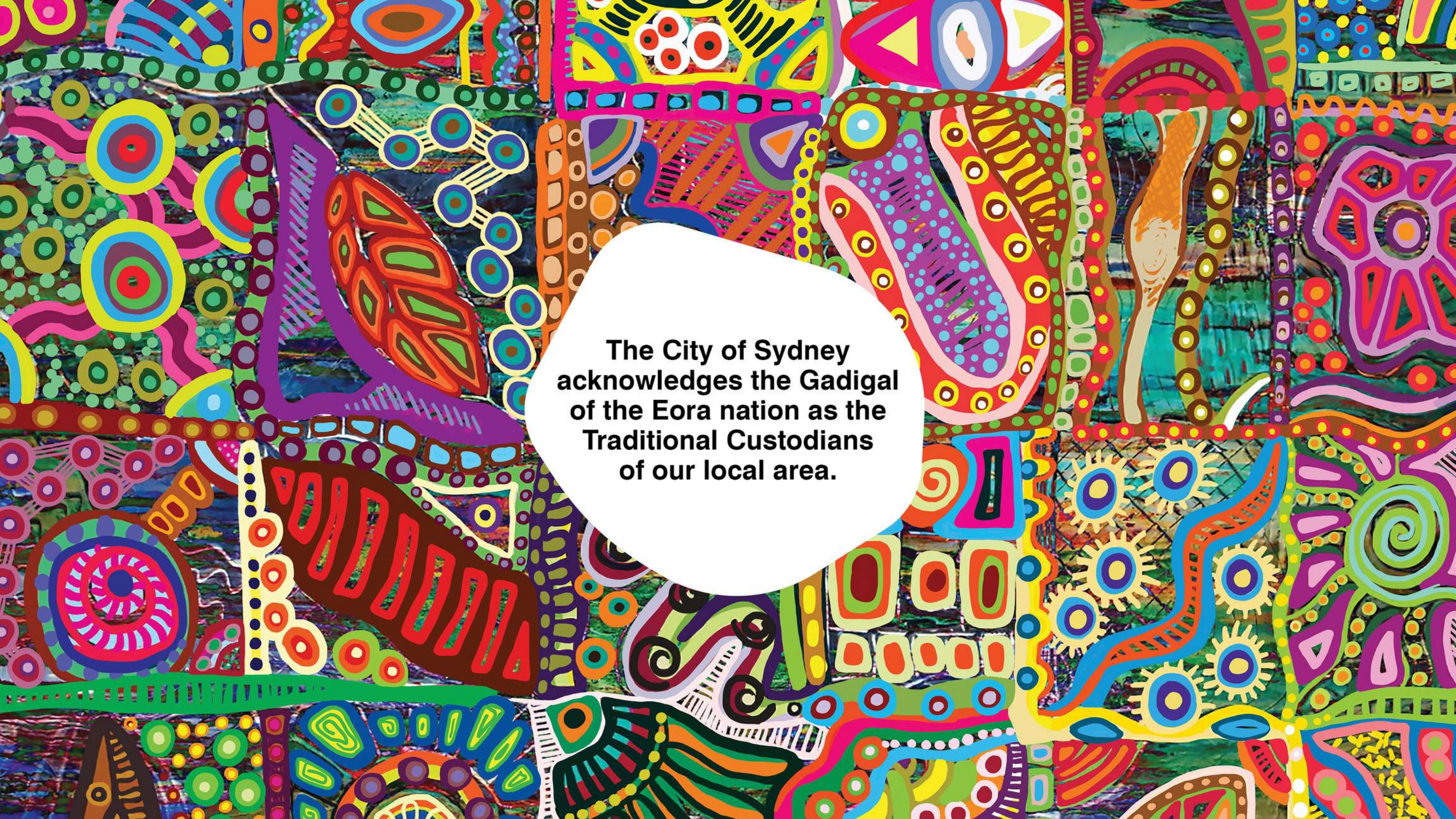


**Using LGA wide MUSIC
models to plan, justify, predict
and track WSUD projects on a
city-wide drainage network**





**The City of Sydney
acknowledges the Gadigal
of the Eora nation as the
Traditional Custodians
of our local area.**

Overview

03	Sustainability goals	
04	Evolution of the models	
06	Expanding their use	
11	Delivering results	

Sustainability goals

City of Sydney's Water quality (WQ) targets

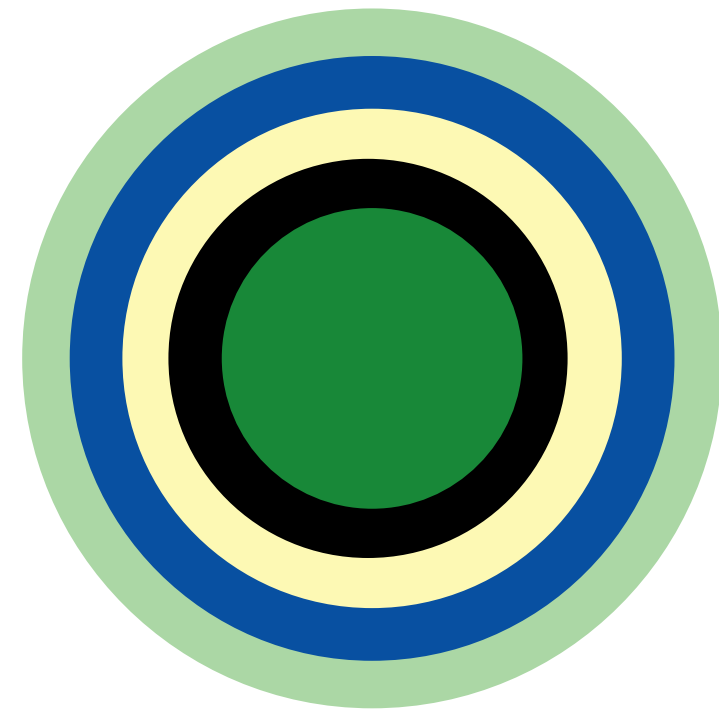
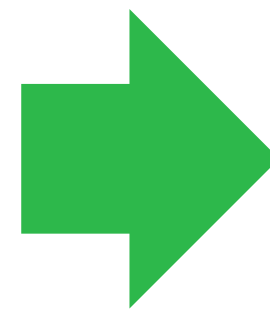
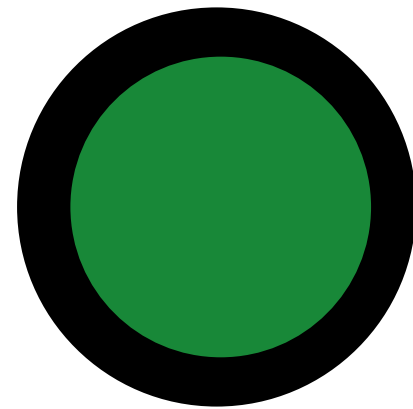
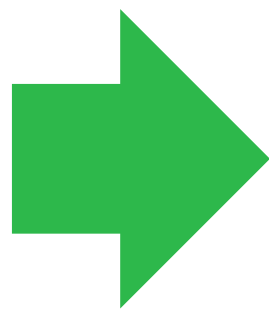
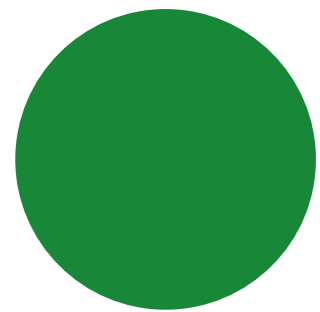
The City of Sydney set targets to reduce the amount of pollution flowing to waterways via stormwater drainage by 2030

Reduction targets

- 50% reduction in Gross Pollutants (GP)
- 50% reduction in Total Suspended Solids (TSS)
- 15% reduction in Total Nitrogen (TP)
- 15% reduction in Total Phosphorous (TN)

We needed to be able to track our progress and report on results

Evolution of the models



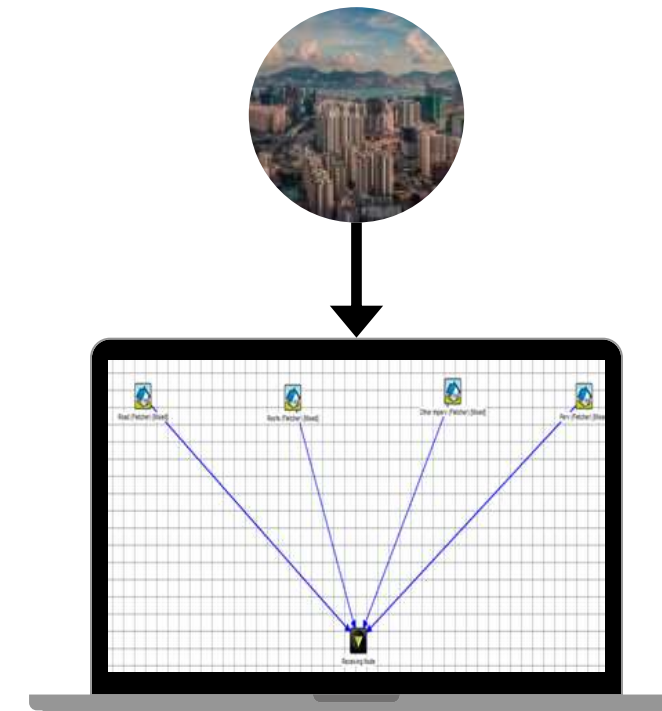
Basic model

Model

- Only considered catchments
- Generated pollutant loads but did not consider treatment

Use

- Used to generate estimate of pollutant loads for use in another report



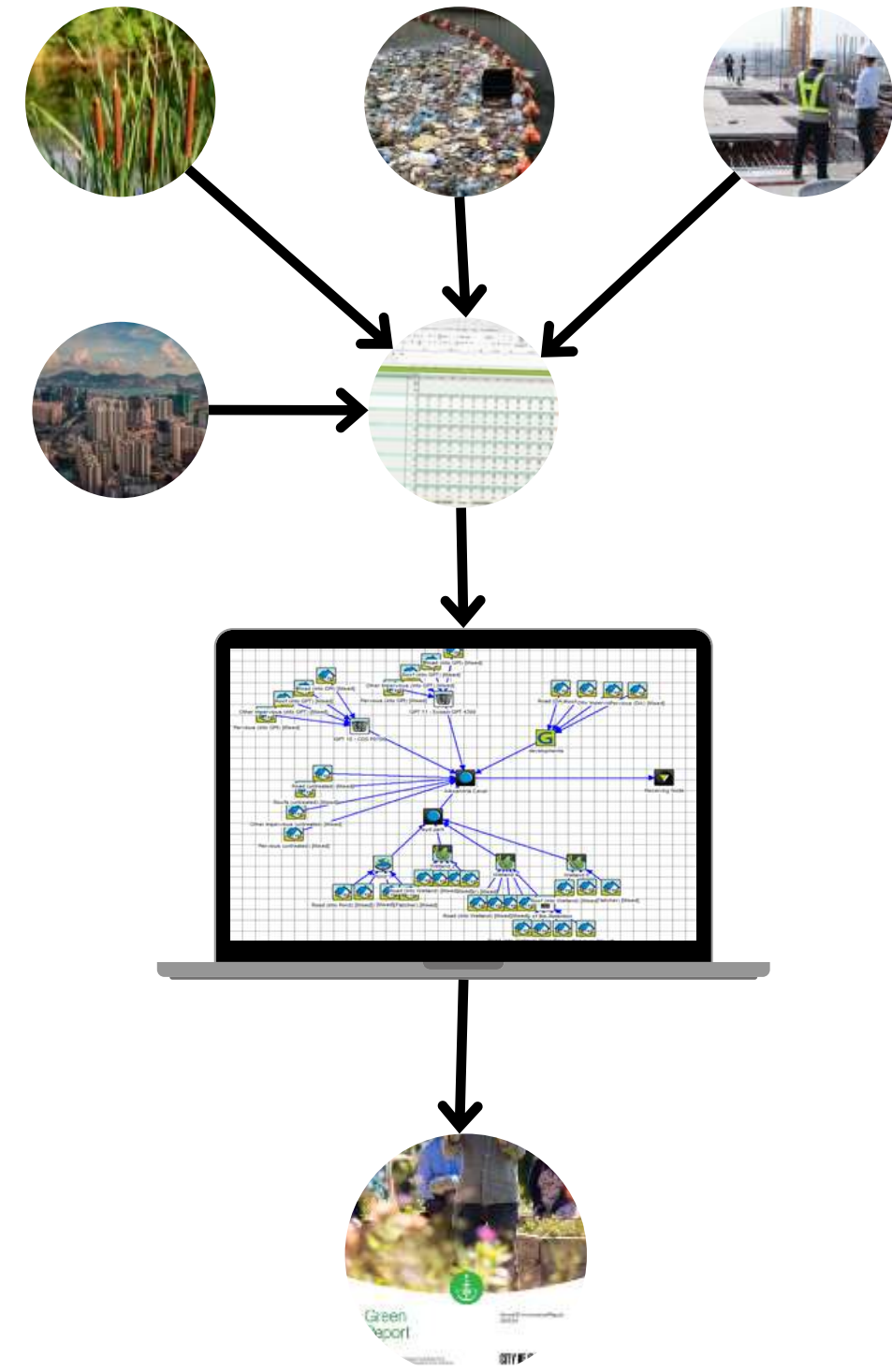
Intermediate model

Model

- Considered:
 - Catchments and pollutant loads
 - Ponds & wetlands
 - Gross Pollutant Traps (GPT)
 - known third party Stormwater Quality Improvement Devices (SQIDS)
- Used an excel file to calculate and update catchments
- Assumptions and method included as secondary document

Use

- Progress tracking (to report on progress towards the City of Sydney's (City) water quality targets)



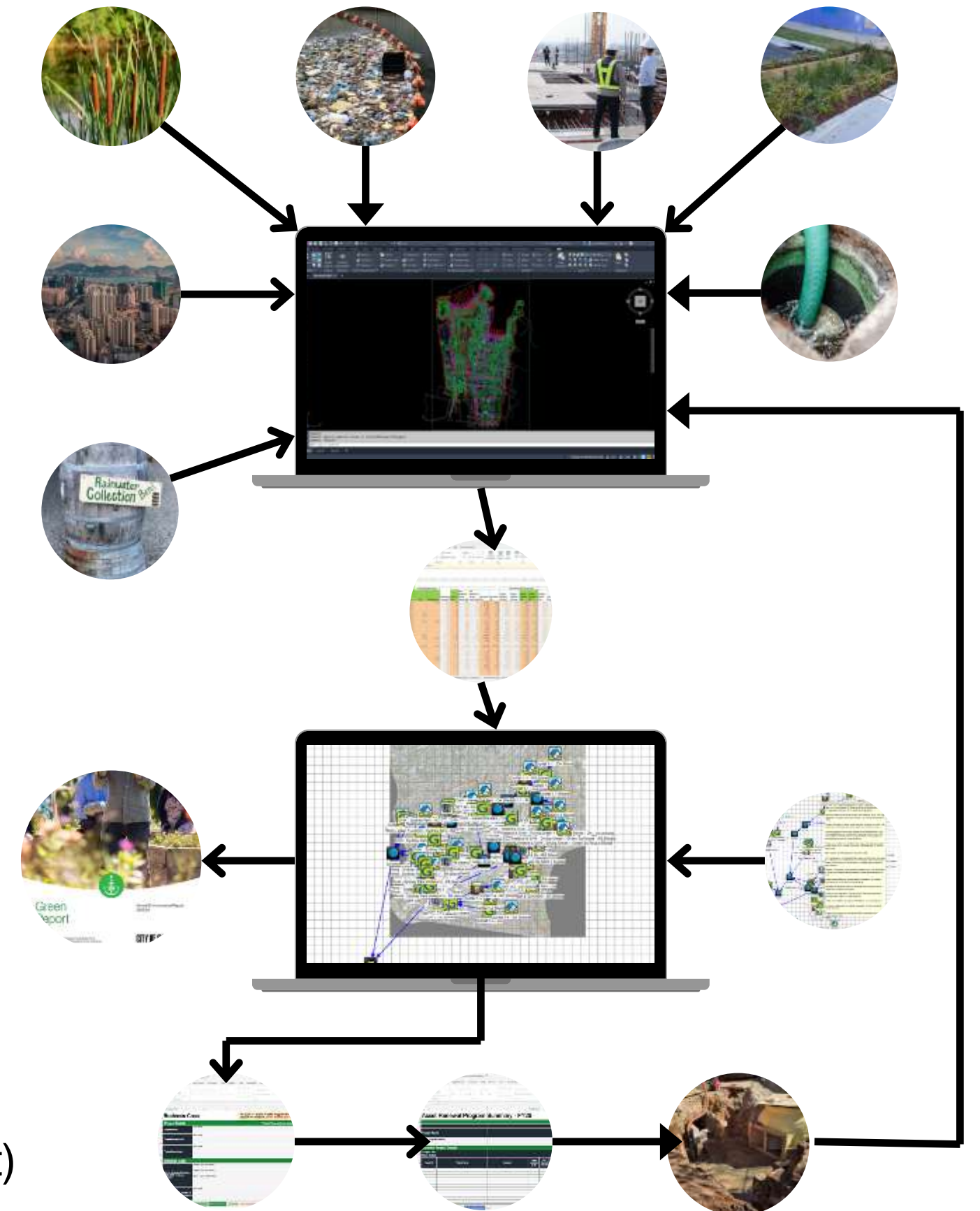
Comprehensive model

Model

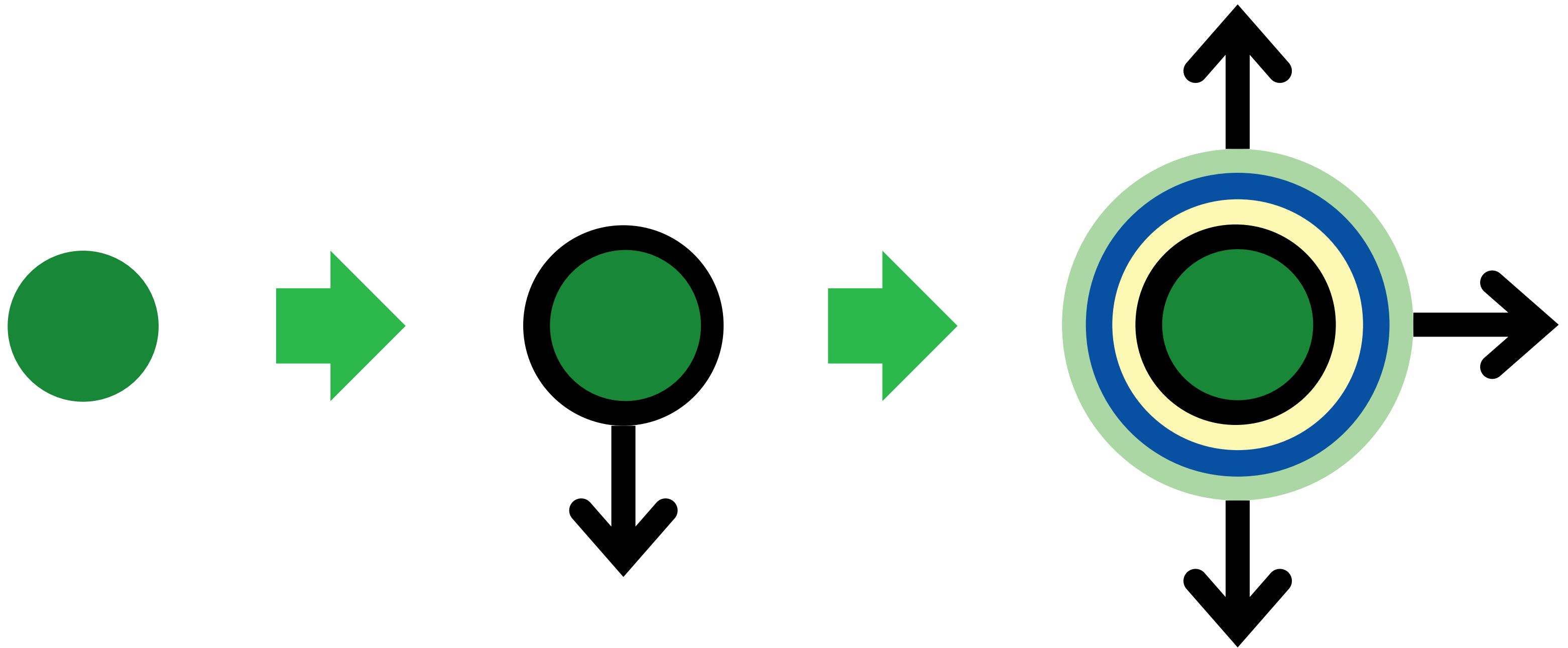
- Rebuilt with new methodology, assumptions, standardised naming and labelling, background imagery and real world placement, and built in QA
- CAD used for catchment analysis, updating and QA checks
- Includes ponds, wetlands, GPT, all third party SQIDS, WSUD assets, stormwater harvesting, drainage maintenance
- Model calibrated against real world data
- Detailed notes attached to each node (assumptions, parameters, sources, reasons)
- Internal and external peer reviewed by industry expert
- Maintained as a live document

Use

- Progress tracking
- Identified shortfalls in achievable targets
- Options analysis
- Business and project planning (business cases, program development)



Expanding their use



Identifying the best opportunities

Prioritising water quality

- Projects purposed for WQ
- Optimized for best Return On Investment (ROI)
- Focus on big and reliable:
 - Largest catchment for biggest impact
 - Accessibility for both construction and MAINTENANCE
 - Constructability (DBYD, D&C)

High Level investigation on how many new GPT are needed to reach the target_v4-18.07.2024... • Saved to this PC

File Home Insert Page Layout Formulas Data Review View Automate Developer Help Content Manager

Clipboard Font Alignment Number Styles Cells

SECURITY WARNING Automatic update of links has been disabled Enable Content

R52

49

50 Number of Outfalls 295 Confirmed

51 Supplemented out

52 Number of GPT already present 65 Supplemented in

53

54 Note 1: This assumes that the rate of new DA GPT will continue as is and, therefore, the amount DA GPT removes will double. For source data on Removal by other means, see email titled "RE

55 W:\City Community & Cultural Services\City Infrastructure\MUSIC Modelling\Modelling Results\Stuart\Contribution by different types of WSUD.xlsx

56

57

		diameter	width	height	Cross-sectional area	% of Total X-area	TSS Load	Removable TSS	Cumulative TSS Removed	TP Load	Removable TP	Cumulative TP Removed	TN Load	Remo TI
58 Asset ID	Catchment													
72 SWD00000579	Blackwattle Bay			3675	1500	5.513	2.40%	115.0	80.527	81	0.187	0.056	0.06	1.385
74 SWD00001028	Alexandria Canal			3400	1500	5.100	2.22%	106.4	74.502	155	0.173	0.052	0.11	1.281
75 SWD00000731	Darling Harbour			2550	1875	4.781	2.08%	99.8	69.845	225	0.162	0.049	0.16	1.201
76 SWD00000536	Alexandria Canal			2600	1800	4.680	2.04%	97.7	68.366	293	0.159	0.048	0.20	1.175
80 SWD00001972	Rushcutters Bay	2325				4.246	1.85%	88.6	62.020	355	0.144	0.043	0.25	1.066
81 SWD00000059	Rushcutters Bay			2325	1800	4.185	1.82%	87.3	61.135	416	0.142	0.043	0.29	1.051
83 SWD00000383	Alexandria Canal			2700	1400	3.780	1.64%	78.9	55.219	472	0.128	0.038	0.33	0.949
95 SWD00002431	City Area			1200	1800	2.160	1.25%	59.9	41.907	514	0.097	0.029	0.36	0.721
99 SWD00000806	Darling Harbour			1500	1200	1.800	0.78%	37.6	26.295	540	0.061	0.018	0.38	0.452
09 SWD00000606	Blackwattle Bay			1200	1125	1.350	0.59%	28.2	19.721	560	0.046	0.014	0.39	0.339
13 SWD00010534	Blackwattle Bay	1200				1.131	0.49%	23.6	16.521	576	0.038	0.012	0.40	0.284
14 SWD00005524	Woolloomooloo	1200				1.131	0.49%	23.6	16.521	593	0.038	0.012	0.41	0.284
24 SWD00005039	Woolloomooloo	1050				0.866	0.38%	18.1	12.649	605	0.029	0.009	0.42	0.217
25 SWD00012237	Blackwattle Bay	1050				0.866	0.38%	18.1	12.649	618	0.029	0.009	0.43	0.217
26 SWD00003732	City Area	1050				0.866	0.38%	18.1	12.649	631	0.029	0.009	0.44	0.217
35 SWD00003522	City Area	1000				0.785	0.34%	16.4	11.473	642	0.027	0.008	0.45	0.197
36 SWD00000983	Johnstons Creek	975				0.747	0.32%	15.6	10.907	653	0.025	0.008	0.45	0.188
37 SWD00000211	Woolloomooloo		1200	600		0.720	0.31%	15.0	10.518	663	0.024	0.007	0.46	0.181
38 SWD00002443	City Area		675	1050		0.709	0.31%	14.8	10.354	674	0.024	0.007	0.47	0.178
39 SWD00004888	City Area		675	1050		0.709	0.31%	14.8	10.354	684	0.024	0.007	0.48	0.178
40 SWD00012860	Darling Harbour	900				0.636	0.28%	13.3	9.293	693	0.022	0.006	0.48	0.160

Summary Graphs Pollutant per pipe SS results vs MUSIC model Sheet2 Sheet1 GPT dimensions catchment per p

Ready Filter Mode Accessibility: Investigate

19°C

Verification in MUSIC

Key projects verified in models

- Key projects were added to the models to verify impact
- Mandible Street Sports Precinct
 - Coincidence with another project gave opportunity for collaboration, and benefits of working in a green site
 - Questions raised on impact of oversized catchment
 - Modelled results showed value of continuing with project



Estimated impacts

Revised project list

- Modelling demonstrated that focus should be on large drainage lines with significant ROI impacts
- Business case was revised accordingly



Revised WQ targets

Achievable stretch targets

- Model demonstrated that WQ targets were not achievable
- WQ targets revised to:
 - 37% reduction in GP
 - 23% reduction in TSS
 - 12% reduction in TP
 - 5% reduction in TN
- Revised targets include forecast third party and privately owned SQIDS



Delivering results

Program of new GPT underway

- First GPT construction complete
- Remaining GPT are in design
- Results of the new GPT have been fed back into the MUSIC models
- Results of first new GPT are positive:
 - First new GPT projected to remove 26 t/yr
 - First GPT clean is complete and indicates it is on track to remove 36 t/yr



Questions?

