENCH WIDTHS

2. THE TRENCH WIDTH SHALL BE THE MINIMUM NECESSARY TO ADEQUATELY AND SAFELY LAY THE PIPE AND TO COMPACT THE SIDE SUPPORT ZONE

3. A MINIMUM HORIZONTAL SEPARATION OF 300mm MAY BE USED WHERE 500mm IS NOT PRACTICAL
NOTE:
1. SIMILAR PROVISION FOR DRAINAGE OF CABLE AND WATER TRENCHES MAY BE REQUIRED.
2. STORMWATER TRENCHES TO BE LAID SLIGHTLY DEEPER THAN SEWER TRENCHES WHERE POSSIBLE.
3. WHERE DRAINAGE OF THE WASTEWATER IS NOT POSSIBLE, ADDITIONAL WATERTIGHT CONSTRUCTION AS PER 21/204 SHEET 6 WILL BE REQUIRED. ALTERNATELY, AN APPROVED THERMOPLASTIC MANHOLE MAY BE PERMITTED.
PVC PIPE SHALL BE PROTECTED WITH 6mm THICKNESS OF DENSO TAPE OR 250microns POLYETHYLENE FILM OR EQUIVALENT WHERE IT PASSES THROUGH THE WATER STOP

NOTES:

1. WATER STOPS SHALL GENERALLY BE AT THE FOLLOWING SPACINGS:

<table>
<thead>
<tr>
<th>PIPE GRADE:</th>
<th>MAXIMUM SPACING (metres)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1:10 or steeper</td>
<td>15</td>
</tr>
<tr>
<td>1:20</td>
<td>30</td>
</tr>
<tr>
<td>1:50</td>
<td>60</td>
</tr>
<tr>
<td>1:100</td>
<td>150</td>
</tr>
</tbody>
</table>

PROVIDED:

a. INTERMEDIATE GRADES ARE DETERMINED BY INTERPOLATION

b. MANHOLES POURED AGAINST A TRIMMED EXCAVATION MAY BE RECKONED AS WATER STOPS

c. WHERE A FLATTER GRADE OCCURS BELOW A STEEPER GRADE, AT LEAST ONE FURTHER WATER STOP SHALL BE LOCATED ON THE UPPER SECTION OF THE FLATTER GRADE AT A DISTANCE FROM THE CHANGE IN GRADE EQUAL TO THE ABOVE TABLE SPACING FOR THE STEEPER GRADE
Schematic of Elements Used in PVC Drain Construction

Preferred Connection Method
Similar system to be used connecting into existing PVC pipelines. PVC Connections as detailed to be used in new PVC drains.

Elevation Alternative Connection Method

Lamp Hole Cleaning Eye
See SD 610 & SD 611 for usual & traffic loaded cases.

Concrete Surround

Branch 45° Plain Junction

Bedding Material

Plain Bend 15° 0-45° Adjustable 45° & 90°

Drop Connection for drop M.H. Details see Plan No.21/204 Sheet 1-3

Solenoid Joint

Standard M.H. Lid & Frame

Precast 75mm Concrete M.H. Adjusting Ring on 900mm Dia x 100mm Thick Concrete Slab.

Existing Glazed Earthenware Drain

Short PVC Pipe Lengths.

G.E.W. Pipe Section Removed

Ceramic Socket to PVC Adaptor, Solvent Joint to PVC Spigot RRJ to G.E.W. PVC Loose/Slip Coupling

Epoxy Mortar Joint Between Saddle & Main

50mm 10MPa Insitu Concrete Surround

No.8 Wire Ties

Elevation Alternative Connection Method

Nelson City Council

Standard PVC Pipe Details

Infrastructural Assets

Approved: 29/07/2010
Senior Executive Infrastructure: Date

SD 616
THE TRENCH WIDTH SHALL BE THE MINIMUM NECESSARY TO ADEQUATELY AND SAFELY LAY THE PIPE AND TO COMPACT THE SIDE SUPPORT ZONE.
REINFORCED CONCRETE SURROUND
D=150Ø to 450Ø
TYPE A

PLAIN CONCRETE SURROUND
D=150Ø to 450Ø
TYPE B

REINFORCED CONCRETE SURROUND
D=100Ø
TYPE C

CONCRETE COVER
D=100Ø
TYPE D

NOTES:
1. FOR DIAMETERS GREATER THAN 450MM SPECIAL DESIGN APPLIES.
2. CONCRETE SHALL BE 20 MPa 100 SLUMP WITH A TOLERANCE OF +0, -20mm.
3. TYPE OF SURROUND SHALL BE SPECIFIED.
4. CONCRETE SURROUND SHALL TERMINATE AT A PIPE JOINT.
5. CONTRACTION JOINTS SHALL BE FORMED AT PIPE JOINTS BY INTERRUPTING CONCRETE WITH 12mm SOFTBOARD OR EQUIVALENT AND APPLYING APPROVED SEALANT TO THE PIPE JOINT TO PREVENT ENTRY OF CONCRETE. ANY REINFORCING STEEL SHALL BE STOPPED UNHOOKED 50mm FROM JOINT.
6. CONTRACTION JOINT SPACING - MAXIMUM:
   R.C.R.R.
   TYPE A 10m
   TYPE B 5m
   TYPE C } Engineer to
   TYPE D } Specify
7. WITH PVC PIPE TYPE E PROTECTION TO BE USED UNLESS OTHERWISE SPECIFIED.

CONCRETE COVER SLAB
MAXIMUM PIPE SIZE 375Ø
TYPE E

20 MPa 100 SLUMP CONC. FULL WIDTH OF TRENCH
HRC 665 MESH
M/4 : AP20 or GC 14-10 SURROUND
HAUNCHING MATERIAL
NELSON CITY COUNCIL
WATER CONNECTION POLICY
SUBDIVISION & CROSS LEASE

INFRASTRUCTURAL ASSETS
APPROVED 29/07/2010
SD 701

DENOTES POSITION OF WATER METER ASSEMBLY
DENOTES POSITION OF VALVE ASSEMBLY
NOTES:
1. SEE SD 617 FOR TRENCH WIDTHS
2. THE TRENCH WIDTH SHALL BE THE MINIMUM NECESSARY TO ADEQUATELY AND SAFELY LAY THE PIPE AND TO COMPACT THE SIDE SUPPORT ZONE
NOTE:

1) ALL FITTINGS TO BS 10 TABLE E (UNRESTRAINED MECHANICAL COUPLING ONLY ON ENGINEERS APPROVAL & ADEQUATELY PROTECTED - CATHODIC & MOISTURE BARRIERS).

2) UNRESTRAINED MECHANICAL COUPLING MAY ONLY BE USED WHEN CUTTING INTO AN EXISTING MAIN.

3) SEE SD 710 FOR FLANGE PROTECTION DETAILS.

4) ADJUST FITTINGS TO ALLOW HYDRANTS/LIDS TO BE INSTALLED.

5) ALL FITTINGS IN CONTACT WITH CONCRETE SHALL HAVE A PROTECTIVE MEMBRANE INSTALLED BETWEEN THE CONCRETE AND THE FITTING, TO ENGINEERS APPROVAL.
FINISHED GROUND LEVEL

CAST IRON VALVE BOX
CONCRETE SUPPORT ON COMPACTED BASECOURSE
LENGTH OF 150mm PVC PIPE
VALVE

COVER VARIES
200-300

CLEAN OUT TO THIS LEVEL

MARKER TAPE

BEDDING MATERIAL

INSITU CONC BLOCK

Z RING TO FLANGE DUCTILE IRON ADAPTOR

PVC PIPE

GALV. FISH TAIL ANCHORS OPP. DIAGONAL

NELSON CITY COUNCIL
SLUICE VALVE INSTALLATION
INFRASTRUCTURAL ASSETS
APPROVED 29/07/2010
SD 704
SENIOR EXECUTIVE INFRASTRUCTURE DATE
SOLID MILD STEEL TAPER CAP WELDED TO SHAFT

TAPER 1 TO 20 ON EACH SIDE

MILD STEEL ROUND SHAFT

6mm FILLET WELD ALL ROUND

LENGTH AS REQUIRED

FABRICATED 10mm MILD STEEL SQUARE KEY SOCKET, SIDES CONTINUOUSLY FILLET WELDED

NOTE: VALVE SPINDLE CAP KEY EXTENSIONS MAY BE SOURCED FROM VALVE MANUFACTURER OR AN APPROVED EQUIVALENT TO AS 2638.1: 2002 WITH ENGINEERS APPROVAL

<table>
<thead>
<tr>
<th>NOMINAL SIZE OF VALVE DN mm</th>
<th>Ø mm</th>
<th>LENGTH OF SQUARE ON CAP (A) mm</th>
<th>SQUARE ON CAP AND KEY (B) mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>80–150</td>
<td>24</td>
<td>50</td>
<td>35</td>
</tr>
<tr>
<td>200–900</td>
<td>32</td>
<td>57</td>
<td>35</td>
</tr>
</tbody>
</table>

NELSON CITY COUNCIL

SLUICE VALVE KEY CAP EXTENSION

INFRASTRUCTURAL ASSETS

APPROVED

29/07/2010

SD 705

SENIOR EXECUTIVE INFRASTRUCTURE

DATE
Hydrant boxes shall be embozed with "FH" on top of cover. Cover and frame shall be to Class C strength in berm access, or Class D if in traffic loaded areas, to AS3996. Covers must be anti-rocking.

In traffic loaded areas/carrigeways, install 200x200 concrete surround 27.5mPa with D10 hoop.

Precast concrete surround, 100mm thick 17.5mPa.

Finished ground level or road surface.

Cast iron medium pattern surface box.

Short pattern hydrant.

Clean out to this level marker tape.

Ductile iron hydrant riser (height varies).

PVC pipe.

Bedding material.

Insitu concrete cradle across trench width.
NOTE:
THIS DIAGRAM APPLIES TO THE SITUATION WHERE
THE MAIN IS LOCATED IN THE FOOTPATH OR BERM
WHERE THE MAIN IS LOCATED IN THE ROAD THE
LAYOUT SHALL BE MODIFIED SO THAT THE SAUNDERS
VALVE IS LOCATED IN THE FOOTPATH OR BERM
CROX NIPPLE SCREWED INTO TAPPED BLANK PLATE

DUCTILE IRON FLANGED BRANCH Z RING HYDRANT TEE

AT TEE JUNCTION

PVC PIPE

FOR HYDRANT DETAIL, REFER 21/404-1

CROX NIPPLE SCREWED INTO TAPPED BLANK PLATE

DUCTILE IRON FLANGED ONE MAINWAY & BRANCH Z RING HYDRANT TEE

AT PIPE END

BLANK PLATE and ANCHOR BLOCK

CONCRETE THRUST BLOCK POURED AGAINST NATURAL GROUND

NELSON CITY COUNCIL

RIDERMAIN CONNECTION USING "TEE"

INFRASTRUCTURAL ASSETS

APPROVED 29/07/2010 SD 708

SENIOR EXECUTIVE INFRASTRUCTURE DATE
NOTE:
FOR CONNECTION TO PE RIDERMAINS, SEE SECTION 7.7.6e
FLANGES FOR PIPES, VALVES & FITTINGS TO AS-2129

SURFACE PREPARATION
Wire brush loose dirt and rust from the flange and adjacent pipe, if appropriate and 100mm onto any shop coating. Ensure all surfaces are clean. Denso primer can be applied to moist or damp surfaces, but very wet surfaces should be dried.

PRIMING
Apply Denso primer to all metal surfaces where possible, protect nuts and bolts by dipping in Denso primer before assembly.

FILLING
Flanges to Tables A & D mould Denso mastic over the heads of bolts, nuts and screw threads with a minimum coverage of 5mm taper onto flange face to provide a suitable contour for tape wrapping flanges to Tables E due to the increased number of bolts in this case, it is necessary to use Denso mastic between individual bolts and nuts to provide a suitable contour for taping.

WRAPPING
Apply one complete turn of Denso tape circumferentially around flange with one side against the edge of the flange. Overlap about 80mm. Mould the overhanging tape over the mastic. Apply a second turn of tape to provide a double thickness around the flange and cover the opposite side for flanges on shop coated lines, spirally wrap Denso tape from the protected flange and 100mm onto the shop coating on either side.

OVERWRAPPING
Envelope with Denso MP/HD tape
Prime nuts and bolts before assembly where possible. This area may be filled with mastic on small diameters.

Within the diagram:
- Denso primer
- Denso Cord or Mastic
- Denso Mastic
- Denso Tape
- Denso MP/HD Tape

NELSON CITY COUNCIL
CORROSION PROTECTION FOR FLANGES
INFRASTRUCTURAL ASSETS
APPROVED
29/07/2010
SD 710
SENIOR EXECUTIVE INFRASTRUCTURE DATE
All Unrestrained Mechanical Couplings shall be wrapped as detailed below where materials other than 316 stainless steel and coatings to AS/NZS 4158 are used.

SURFACE PREPARATION

WIRE BRUSH LOOSE DIRT AND LOOSE RUST FROM THE JOINT AND ADJACENT PIPE.
DENSO PRIMER CAN BE APPLIED TO MOIST OR DAMP SURFACES, BUT VERY WET SURFACES SHOULD BE DRIED

PRIMING

APPLY DENSO PRIMER TO ALL METAL SURFACES
WHERE POSSIBLE, PROTECT NUTS AND BOLTS BY DIPPING IN DENSO PRIMER BEFORE ASSEMBLY

FILLING

FILL BETWEEN BOLTS AND SLEEVE, AND BOLTS TO TOP FLANGES WITH DENSO MASTIC
COVER BOLT HEADS, NUTS AND ANY PROTRUDING THREAD WITH DENSO MASTIC

WRAPPING

WHERE A SERVICE TAPPING MAY BE INCLUDED WITH THE UNRESTRAINED MECHANICAL COULING,
APPLY ONE COMPLETE TURN OF DENSO TAPE AROUND THE JOINT LAPPING BOTH ENDS ONTO THE SERVICE PIPE.
APPLY DENSO TAPE AROUND ONE END OF JOINT WITH AN END LAP OF 80mm. MOULD THE TAPE FROM THE HIGHEST POINT ON THE FLANGE WORKING DOWN TO EXCLUDE AIR BUBBLES.
APPLY ANOTHER COMPLETE TURN OF TAPE SIMILARLY WITH MINIMUM SIDE LAP OF 20mm. MOULD THE TAPE AROUND THE MASTIC COVERED BOLT HEADS, E.T.C.

OVERWRAPPING

ENVELOPE WITH DENSO MP/HD TAPE

NOTE

FOR CONCRETE LINED STEEL PIPES
DENSO SYSTEM TO OVER LAP
ONTO SHOP WRAPPING AS IN:
FLANGE DETAIL 21/407 SHT 1

---

<table>
<thead>
<tr>
<th>RUBBER RINGS</th>
<th>PIPE</th>
</tr>
</thead>
<tbody>
<tr>
<td>SLEEVE</td>
<td></td>
</tr>
</tbody>
</table>

---

DENSO PRIMER
(APPLIED BEFORE ASSEMBLY
WHERE POSSIBLE

DENSO MASTIC

DENSO TAPE

DENSO MP/HD TAPE

---

NELSON CITY COUNCIL

CORROSION PROTECTION FOR
UNRESTRAINED MECHANICAL COUPLINGS

INFRASTRUCTURAL ASSETS

APPROVED 29/07/2010

SENIOR EXECUTIVE INFRASTRUCTURE DATE

SD 711
F.H. MARKER POSTS INSTALLED ONLY AS DIRECTED BY THE ENGINEER.

MIN. 600mm MAX. 800mm HIGH

S.V. MARKER POSTS INSTALLED ONLY AS DIRECTED BY THE ENGINEER.

MIN. 600mm MAX. 800mm HIGH

BLUE RAISED REFLECTIVE PAVEMENT MARKER AT OR CLOSE TO, AND ON THE APPROPRIATE SIDE OF, THE CENTRE OF THE ROADWAY AT OR NEAR THE BASE OF THE YELLOW TRIANGLE MARKER.

HYDRANT MARKINGS:

NOT TO SCALE

VALVE MARKINGS:

NOT TO SCALE

NELSON CITY COUNCIL

VALVE & HYDRANT ROAD MARKINGS

INFRASTRUCTURAL ASSETS

APPROVED 29/07/2010

SD 712

SENIOR EXECUTIVE INFRASTRUCTURE DATE
VALVE CODING:

- YELLOW
- RED
- RED
- LOW LEVEL
- AIR
- AIR VALVE
- HIGH LEVEL
- PRV
- PRESSURE REDUCING VALVE
- SHUT
- NRV
- NON RETURN VALVE
- BYPASS
- NRV
- NON RETURN VALVE
- LH
- LEFT HAND VALVE (ie. ANTICLOCKWISE TO OPEN)
- NRV
- NON RETURN VALVE
- PUMPED SUPPLY (EXTRA HIGH LEVEL)

NOTES:
1. PAINT USED FOR ALL ROAD MARKINGS SHALL BE NRB "ROAD MARKING PAINT" (YELLOW - NRB M/7-Y) AND PLASTI-KOTE INDUSTRIAL TRAFFIC PAINT "6639N RED" OR EQUIVALENT.

2. ALL HYDRANT KERB MARKINGS SHALL BE YELLOW AND ALL VALVE KERB MARKINGS SHALL BE RED.
FOR CHIP SEAL, THIN ASPHALT & DEEP ASPHALT

1. UNSEALED ROADS & SHOULDERS. REINSTATEMENT TO BE 150MM DEPTH OF 40MM BASECOURSE TOPPED OFF WITH 50MM DEPTH OF 20MM BASECOURSE
2. FOR FINISHED SEAL LEVEL TOLERANCES SEE SECTION 8.7.2
3. *DEPTH TO MATCH EXISTING BITUMINOUS LAYER DEPTH, WHERE DEPTH IS GREATER THAN 50mm

NELSON CITY COUNCIL

TRENCH REINSTATEMENT IN CARRIAGEWAY

INFRASTRUCTURAL ASSETS

APPROVED

29/07/2010

SD 801

SENIOR EXECUTIVE INFRASTRUCTURE

DATE
CONCRETE

* 100mm FOR FOOTPATH, 150mm FOR RESIDENTIAL CROSSING, 200mm FOR COMMERCIAL CROSSING WITH 665 MESH, FOR INDUSTRIAL CROSSING PAVEMENT TO SPECIFIC DESIGN (TO MATCH EXISTING).

THIN ASPHALTIC
(FOR CHIP SEAL FOOTPATHS ALSO)

FOR VEHICLE CROSSINGS DETAILS REFER TO 21/304 SHEETS 1 AND 2

AP40 BASECOARSE

100mm MIN

APPROVED BACKFILL COMPACTED IN LAYERS.

GRASS SEED & TOPSOIL.

50 SCREENED TOPSOIL.

APPROVED BACKFILL COMPACTED IN LAYERS.

@ UNSCREENED TOPSOIL (50mm FOR CLAY FILLS, 100mm FOR GRAVEL OR SAND FILLS).

GRASS
FOR FRICTION COURSE

1. FOR FINISHED SEAL LEVEL TOLERANCES SEE SECTION 8.7.2
2. *DEPTH TO MATCH EXISTING BITUMINOUS LAYER DEPTH, WHERE DEPTH IS GREATER THAN 50mm
NELSON CITY COUNCIL

FOOTPATH SURFACE REINSTATEMENT

INFRASTRUCTURAL ASSETS

APPROVED

29/07/2010

SD 804

SENIOR EXECUTIVE INFRASTRUCTURE DATE
Fig 1 - REINSTATEMENT OF CONCRETE PATH OR DRIVEWAY

Fig 2 - EXCAVATION IN FOOTPATH OR DRIVEWAY

NELSON CITY COUNCIL

FOOTPATH SURFACE REINSTATEMENT

INFRASTRUCTURAL ASSETS

APPROVED 29/07/2010

SD 805

SENIOR EXECUTIVE INFRASTRUCTURE DATE
Fig 1 – FINISHING OF IRREGULAR SHAPED EXCAVATIONS

Fig 2 – TRENCH EXCAVATION WITH CORNERS

Fig 3 – PARALLEL CUTTING OF JOINTS

NOTE:

1. A MINIMUM TRIMMING ALLOWANCE OF 150mm

2. TOTAL LENGTH OF OVER BREAK OF THE TRENCH MUST NOT EXCEED 10% OF ITS LENGTH. THE LENGTH OF TRIM AT ANY SINGLE SECTION OF OVER BREAK SHOULD NOT BE LESS THAN 5m (See Fig. 3). THE PURPOSE OF THESE REQUIREMENTS IS TO AVOID AN UNDESIRABLE VISUAL IMPACT.
<table>
<thead>
<tr>
<th>NELSON CITY COUNCIL</th>
<th>CONTOUR DRAIN</th>
</tr>
</thead>
<tbody>
<tr>
<td>INFRASTRUCTURAL ASSETS</td>
<td></td>
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<tr>
<td>APPROVED</td>
<td>29/07/2010</td>
</tr>
<tr>
<td>SENIOR EXECUTIVE INFRASTRUCTURE</td>
<td>DATE</td>
</tr>
</tbody>
</table>
SEE SECTION 9.3.3.2c FOR GUIDANCE ON WHERE BENCH SLOPES ARE TO BE USED.
Runoff Diversion Channel/Bund height is to be at least twice the pipe diameter or twice the height of the flume.

Inlets are to be stabilised against erosion using impermeable geotextile overlapped into the inlet of the drop structure.

Design Criteria for Pipe Drop Structure

<table>
<thead>
<tr>
<th>Pipe Diameter (mm)</th>
<th>Maximum Catchment area (ha)</th>
</tr>
</thead>
<tbody>
<tr>
<td>150</td>
<td>0.05</td>
</tr>
<tr>
<td>350</td>
<td>0.20</td>
</tr>
<tr>
<td>450</td>
<td>0.60</td>
</tr>
<tr>
<td>500</td>
<td>1.00</td>
</tr>
<tr>
<td>600</td>
<td>1.00</td>
</tr>
</tbody>
</table>

Specific designs are required for Flume sizing.

Cross Section A-A

Pipe Drop Structure

Sealant

30x76mm bracing

22mm Marine Ply (seconds)

Fastens at 100mm centres using large head 75mm wood screws

Waratah supports wired together

400mm

2400mm

350mm

400mm
Wide shallow level spillway over existing ground where possible, retaining the existing grass cover. Minimum width 6 metres. Bare areas to be stabilised with concrete, two layers of geotextile or other armouring.

Bund/diversion channels to ensure all flow enters at the inlet end.

Secure the ends of the level spreader by burying within the earth bund and haunching with concrete.

Sediment Forebay (1m deep and 2m wide).

Level spreader full width of inlet end, batter into pond to be stabilised with soft matting geotextile.

Extra crest width may be required to provide for machinery access for cleaning out.

All bare surfaces to be stabilised with vegetation if the pond is to remain through a winter period, otherwise just the outer batter needs to be stabilised.

Floating decants.

Pinned geotextile overlaid with large rock to break up flow.
Wire limiting vertical movement of decant.

Standard Tee joint

Flexible rubber joints glued and clamped – two joints to be used only for lower decant.

Attach 1.8m long waratah to weight decant (see section A-A).

Standard end caps

Wire or steel straps to join decant and float.

Decant: Six equally spaced rows of 10mm diameter holes at 60mm spacings along the full length of the decant pipe, 200 holes per 1.5 ha catchment.

Float

Nylon cord to be tied through the end holes in decant and secured to the waratah.

Single waratah fixed firmly behind cable ties/straps required to weight decant.

Decant

Standard waratah placement at either end of the decant.

Section A-A
Level spreader full width of inlet end, stabilised from the beginning of the inlet to the pond invert with appropriate soft matting textile.

Level spreader 150 mm x 50 mm timber weir

Earth Bund with site concrete cover

Geotextile wrapped around level spreader and concrete haunching

Concrete haunching

3:1 inlet batter to be smoothed and free of voids

Sediment Retention Pond

Geotextile

Forebay 1 m deep
Width of top embankment should be wide enough to ensure machinery access for de-sludging of pond, if there are no other access points available.

Spillway compacted and smoothed to eliminate all voids prior to laying and pinning appropriate geotextile/concrete.

Pond batters 2:1 to 3:1

100mm diameter discharge pipe laid at 1 or 2% gradient

2 x rubber couplings to provide additional range

See decant detail

Live storage variable up to 1500mm

Dead storage 500mm

Pond base level

Waratah stakes

Rip-rap placed at pond outlet with geotextile placed underneath

Geotextile should be laid into the pond to a depth of at least 500mm below the spillway invert

Waratahs and strong nylon cord to control level of decant

Geotextile secured firmly to the embankment face

Anti-seep collars

SD 910
Width of top embankment should be wide enough to ensure machinery access for de-sludging of pond, if there are no other access points available.

Spillway compacted and smoothed to eliminate all voids prior to laying and pinning appropriate geotextile/concrete.

Pond batter 2:1 to 3:1

Pour concrete anti-seep collar

Pour concrete anti-seep collar

150mm diameter discharge pipe laid at 1% or 2% gradient

150-100mm reduction

Cross Section

Minimum freeboard 300mm

60° Y junction

150mm diameter riser

350mm

Upper decants extent of travel is over 50% of the live storage depth

See decant detail

Lower decants extent of travel is over 100% of the live storage depth – variable up to 1500mm

Waratah stake

2x rubber couplings to provide additional range

Dead storage 500mm

Rip-rap placed at pond outlet with geotextile placed underneath

Geotextile should be laid into the pond to a depth of at least 500mm below the spillway invert

Waratahs and strong nylon cord to control level of decant

If necessary place a 30° bend to keep lower decant well away from upper decant

Geotextile secured firmly to the embankment face

Anti-seep collars

Plan

NELSON CITY COUNCIL

SEDIMENT RETENTION POND FOR CATCHMENTS BETWEEN 1.5ha and 3ha

INFRASTRUCTURAL ASSETS

APPROVED 29/07/2010

SD 911

SENIOR EXECUTIVE INFRASTRUCTURE DATE
Width of top embankment should be wide enough to ensure machinery access for de-sludging of pond, if there are no other access points available.

Spillway compacted and smoothed to eliminate all voids prior to laying and pinning appropriate geotextile/concrete.

Pond batter 2:1 to 3:1

Minimum freeboard 300mm

Concrete riser may require weighting or anchoring to prevent floating

Middle decant operates over top 2/3 of live storage only

Lower decant operates over full depth of live storage up to 1500mm

500mm dead storage

Waratah stakes required for all decants

See decant detail

Cross Section

300mm diameter discharge pipe laid at 1 or 2% gradient

Lowest inlet pipe to riser is angled upward at 15° to ease tension on flexible joint

Rip-rap placed at pond outlet with geotextile placed underneath

Geotextile should be laid into the pond to a depth of at least 500mm below the spillway invert

Waratahs and strong nylon cord to control level of decant

Geotextile secured firmly to the embankment face

Anti-seep collars

Plan

NELSON CITY COUNCIL

SEDIMENT RETENTION POND FOR CATCHMENTS BETWEEN 3ha and 5ha

INFRASTRUCTURAL ASSETS

APPROVED

SD 912

29/07/2010

SENIOR EXECUTIVE INFRASTRUCTURE DATE
Steel standards such as waratahs or standard wooden fencepost driven a minimum of 400mm into the ground.

Elevation

Geotextile fixed firmly to post/waratah

Compacted backfill

Trench geotextile 200 mm minimum into ground

Cross Section

Overlap wooden battens

400 mm minimum height of geotextile

400 mm minimum post depth

Standard Fabric Joint

Where required returns a minimum of 2 metres in length to reduce velocity along the silt fence and provide intermediate impoundment

Perspective View

Ends of returned wired back to stake or waratah

Provide leakproof joint at the junction of the return and main silt fence alignment
STORMWATER INLET PROTECTION

NELSON CITY COUNCIL

INFRASTRUCTURAL ASSETS

APPROVED

29/07/2010

SD 914

SENIOR EXECUTIVE INFRASTRUCTURE

DATE
Cross Section

Key bund into stable ground to a minimum depth of 0.3 m.

160 mm non-perforated pipe through bund
Compacted fill (90% compaction) by track rolling at 200 mm lifts with particular care to get suitable compaction around pipes.

Elevation

2 m minimum

Plan

Outlet Detail

Live storage volume - 70% of total treatment volume

1 m maximum height to spillway level

Dead storage volume - 30% of total treatment volume

Level invert surrounding decant

160 mm dia. Perforated novacoil pipe fixed to waratah with wire ties.

Right angle PVC elbow Joints to be glued and fixed with PK screws

SD 915
NELSON CITY COUNCIL
INFRASTRUCTURAL ASSETS

EARTH BUND

APPROVED
29/07/2010

SENIOR EXECUTIVE INFRASTRUCTURE
DATE

NELSON CITY COUNCIL
INFRASTRUCTURAL ASSETS

EARTH BUND

APPROVED
29/07/2010

SENIOR EXECUTIVE INFRASTRUCTURE
DATE
BOUNDARY OR EDGE OF LANDSCAPING STRIP

600

CENTRELINE OF CABLE

NCC STREETLIGHT CABLE

400V CABLE DUCTING MIN. 100mm

400V CABLE DUCTING MIN. 100mm

11kV CABLE DUCTING MIN. 100mm

COMMUNICATION CABLE

ROAD RESERVE

900mm MIN COVER ALONG ROAD ALIGNMENT. 900mm COVER (DUCTED) ACROSS ROAD ALL SERVICES

COMMUNICATION DUCT

NOTE

ALL DIMENSIONS ARE MINIMUM ONLY OR OTHERWISE APPROVED BY THE LINE OWNER.

WHEN TRENCH IS A-shared WITH OTHER SERVICES THE DIMENSIONS WILL HAVE TO BE DEEPPENED AND/OR WIDENED TO ACCOMMODATE EACH TYPE OF SERVICE AS PER THE LINE OWNER STANDARDS FOR CABLE BEDDING & MECHANICAL PROTECTION REQUIREMENTS.

PLACE WARNING TAPE ABOVE ALL SERVICES

REFER TO LINE OWNERS STANDARDS FOR CABLE BEDDING & MECHANICAL PROTECTION REQUIREMENTS.
NOTE

* ANY CABLE WHETHER OWNED BY A LINE OPERATOR or CUSTOMER MUST BE SEGREGATED FROM A TELEPHONE CABLE BY MIN 450mm IF UNSCREENED or 150mm IF SCREENED

SEE CLAUSE 10.2.3b RE DUCTS UNDER ROW

SEE TABLE 11-2 FOR SEPARATION BETWEEN POWER & COMMUNICATION SERVICES. PLACE WARNING TAPE ABOVE ALL SERVICES

REFER TO LINE OWNERS STANDARDS FOR CABLE BEDDING & MECHANICAL PROTECTION REQUIREMENTS

500 min WHEN IN ROAD BERM
NOTE:

VEHICLE ENTRANCES AT ADJOINING BOUNDARIES CAN BE JOINED TOGETHER AND HAVE A CONTINUOUS KERB CROSSING WHERE THERE ARE NO ABOVE GROUND UTILITY BOXES AND THE KERB CROSSING LENGTH DOES NOT EXCEED 6.0m

P = POWER BOX
T = TELECOMMUNICATION BOX
SELECTED 1.8m+ TREE GROWN IN A PB90 AND TRAINED AS A STREET TREE. PRUNE TO SHAPE AFTER PLANTING. REMOVE DAMAGED BRANCHES AS REQUIRED.

NOTE:

1. TOTAL VOLUME OF ROOT WELL SHALL BE 4m³ min

2. DO NOT APPLY SLOW RELEASE HERBICIDE GRANULES IN THE VICINITY OF STREET TREES

3. TREE TO BE PLANTED BY EXPERIENCED STAFF. PRUNE ANY DAMAGED ROOTS, AND APPLY SLOW RELEASE FERTILISER

4. 50/50 MIX OF COMPOST AND GOOD CLEAN TOPSOIL. EVENLY COMPACTED AROUND ROOTS OR ROOT BALL

EXCAVATE A ROOT WELL 900mm DEEP AND ENSURE THE BOTTOM AND SIDES ARE FREE DRAINING. BACKFILL WITH TOP QUALITY TOPSOIL.

PURPOSE MADE PLASTIC ROOT DIRECTOR WHERE ADJACENT TO KERB, FOOTPATHS, OR PAVED SURFACES. MINIMUM 1.0m DIAMETER X 0.75m DEPTH

NEILSON CITY COUNCIL

STREET TREE PLANTER IN BERM

COMMUNITY SERVICES

APPROVED MANAGER PARKS & FACILITIES SD 1201

29/07/2010 DATE
SELECTED 1.8m+ TREE GROWN IN A PB90 AND TRAINED AS A STREET TREE. PRUNE TO SHAPE AFTER PLANTING. REMOVE DAMAGED BRANCHES AS REQUIRED.

FOR EXTRA INITIAL SUPPORT THE TREE SHOULD BE TIED IN TWO OPPOSITE DIRECTIONS WITH A SUITABLE LENGTH OF BIKE TUBE.

APPROVED NCC TREE GUARD PAINTED IN GLOSS BLACK ENAMEL (POWDER COAT).

1. TOTAL VOLUME OF ROOT CELLS PLUS ROOT WELL SHALL BE 4m³
   min

2. DO NOT APPLY SLOW RELEASE HERBICIDE GRANULES IN THE VICINITY OF STREET TREES.

3. REMOVE BOTH GRATES AND GUARD AFTER 5 YEARS FROM PLANTING.

4. TOP UP TO PATH LEVEL WITH PEA METAL OR SIMILAR.

5. IF IRRIGATION IS NOT AVAILABLE, A 50mm GAP SHOULD BE LEFT BETWEEN THE GRATE AND THE SOIL TO ALLOW A 'WELL' FOR TREE WATERING. THE GRATES WILL BE SUPPORTED BY THE CONCRETE PLANTER.

6. TREE TO BE PLANTED BY EXPERIENCED STAFF, PRUNE ANY DAMAGED ROOTS, AND APPLY SLOW RELEASE FERTILISER.

TREE GUARD BOLTED TO TREE GRATE. DRILL AND TAP GRATE IN WORKSHOP. ENSURE TREE GUARD IS PERPENDICULAR.

NCC APPROVED CAST IRON TREE GRATE SUPPORTED BY FRAME AND/OR CONCRETE SURROUND

KERB

FOOTPATH

150X150 CONCRETE SURROUND REINFORCED WITH D12 BAR.

PURPOSE MADE PLASTIC ROOT DIRECTOR. MINIMUM 1.0m DIAMETER X 0.75m DEPTH

50/50 MIX OF COMPOST AND GOOD CLEAN TOPSOIL. EVENLY COMPACTED AROUND ROOTS OR ROOT BALL.

EXCAVATE A ROOT WELL 900mm DEEP AND ENSURE THE BOTTOM AND SIDES ARE FREE DRAINING. BACKFILL WITH TOP QUALITY TOPSOIL.
IF PLAQUE IS FITTED IT IS TO BE SET INTO THE CENTRE OF THE TOP BOARD SO THAT THE FRONT OF THE PLAQUE IS FLUSH.

LENGTH OF SEAT IS 1.8m WITH PIPE LEGS 300mm IN FROM EACH END.

CAP EACH END OF GALVANISED PIPE. PIPE IS 900mm LONG. BEND TO 100°.

EXCESS THREAD TO BE TRIMMED OFF AND ENDS PENDED OVER OR LIGHTLY WELDED TO REMOVE SHARP EDGES AND PREVENT REMOVAL.

120mm RADIUS

WELDS TO BE WIRE BRUSHED AND PAINTED WITH GREY ANTI RUST PRIMER PAINT SUCH AS COLDGALV.

CONCRETE PAD 2.2 x 1.0 x 0.1 STEEL FLOAT FINISH WITH EDGING TROWEL FINISH AROUND OUTSIDE EDGE. PAD TO HAVE 3% CROSSFALL TO DISPERSE RAIN.

40mm NOMINAL GALVANISED PIPE 740mm LONG. PRESS AND SHAPE TO FIT AT 93° AND WELD WITH 6mm FILLET ALL ROUND.

STEEL LEGS ARE TO BE BENT IN A HYDRAULIC PIPE BENDER WITH SUITABLE FORMER AND WELDED IN A JIG TO ENSURE UNIFORMITY.

NTS

NELSON CITY COUNCIL

STANDARD PARK BENCH

COMMUNITY SERVICES

APPROVED

MANAGER PARKS & FACILITIES

DATE

PLAN No.

SD 1203
NOTES:

1. LETTER FONT TO BE 'ARIAL BOLD' SIZE AS APPROPRIATE TO FIT CENTRE WORDS TO SIGN BOARD

2. WHERE APPROPRIATE INCLUDE MAORI NAME BELOW NAME ON SAME SIGN BOARD AND REDUCE FONT SIZE AS REQUIRED TO FIT

3. ALL TIMBER ABOVE GROUND TO BE PAINTED WITH RESENE LUMBERSIDER 'DOC GREEN' LETTERING TO BE ROUTED TO DEPTH OF 5mm WITH CLEAN EDGES (LIGHTLY Sanded) LETTER COLOUR TO BE RESENE 'BUTTERMILK' 6BY50
ELEVATION
SCALE 1:50

NOTE
A GAP OF 1.5m FOR EASY PEDESTRIAN ACCESS
SHOULD BE ALLOWED FOR EVERY FEW BOLLARDS.

DRESSED/GAUGED TANALISED H4
125x125mm SQUARE POST
Ø 3000mm CTRS.

30mm CHAMFER AROUND TOP

30mmØ HOLE

100mm THICK CONCRETE
MOWING STRIP, BOX UP 300mm
SQUARE. (SEE NOTES 1 & 2)

300Ø HOLE CONCRETE FOOTING

TYPICAL SECTION
SCALE 1:20

REGULAR GALVANISED CHAIN
LINK 30 x 18mm x 6mmØ FIXED
THROUGH HOLES IN POST

150mm JOLT HEAD NAIL
FIXED THROUGH CHAIN
LINK, FINISHED FLUSH.

NOTES
1. REINSTATE WITH TOPSOIL & GRASSING TO BE
FLUSH WITH CONCRETE.

PLAN
SCALE 1:20

NELSON COUNCIL
WOODEN BOLLARD & CHAIN FENCE

INFRASTRUCTURAL ASSETS
APPROVED
29/07/2010
SD 1205
SENIOR EXECUTIVE INFRASTRUCTURE
DATE