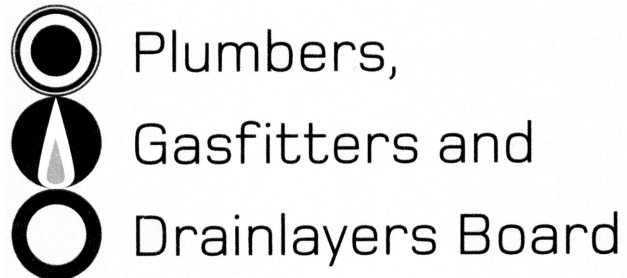


No. 9198



REGISTRATION EXAMINATION, NOVEMBER 2012
CERTIFYING DRAINLAYER

ANSWER SCHEDULE

ANSWER 1

- (a) 30 minutes (1 mark)
- (b) 2 ml per hour × 300 mm diameter × 57 metres long
 $2 \times 300 \times 57 = 34200$ mls/hr (1 mark)
 $34200 \div 2 = 17100$ mls (1 mark)
 $17100 \div 1000 = 17.1$ litres (1 mark)
(3 marks)
- (c) Soaked with water for at least 24 hours (1 mark)
- (d) High pressure air test (½ mark)
Low pressure air test (½ mark)
(1 mark)
- Total 4 marks**

ANSWER 2

- (a) Drawing to show
Correct location of vent (1 mark)
ORG included (1 mark)
Correct locations of inspection points (drain) (2 marks)
Inspection point at septic tank (1 mark)
Fresh air inlet (1 mark)
Distribution box OR effluent dosing system (2 marks)
Effluent lines following contours of ground (2 marks)
(10 marks)
- (b) So that one area can be rested while the other area is in service to prevent overloading of the soil.
(1 mark)
- (c) LTAR (and DLR) may be improved by (½ mark each):
(i) Improving the quality of the effluent and there by minimising the build up of a clogging layer.
(ii) Lowering the water-table and increasing hydraulic gradients (if a water-table is present within 1.5 m depth).
(iii) Diverting and shedding incident rainfall and/or shallow subsurface seepage (increases soil hydraulic gradients).
(iv) Distributing the effluent uniformly (leads to better usage of the soil infiltrating surface area).
(v) Encouraging envapo-transpiration with plantings.
(vi) Alternating loading and resting of sections of the land-application area (minimises the build-up of the clogging layer).
(3 marks)
- Total 14 marks**

ANSWER 3

- (a) Any FIVE (1 mark each):
PGD Act.
Building Act.
Resource Management Act.
Industry Training Act.
Local Government Act.
Health and Safety in Employment Act. (5 marks)
- (b) The performance requirements describe the outcomes that must be met by the design.
The Acceptable solutions are a means of meeting those outcomes. (2 marks)
- (c) The Certifying Drainlayer must continue to supervise people working under this exemption and must test and verify all their work. (2 marks)
- (d) (i) Work that does not require a building consent. (1 mark)
- (ii) Any TWO (1 mark each):
- Opening an existing access point to clear a blockage and resealing that access point.
 - A kitchen benchtop is replaced and the kitchen sink is moved to an adjacent wall (see exemption (ad)). The existing gully trap servicing the kitchen needs to be shifted a short distance to receive the discharge from the repositioned sink wastepipe.
 - A toilet pan has been repositioned in an existing bathroom (see exemption (ad)) and it is reconnected into the existing drain at a different point.
 - Installing a new access or rodding point for unblocking drains.
 - A short extension to a stormwater drain to collect water from a new downpipe.
 - Connecting a new gully trap on an existing drain to receive discharge from a redirected waste pipe.
 - Sealing off a branch drain following the removal of sanitary fixtures from an outbuilding associated with a dwelling.
 - Extending, for a short distance, the drain from a dwelling to connect to a new council sewer lateral installed at the boundary by the NUO due to the original lateral being damaged by tree roots (provided no new connections to a NUO system are made). (2 marks)
- (iii) Certifying Drainlayer.
Licensed Drainlayer.
Trainee Drainlayer.
Exemption holder. (3 marks)

Total 15 marks

ANSWER 4

(a)

| Area of catchment per downpipe | | Area of catchment for pipe section | | Minimum diameter pipe for each section | |
|--------------------------------|--------------------|------------------------------------|-------|--|----------|
| Downpipe | Area | Section | Area | Section | Diameter |
| 1 | 108 | A – B | 108 | A – B | 85 |
| 2 | 108 | B – C | 216 | B – C | 100 |
| 3 | 108 | C – G | 324 | C – G | 150 |
| 4 | 121.5 | G – H | 691 | G – H | 150 |
| 5 | 121.5 | D – E | 121.5 | D – E | 85 |
| 6 | 135 | E – F | 243 | E – F | 100 |
| Sump | 367 m ² | F – H | 378 | F – H | 150 |
| ½ mark each – Max 3 marks | | H – X | 1069 | H – X | 255 |
| | | ½ mark each – Total 4 marks | | ½ mark each – Total 4 marks | |

| Fall per section of pipe | | |
|----------------------------------|-----------|--------|
| Section | Length | Fall |
| A – B | 18 metres | 300 mm |
| B – C | 19 metres | 317 mm |
| C – G | 17 metres | 283 mm |
| G – H | 15 metres | 250 mm |
| D – E | 27 metres | 450 mm |
| E – F | 16 metres | 267 mm |
| F – H | 10 metres | 167 mm |
| H – X | 12 metres | 200 mm |
| ½ mark each – Total 4 marks | | |
| Allowance when made for rounding | | |

(15 marks)

- (b) 1.35 metres + allowance for minimum cover as per E1

Acceptable answers – 1.85 metres, 1.725 metres or 1.525 metres depending on type of cover – compacted selected fill, compacted granular bedding or concrete respectively.

Answers may be in accordance with NZBC Clause G13/AS3 (AS/NZS 3500. Part 2). (1 mark)

- (c) Any TWO (1 mark each):

- The pipe diameters could be increased to allow the gradients to decrease, therefore less fall would be required.
- The pipes could be laid at their minimum gradients which would require less fall and the connection point would not have to be as deep.
- Installation of a bubble up chamber
- Installation of a pump system

(2 marks)

(d) Any FOUR (½ mark each):

- At least every 50 m where rodding points are used.
- At least every 100 m where inspection points, inspection chambers or access chambers are used.
- Changes in direction of greater than 45°,
- Changes in gradient of greater than 45°,
- Junctions of drains - other than a drain, serving a single downpipe, that is less than 2.0 m long.

(2 marks)

Total 20 marks

ANSWER 5

| Depth of invert of drain | |
|--------------------------|---------------------|
| Point | Depth |
| A | 896.65 mm (2 marks) |
| B | 846.45 mm (2 marks) |
| C | 879.45 mm (2 marks) |
| D | 954.35 mm (2 marks) |
| E | 837.55 mm (2 marks) |

Total 10 marks

ANSWER 6

Total volume allowing for rocks $4 \div 38 \times 100 = 10.53 \text{ m}^3$ (2 marks)

Radius = $2.6 \div 2 = 1.3$

= 1.3

$A = 3.142 \times 1.3^2$

$A = 5.3$

(2 marks)

Depth/Height = Volume \div Area of circle

= $10.53 \div 5.30$

= 1.987 m

(1 mark)

Total 5 marks

ANSWER 7

Diagram to show:

- Minimum of one gully trap. (3 marks)
- Gully trap(s) not under the deck. (3 marks)
- Inspection openings at code locations. (3 marks)
- Vent. (1 mark)
- Practical and economic layout. (1 mark)

Total 10 marks

SECTION B

- 1 E A Department of Labour preferred work practice.
- 2 D 1000 mm
- 3 C Extra weight from soil or vehicles near the edge of the trench.
- 4 E 2000 mm
- 5 A Methane.
- 6 A Excavations that are deeper than the horizontal width.
- 7 D Every 50 years.
- 8 E 1:350
- 9 B The network utility operator.
- 10 A Flanged or butt-welded joints.
- 11 B New Zealand Building Code Clause G13 Foul Water OR
C New Zealand Building Code Clause G14 Industrial Liquid Waste.
- 12 C A drain that serves two or more properties.
- 13 E 60 metres.
- 14 C When the branch drain is not receiving the discharge from any soil fixtures (except urinals).
- 15 A When the drain is receiving 18 or more fixture discharge units.
- 16 A To allow a drain to be laid within a neighbouring property.
- 17 D 500 mm
- 18 B 80 mm
- 19 C 1:60
- 20 E 10 metres.

Total 20 marks