

Using MUSIC-link for The City of Newcastle

When The City of Newcastle are assessing a development proposal, we must check that it complies with our Water Sensitive Urban Design policies. While eWater's MUSIC software makes it possible to achieve compliance with the targets and parameters, the assessment and refinement process has traditionally been iterative and time-consuming.

The main benefit of MUSIC-*link* is that developers and consultants can design their stormwater management infrastructure and then immediately validate it (within the software) to ensure that parameters fall within the limits of The City of Newcastle's requirements. On receiving a submitted design and related validation report, our Development Assessment team can immediately check for compliance with our standards. If the design is compliance, it can be passed onto engineers for detailed evaluation.

MUSIC-*link* streamlines the process of achieving a match between The City of Newcastle's specific guidelines and urban developers' water sensitive designs. This shortcut bypasses the traditionally iterative process, where assessing authorities returned models to developers to be amended and re-submitted until they are suitable for engineering evaluation.

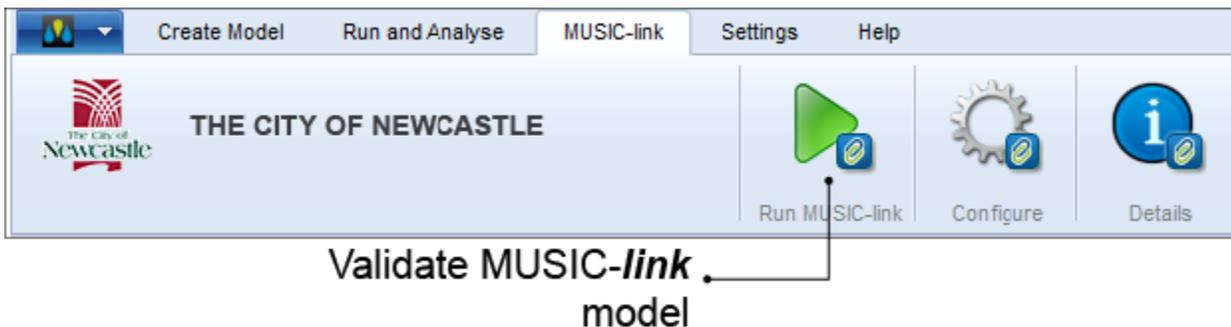
MUSIC-*link* allows The City of Newcastle to:

- Apply a simple, robust and quicker process of WSUD assessment, helped by the compliance report that MUSIC-*link* provides with designs;
- Communicate clearly and directly with developers and designers, providing locally specific WSUD requirements and modelling parameters;
- Provide increased levels of redundancy for model assessment; and
- Build capacity and support policy redundancy to support longevity.

Using MUSIC-*link*

MUSIC-*link* forms part of the standard MUSIC 6 interface, and can be accessed using the MUSIC-*link* tab (shown below) in the main interface.

MUSIC-*link* tab



Working with MUSIC-*link* is a two-step process:

1. Create and run your MUSIC model; and
2. Validate your model against the set of pre-defined parameters for a particular assessing authority.

Creating a MUSIC model

When creating a MUSIC model for inclusion in the validation process, you can choose one of two methods: either create a standard model, or directly create a MUSIC-*link* model, as described below.

Create a standard model

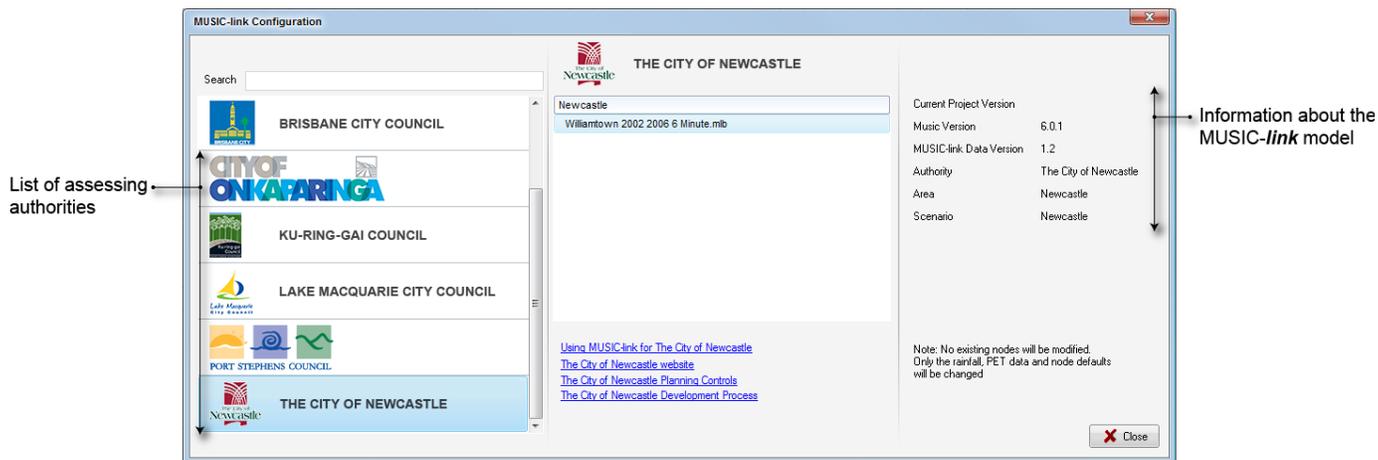
- Choose a standard meteorological template that is available with MUSIC;
- Build and run your MUSIC model;
- In the MUSIC-*link* tab, click **Configure** and choose **Yes** to convert the existing model to a MUSIC-*link* model;
- Choose The City of Newcastle and the associated meteorological template from the MUSIC-*link* Configuration window that opens (as per below diagrams); and
- Then, initiate the validation process. Refer to Validating the MUSIC-*link* model for details.

Directly create a MUSIC-*link* model

- Choose New MUSIC-link from the main MUSIC tab;
- Choose The City of Newcastle option from the drop down list and the associated meteorological template (as shown below);

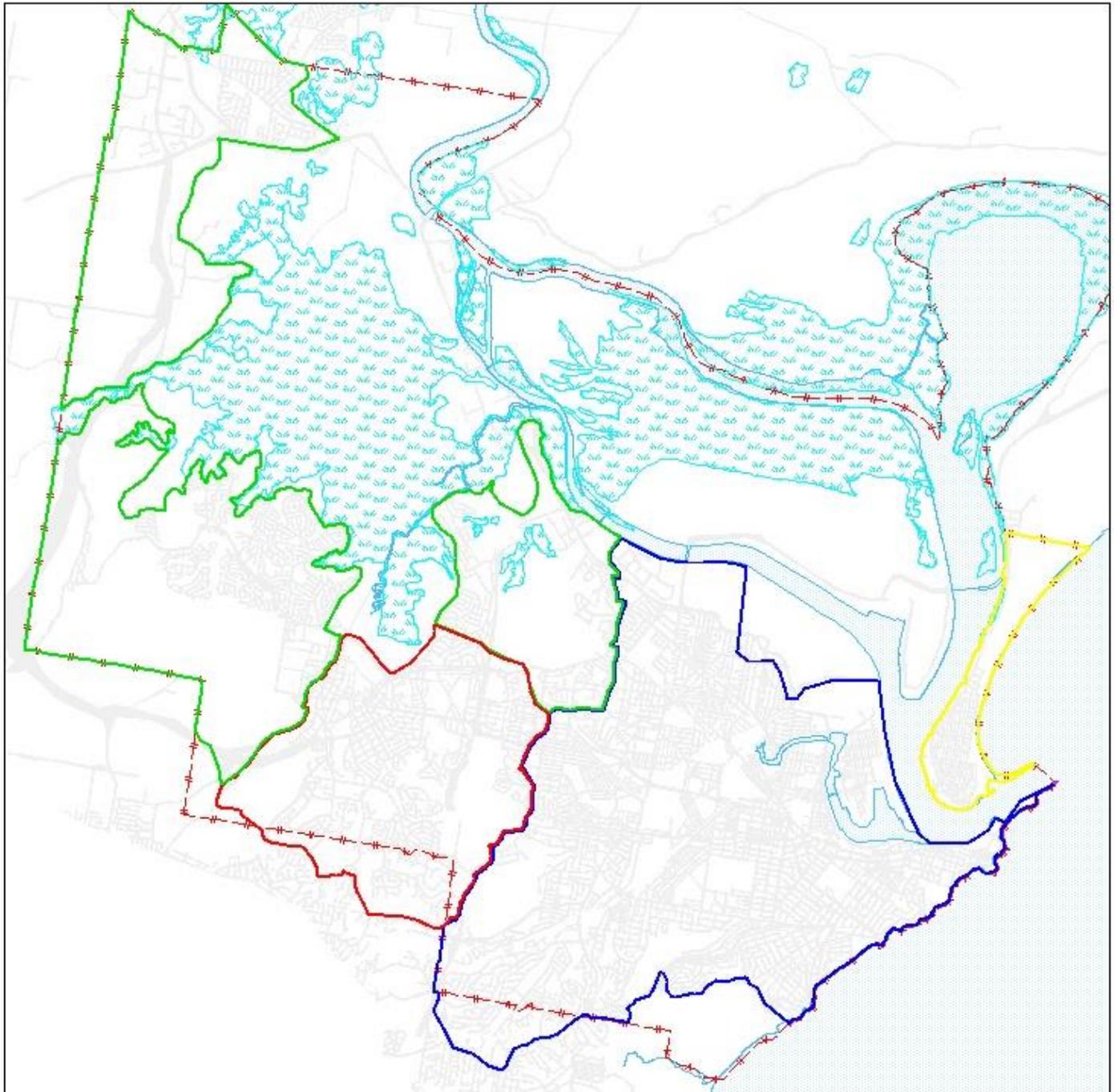
- Build your model; and
- Then, initiate the validation process. Refer to Validating the MUSIC-*link* model for details.

Note: When using MUSIC-*link*, nodes with import flows do not contribute to the total area or the impervious percentage calculations.



Selection of appropriate source nodes

The City of Newcastle has specific source nodes depending on your location. Source nodes have been defined with specific rainfall and runoff parameters based on the topography and soil types across the Newcastle area. There are a total of four specific catchment areas as defined in the map below. There are three separate types of source nodes for the four catchments, these are Urban, Rural and Forest. The Urban node should be used for all Urban areas throughout Newcastle including open spaces. The Rural node should be used for agricultural land and large rural residential catchments (>1ha). The Forest node is appropriate for bushland, wetlands and other natural spaces greater than 1ha. There is a number of surface types that can be selected within the Urban node to model your catchment to the level of detail required. More information of how to select appropriate surface types is discussed later in this document.



**Newcastle Local Government Area
Music Model Areas**

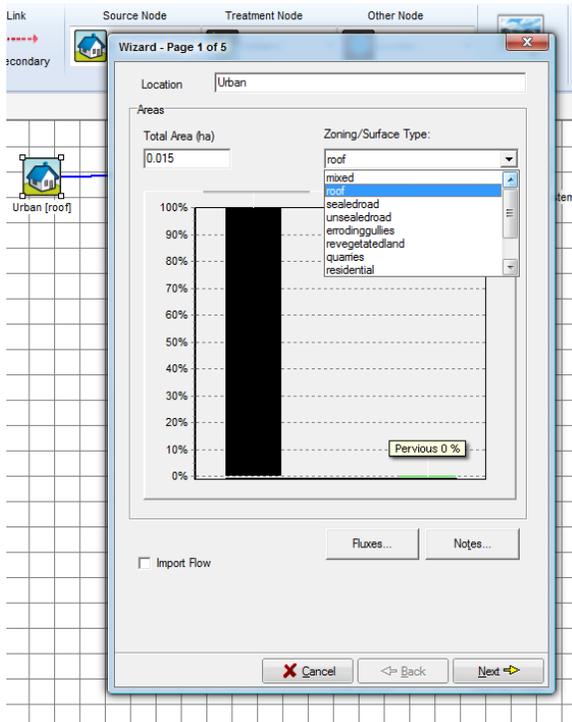
- | | |
|---|--|
|  Urban waterway |  Catchment area 1 |
|  SEPP 14 Coastal wetland |  Catchment area 2 |
|  Newcastle Local Government Area |  Catchment area 3 |
| |  Catchment area 4 |



Created: 29 January 2016
Source: NCC Data

Appropriate surface type selection in Urban Source Nodes

MUSIC has the ability to adjust the concentration of pollutants generated from a catchment with the Zoning/Surface Type dropdown box in the urban source node. This is an important feature of the software to adjust when modelling in fine detail where certain surface features in a catchment become segregated i.e. it is common to model the private lot areas of a subdivision from the roads and open spaces. If modelling on a broad scale or conceptual level then the default Zoning/Surface Type of mixed is recommended. Otherwise the user should select the appropriate Surface Type from the dropdown box that reflects the type of catchment area that is to be modelled. Refer to the figure below showing the location of the dropdown box in the urban source node and the correct method for selecting a roof catchment. Note that it is important to select an appropriate surface type and related impervious percentage. Again where a multiple of Surface Types are within your catchment the mixed selection is recommended with an appropriate average of impervious area across the catchment.



A description of the most common surface types is below:

Mixed - A default selection for where a combination of surface types is represented in the catchment such as roofs, driveways, backyards, roads and open spaces. Also use in cases where the surface type has not been defined.

Roof - For selection where the roof area of a catchment is segregated from other surface types and can be useful where the sizing of raintanks is to be undertaken. Note that the amount of pollutants generated from a roof surface type would be less than others surface types on the ground.

Revegetated land - This surface type can be used where open spaces exist within urban areas, or where revegetated land is found i.e. for rehabilitated mine or quarry sites. This should not be confused with bushland or forest areas where the separate source node should be used. Do not use this surface type if the open space includes expansive impervious areas or agricultural uses

Sealed road - Use this surface type if modelling a road in an urban area separate from the lot areas.

Unsealed road - Use this surface type if modelling a dirt/gravel road separate from the lot areas.

Residential - Use this surface type for the lots of a residential area that are separated from the road and open space surface types. If the lot area is modelled with the road and open space areas combined then the mixed surface type is more appropriate.

Commercial - Applicable for areas modelled for shopping centres, offices, storage space, clubs/gyms and retail areas.

Industrial - Applicable for areas modelled for heavy industry, warehouses, mechanical, service stations and primary production sites.

Other surface types are very specific and should only be used in cases where the surface type exactly describes the site being modelled.

Self-Validating the MUSIC-link model (Prior to lodgement with The City of Newcastle)

Ensure that your MUSIC model has been created with The City of Newcastle inputs prior to validating it. Once you have created your model:

1. Choose the MUSIC Link tab and click **Run MUSIC-link**; and
2. Once the model has been run, the MUSIC-link window appears showing the validation report (see below).

Validation report

A report is generated on completion of a validation run (as shown below). The top half of the report provides details of the validation result. It shows the compliance status of each parameter, which indicates whether the result is within the allowable range. An unchanged result indicates that this value has not been modified by the user (default value used during model run), and hence, it has no effect on overall compliance.

You can now do the following with the report:

- Click **Create Report** to expand a form, where you can enter details of the project & associated notes as well as contact details for those who are submitting the model & report. A report will only be generated (and can be saved in a PDF format) if all the parameters are compliant, or you have provided an explanation to justify why parameters are non-compliant (using the **Comment** field).
- Click **Next Steps** to expand the report for The City of Newcastle lodgement Instructions (as outlined in the below diagram).

Results

Parameter	Min	Max	Actual	Result
Detention Basin				
Uncategorised Parameters				
Evaporative Loss as % of PET	0	75	75	Passed
Exfiltration Rate (mm/hr)	0	0	0	Unchanged
Hi-flow bypass rate (cum/sec)	None	99	100	Failed
Notional Detention Time (hrs)	None	None	0.0937	Passed
Threshold Hydraulic Loading for C** (m/yr)	3500	3500	3500	Unchanged
Total Nitrogen - C* (mg/L)	1.4	1.4	1.4	Unchanged

Next Steps

Once you have used the MUSIC-*link* self-validation functionality for your MUSIC model and it either:

A) Meets the reportable parameter requirements for The City of Newcastle's setup configuration and targets, then;

STEP 1) Generate a The City of Newcastle MUSIC-*link* PDF report for submission with your model.
 STEP 2) Submit your self-validated MUSIC model along with The City of Newcastle MUSIC-*link* PDF report to The City of Newcastle as part of your Development Application. All material submitted must be in accordance with The City of Newcastle DA submission requirements.

Create Report

Project Summary: Contact Name:

Company Name: Phone:

Address: Email:

Reporting Node:

Comment:

Create Report

Lodgement of your MUSIC model and MUSIC-*link* Report to The City of Newcastle

If the MUSIC model meets the reportable parameter requirements for The City of Newcastle's setup configuration and targets, proceed as follows:

1. Create/Generate a The City of Newcastle MUSIC-*link* PDF report for submission with your model;
2. Submit your self-validated MUSIC model along with the The City of Newcastle MUSIC-*link* PDF report to The City of Newcastle as part of your Development Application.

If the parameters and/or targets are outside the required ranges and you believe the use of these parameters or the output results can be justified, please follow the steps below:

1. Generate a The City of Newcastle MUSIC-*link* PDF report for submission with your model. **NOTE:** Any parameter breaches must be justified for the model to be considered by The City of Newcastle;
2. Provide reasons for model assumptions that are outside of default parameter ranges in the **Comments** section; and/or
3. Submit your self-validated MUSIC model along with The City of Newcastle MUSIC-*link* PDF report to The City of Newcastle as part of your Development Application.



All material submitted must be in accordance with The City of Newcastle DA submission requirements.

If you require further assistance with utilising MUSIC-link The City of Newcastle, please contact eWater support on 1300 92837 support@ewater.org.au or The City of Newcastle on (02) 4974 2000 during business hours.