

Lessons learned from one of New Zealand's most challenging civil engineering projects: rebuilding the earthquake damaged pipes, roads, bridges and retaining walls in the city of Christchurch 2011 - 2016.

G-File Overview Flowchart

Story: Data Governance – Standardise, Process and Deliver

Theme: Finance and Business Systems

A flowchart which illustrates where the G-File was used throughout the life cycle of asset data collection, processing and delivery.

This document has been provided as an example of a tool that might be useful for other organisations undertaking complex disaster recovery or infrastructure rebuild programmes.

For more information about this document, visit www.scirtlearninglegacy.org.nz



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Overview of G-File and key processes that use this data

1. The G-File

G-file, data governance file. Determines the data structure features, fields, domain values required to create SCIRT Schema definitions. All of this detail is captured in an excel spreadsheet with many sheets defining the requirements for what needed to be captured as the existing CCC schema was not going to be able to accommodate these requirements for SCIRT. The spreadsheet can be updated, edited to add or remove features—a number of other processes will have to be updated as well if this happens as the G file has a number of functions:

- Defines how to survey asset data i.e. SAG/SAT;
- Defines the SCIRT schema;
- Maps CCC schema to SCIRT schema;
- Maps SCIRT schema to CCC schema;
- Maps 12d data to SAT data;
- Defines iForm format;

CCC asset data

(update/create/delete & edit—features, fields, domains & specifications through business rules)

Download from WFS
Assign UID's to features & inverts to pipes

G:\GIS\Data Incoming\From Council\Downloads\Services

2. Services.gdb

Webmaps
Webmaps mobile
Correct US/DS nodes
Infonet need this correct to be able to recreate the pipes correctly

Infonet
12D
CAD

Key GDB → G-File as an input
FME process → SAT as an input

CCC Schema Structure

G-File

1. SCIRT

(capture asbuilt data and supply back to CCC)
G-File.xlsx
(data structure, fields, features, domains)
update/create/delete & edit—features, fields, domains if required

Create CCC GDB Schema from G File
SCIRT Schema G File File to Amazon.fmw

Convert xlsx to gdb, this is what other processes read, also some tables created at this stage

3. SCIRT_Schema_Services.gdb

Create SCIRT Schema Services.gdb

CCC_Schema_GML
SCIRT_Schema_G_File.gdb
SCIRT_Schema_G_File.mdb

2. **CCC asset data**
CCC asset data downloaded from WFS weekly at SCIRT. Services.gdb is exact copy of data downloaded from CCC. SCIRT assign a UID (feature prefix & CCC asset id), assign US/DS inverts as attribute on pipes. US/DS nodes are corrected before exporting to Infonet

3. **SCIRT Schema Services**
Existing CCC Services.gdb data downloaded every week but with SCIRT schema format applied. SCIRT Schema Services is used in many processes throughout the As-Built phase.

4. **12d mapping tables**
Used to tell 12d how to interpret SAT and how to call field names. If 12d want to change a field name then the G-File needs to be updated.

5. **SAG Guideline (Survey Asbuilt Guideline)**
Document that describes how to capture the features described in SCIRT schema format.

6. **SAT template (Survey Asbuilt Template)**
Excel spreadsheet with features defined with required fields and pick lists for everything that's been described in the SAG

Create standard formats

4. 12d mapping tables

Diagrams.csv
Match tables.csv
SAG tables.xlsx
SAT_Feature
SAT_PickList_Changes.xlsx

Other processes used to convert SAT to different guideline revisions *no longer being run

Take any spatial file with coordinates and creates a skeleton SAT spreadsheet

7. Spatial survey data

Location of assets in the field

Take any spatial file with coordinates and creates a skeleton SAT spreadsheet

Survey data with UID's

File copy process to download the latest template

Complete SAT in office merge coordinate information with attribute information

8. **iForm app data collection**
Attribute information relating to the surveyed locations of assets can be collected through a form that can be used on mobile devices, offline and in the field. It does require the corresponding SAT UID to provide the link between surveyed locations and attribute information. Update the iForm if new features have to be collected in the field, update iForm if new domain values have been added to the G-File and required in the field. iForm data collection does not require a pre-existing SAT, it will create the data collected automatically into the correct SAT format.

9. **SAT**
Survey location of assets and attribute information about what surveyed

Survey data x,y,z

7. Spatial survey data

Location of assets in the field

Take any spatial file with coordinates and creates a skeleton SAT spreadsheet

Survey data with UID's

8. iForm app

Create iForm from G-File.fmw

Create 61 Forms with 1200 elements and 600 pick list values

iForm App
Collect attribute information to SCIRT Schema standard

Create SAT from Mobile Device Data.fmw

9. **SAT**
Survey location of assets and attribute information about what surveyed

10. **SAT validation/review**
Validating/reviewing SAT data to make sure that it will meet the requirements as defined in the SAG and be in a complete state with all issues addressed before being passed to the IST for production stage.

11. **Collector app**
Highlight what geometries have missing attributes. Attributes shown as missing only what's on the SAT & some extra fields to show what's missing. The collector app needs an SAT as an input.

Survey data attributes

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Survey data validation

10. Validation/Review

SAT_Validation_Tool.fmw
SAT Lining and Repairs Validation.fmw

Check data and update on the SAT in the office

Collector app

11. Collector app

Highlights missing information (attributes) with the spatial data

12. **CCTV data validation/review**
Validating/reviewing CCTV AsBuilt footage

13. **Production phase set up**
GIS production takes the finalised SAT and uses the AAT (Auto Asbuilt Tool) to create the SAT into gdb format that GIS use to do further QA on the data set should have a clean SAT by now but can still be issues with data that need to query delivery team about

14. **12d tab file**
12d needs to have all end points of a line defined to be able to recreate it, the SAT does not need to include all of these if they are existing data, this file has created dummy points into the file to allow 12d to recreate it before it exports it to CAD for Final Check Prints

15. **Final data checks**
Further round of tests all automated to make sure nothing has been missed, making sure everything is as it should be for supplying in the right format with right attributes for CCC.

16. **Final Data supply**
Final data supply to CCC. The ReviewWorks.gdb is updated with all the info from the final checks and is the last time the final version of the SAT in SCIRT Schema format with all domain values and field names as specified in the G-File.

17. **Constructed Services**
AsBuilt data all in one gdb, updated when anything new happens

CCTV data validation

12. Validation/Review

Match_CCTV_to_SAT.fmw
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GIS Production Phase

13. Production set up

AAT.fmw
Create Longsections from AsBuilt.fmw
SAT to Drafting Outputs.fmw

Take final SAT and apply it for production gdb format

Create geometries for repairs

14. 12d tab file

Create table of pts/lines that include all missing points as dummy points for 12d & export as

12d macro .csv's & tab (txt) file with all points defined

Patch repairs & name of patch repairs

Final CAD outputs

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GIS Testing Phase

15. Final data check

01 AsbuiltTopology.fmw
04 CheckFields.fmw
08 Counterdata.fmw
MatchCouncilDataback.fmw

Geometry checks
Use All_features:Geometry_Type to filter out just points

Attribute checking
WW/SWWS_Feature:Mandatory, for to determine which fields to look for

Assign SCIRT ids
Use UID prefixes tab to assign UID to each feature

Schema map CCC completed
Use Domain field to Match back Internal Diameter from Council Diameter Domain

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GIS Completed Phase

16. Supply to CCC

Completed.gdb
Completed.gml
Final dataset
Review-Works.gdb

CCC Schema Services format

SCIRT Schema Services format

Backup
Temp for edit
Stage
Production

WFS

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CCC processing

16. Supply to CCC

Completed.gdb
Completed.gml
Final dataset
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Some more notes

Create new/update existing iForm

Delete complete iForm
Update iForm
Add option list

If new features created in G-File that need to be surveyed, delete existing iForm

Create new iForm with all features as described in G-File

Can be run independently of delete/update. If new domain values added to G-File run this.

*The option list goes from 0-10 so might not always make sense as new values get added at end. The process figures out what order the options in and gets as close to alphabetical as possible

The Collector Schema

CreateCollectorGDB from G File_network.fmw → CollectorSATSchema.gdb

G-File maps to SAT, SAT maps to Collector

The Collector App

Data upload → Update Ftr service → Send to App
Data download ← Update Ftr service ← Make corrections

Constructed Services.gdb

Checks ABT progress spreadsheet to get status of project

Projects currently in validation = draft => Rank = 3
data taken from AsBuiltDraft.gdb

Projects currently in production = Current work load => Rank = 1, data taken from ReviewWorks.gdb
*if queries back from CCC can still be doing work even if project finished

Projects completed & no queries = completely finished => Rank = 2
*data taken from ReviewWorks.gdb

17. Constructed Services.gdb

Run Financial Output

Final Costs
Scirt Schema & CCC Schema format

17. **Constructed Services**
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