

## ROAD DRAINAGE SYSTEM COMPARISON

With the increase in road users and the urban sprawl, engineers are challenged to design a road within a designated corridor that will allow the traffic to move efficiently and to ease congestion during peak periods. The confined space that the road is designed for must also incorporate a drainage system that effectively captures the runoff from the road surface during storms. This is to minimise the risk of ponding or runoff spreading into the traffic lane thereby creating hazards to the road users.

There are several ways in capturing the runoff from roads with different costs implications. The following is a comparison of the installed costs between three road drainage scenarios. This comparison is based on a 100m length of road which is relatively flat with a sag (low) point located centrally using:

1. Kerb Inlet Pit & Pipe System – traditional drainage system (Figure 1. and 4.)
2. ACO's TraffikDrain TD200 System – grated trench drainage (Figure 2. and 5.)
3. ACO's KerbDrain QK200 System – integral kerb and drainage channel (Figure 3. and 6.)

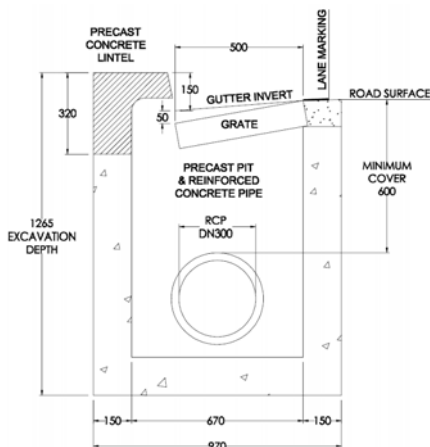


Figure 1.

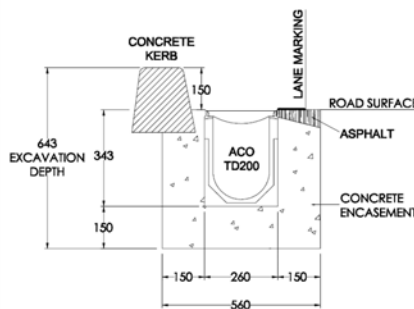


Figure 2.

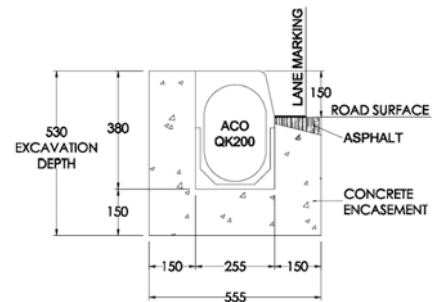


Figure 3.

### Cost Comparison Results

1. Kerb Inlet Pit & Pipe System	<b>\$47,000</b>	
2. ACO's TraffikDrain TD200 System	<b>\$40,000</b>	<b>15% cheaper than Kerb Inlet Pit &amp; Pipe</b>
3. ACO's KerbDrain QK200 System	<b>\$30,000</b>	<b>36% cheaper than Kerb Inlet Pit &amp; Pipe</b>

A summary of the installed costs are shown in Table 1 and a breakdown of all costs are shown in Appendix A. The installation cost does not include labour rates, time on site, removal of surplus excavated material and other incidentals such as site setup, traffic control etc. Component prices are derived from the Rawlinsons Australian Construction Handbook.

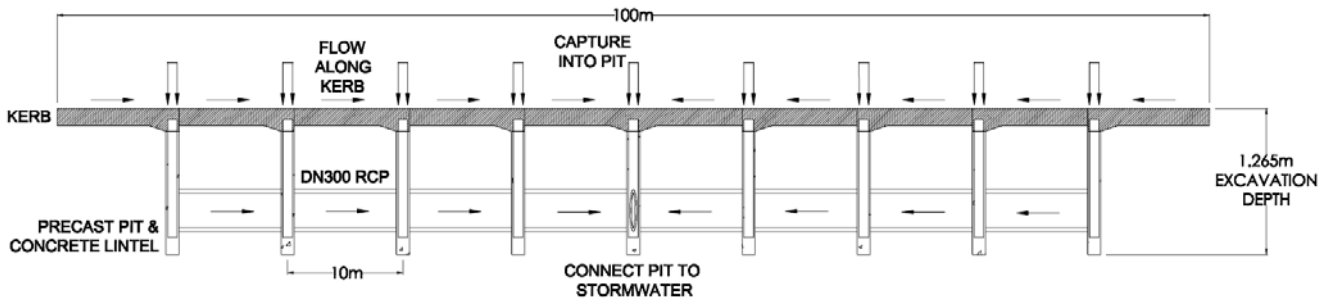
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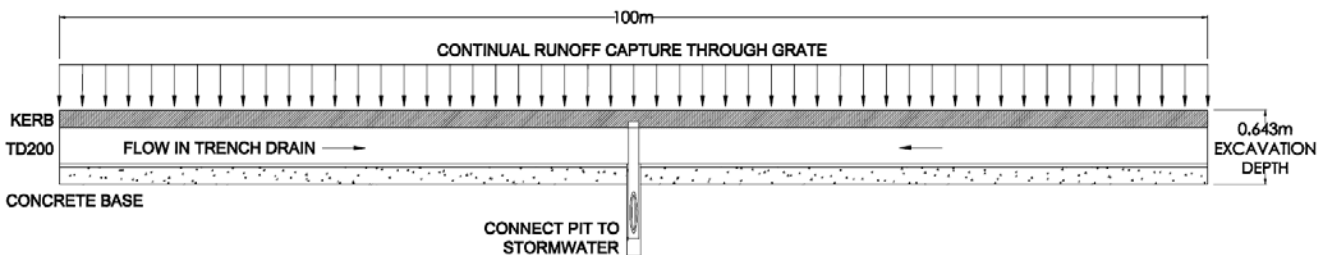
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**Table 1. Summary of the Cost Comparison**

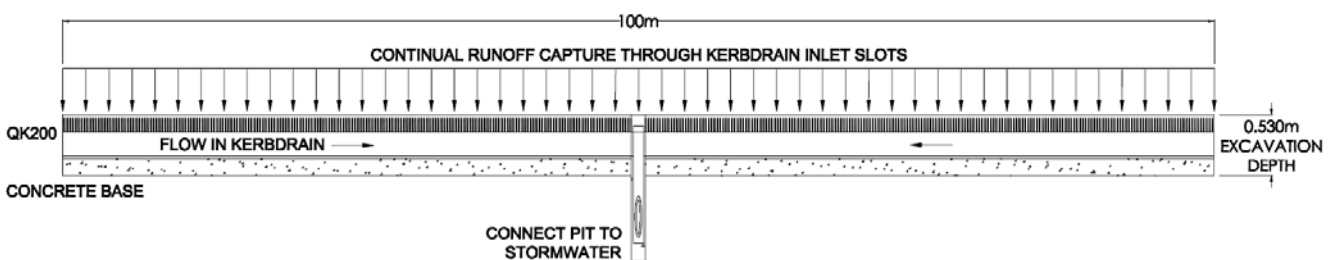
Installation Activity	1. Kerb Inlet Pit & Pipe Installed Cost	2. TraffikDrain TD200 Installed Cost	3. KerbDrain QK200 Installed Cost
Trench Excavation	\$3,762	\$1,736	\$1,860
Backfilling for Pipes	\$2,950	N/A	N/A
Laying/Joining & Price for Concrete DN300 Pipe	\$10,400	N/A	N/A
Excavation/Backfilling & Price for Pits & Connect to Pipes	\$13,725	\$1,525	\$1,525
Product Price for Kerb Inlet Lintel	\$3,240	\$360	\$360
Kerb Installation	\$6,272	\$7,840	N/A
500mm Shoulder - Base Course	\$1,842	N/A	N/A
500mm Shoulder - Concrete Paving	\$3,526	N/A <td N/A	
500mm Shoulder - Reinforcement	\$1,180	N/A	N/A
Product Price for ACO Product	N/A	\$25,000	\$23,000
Concrete Encasement for ACO Product	N/A	\$3,515	\$3,330
<b>Total Cost:</b>	<b>\$46,897</b>	<b>\$39,976</b>	<b>\$30,075</b>
<b>Approximate Cost per metre:</b>	<b>\$470</b>	<b>\$400</b>	<b>\$300</b>
<b>Percentage Cheaper than Kerb Inlet Pit &amp; Pipe Installation:</b>		<b>15%</b>	<b>36%</b>



**Figure 4. Long section of Kerb Inlet Pit & Pipe System**



**Figure 5. Long section of ACO's TraffikDrain TD200 System**



**Figure 6. Long section of ACO's KerbDrain QK200 System**

**There are advantages of trench drainage (ACO's TraffikDrain and ACO's KerbDrain) compared with the kerb inlet pit & pipe system with regards to:**

**Hydraulics & Safety:**

- Trench drainage can eliminate the need to install multiple pits.
- Continuous capture of runoff by TraffikDrain grates / KerbDrain inlet slots, minimising the risk of ponding / gutter flow from encroaching into the traffic lane. This is contrasted against kerb inlet pit and pipe system where runoff will flow out on to the road between pits creating hazards to road users and pedestrians.
- For kerb inlet pit and pipe a road shoulder may be required to ensure the gutter flow width does not encroach into the traffic lane, this is not required for the TraffikDrain or KerbDrain Systems.
- TraffikDrain HiFlo grates ensure maximum water intake resulting in quicker water removal.



**Installation:**

- TraffikDrain and KerbDrain channels require a shallower trench excavation compared with kerb inlet pit and pipe system requiring a deep excavation for the pipes
- Shallow trench excavation for TraffikDrain and KerbDrain will minimise the risk of interference with other services resulting in high costs involved in relocating existing services in the verge such as electrical, communications, gas, water supply and sewer. Underground pipe for the kerb inlet pit option will be installed at relatively the same depth as the existing services.
- KerbDrain is an integral kerb and trench drain and eliminates the need to construct a separate kerb and drainage system.



**Maintenance:**

- Trench drain blockages can be located quicker through the TraffikDrain grates
- Rubbish easily cleaned out by removing the TraffikDrain grate above the blockage. It's more difficult to identify the location of the blockage in the underground pipe in the kerb inlet pit and pipe system.
- KerbDrain access units can be used anywhere along the run.



## Appendix A. Cost Comparison

1. Kerb Inlet Pit & Pipe Installation	Rawlinsons - Australian Construction Handbook - Edition 31 - 2013 - Sydney Prices	Page	Unit	Unit Cost	Quantity	Cost
Excavation for Pipes	Trench Excavation - Trenches (exceeding 300mm wide) - Excavate trenches or pits by machine: 1000/2000mm total depth in - Clay	476	cum	\$ 66.00	57	\$ 3,762
Backfilling for Pipes	Trench Excavation - Backfilling - Backfilling trenches with: 20mm crushed rock	476	cum	\$ 118.00	25	\$ 2,950
Laying/Joining & Price for Concrete DN300 Pipe	Sewer Drains - Concrete - Concrete pipe to AS 4058-1992 with rubber ring joints: Class 2: 300mm dia.	477	m	\$ 130.00	80	\$ 10,400
Excavation/Backfilling & Price for Pits & Connect to Pipes	Manholes, Soakwells, Sumps - Manhole 600 x 600mm internally with 150mm concrete base, precast concrete wall sections: 1200mm	486	No	\$ 1,525.00	9	\$ 13,725
Product Price for Kerb Inlet Lintel	Price for precast kerb inlet lintel only	CP	No	\$ 360.00	9	\$ 3,240
Kerb Installation	Kerbs & Drains - Cast in situ concrete including reinforcement, formwork and surface finishes in: 250 x 150mm kerb	224	m	\$ 78.40	80	\$ 6,272
500mm Shoulder - Base Course	Roadworks - Basecourse - Crushed rock/blue metal: 300mm thick	678	sqm	\$ 30.20	61	\$ 1,842
500mm Shoulder - Concrete Paving	Roadworks - Paving - Concrete (32MPa), unreinforced: 200mm thick	678	sqm	\$ 57.80	61	\$ 3,526
500mm Shoulder - Reinforcement	Concrete Work - Reinforcement - Fabric - Square mesh : SL 102	247	sqm	\$ 19.35	61	\$ 1,180
<b>Kerb Inlet Pit &amp; Pipe Installation - Total Cost:</b>						<b>\$ 46,897</b>
<b>Kerb Inlet Pit &amp; Pipe Installation - Cost per metre:</b>						<b>\$ 470</b>
2. ACO TraffikDrain TD200 Installation	Rawlinsons - Australian Construction Handbook - Edition 31 - 2013 - Sydney Prices	Page	Unit	Unit Cost	Quantity	Cost
Product Price for Grated Trench Drain	ACO TraffikDrain TD200 System - 200mm wide grated trench drain	ACO	m	\$ 250.00	100	\$ 25,000
Excavation of Trench	Trench Excavation - Trenches (exceeding 300mm wide) - Excavate trenches or pits by machine: Not exceeding 1000mm total depth in - Clay	475	cum	\$ 62.00	28	\$ 1,736
Concrete Encasement for Grated Trench Drain	Concrete Work - Base Prices - Concrete, delivered to site: 25MPa	235	cum	\$ 185.00	19	\$ 3,515
Excavation/Backfilling for Pits & Connection to Drain	Manholes, Soakwells, Sumps - Manhole 600 x 600mm internally with 150mm concrete base, precast concrete wall sections: 1200mm	486	No	\$ 1,525.00	1	\$ 1,525
Product Price for Kerb Inlet Lintel	Price for precast kerb inlet lintel only	CP	No	\$ 360.00	1	\$ 360
Kerb Installation	Kerbs & Drains - Cast in situ concrete including reinforcement, formwork and surface finishes in: 250 x 150mm kerb	224	m	\$ 78.40	100	\$ 7,840
<b>ACO TraffikDrain TD200 Installation - Total Cost:</b>						<b>\$ 39,976</b>
<b>ACO TraffikDrain TD200 Installation - Cost per metre:</b>						<b>\$ 400</b>
<b>Percentage Cheaper than Kerb Inlet Pit &amp; Pipe Installation:</b>						<b>15%</b>
3. ACO KerbDrain QK200 Installation	Rawlinsons - Australian Construction Handbook - Edition 31 - 2013 - Sydney Prices	Page	Unit	Unit Cost	Quantity	Cost
Product Price for KerbDrain	ACO KerbDrain QK200 System - 200mm wide trench drain with integral kerb	ACO	m	\$ 230.00	100	\$ 23,000
Excavation of Trench	Trench Excavation - Trenches (exceeding 300mm wide) - Excavate trenches or pits by machine: Not exceeding 1000mm total depth in - Clay	475	cum	\$ 62.00	30	\$ 1,860
Concrete Encasement for KerbDrain	Concrete Work - Base Prices - Concrete, delivered to site: 25MPa	235	cum	\$ 185.00	18	\$ 3,330
Excavation/Backfilling for Pits & Connection to Drain	Manholes, Soakwells, Sumps - Manhole 600 x 600mm internally with 150mm concrete base, precast concrete wall sections: 1200mm	486	No	\$ 1,525.00	1	\$ 1,525
Product Price for Kerb Inlet Lintel	Price for precast kerb inlet lintel only	CP	No	\$ 360.00	1	\$ 360
<b>ACO KerbDrain QK200 Installation - Total Cost:</b>						<b>\$ 30,075</b>
<b>ACO KerbDrain QK200 Installation - Cost per metre:</b>						<b>\$ 300</b>
<b>Percentage Cheaper than Kerb Inlet Pit &amp; Pipe Installation:</b>						<b>36%</b>

### Notes & Assumptions

The installation cost does not include the labour rates, time on site, removal of surplus excavated material and other incidentals such as site setup, traffic control etc.

The material to be excavated to install the ACO trench drain is assumed to be clay.

TraffikDrain TD200 System, has an overall width of 260mm and overall depth of 340mm, based on the TD2-020 neutral channel.

KerbDrain QK200 System, has an overall width of 260mm and overall depth of 380mm, based on the QK200B KerbDrain unit.

Volume of concrete to be poured for the ACO TraffikDrain TD200 and KerbDrain QK200 for a Load Class C-D installation requires 150mm concrete haunch and base.

1. This is not a quotation. Use as a guide only.
2. ACO Product Prices are based on ACO's Price List and excludes GST.
3. Other Component Prices are derived from Rawlinsons - Australian Construction Handbook - Edition 31 - 2013 - Sydney Prices.
4. The recommendation has been made in good faith with the belief that the information used is correct and that the assumptions made are valid.
5. It is the customer's responsibility to check and confirm that the recommendation is acceptable and suitable for use.