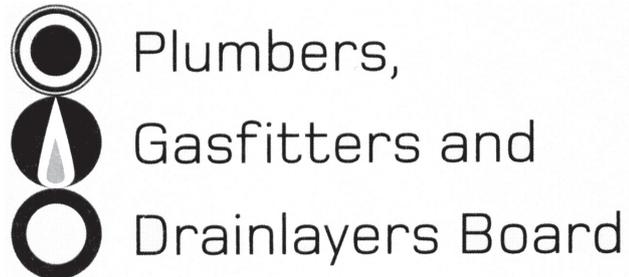


No. 9197



REGISTRATION EXAMINATION, JUNE 2008  
**DRAINLAYING**

**ANSWER SCHEDULE**



## ANSWER 1

(a) To allow the surcharge from a drain in situation when drain is blocked or overloaded. (1 mark)

- (b)
- 1 Within the boundaries of the property
  - 2 External to the building
  - 3 So that the top of the gully is accessible
  - 4 Where the discharge will be noticeable
  - 5 With clear access for more than two metres above the top of gully grate
  - 6 Not be enclosed
  - 7 Under hose tap if not receiving discharge.
- (Any FOUR 1 mark each) (4 marks)

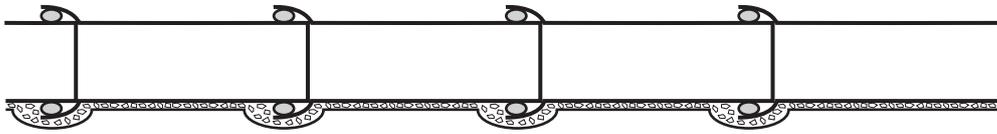
- (c)
- 1 Check no overhead services are in vicinity
  - 2 Check no underground services are in vicinity
  - 3 Determine the safest method of excavation
  - 4 Determine the best plant for job, (bearing in mind limitations of access, headroom, overhead cables or structure, bearing capacity of ground, noise restrictions).
  - 5 Determine the best type of support for the sides of the excavation, or if the sides can be cut back to a safe batter.
  - 6 Determine how the side support system can be installed safely
  - 7 Determine the best method, if the occasion demands, of keeping water out of the excavation and keeping it reasonably dry, so work can proceed without interruption
  - 8 If over 1.5m deep, must notify OSH
  - 9 Erection of signs and barriers for safety.
- (Any FIVE, 1 mark each) (5 marks)

**Total 10 marks**

**ANSWER 2**

- (a) (i) uPVC is laid on a flat bed, but Vitclay or concrete bedding is scooped out below sockets and only the pipe barrel is laid on flat bed. (2 marks)

(ii)



Bedding scooped out under sockets for vitclay or concrete not uPVC

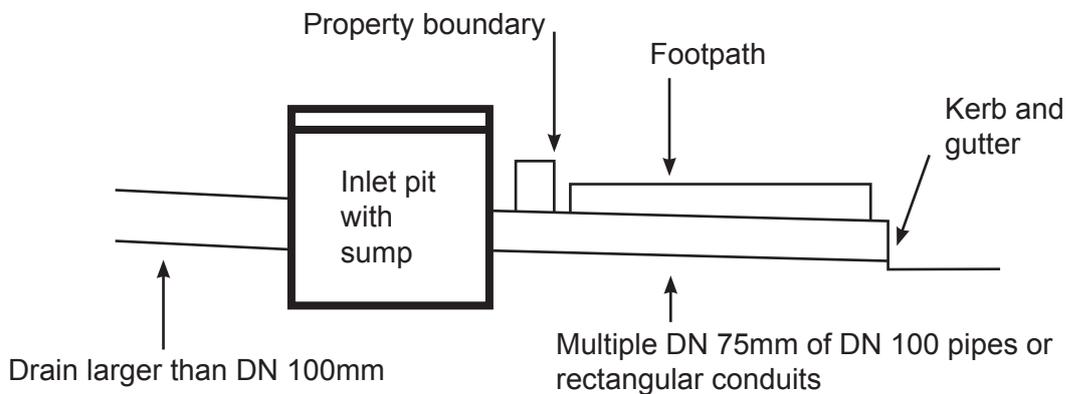
(half mark for drawing, half mark for under socket) (1 mark)

- (b) (i) Industrial liquid waste [trade waste] may be defined as any liquid, materials or remnants discharged from trade or industrial premises. (1 mark)

- (ii) Prohibited Industrial Liquid Waste (trade waste) are any poisons or flammable substance or wastes above 60°. (1 mark)

- (iii) To safeguard the environment, the sewage system and the people that maintain and service the sewage system. (1 mark)

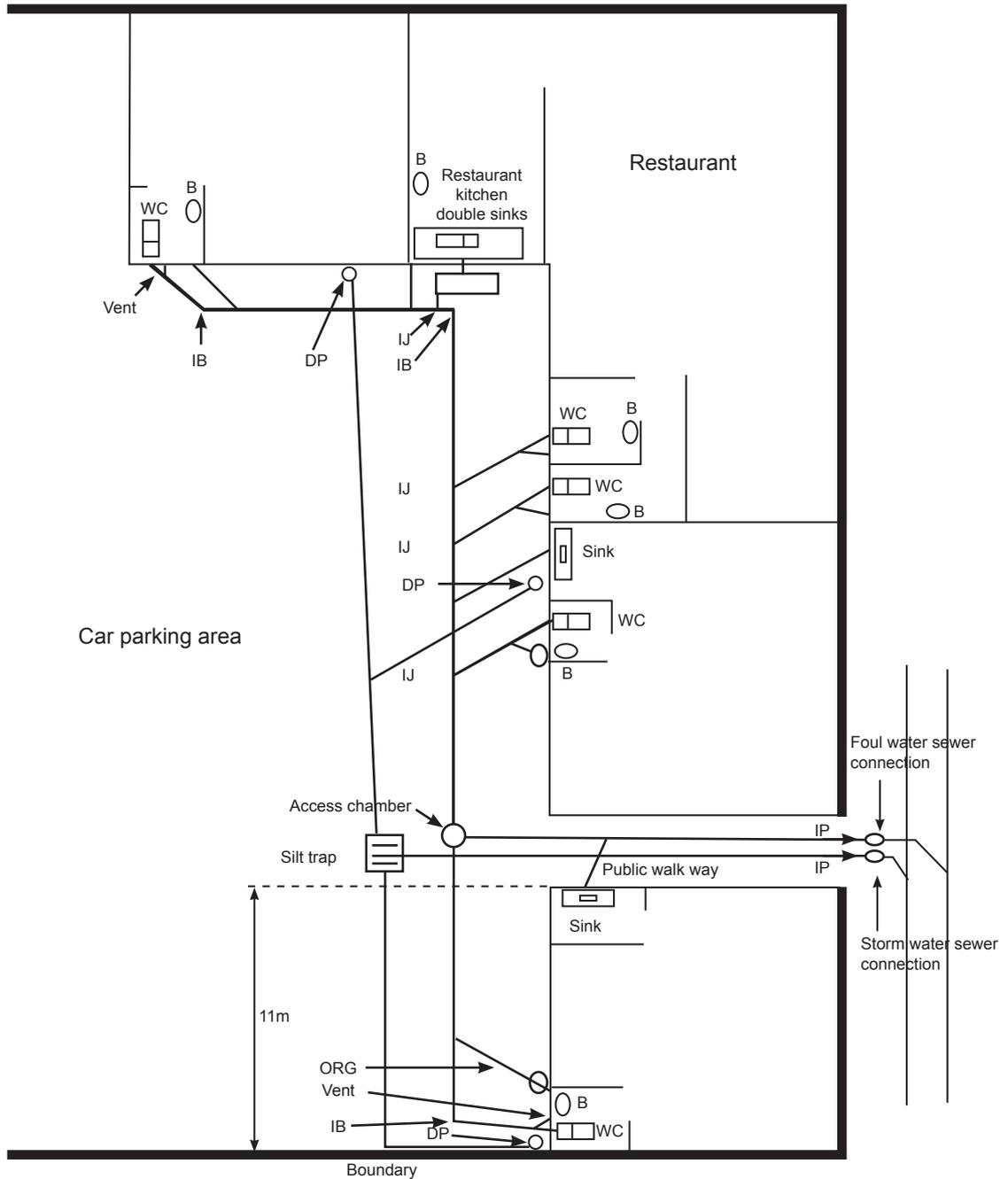
(c)



- 1 mark for pipe diameter larger (than DN 100 mm)
- 1 mark for pipe, rectangular conduit or pipes (DN 100 mm) or smaller
- 1 mark for inlet pit with sump
- 1 mark for property boundary between pit and footpath

**Total 10 Marks**

**ANSWER 3**



**Foul Water**

- 1 mark for vent at head of drain
- 1 mark for vent on branch drain
- 1 mark for overflow relief gully
- ½ mark each for inspection junctions or bends (total 3 marks)
- 1 mark for inspection prior to joining sewer.
- 2 marks for grease trap
- 1 mark if all fixtures are covered.
- 1 mark if correctly labelled

**Storm water**

- 1 mark for inspection prior to joining sewer
- 2 marks for silt trap
- 1 mark if all DP go to silt trap or storm water drain

**Total 15 marks**

## ANSWER 4

| Item                        | Number | Cost per item    | Cost      |
|-----------------------------|--------|------------------|-----------|
| Pipe length                 | 74.5   | \$16.50 per m    | \$1229.30 |
| Plain junctions             | 7      | \$22.60 each     | \$158.20  |
| Inspection junctions        | 4      | \$33.50 each     | \$134.00  |
| Plain bends                 | 1      | \$ 19.60         | \$19.60   |
| Inspection bends            | 2      | \$ 29.30         | \$58.60   |
| Overflow relief gully (ORG) | 1      | \$56.50 complete | \$56.50   |
| Sewer connection            | 0      | \$85.00          | 0         |
| Sub total                   |        |                  | \$1656.20 |
| GST (12.5%)                 |        |                  | \$207.03  |
| Total cost                  |        |                  | \$1863.23 |

Half mark for correct number of pipe and fittings. (total 3 marks)

Half mark for each correct cost (total marks 3)

1 mark for calculation of GST

1 mark for correct sub total

1 mark for correct total

**Total 9 Marks**

## ANSWER 5

- (a) Two pumps in the one system, one in use one on stand by. (1 mark)
- (b) (i) Acceptable solution G13/AS2 Drainage 80mm  
(ii) AS/NZS 3500 Part 2 Sanitary plumbing and drainage 50mm (1 mark each) (2 marks)
- (c) (i) Any THREE  
1 Plan  
2 Specification  
3 Soil report  
4 All calculations showing proposed method to protect the installation. (1 mark each) (3 marks)
- (ii) Appropriately qualified engineer. (1 mark)

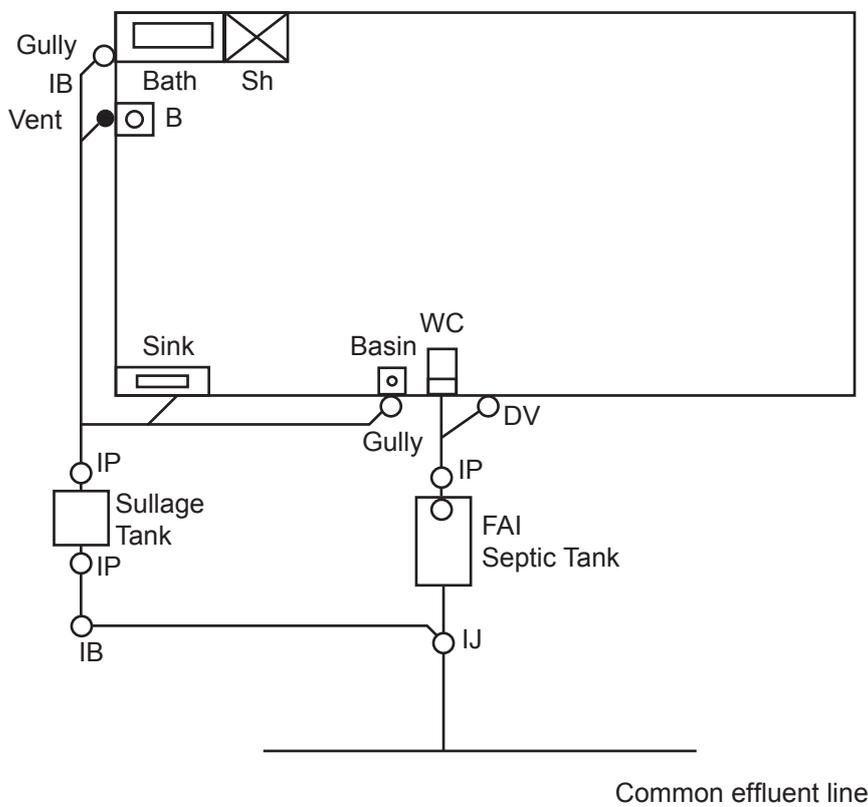
(d) Any THREE:

- 1 A heavy duty trafficable cover shall be installed at surface level above and independent to the cap
- 2 The cover shall be suitably supported so that no load can be transmitted onto the shaft.
- 3 The shaft shall be terminated just below the underside of the cover
- 4 The cap may be installed below surface level

(1 mark each) (3 marks)

**Total 10 marks**

**ANSWER 6**



**Sanitary line**

- 1 mark for gully
- 1 mark for vent
- 1 mark for Sullage tank in correct position
- ½ mark each for inspections either side of Sullage tank (total 1 mark)
- 1 mark for effluent line to common line

**Foul water line**

- 1 mark for drain vent
- 1 mark for inspection pipe
- 1 mark for FAI
- 1 mark for septic tank in correct position
- 1 mark for effluent line

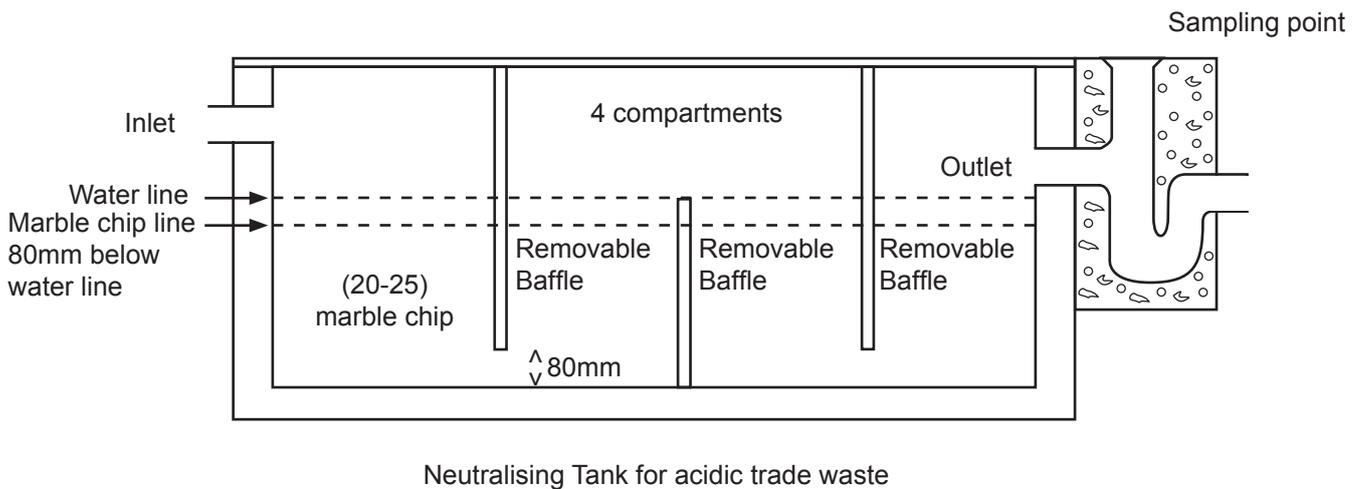
**Total 10 marks**

## ANSWER 7

- (a) A structure to support earth embankments surrounding either an intake or outfall pipe to prevent erosion and subsequent collapse  
(1 mark for support embankment, 1 mark for prevent erosion) (2 marks)
- (b) At culverts accepting storm water to be piped below ground such as when crossing below a road. An outfall for storm water into a river, stream or creek  
(1 mark for culverts for road crossings, 1 mark for rivers or creeks) (2 marks)
- (c) To dissipate the power of the water and spread the discharge to prevent scouring and erosion.  
(1 mark for dissipate the power of water, 1 mark for prevent scouring or erosion) (2 marks)
- (d) (i) Installed at entrance to wing wall.  
(ii) At an angle of 45 degree with the flow  
(iii) This allows for any entrapped debris to be forced upward by the pressure of the incoming water which in turn keeps the entrance free for water passage.  
(1 mark each) (3 marks)

**Total 9 marks**

## ANSWER 8



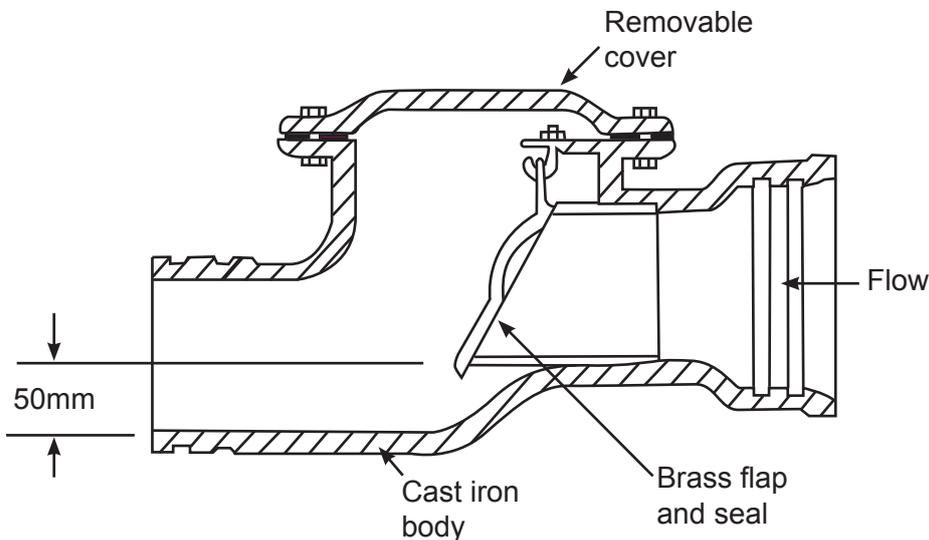
- 1 mark for 4 compartments  
1 mark for marble chip  
1 mark for removable baffle  
1 mark for sampling point  
1 mark for marble chip line 80mm below water line

**Total 5 marks**

**ANSWER 9**

- (a) (i) Adjacent to the shaft  
 (ii) Immediately downstream from and adjacent to the outlet of the boundary trap.  
 (1 mark each) (2 marks)

(b) (i)



(Feasible flap, 1 mark)  
 (Any TWO steps ½ mark)  
 (Cascade down ½ mark)  
 (Inspection ½ mark)

(ii) A manual reflux valve

- Has invert drop [50mm]
- Provides a face for hinged gate
- Gate opens allowing liquids to pass through
- Gate closes under surcharge situation
- Prevents sewage from back flowing into drain.
- When back pressure stops liquid can again pass through to sewer

(½ mark each) (3 marks)

(c)

| Pipe material       | Jointing method one | Jointing method two |
|---------------------|---------------------|---------------------|
| ABS Plastics        | Solvent welded      | Flanged             |
| Ceramic             | Rubber ring         | Rubber sleeve       |
| Ductile Iron        | Rubber Ring         | Flanged             |
| Polyethylene (HDPE) | Heat welded         | Flanged             |
| Vitrified Clay      | Rubber ring         | Rubber sleeve       |

(½ mark each) (5 marks)

**Total 12 marks**

## ANSWER 10

- (a) 1 E1 – Surface water  
2 G14 – Industrial liquid waste

(½ mark for number, ½ mark for name) (2 marks)

- (b) Licensed drainlayers

Holders of a current limited certificate to work at drainlaying under the supervision of a registered and licensed drainlayer

(1 mark each) (2 marks)

- (c) 1 Methane  
2 Ammonia  
3 Hydrogen sulphide

(1 mark each) (3 marks)

- (d) 1 Acceptable solutions – Provides examples of materials, components and construction methods which, if used, will result in compliance with the NZ Building Code  
2 Alternative Solution – An alternative solution is any design or construction that does not comply with an approved document but which does comply with the NZ Building Code  
3 A Verification method – Provides methods [often using formulas] by which a drainlayer's alternative solution may be evaluated for compliance.

(1 mark each) (3 marks)

**Total 10 marks**



