



12d[®] International Conference

2016

12d International Innovation Awards

Kelvin Jenkins Generic Sewer Reticulation Designs

HIGHLY COMMENDED: DRAINAGE, SEWER, UTILITIES AND RIVERS



Name:	<input type="text" value="Kelvin Jenkins"/>	Category:
Position:	<input type="text" value="Civil Engineer"/>	<input type="checkbox"/> Design & Visualisation
Company:	<input type="text" value="Wood & Grieve Engineers"/>	<input type="checkbox"/> Survey & Construction
Name Project:	<input type="text" value="Generic Sewer Reticulation Designs"/>	<input checked="" type="checkbox"/> Drainage, Sewer, Utilities & Rivers
Client:	<input type="text" value="-"/>	<input type="checkbox"/> Customisation
		<input type="checkbox"/> 12d Synergy



WOOD & GRIEVE ENGINEERS



12d International Innovation Awards

Description of Project:

- Developed to automate the design and documentation of Sewer Reticulation to Local authority standards
- The customisation was developed for Queensland Projects, but is adaptable and flexible enough for any region and standard.

Description of problem faced / task undertaken:

- We have found certain aspects of sewer reticulation design and documentation within 12d quite difficult using the native framework of 12d.
- 12d has limited scope to set various elements of reticulation sewer design, such as lid types, bulkheads, house connection type, embedment types and structure drop types.
-

How the problem was solved:

- We have developed a sewer design tool for 12d which designs sewers based on local authority standards,
The tool will automatically design and/or set:
 - Structure Drop Types
 - Structure Lid Types
 - Bulkhead Types and Spacings
 - House Connection Types
 - Embedment Types
- The design tool can be modified by users to suit different local authority standards and includes a library or different local authority standards.
- The Design Tool will also give errors and commentary to the user about the sewer design based on standards and allows for the design to be tweaked accordingly. For example if a pipe enters too high within the bulb of a poo pit, the tool will highlight the issue and suggest a solution.
- Using this design tool with 12d, sewer designs can be plotted to a local authority standard longsection with no additional drafting or calculations required.

Relevant 12d screenshots and/or data attached:

- Structure Details Design Tool Screenshot
- House Connection Design Tool Screenshot
- Final Sewer Longsection Plot PDF



12d International Innovation Awards

MAINTENANCE HOLE/SHAFT NO.	2/1	1/1	5/X1	2/2	1/2	6/X1	6/3	5/3	4/3	RB3/3	2/3	1/3
WHIMS TYPE	MS	MS	EXISTING MH	MS	MS	EXISTING MH	MS	MS	MS	MS	MS	F
WHIMS COVER TYPE	CRC	CRC	CRC	CRC	CRC	CRC	CRC	CRC	CRC	CRC	CRC	CRC
JUNCTION LINE			XI			XI						XI
DOWNSTREAM STRUCTURE DROP TYPE		BULB	A		BULB	D		BULB	A		BULB	D
DEPTH TO HOUSE CONNECTION	1,200	1,000	1,000	1,200	1,300	0,888	1,100	1,000	1,000	1,000	1,000	1,000
HOUSE CONNECTION INVERT LEVEL	46,200	46,345	46,077	46,207	46,207	46,078	46,200	46,200	46,200	46,200	46,200	46,200
HOUSE CONNECTION TYPE	B3	B1	B1	B1	B1	B1	B1	B1	B1	B1	B1	B1
HOUSE CONNECTION LOT NO.	10,220	10,220	10,220	10,220	10,220	10,220	10,220	10,220	10,220	10,220	10,220	10,220
DISTANCE FROM DIS STRUCTURE	94,977	70,653	64,003	40,447	20,196	1,018	62,5	47,200	31,574	17,207	12,018	12,018
EMBEDMENT TYPE	3	3	3	3	3	3	3	3	3	3	3	3
BULKHEADS (B) / TRENCHESTOPS (T)	84(T) at 10.0m CRS	24(T) at 7.5m CRS										
PIPE NOMINAL DIAMETER (DN)	DN160	DN160	DN160	DN160	DN160	DN160	DN160	DN160	DN160	DN160	DN160	DN160
PIPE TYPE & CLASS	PE100 SDR21	PE100 SDR21	PE100 SDR21	PE100 SDR21	PE100 SDR21	PE100 SDR21	PE100 SDR21	PE100 SDR21	PE100 SDR21	PE100 SDR21	PE100 SDR21	PE100 SDR21
PIPE GRADE (% IN X)	12.58	13.84	13.84	20.43	42.50	42.50	20.43	100	50.00	50.00	50.00	55.01
PIPE LENGTH (m)	94,977	21,669	21,669	40,447	16,780	16,780	62,500	13,065	9,973	11,800	85,264	85,264
DATUM RL	25.0	25.0	25.0	25.0	25.0	25.0	30.0	30.0	30.0	30.0	30.0	30.0
JUNCTION INVERT LEVEL												
DEPTH TO INVERT BELOW FSL	1,693	1,693	1,693	1,693	1,693	1,693	1,507	1,507	1,507	1,507	1,507	1,507
INVERT LEVEL (L)	46,108	46,108	46,108	46,108	46,108	46,108	47,698	47,698	47,698	47,698	47,698	47,698
FINISHED SURFACE LEVEL (FSL)	47,795	47,795	47,795	47,795	47,795	47,795	49,205	49,205	49,205	49,205	49,205	49,205
EXISTING SURFACE LEVEL (ESL)	47,813	47,813	47,813	47,813	47,813	47,813	49,205	49,205	49,205	49,205	49,205	49,205
SETOUT COORDINATES	E: 1182,093 N: 5154,467	E: 1182,093 N: 5154,467	E: 1182,093 N: 5154,467	E: 1182,093 N: 5154,467	E: 1182,093 N: 5154,467	E: 1182,093 N: 5154,467	E: 1182,093 N: 5154,467	E: 1182,093 N: 5154,467	E: 1182,093 N: 5154,467	E: 1182,093 N: 5154,467	E: 1182,093 N: 5154,467	E: 1182,093 N: 5154,467
CHANNAGE (CH)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
LINE NUMBER	1	1	1	2	2	2	3	3	3	3	3	3

SEQ NuSewer Standards						Input H/C Data from 12d Clipboard		Output H/C Design to Clipboard		Show Working Hide Working	
House Connection Type Parameters											
		Depth Range		Sewer Depth Max	Connection Location	MH Stub	Quick Functions				
ID	From	To									
A1	0	0.2	1.5	WP	S	TEXT	C3				
A2	0	0.2	1.5	XB	S	TEXT	C4				
A3	0	0.2	1.5	WP	MS	TEXT	C1				
A3	0	0.2	1.5	WP	MH	TEXT	C1				
A4	0	0.2	1.5	XB	MS	TEXT	C4				
A4	0	0.2	1.5	XB	MH	TEXT	C1				
B1	0.2	0.5	3	WP	S	TEXT	-1				
B2	0.2	0.5	3	XB	S	TEXT	C4				
B3	0.2	0.5	3	WP	MS	TEXT	C2				
B3	0.2	0.5	3	WP	MH	TEXT	C2				
B4	0.2	0.5	3	XB	MS	TEXT	C2				
B4	0.2	0.5	3	XB	MH	TEXT	C2				
C1	0.5	1.5	3	WP	S	TEXT	C2				
C2	0.5	1.5	3	XB	S	TEXT	C2				
C3	0.5	.999	.999	VP	MH	TEXT	C2				
C4	0.5	.999	.999	XB	MH	TEXT	C4				
C3	0.75	.999	.999	VP	MS	TEXT	C2				
C4	0.75	.999	.999	XB	MS	TEXT	C2				
						PAIL	C4				
						PAIL	C2				
						PAIL	C2				
								Connection Drop too high for Stub, try lowering Connection by 0.246			
								C3			
								Sewer too deep for stub Connection, use MS or MH			
								Sewer too deep for stub Connection, use MS or MH			
								Sewer too deep for stub Connection, use MS or MH			
								Sewer too deep for stub Connection, use MS or MH			
								C3			
								Sewer too deep for stub Connection, use MS or MH			
								Sewer too deep for stub Connection, use MS or MH			
								Sewer too deep for stub Connection, use MS or MH			
								C3			
								C3			

Sewer Design Parameters	
Max depth of sewer for stub connection	3 m
Maximum Depth of Property Connection	1.5 m
Buffer (Control to Connection IL)	0.15 m
Connection Min Depth to Invert	0.6 m