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CARS (College Awareness of Road Safety) Project: the Redesign of a Dublin City Centre Junction With Respect to Non-Vehicular Traffic Between the Ages of 17-24.

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CARS Project

(College Awareness of Road Safety)

The redesign of a Dublin City Centre junction with respect to non-vehicular traffic between the ages of 17-24

Group 4
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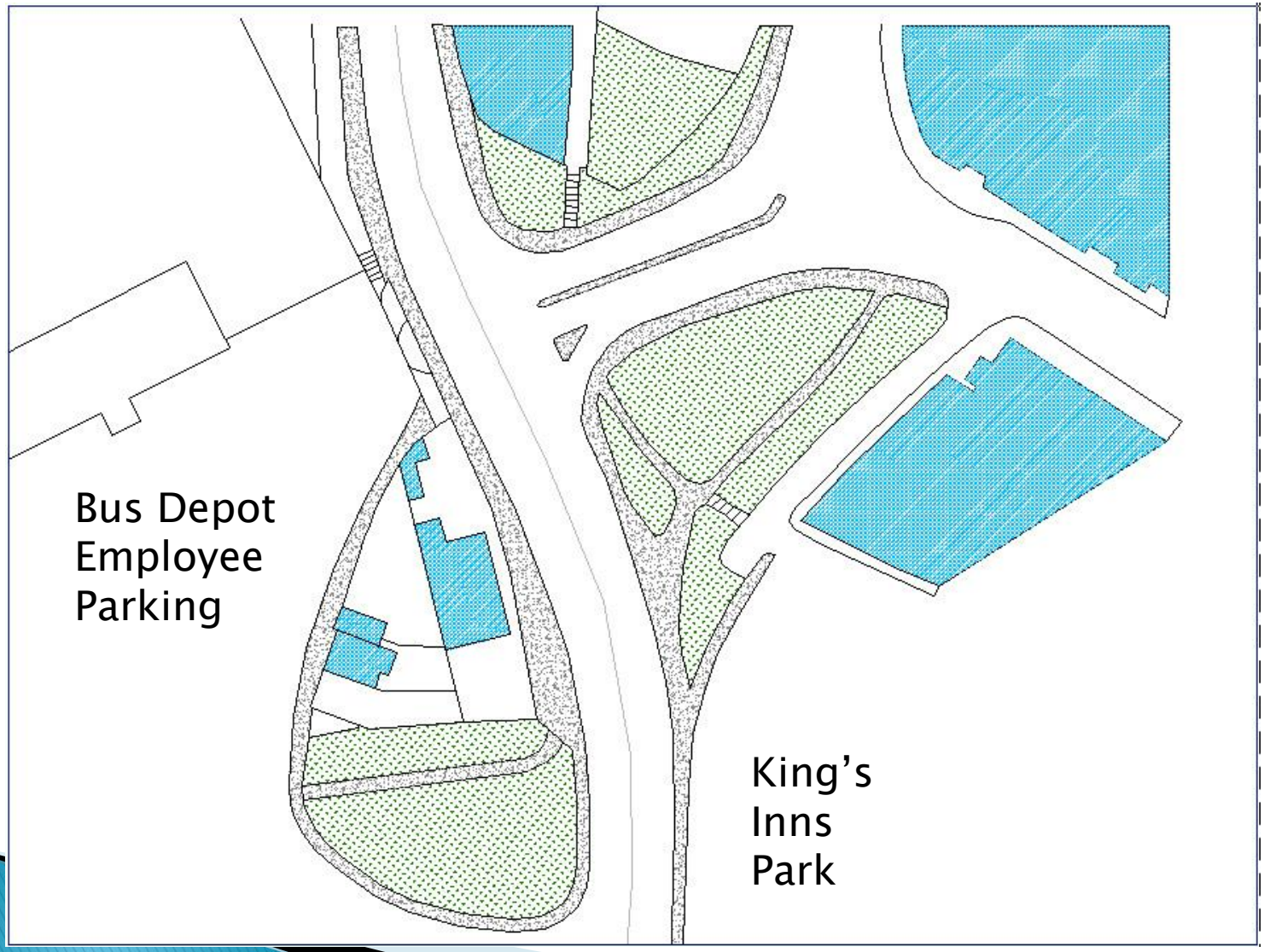
Constitution Hill – Western Way



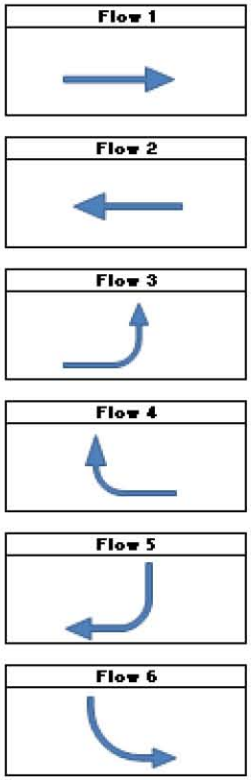
Introduction

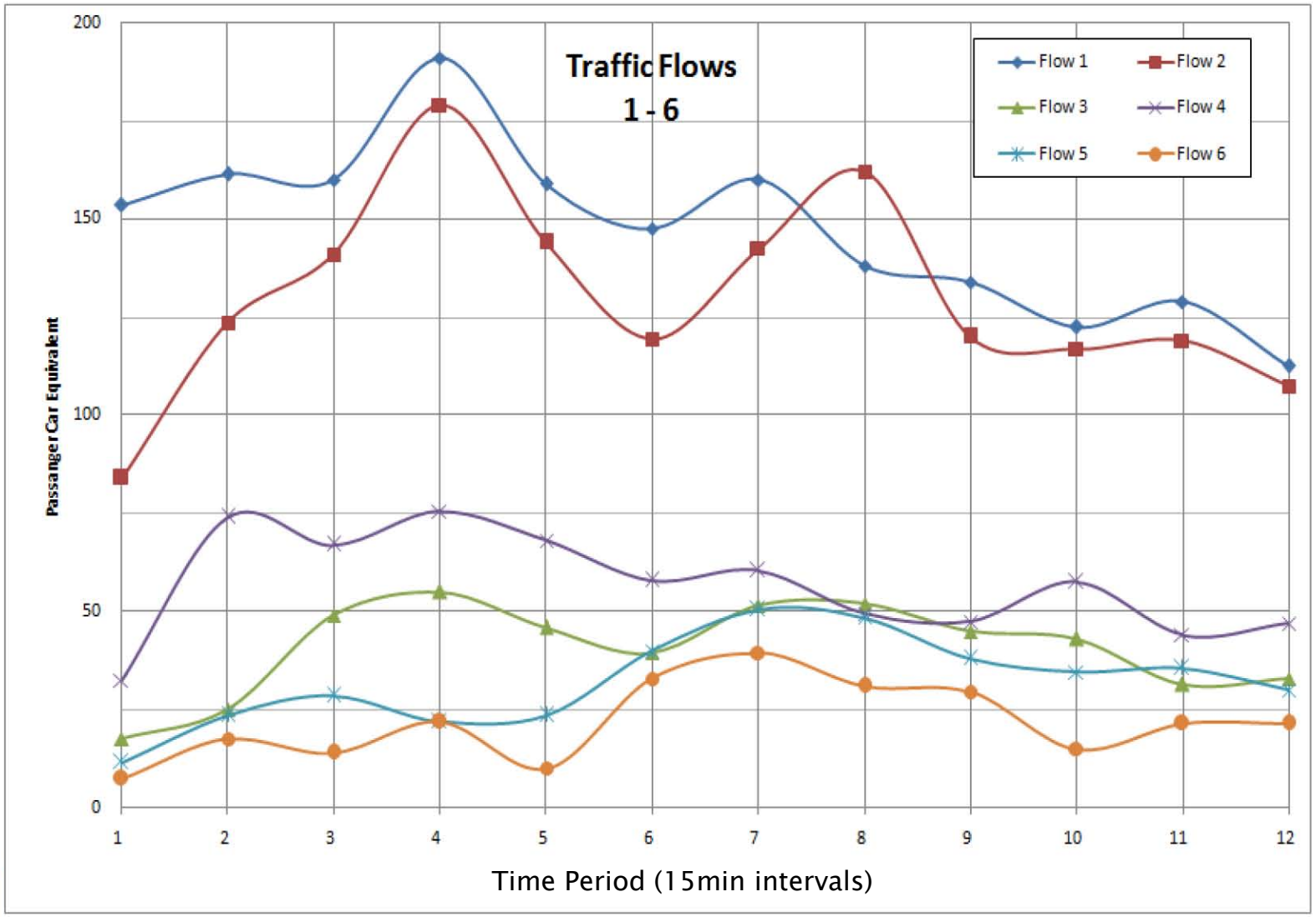
- The purpose of this project was to improve the road safety of a specific target group of 17-24 year old non drivers.
- The reason for this is that students will make up the majority of traffic heading to the new campus
- The new campus will bring an excess of 20,000 students + staff to the area as it is adjacent to a major entrance and exit of the Grangegorman Site

Research

- Traffic Analysis Survey
- NRA – Roadworks Unit Rate Database
- Grangegorman Development Plan
- Google Maps and Google Earth
- Ordnance Survey Ireland
- RSA – Collision Statistics 2005-09

Traffic Survey





Results of Survey

- The survey showed that vehicular traffic was satisfactory and there was no delays or queuing
- Pedestrians were more-or-less oblivious to traffic signalling and designated crossing points
- Cyclists had to share the road with busses thus jeopardising their safety
- Alterations to the junction are required to enhance pedestrian and cyclist safety

Unused Redesign Alternatives

- Zebra Crossings
  - Traffic Flow Disruption
- On-Demand Signalling
  - Traffic Flow Disruption
- Diagonal Crossings
  - Unfeasible – Traffic Flow Disruption
- Roundabout
  - Geometric limitations

Chosen Designs

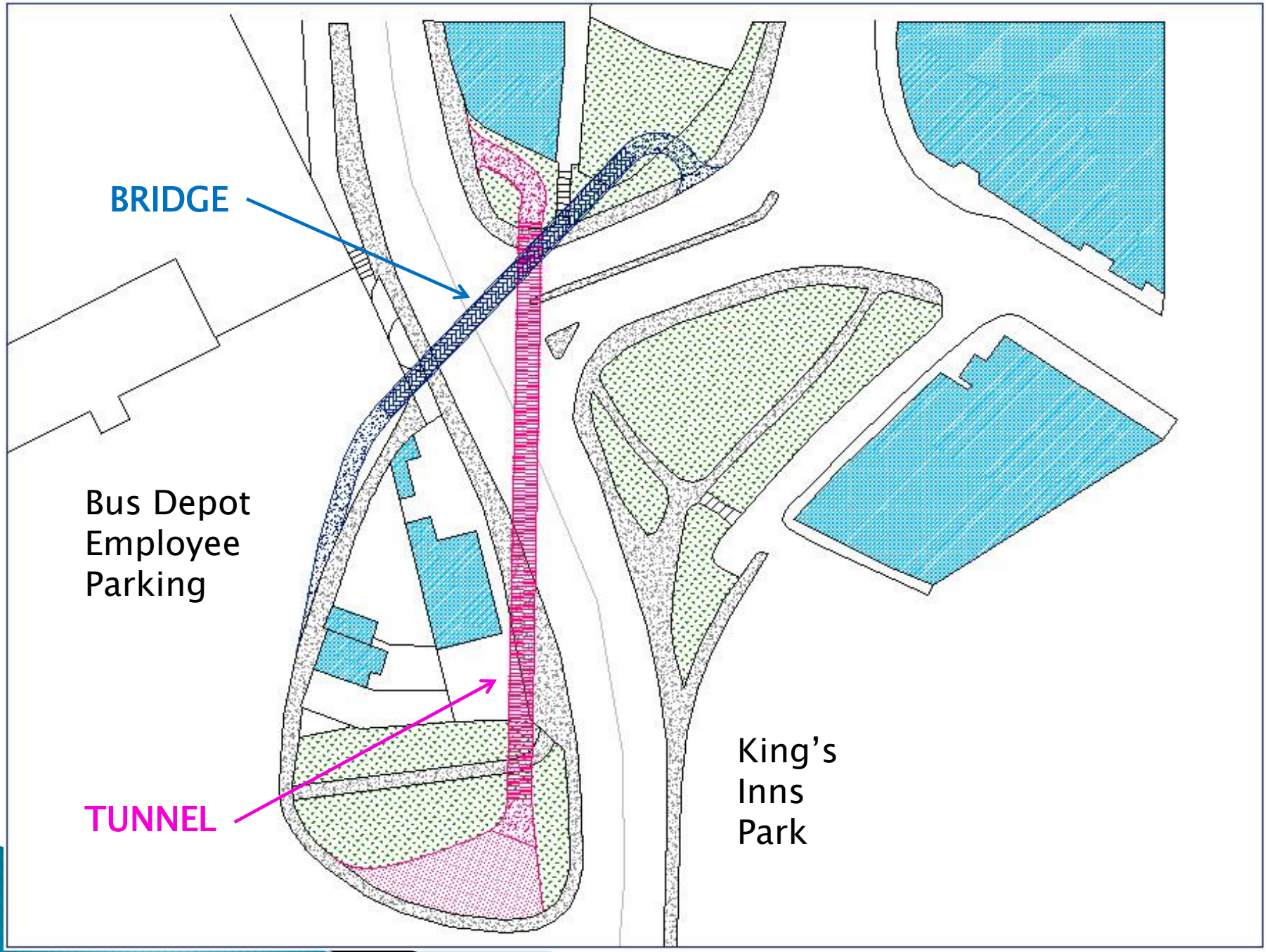
- An Overpass
- Underground Passage/Tunnel
- Do-Minimum Situation

Overpass/Bridge

- The overpass will span from the two elevated locations resulting in no need for unsightly support structures.
- It will safely transport pedestrians and cyclists over the junction without the need for vehicular traffic to stop.
- The estimated cost of installation is almost 600 thousand euro.

Underpass/Tunnel

- The tunnel would run from South of the existing petrol station to North of the junction in question.
- It will safely transport pedestrians and cyclists under the junction without impeding the flow of vehicular traffic.
- The estimated cost of installation is over 600 thousand euro.
- Potential antisocial behaviour issues.


BRIDGE
Bus Depot
Employee
Parking
TUNNEL
King's
Inns
Park

The Ferry Cycle Bridge near Maghery Country Park

The Ferry Cycle Bridge opened Spring 2002 funded by Loughshores Area Strategy DARD EHS Craigavon/Dungannon Councils. This foot and cycle bridge cost £250K to build and was constructed especially for the route of the Lough Neagh Loughshore Trail which crosses the River Blackwater at Maghery.

Cost Analysis – Bridge

The cost analysis for the bridge design has been taken from a 55m span, foot and cycle bridge near Maghery country park. The bridge cost € 300,000 in 2002. Using the present value formula it can be determind this bridge would cost € 488,668.40 in today's preset value. On this basis the Total cost of contrustion can be computed as follows:

	unit	Amount	Distance	Cost (€) / unit	Total cost
Materials:					
Cost of bridge	(€)	1	55	€8,884.88	€488,668.40
					€0.00
Hand Rails	(m)	1			€0.00
Paving at Bridge	(m^2)	2	50	€25.00	€2,500.00
electricals					
lighting column	//	6	1	€500.00	€3,000.00
wiring	(m)	1	200	€3.00	€600.00
signage	(m)	5	1	€200.00	€1,000.00
Bridge lighting	//	10	//	€35.00	€350.00

External cost.

	days	Manhours/day	Crew	Shifts	cost per person/hour	Total Man Cost
Labour	12	7	8	3	€18.00	€36,288.00
Design.	10	7	2	1	€28.00	€3,920.00
Forman.	12	7	1	3	€22.75	€5,733.00
Site Engineer	12	8	1	1	€28.00	€2,688.00
Specialist Fabricato	2	5	2	2	€26.00	€1,040.00
Machinery					Per Day	
Crane	1	8	1	3	€300.00	€7,200.00
Contingency cost	15	//	//	//	€500.00	€7,500.00
	15	//	//	//	€4,000.00	€4,000.00
Loss of earnings	15	//	//	//	€2,000.00	€30,000.00

Total construction cost: € 594,487.40

Typical Box Culvert

Cost Analysis – Tunnel

Cost Analysis of 110 m Tunnel.						
Materials:	Size:	Length (m)	Unit	Rate (€)	Total cost (€):	
Culvert	3.7 m x 2.6 m	110	(m)	€3,400.00	€374,000.00	
Bedding layer	300 mm	122	(m^3)	€25.00	€3,050.00	
Geotextile	9.5	110	(m^2)	€1.50	€1,567.50	
Roadway.						
Hardcore fill.	18	110	(m^2)	€12.00	€23,760.00	
Capping clause 804	5.5	110	(m^2)	€25.00	€15,125.00	
Roadbase	5.5	110	(m^2)	€20.00	€12,100.00	
Pavement Finish 75mm	5.5	110	(m^2)	€15.00	€9,075.00	
Drainage system.						
left	0.225	110	(m)	€20.00	€2,200.00	
Right	0.225	110	(m)	€20.00	€2,200.00	
surface:	prime cost	//	//	//	€10,000.00	
Civil costs/Services.	Prime cost	//	//	//	€40,000.00	
	Length (m)			cost (€)/m	Total cost.	
Crossing Barrier	50			€280.00	€14,000.00	

External cost:						
		Unit	Amount.	Rate (€).	Total Cost (€).	
soil removal.	Soft	(m^3)	900	€9.00	€8,100.00	
	Hard	(m^3)	200	€30.00	€6,000.00	
Disposal of Material	Soft	(m^3)	900	€2.00	€1,800.00	
	Hard	(m^3)	200	€2.00	€400.00	
	days	Manhours/day	Crew	Shifts	cost per person/hour	Total Man Cost
Labour	15	7	11	3	€18.00	€62,370.00
Design.	10	7	2	1	€28.00	€3,920.00
Forman.	15	7	1	3	€22.75	€7,166.25
Site Engineer	15	8	1	1	€28.00	€3,360.00
Machinery					Per Day	
Crane	1.3	7	1	3	€300.00	€8,190.00
Contingency cost	15	//	//	//	€500.00	€7,500.00
	15	//	//	//	€4,000.00	€4,000.00
Loss of earnings	15	//	//	//	€2,000.00	€30,000.00

Total cost of project: € 649, 883.75

Justification of project

- Total cost of projects:
  - Underpass: € 595, 000.
  - Overpass: € 650, 000.

- Current cost of accidents:
  - Fatal: €1,694,481
  - Serious: €190,400
  - Minor: €140,681

Total Cost of accidents:
€ 1,899,562.

- Proposed cost of accidents if proposal is NOT implemented:
  - Fatal: €16,775,361
  - Serious: € 1,884,960
  - Minor: €1,453,419

Total Cost of accidents:
€ 20,113,740.

- Therefore, there is potential for approximately €19,400,000 of accident savings if the proposed underpass or overpass is implemented at the Broadstone Gate junction entrance.

Conclusion

- Following our research we feel that by constructing an overpass the junction will be capable of handling the volumes of traffic without congestion problems.
- In the event of local objections there is the option of an underpass which although more costly will not affect the visual aspect of the junction and surrounding areas.
- If the underpass or overpasss is implemented, the potential increase in road safety for the 17-24 age bracket is significant.

THE END

Please feel free to ask any Questions.

Please see the report for more information, calculations and references.