

APPENDIX C

Hydrologic Parameter Sheets



Project Name: Glenelg Expansion Lands
 Project Number: 1060-6220
 Date: 2023-07-28
 By: KS

D.A. NAME PRE-1
D.A. AREA (ha) 4.32

**Hydrologic Parameters: CALIB NASHYD Command
 Pre Development Drainage Area: Catchment PRE-1
 Pre-Dev to CP Trail (Outlet #1)**

Curve Number Calculation

Soil Types Present:				
Type	ID	Hydrologic	% Area	Area
Listowel Silt Loam	LTW	B	100.0%	4.3
				0
				0
				0
Total Area				4.3

Impervious Landuses Present:

Soils	Roadway		Sidewalk		Driveway		Building		SWMF		Subtotals	
	Area	CN	Area	CN	Area	CN	Area (ha)	CN	Area	CN	Area	A*CN
LTW	0	98	0	98	0	98	0	98	0	98	0.00	0.00
	0	98		98		98		98		98	0	0
	0	98		98		98		98		98	0	0
	0	98		98		98		98		98	0	0
Subtotal Area	0		0		0		0		0			

Pervious Landuses Present:

Soils	Woodland		Meadow		Wetland		Lawn		Cultivated		Subtotals	
	Area	CN	Area	CN	Area	CN	Area (ha)	CN	Area	CN	Area	A*CN
LTW	0.00		0.00		0.00		0.00		4.3	74	4.32	319.98
	0										0.00	0.00
	0										0.00	0.00
	0										0.00	0.00
Subtotal Area	0.00		0.00		0.00		0.00		4.3			

		Composite Area Calculations		Total Pervious Area	4.3
				Total Impervious Area	0.0
				% Impervious	0.0%
				Composite Curve Number	74.0
				Total Area Check	4.3

Initial Abstraction and Tp Calculations

Initial Abstraction				Composite Curve Number								
Landuse	IA (mm)	Area (ha)	A * IA	Listowel Silt Loam		0		0		0		A*RC
				RC	Area	RC	Area	RC	Area	RC	Area	
Woodland	10	0.00	0		0		0		0		0	0
Meadow	8	0	0		0		0		0		0	0
Wetland	16	0	0		0		0		0		0	0
Lawn	5	0	0		0		0		0		0	0.000
Cultivated	7	4	30.2687	0.35	4		0		0		0	1.513
Impervious	2	0	0		0		0		0		0	0.000
Composite IA		4.32	7	Composite Runoff Coefficient								0.350

Time to Peak Inputs						Uplands			Bransby Williams		Airport	
Flow Path Description	Length (m)	Drop (m)	Slope (%)	V/S ^{0.5}	Velocity (m/s)	Tc (hr)	Tp (hr)	TOTAL Tp (hr)	Tc (hr)	Tp (hr)	Tc (hr)	Tp (hr)
Overland	184.5	2	1.08%	2.7	0.28	0.18	0.12	0.12	0.15	0.10	0.54	0.36

Appropriate calculated time to 0.36 Appropriate Method: Airport



Project Name: Glenelg Expansion Lands
 Project Number: 1060-6220
 Date: 2023-07-28
 By: KS

D.A. NAME PRE-2
D.A. AREA (ha) 13.33

**Hydrologic Parameters: CALIB NASHYD Command
 Pre Development Drainage Area: Catchment PRE-2
 Pre-Dev to North Tile Drain (Outlet #2)**

Curve Number Calculation

Soil Types Present:				
Type	ID	Hydrologic	% Area	Area
Listowel Silt Loam	LTW	B	100.0%	13.3
				0
				0
				0
Total Area				13.3

Impervious Landuses Present:

Soils	Roadway		Sidewalk		Driveway		Building		SWMF		Subtotals	
	Area	CN	Area	CN	Area	CN	Area (ha)	CN	Area	CN	Area	A*CN
LTW	0	98	0	98	0	98	0.000	98	0	98	0.00	0.00
	0	98	0	98	0	98	0	98		98	0	0
	0	98		98		98		98		98	0	0
	0	98		98		98		98		98	0	0
Subtotal Area	0		0		0		0		0			

Pervious Landuses Present:

Soils	Woodland		Meadow		Wetland		Lawn		Cultivated		Subtotals	
	Area	CN	Area	CN	Area	CN	Area (ha)	CN	Area	CN	Area	A*CN
LTW	0.00		0.00		0.00		0.00		13.3	74	13.33	986.72
	0		0.00		0.00		0.00		0.00		0.00	0.00
	0		0.00		0.00		0.00		0.00		0.00	0.00
	0		0.00		0.00		0.00		0.00		0.00	0.00
Subtotal Area	0.00		0.00		0.00		0.00		13.3			

Composite Area Calculations		Total Pervious Area	13.3
		Total Impervious Area	0.0
		% Impervious	0.0%
		Composite Curve Number	74.0
		Total Area Check	13.3

Initial Abstraction and Tp Calculations

Initial Abstraction				Composite Curve Number								
Landuse	IA (mm)	Area (ha)	A * IA	Listowel Silt Loam		0		0		0		
				RC	Area	RC	Area	RC	Area	RC	Area	A*RC
Woodland	10	0.00	0		0		0		0		0	0
Meadow	8	0	0		0		0		0		0	0
Wetland	16	0	0		0		0		0		0	0
Lawn	5	0	0		0		0		0		0	0.000
Cultivated	7	13	93.3387	0.35	13		0		0		0	4.667
Impervious	2	0	0		0		0		0		0	0.000
Composite IA		13.33	7	Composite Runoff Coefficient								0.350

Time to Peak Inputs						Uplands			Bransby Williams		Airport	
Flow Path Description	Length (m)	Drop (m)	Slope (%)	V/S ^{0.5}	Velocity (m/s)	Tc (hr)	Tp (hr)	TOTAL Tp (hr)	Tc (hr)	Tp (hr)	Tc (hr)	Tp (hr)
Overland	552.64	6	1.09%	2.7	0.28	0.55	0.37	0.37	0.40	0.27	0.93	0.62

Appropriate calculated time to 0.62 Appropriate Method: Airport



Project Name: Glenelg Expansion Lands
 Project Number: 1060-6220
 Date: 2023-07-28
 By: KS

D.A. NAME PRE-3
D.A. AREA (ha) 2.66

**Hydrologic Parameters: CALIB NASHYD Command
 Pre Development Drainage Area: Catchment PRE-3
 Pre-Dev to East Tile Drain (Outlet #3)**

Curve Number Calculation

Soil Types Present:				
Type	ID	Hydrologic	% Area	Area
Listowel Silt Loam	LTW	B	100.0%	2.66
				0
				0
				0
Total Area				2.66

Impervious Landuses Present:

Soils	Roadway		Sidewalk		Driveway		Building		SWMF		Subtotals	
	Area	CN	Area	CN	Area	CN	Area (ha)	CN	Area	CN	Area	A*CN
LTW	0	98	0	98	0	98	0.000	98	0	98	0.00	0.00
	0	98	0	98	0	98	0	98		98	0	0
	0	98		98		98		98		98	0	0
	0	98		98		98		98		98	0	0
Subtotal Area	0		0		0		0		0			

Pervious Landuses Present:

Soils	Woodland		Meadow		Wetland		Lawn		Cultivated		Subtotals	
	Area	CN	Area	CN	Area	CN	Area (ha)	CN	Area	CN	Area	A*CN
LTW	0.00		0.00		0.00		0.00		2.7	74	2.66	197.16
	0		0.00		0.00		0.00		0.00		0.00	0.00
	0		0.00		0.00		0.00		0.00		0.00	0.00
	0		0.00		0.00		0.00		0.00		0.00	0.00
Subtotal Area	0.00		0.00		0.00		0.00		2.7			

Composite Area Calculations		Total Pervious Area	2.7
		Total Impervious Area	0.0
		% Impervious	0.0%
		Composite Curve Number	74.0
		Total Area Check	2.7

Initial Abstraction and Tp Calculations

Initial Abstraction				Composite Curve Number								
Landuse	IA (mm)	Area (ha)	A * IA	Listowel Silt Loam								
				RC	Area	RC	Area	RC	Area	RC	Area	A*RC
Woodland	10	0.00	0		0		0		0		0	0
Meadow	8	0	0		0		0		0		0	0
Wetland	16	0	0		0		0		0		0	0
Lawn	5	0	0		0		0		0		0	0.000
Cultivated	7	3	18.6501	0.35	3		0		0		0	0.933
Impervious	2	0	0		0		0		0		0	0.000
Composite IA		2.66	7	Composite Runoff Coefficient								0.350

Time to Peak Inputs						Uplands			Bransby Williams		Airport	
Flow Path Description	Length (m)	Drop (m)	Slope (%)	V/S ^{0.5}	Velocity (m/s)	Tc (hr)	Tp (hr)	TOTAL Tp (hr)	Tc (hr)	Tp (hr)	Tc (hr)	Tp (hr)
Overland	133.35	5	3.75%	2.7	0.52	0.07	0.05	0.05	0.09	0.06	0.30	0.20

Appropriate calculated time to 0.20 Appropriate Method: Airport



Project Name: Glenelg Expansion Lands
 Project Number: 1060-6220
 Date: 2023-07-28
 By: KS

D.A. NAME PRE-4
D.A. AREA (ha) 1.93

Hydrologic Parameters: CALIB NASHYD Command
Pre Development Drainage Area: Catchment PRE-4
Pre-Dev to Southeast Tile Drain (Outlet #4)

Curve Number Calculation

Soil Types Present:				
Type	ID	Hydrologic	% Area	Area
Listowel Silt Loam	LTW	B	100.0%	1.9
				0
				0
				0
Total Area				1.9

Impervious Landuses Present:													
Soils	Roadway		Sidewalk		Driveway		Building		SWMF		Subtotals		
	Area	CN	Area	CN	Area	CN	Area (ha)	CN	Area	CN	Area	A*CN	
LTW	0	98	0	98	0	98	0.000	98	0	98	0.00	0.00	
	0	98	0	98	0	98	0	98		98	0	0	
	0	98		98		98		98		98	0	0	
	0	98		98		98		98		98	0	0	
Subtotal Area	0		0		0		0		0				

Pervious Landuses Present:													
Soils	Woodland		Meadow		Wetland		Lawn		Cultivated		Subtotals		
	Area	CN	Area	CN	Area	CN	Area (ha)	CN	Area	CN	Area	A*CN	
LTW	0.00		0.00		0.00		0.00		1.9	74	1.93	143.15	
	0		0.00		0.00		0.00		0.00		0.00	0.00	
	0		0.00		0.00		0.00		0.00		0.00	0.00	
	0		0.00		0.00		0.00		0.00		0.00	0.00	
Subtotal Area	0.00		0.00		0.00		0.00		1.9				

Composite Area Calculations		Total Pervious Area	1.9
		Total Impervious Area	0.0
		% Impervious	0.0%
		Composite Curve Number	74.0
		Total Area Check	1.9

Initial Abstraction and Tp Calculations

Initial Abstraction				Composite Curve Number								
Landuse	IA (mm)	Area (ha)	A * IA	Listowel Silt Loam			0			0		
				RC	Area	RC	Area	RC	Area	RC	Area	A*RC
Woodland	10	0.00	0		0		0		0		0	0
Meadow	8	0	0		0		0		0		0	0
Wetland	16	0	0		0		0		0		0	0
Lawn	5	0	0		0		0		0		0	0.000
Cultivated	7	2	13.5408	0.35	2		0		0		0	0.677
Impervious	2	0	0		0		0		0		0	0.000
Composite IA		1.93	7	Composite Runoff Coefficient								0.350

Time to Peak Inputs						Uplands			Bransby Williams		Airport	
Flow Path Description	Length (m)	Drop (m)	Slope (%)	V/S ^{0.5}	Velocity (m/s)	Tc (hr)	Tp (hr)	TOTAL Tp (hr)	Tc (hr)	Tp (hr)	Tc (hr)	Tp (hr)
Overland	107.85	4	3.71%	2.7	0.52	0.06	0.04	0.04	0.07	0.05	0.27	0.18

Appropriate calculated time to 0.18, Appropriate Method: Airport
 Minimum TP of 0.20 applied



Project Name: Glenelg Expansion Lands
 Project Number: 1060-6220
 Date: 2023-07-28
 By: KS

D.A. NAME PRE-5
D.A. AREA (ha) 3.00

**Hydrologic Parameters: CALIB NASHYD Command
 Pre Development Drainage Area: Catchment PRE-5
 Pre-Dev to South Residential**

Curve Number Calculation

Soil Types Present:				
Type	ID	Hydrologic	% Area	Area
Listowel Silt Loam	LTW	B	100.0%	3.0
				0
				0
				0
Total Area				3.0

Impervious Landuses Present:												
Soils	Roadway		Sidewalk		Driveway		Building		SWMF		Subtotals	
	Area	CN	Area	CN	Area	CN	Area (ha)	CN	Area	CN	Area	A*CN
LTW	0	98	0	98	0	98	0.000	98	0	98	0.00	0.00
	0	98	0	98	0	98	0	98		98	0	0
	0	98		98		98		98		98	0	0
	0	98		98		98		98		98	0	0
Subtotal Area	0		0		0		0		0			

Pervious Landuses Present:												
Soils	Woodland		Meadow		Wetland		Lawn		Cultivated		Subtotals	
	Area	CN	Area	CN	Area	CN	Area (ha)	CN	Area	CN	Area	A*CN
LTW	0.00		0.00		0.00		0.00		3.0	74	3.00	221.64
	0		0.00		0.00		0.00		0.00		0.00	0.00
	0		0.00		0.00		0.00		0.00		0.00	0.00
	0		0.00		0.00		0.00		0.00		0.00	0.00
Subtotal Area	0.00		0.00		0.00		0.00		3.0			

Composite Area Calculations		Total Pervious Area	3.0
		Total Impervious Area	0.0
		% Impervious	0.0%
		Composite Curve Number	74.0
		Total Area Check	3.0

Initial Abstraction and Tp Calculations

Initial Abstraction				Composite Curve Number								
Landuse	IA (mm)	Area (ha)	A * IA	Listowel Silt Loam		0		0		0		A*RC
				RC	Area	RC	Area	RC	Area	RC	Area	
Woodland	10	0.00	0		0		0		0		0	0
Meadow	8	0	0		0		0		0		0	0
Wetland	16	0	0		0		0		0		0	0
Lawn	5	0	0		0		0		0		0	0.000
Cultivated	7	3	20.9664	0.35	3		0		0		0	1.048
Impervious	2	0	0		0		0		0		0	0.000
Composite IA		3.00	7	Composite Runoff Coefficient								0.350

Time to Peak Inputs						Uplands			Bransby Williams		Airport	
Flow Path Description	Length (m)	Drop (m)	Slope (%)	V/S ^{0.5}	Velocity (m/s)	Tc (hr)	Tp (hr)	TOTAL Tp (hr)	Tc (hr)	Tp (hr)	Tc (hr)	Tp (hr)
Overland	105.7	4.5	4.26%	2.7	0.56	0.05	0.04	0.04	0.07	0.05	0.26	0.17

Appropriate calculated time to 0.17 Appropriate Method: Airport
 Minimum TP of 0.20 applied



Project Name: Glenelg Expansion Lands
 Project Number: 1060-6220
 Date: 2023.08.14
 By: KS

D.A. NAME POST-1
D.A. AREA (ha) 1.02

Hydrologic Parameters: CALIB NASHYD Command
Post Development Drainage Area: Catchment POST-1

Curve Number Calculation

Soil Types Present:				
Type	ID	Hydrologic	% Area	Area
Listowel Silt Loam	LTW	B	100.0%	1.0
				0
				0
				0
Total Area				1.0

Impervious Landuses Present:													
Soils	Roadway		Sidewalk		Driveway		Building		SWMF		Subtotals		
	Area	CN	Area	CN	Area	CN	Area (ha)	CN	Area	CN	Area	A*CN	
LTW	0	98	0.1338	98	0	98	0	98	0	98	0.13	13.11	
	0	98	0	98	0	98	0	98	0	98	0	0	
	0	98		98		98		98		98	0	0	
	0	98		98		98		98		98	0	0	
Subtotal Area	0		0.1338		0		0		0				

Pervious Landuses Present:													
Soils	Woodland		Meadow		Wetland		Lawn		Cultivated		Subtotals		
	Area	CN	Area	CN	Area	CN	Area (ha)	CN	Area	CN	Area	A*CN	
LTW	0.00		0.00		0.00		0.89	71	0.0	74	0.89	62.91	
	0										0.00	0.00	
	0										0.00	0.00	
	0										0.00	0.00	
Subtotal Area	0.00		0.00		0.00		0.89		0.0				

Composite Area Calculations										Total Pervious Area		0.9
										Total Impervious Area		0.1
										% Impervious		13.1%
										Composite Curve Number		74.5
										Total Area Check		1.0

Initial Abstraction and Tp Calculations

Initial Abstraction				Composite Curve Number								
Landuse	IA (mm)	Area (ha)	A * IA	Listowel Silt Loam				0				
				RC	Area	RC	Area	RC	Area	RC	Area	A*RC
Woodland	10	0.00	0		0		0		0		0	0
Meadow	8	0	0		0		0		0		0	0
Wetland	16	0	0		0		0		0		0	0
Lawn	5	0.886	4.43	0.15	0.89		0		0		0	0.133
Cultivated	7	0	0		0		0		0		0	0.000
Impervious	2	0.1338	0.2676	0.90	0.13		0		0		0	0.120
Composite IA		1.02	4.60639	Composite Runoff Coefficient								0.248

Time to Peak Inputs						Uplands			Bransby Williams		Airport	
Flow Path Description	Length (m)	Drop (m)	Slope (%)	V/S ^{0.5}	Velocity (m/s)	Tc (hr)	Tp (hr)	TOTAL Tp (hr)	Tc (hr)	Tp (hr)	Tc (hr)	Tp (hr)
Overland	213	2.28	1.07%	2.7	0.28	0.21	0.14	0.14	0.20	0.13	0.66	0.44

Appropriate calculated time to 0.44 Appropriate Method: Airport



Project Name: Glenelg Expansion Lands **D.A. NAME** **POST-2**
 Project No.: 1060-6220 **D.A. AREA (ha)** **17.13**
 Date: 2023.08.14
 By: KS

Post Development Drainage Area: Catchment POST-2

Curve Number Calculation

Soil Types Present:				
Type	ID	Hydrologic	% Area	Area
Listowel Silt Loam	LTW	B	100%	17.13
Total Area Check				17.13

Impervious Landuses Present:												
Soils	Roadway		Sidewalk		Driveway		Building		SWMF		Subtotals	
	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area	A*CN
LTW	5.14	98	0.07	98	0.000	98	6.601	98	0	98	11.81	1157.409
	0	98		98		98		98		98	0	0
	0	98		98		98		98		98	0	0
	0	98		98		98		98		98	0	0
Subtotal Area	5.138		0.071		0.000		6.601		0			

Pervious Landuses Present:												
Soils	Woodland		Meadow		Wetland		Lawn		Cultivated		Subtotals	
	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area	A*CN
LTW	0	60	0	66	0	50	5.318	71	0	74	5.318104	377.585
	0										0	0
	0										0	0
	0										0	0
Subtotal Area	0		0		0		5.318		0			

	Pervious Area Calculations	Total Pervious Area	5.32
		Composite Pervious Curve Number	71
	Impervious Area Calculations	Total Directly Connected Area	10.455
		Total Indirectly Connected Area	1.355
		Total Impervious Area	11.81
		% X imp	61.0
		% T imp	69.0
Total Area Check			17.13

Initial Abstraction and Tp Calculations

Landuse	IA (mm)	Area (ha)	A * IA
Woodland	10	0	0
Meadow	8	0	0
Wetland	16	0	0
Lawn	5	5.32	26.59
Cultivated	7	0	0

Land Use	IA (mm)	Slope (%)	Travel Length (m)	Manning's n
Pervious	5.0	2	30	0.25
Impervious	2.0	0.5	338	0.013



Project Name: Glenelg Expansion Lands **D.A. NAME** **POST-3**
 Project No.: 1060-6220 **D.A. AREA (ha)** **0.71**
 Date: 2023.08.14
 By: KS

Post Development Drainage Area: Catchment POST-3

Curve Number Calculation

Soil Types Present:				
Type	ID	Hydrologic	% Area	Area
Listowel Silt Loam	LTW	B	100%	0.71
				0
				0
				0
Total Area Check				0.71

Impervious Landuses Present:												
Soils	Roadway		Sidewalk		Driveway		Building		SWMF		Subtotals	
	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area	A*CN
LTW	0.26	98	0.00	98	0.000	98	0.262	98		98	0.52	51.143
	0	98		98		98		98		98	0	0
	0	98		98		98		98		98	0	0
	0	98		98		98		98		98	0	0
Subtotal Area	0.260		0.000		0.000		0.262		0			

Pervious Landuses Present:												
Soils	Woodland		Meadow		Wetland		Lawn		Cultivated		Subtotals	
	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area	A*CN
LTW	0	60	0	66	0	50	0.188	71	0	74	0.188232	13.364
	0	60	0	66	0	50	0	71	0	74	0	0
	0	60	0	66	0	50	0	71	0	74	0	0
	0	60	0	66	0	50	0	71	0	74	0	0
Subtotal Area	0		0		0		0.188		0			

	Pervious Area Calculations	Total Pervious Area	0.19
		Composite Pervious Curve Number	71
	Impervious Area Calculations	Total Directly Connected Area	0.476
		Total Indirectly Connected Area	0.046
		Total Impervious Area	0.52
		% X imp	67.0
		% T imp	73.5
Total Area Check			0.71

Initial Abstraction and Tp Calculations

Landuse	IA (mm)	Area (ha)	A * IA
Woodland	10	0	0
Meadow	8	0	0
Wetland	16	0	0
Lawn	5	0.19	0.94
Cultivated	7	0	0

Land Use	IA (mm)	Slope (%)	Travel Length (m)	Manning's n
Pervious	5.0	2	30	0.25
Impervious	2.0	0.5	69	0.013



Project Name: Glenelg Expansion Lands
 Project Number: 1060-6220
 Date: 2023.08.14
 By: KS

D.A. NAME POST-4
D.A. AREA (ha) 0.58

Hydrologic Parameters: CALIB NASHYD Command
Post Development Drainage Area: Catchment POST-4

Curve Number Calculation

Soil Types Present:				
Type	ID	Hydrologic	% Area	Area
Listowel Silt Loam	LTW	B	100.0%	0.6
				0
				0
				0
Total Area				0.6

Impervious Landuses Present:												
Soils	Roadway		Sidewalk		Driveway		Building		SWMF		Subtotals	
	Area	CN	Area	CN	Area	CN	Area (ha)	CN	Area	CN	Area	A*CN
LTW	0	98	0.02758	98	0	98	0	98	0	98	0.03	2.70
	0	98	0	98	0	98	0	98	0	98	0	0
	0	98		98		98		98		98	0	0
	0	98		98		98		98		98	0	0
Subtotal Area		0	0.02758		0		0		0			

Pervious Landuses Present:												
Soils	Woodland		Meadow		Wetland		Lawn		Cultivated		Subtotals	
	Area	CN	Area	CN	Area	CN	Area (ha)	CN	Area	CN	Area	A*CN
LTW	0.00		0.00		0.00		0.56	71	0.0	74	0.56	39.52
	0										0.00	0.00
	0										0.00	0.00
	0										0.00	0.00
Subtotal Area		0.00	0.00		0.00		0.56		0.0			

Composite Area Calculations		Total Pervious Area	0.6
		Total Impervious Area	0.0
		% Impervious	4.7%
		Composite Curve Number	72.3
		Total Area Check	0.6

Initial Abstraction and Tp Calculations

Initial Abstraction				Composite Curve Number								
Landuse	IA (mm)	Area (ha)	A * IA	Listowel Silt Loam		0		0		0		A*RC
				RC	Area	RC	Area	RC	Area	RC	Area	
Woodland	10	0.00	0		0		0		0		0	0
Meadow	8	0	0		0		0		0		0	0
Wetland	16	0	0		0		0		0		0	0
Lawn	5	0.5566	2.7831	0.15	1		0		0		0	0.083
Cultivated	7	0	0	0.35	0		0		0		0	0.000
Impervious	2	0.0276	0.05516	0.90	0		0		0		0	0.025
Composite IA		0.58	4.85837	Composite Runoff Coefficient								0.185

Time to Peak Inputs						Uplands			Bransby Williams		Airport	
Flow Path Description	Length (m)	Drop (m)	Slope (%)	V/S ^{0.5}	Velocity (m/s)	Tc (hr)	Tp (hr)	TOTAL Tp (hr)	Tc (hr)	Tp (hr)	Tc (hr)	Tp (hr)
Overland	50	1	2.00%	2.7	0.38	0.04	0.02	0.02	0.04	0.03	0.28	0.19

Appropriate calculated time to 0.19, Appropriate Method: Airport
 Minimum Tp of 0.2hr used



Project Name: Glenelg Expansion Lands **D.A. NAME** **POST-5**
 Project No.: 1060-6220 **D.A. AREA (ha)** **0.45**
 Date: 2023.08.14
 By: KS

Post Development Drainage Area: Catchment POST-5

Curve Number Calculation

Soil Types Present:				
Type	ID	Hydrologic	% Area	Area
Listowel Silt Loam	LTW	B	100%	0.45
Total Area Check				0.45

Impervious Landuses Present:												
Soils	Roadway		Sidewalk		Driveway		Building		Paved Park		Subtotals	
	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area	A*CN
LTW	0.00	98	0.17	98	0.00	98	0.000	98	0.00	98	0.17	16.670
	0	98		98		98		98		98	0	0
	0	98		98		98		98		98	0	0
	0	98		98		98		98		98	0	0
Subtotal Area	0.000		0.170		0.000		0.000		0			

Pervious Landuses Present:												
Soils	Woodland		Meadow		Wetland		Lawn		Cultivated		Subtotals	
	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area	A*CN
LTW	0	60	0	66	0	50	0.285	71	0	74	0.2848	20.221
	0	60	0	66	0	50	0	71	0	74	0	0
	0	60	0	66	0	50	0	71	0	74	0	0
	0	60	0	66	0	50	0	71	0	74	0	0
Subtotal Area	0		0		0		0.285		0			

	Pervious Area Calculations	Total Pervious Area	0.28
		Composite Pervious Curve Number	71
	Impervious Area Calculations	Total Directly Connected Area	0.170
		Total Indirectly Connected Area	0.000
		Total Impervious Area	0.17
		% X imp	37.4
		% T imp	37.4
Total Area Check			0.45

Initial Abstraction and Tp Calculations

Landuse	IA (mm)	Area (ha)	A * IA
Woodland	10	0	0
Meadow	8	0	0
Wetland	16	0	0
Lawn	5	0.28	1.42
Cultivated	7	0	0

Land Use	IA (mm)	Slope (%)	Travel Length (m)	Manning's n
Pervious	5.0	2	30	0.25
Impervious	2.0	0.5	55	0.013



Project Name: Glenelg Expansion Lands **D.A. NAME** **POST-6**
 Project No.: 1060-6220 **D.A. AREA (ha)** **0.45**
 Date: 2023.08.14
 By: KS

Post Development Drainage Area: Catchment POST-6

Curve Number Calculation

Soil Types Present:				
Type	ID	Hydrologic	% Area	Area
Listowel Silt Loam	LTW	B	100%	0.45
				0
				0
				0
Total Area Check				0.45

Impervious Landuses Present:												
Soils	Roadway		Sidewalk		Driveway		Building		SWMF		Subtotals	
	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area	A*CN
LTW	0.09	98	0.10	98	0.000	98	0.128	98		98	0.32	31.343
	0	98		98		98		98		98	0	0
	0	98		98		98		98		98	0	0
	0	98		98		98		98		98	0	0
Subtotal Area	0.094		0.097		0.000		0.128		0			

Pervious Landuses Present:												
Soils	Woodland		Meadow		Wetland		Lawn		Cultivated		Subtotals	
	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area	A*CN
LTW	0	60	0	66	0	50	0.128	71	0	74	0.12847	9.121
	0	60	0	66	0	50	0	71	0	74	0	0
	0	60	0	66	0	50	0	71	0	74	0	0
	0	60	0	66	0	50	0	71	0	74	0	0
Subtotal Area	0		0		0		0.128		0			

	Pervious Area Calculations	Total Pervious Area	0.13
		Composite Pervious Curve Number	71
	Impervious Area Calculations	Total Directly Connected Area	0.297
		Total Indirectly Connected Area	0.023
		Total Impervious Area	0.32
		% X imp	66.1
		% T imp	71.3
Total Area Check			0.45

Initial Abstraction and Tp Calculations

Landuse	IA (mm)	Area (ha)	A * IA
Woodland	10	0	0
Meadow	8	0	0
Wetland	16	0	0
Lawn	5	0.13	0.64
Cultivated	7	0	0

Land Use	IA (mm)	Slope (%)	Travel Length (m)	Manning's n
Pervious	5.0	2	30	0.25
Impervious	2.0	0.5	55	0.013



Project Name: Glenelg Expansion Lands **D.A. NAME** **POST-7**
 Project No.: 1060-6220 **D.A. AREA (ha)** **3.32**
 Date: 2023.08.14
 By: KS

Post Development Drainage Area: Catchment POST-7

Curve Number Calculation

Soil Types Present:				
Type	ID	Hydrologic	% Area	Area
Listowel Silt Loam	LTW	B	100%	3.32
Total Area Check				3.32

Impervious Landuses Present:

Soils	Roadway		Sidewalk		Driveway		Building		Paved Park		Subtotals	
	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area	A*CN
LTW	0.00	98	0.00	98	0.00	98	1.823	98	0.00	98	1.82	178.679
	0	98		98		98		98		98	0	0
	0	98		98		98		98		98	0	0
	0	98		98		98		98		98	0	0
Subtotal Area	0.000		0.000		0.000		1.823		0			

Pervious Landuses Present:

Soils	Woodland		Meadow		Wetland		Lawn		Cultivated		Subtotals	
	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area	A*CN
LTW	0	60	0	66	0	50	1.492	71	0	74	1.49175	105.914
	0	60		66		50		71		74	0	0
	0	60		66		50		71		74	0	0
	0	60		66		50		71		74	0	0
Subtotal Area	0		0		0		1.492		0			

	Pervious Area Calculations	Total Pervious Area Composite Pervious Curve Number	1.49 71
	Impervious Area Calculations	Total Directly Connected Area Total Indirectly Connected Area Total Impervious Area % X imp % T imp	1.823 0.000 1.82 55.0 55.0
Total Area Check			3.32

Initial Abstraction and Tp Calculations

Landuse	IA (mm)	Area (ha)	A * IA
Woodland	10	0	0
Meadow	8	0	0
Wetland	16	0	0
Lawn	5	1.49	7.46
Cultivated	7	0	0

Land Use	IA (mm)	Slope (%)	Travel Length (m)	Manning's n
Pervious	5.0	2	30	0.25
Impervious	2.0	0.5	149	0.013



Project Name: Glenelg Expansion Lands **D.A. NAME** **SWMF**
 Project No.: 1060-6220 **D.A. AREA (ha)** **1.56**
 Date: 2023.08.14
 By: KS

Post Development Drainage Area: Catchment SWMF

Curve Number Calculation

Soil Types Present:				
Type	ID	Hydrologic	% Area	Area
Listowel Silt Loam	LTW	B	100%	1.56
				0
				0
				0
Total Area Check				1.56

Impervious Landuses Present:												
Soils	Roadway		Sidewalk		Driveway		Building		SWMF		Subtotals	
	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area	A*CN
LTW	0.00	98	0.00	98	0.000	98	0.000	98	0.7803	98	0.78	76.469
	0	98		98		98		98		98	0	0
	0	98		98		98		98		98	0	0
	0	98		98		98		98		98	0	0
Subtotal Area	0.000		0.000		0.000		0.000		0.7803			

Pervious Landuses Present:												
Soils	Woodland		Meadow		Wetland		Lawn		Cultivated		Subtotals	
	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area	A*CN
LTW	0	60	0	66	0	50	0.780	71	0	74	0.7803	55.401
	0	60	0	66	0	50	0	71	0	74	0	0
	0	60	0	66	0	50	0	71	0	74	0	0
	0	60	0	66	0	50	0	71	0	74	0	0
Subtotal Area	0		0		0		0.780		0			

	Pervious Area Calculations	Total Pervious Area	0.78
		Composite Pervious Curve Number	71
	Impervious Area Calculations	Total Directly Connected Area	0.390
		Total Indirectly Connected Area	0.390
		Total Impervious Area	0.78
		% X imp	50.0
		% T imp	50.0
Total Area Check			1.56

Initial Abstraction and Tp Calculations

Landuse	IA (mm)	Area (ha)	A * IA
Woodland	10	0	0
Meadow	8	0	0
Wetland	16	0	0
Lawn	5	0.78	3.90
Cultivated	7	0	0

Land Use	IA (mm)	Slope (%)	Travel Length (m)	Manning's n
Pervious	5.0	2	30	0.25
Impervious	2.0	0.5	102	0.013



Project Name: Glenelg Phase 2
 Project Number: 1060-5545
 Date: 2023-08-14
 By: AM

D.A. NAME TR-1
 D.A. AREA (ha) 0.78

Hydrologic Parameters: CALIB STANDHYD Command
Post Development Drainage Area: Catchment TR-1
Uncontrolled Area to CP Rail Trail

Curve Number Calculation

Soil Types Present:				
Type	ID	Hydrologic Group	% Area	Area
Listowel Silt Loam	Ls	BC	100	0.78
Total Area Check				0.78

Impervious Landuses Present:												Subtotals	
Soils	Roadway		Sidewalk		Driveway		Building		SWMF		Area	A*CN	
	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN			
Ls	0.00	98	0.00	98	0.00	98	0.15	98		50	0.15	14.98	
		98		98		98		98		50	0	0	
		98		98		98		98		50	0	0	
		98		98		98		98		50	0	0	
Subtotal Area	0.00		0.00		0.00		0.15		0		0	0	

Pervious Landuses Present:												Subtotals	
Soils	Woodland		Meadow		Wetland		Lawn		Cultivated		Area	A*CN	
	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN			
Ls	0		0		0		0.63	74	0		0.63	46.29	
	0		0		0		0		0		0	0	
	0		0		0		0		0		0	0	
	0		0		0		0		0		0	0	
Subtotal Area	0		0		0		0.63		0		0	0	

	Pervious Area Calculations	Total Pervious Area	0.63
		Composite Pervious Curve Number	74
	Impervious Area Calculations	Total Directly Connected Area	0.0
		Total Indirectly Connected Area	0.15
		Total Impervious Area	0.15
		% X imp	0 *Min 0.15 used
		% T imp	20
Total Area Check			0.78

Initial Abstraction and Tp Calculations

Landuse	IA (mm)	Area (ha)	A * IA
Woodland	10	0	0
Meadow	8	0	0
Wetland	16	0	0
Lawn	5	0.63	3.13
Cultivated	7	0	0

Land Use	IA (mm)	Slope (%)	Travel Length (m)	Manning's n
Pervious	5.0	2	30	0.25
Impervious	2.0	0.5	72	0.013