

ANNEXURE A



**Western Cape
Government**

Spatial Information and GIS Location Services Standard Operating Procedure (SOP)

March 2022

**Compiled by:
Department of the Premier
Provincial Spatial Information
Corporate GIS**

Foreword

The purpose of this document is to communicate and inform the WCG GIS users about:

1. the shared spatial data and GIS location tools, services, and resources available to perform their tasks; and
2. the guidelines, standards, and workflow procedures which operationalise the data governance framework for security, availability, and accuracy of spatial data.

The document's structure is based on the "Frequently Asked Questions" (FAQ) format. The answer to each question complies with the IT and Data governance standards of WCG. This document describes the processes, "What we do?" and procedures, "How we do it?" shown in the governance pyramid below.

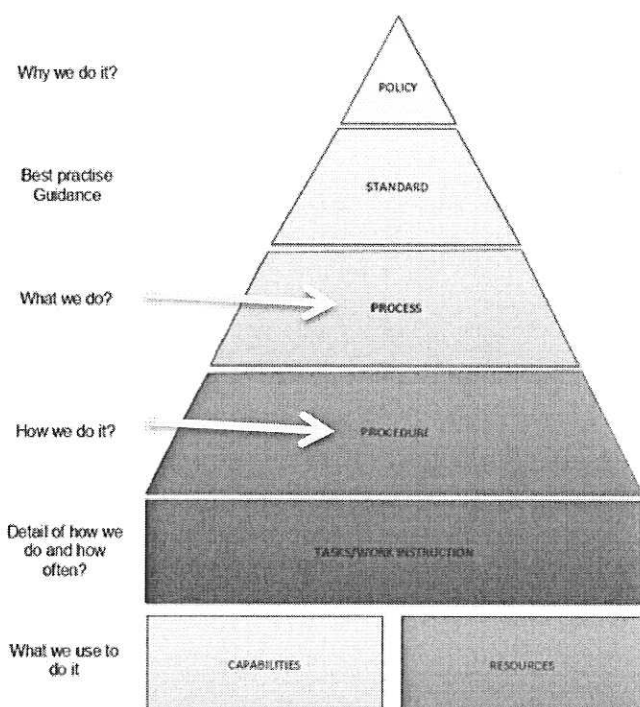


Figure The governance pyramid (See 10.1 for the detailed governance pyramid)

Background and context:

Selected departments started using Geographic Information Systems (GIS) in **2004**. The Centre for e-Innovation (Ce-I) within the Department of the Premier (DoP) conducted a transversal audit of ESRI GIS products deployed in the Western Cape Government (WCG) in **2009** and the results confirmed that five departments owned ESRI GIS products. 75% of these were out of date due to lack of funding for annual maintenance and 10% were at their end-of-life. WCG departments operated independently resulting in duplication of resources, data and GIS infrastructure. They had little or no skilled staff to support the GIS technology.

Department representatives at a WCG GIS practitioner's forum requested Ce-I to investigate centralised funding for an ESRI Enterprise Licence Agreement (ELA). They confirmed their support for centrally managed GIS desktop software and hosted GIS infrastructure server environment with GIS support skills. Ce-I's top management approved the funding for the ESRI ArcGIS ELA and the Enterprise Architecture Board adopted the ESRI ArcGIS Desktop and Server as the corporate standard for GIS location services.

During **2010** transversal funds were made available for the procurement of shared spatial data with maintenance by vendors. During **2011** the Directorate: Provincial Spatial Information and Sub Directorate Corporate GIS were created in Department of the Premier

From **2012** to **2021** the uptake of GIS in WCG increased to 150 ArcGIS Desktop installations for GIS users. All of whom have access to the WCG Shared Spatial Data Warehouse which contributes to spatial planning, spatial management of operational service delivery, and spatial analysis to inform policy and decision making. There are also about 291 web maps which reuse the WCG Shared Spatial Data Warehouse; making informed spatial decisions possible to non-technical users.

Conclusion:

It is evident that many people in the WCG have contributed to it being the first province in South Africa to implement an ESRI Enterprise Licence Agreement (ELA). Subsequently, other provinces have followed the WCG example.

This document provides the GIS users and other role players with the opportunity to improve the workflow of their operational procedures by contributing to its regular updates. This will help to preserve the investment in spatial data, GIS location services technology, and most importantly the knowledge and skills of our GIS users. It hopes to discourage an ethos of self-centredness and inspires a mind-set of working "**better together**".

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List of Acronyms and Abbreviations

ArcGIS	Esri's GIS software
Ce-I	Centre for e-Innovation
CGIS	Corporate GIS
DCAS	Department of Cultural Affairs and Development Planning
DEA&DP	Department of Environmental Affairs and Development Planning
DEDAT	Department of Economic Development and Tourism
DHS	Department of Human Settlements
DLG	Department of Local Government
DoA	Department of Agriculture
DoCS	Department of Community Safety
DoH	Health
DotP	Department of the Premier
DSD	Department of Social Development
DTPW	Department of Transport and Public Works
ELA	Enterprise License Agreement
ESRI	Originally stood for "Environmental Scientific Research Institute", but is now known simply as Esri – a GIS software company
FGDC	Federal Geographic Data Committee
GIS	Geographical Information System
GPS	Geographical Positioning System
ha	Hectare
ISO	International Standards Organisation
km	Kilometre
PSI	Directorate: Provincial Spatial Information
PT	Provincial Treasury
QA	Quality Assurance QA Spatial Database refers to the departmental working area.
SAEON	South African Earth Observation Network
SANS	South African National Standards
SANSA	South African National Space Agency
SDE	Spatial Database Engine (Spatial Data Warehouse)
SMI	Chief Directorate: Strategic Management Information
UTF-8	Unicode Transformation Format using 8-bit
UTM	Universal Transverse Mercator
WCED	Western Cape Education Department
WCG	Western Cape Government
WCSIF	Western Cape Spatial Information Forum
WGS	World Geodetic System
File Types	CSV – Comma Separated Values (AKA comma delimited files) DBF – Database file GDB – Geodatabase GML – Geography Markup Language JPEG/JPG – Joint Picture Expert Group KMZ / KML – Google Earth files MXD – Project file for ArcMap

	PRJ – Projection definition for shapefile SHP – Shape file (GIS data format) TIFF – Tagged Image File Format XLSX – Excel spreadsheet document XML – Extensible Markup Language APRX – Project file for ArcPro
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1. Spatial information within the Western Cape Government

1.1. Who in the WCG should make use of spatial and location services?

WCG staff who currently use or may benefit from spatial information and GIS services are:

- Strategic managers and planners;
- Knowledge or Information managers;
- Business or Operational managers;
- Information Officers;
- Application developers;
- Researchers; and
- GIS users.

1.2. Who is responsible for driving the use of spatial information in the Western Cape Government?

The use of spatial information within the WCG is driven from within the Department of the Premier by the Directorate: Provincial Spatial Information (PSI). Corporate GIS (CGIS) falls under the Cel in the Transversal Application directorate. Their purpose enables departments to make use of spatial information and GIS to analyse, plan and perform operational management of their service delivery model spatially:

- **PSI** is to support provincial policy development, strategic planning and data governance with provincial spatial information. For detailed information about PSI services please see *1.3 What services does PSI provide?*
- **CGIS** is to render operational GIS location services to all Western Cape Government Departments. For more details about the technical services provided by CGIS please see *1.4 What are the technical services rendered by CGIS?*

Note the responsibilities of the individual WCG departments and the GIS users within them are described in section *1.5. What are the roles and responsibilities of departments GIS user and GIS practitioner?*

1.3. What services does PSI provide?

PSI has seven functions as per the official organogram:

1. Develop and maintain a strategic framework for provincial spatial data.
2. Ensure standardisation of spatial data within the province.
3. Monitor the implementation of spatial information standards and procedures.
4. Facilitate the analysis and alignment of spatial information to the strategic imperatives.
5. Facilitate advocacy and ensure capacity building in the province.
6. Facilitate the integration with local authorities and national government on spatial information.
7. Provide operational spatial information product support.

These functions can be grouped into three service areas provided by PSI.

1.3.1. Spatial Data Governance

- Develop and maintain a strategic framework for WCG Spatial Information and spatial data
- Ensure standardisation of spatial data within the province
 - Document WCG spatial information standards and processes
 - Advocate and advise on standards and processes
- Monitor the implementation of spatial information standards and procedures
 - Provide departments and auditors with supporting documentation for spatial information compliance
 - Data usage and copyright agreements
 - Metadata management
 - Security classification of spatial data in collaboration with data owners or custodians

1.3.2. Spatial Data Content Management

- Data Acquisition
 - From WCG departments
 - From external free sources
 - From value add reseller vendors
 - Publish data acquisition report
- Data Dissemination
 - WCG department managed data with custodian's record permission
 - Publish data dissemination report
- Maintain WCG Spatial Data Catalogue / Inventory

1.3.3. WCG GIS Community Collaboration

- Facilitate the analysis and alignment of spatial information to the strategic imperatives
- Facilitate advocacy and ensure capacity building in the province
- Facilitate the integration with local authorities and national government on spatial information
- Provide operational support and assist departments with GIS Users duties as required
- Co-ordinate the custodianship of spatial information content and publication
- Coordinate WCG Spatial Information Forum to communicate and collaborate on all spatial data related initiatives

1.4. What are the technical services rendered by CGIS?

CGIS has four GIS functions as per the official organogram:

1. Location data services
2. Location development services
3. Location integration services.
4. Location platform technology hosting, support and collaboration services

These four functions are described in great detail below.

1.4.1. Location data Services

- Operational support for the WCG Spatial Data Warehouse
- Provision and support specialist location web services such as geocoding and routing

- Support PSI in the execution of the spatial data acquisition and dissemination processes.

1.4.2. Location development services

- Web map applications developed for both desktop browser and mobile platforms.
- Mobile data collection and survey applications to facilitate field spatial data capture workflows.
- Development of spatial enabled dashboard applications

1.4.3. Location integration services

- Spatially enable existing or planned operational systems by means:
 - Embedded web map URLs in websites or SharePoint sites
 - Database level integration
 - Application API level integration

1.4.4. GIS Technology and Hosting services

- Management and co-ordination of ESRI Enterprise License Agreement for ArcGIS Server and Desktop software products
- Provisioning of the ArcGIS Desktop software products
- Provisioning of the ArcGIS Server software products
- Design the architecture plan and road map of the WCG GIS infrastructure
- Implementation and operational management of WCG GIS infrastructure
- Design and implement the technology to support WCG Spatial Data Warehouse
- Alignment of GIS with IT governance and technology standards
- Coordinate WCG GIS Users forum, to communicate and collaborate all GIS technology and related initiatives.

1.5. What are the roles and responsibilities of departmental GIS users and GIS lead practitioners?

1.5.1. GIS users

- Are not required to use the cooperate standard GIS software ArcGIS Pro. They are encouraged to use Map Viewer via browser.
- Create, enhance, and maintain their department's spatial data according to the norms and standards of the WCG
- Manage the content of the departmental spatial databases
- Create custom decision-making maps for their department
- Build and maintain internal staff capacity and competency of GIS skills
- Collaborates on GIS related business requirements with DotP.

1.5.2. GIS practitioners

GIS practitioners have been nominated as the coordinators of GIS initiatives and contact person within their department. They are also recognised as their department's subject matter experts for spatial information.

- DCAS
- DEA&DP – Prabani Naidoo (Prabani.Naidoo@westerncape.gov.za)
- DEDAT – Gershon Oliver (Gershon.Oliver@westerncape.gov.za)
- DHS – Kenneth Kirsten (Kenneth.Kirsten@westerncape.gov.za)
- DLG –
- DOA – Francois Koelenberg (FrancoisK@elsenburg.com)
- DOCS –
- DOH – Lesley Shand (Lesley.Shand@westerncape.gov.za)
- DOTP – Roger Daniels (Roger.Daniels@westerncape.gov.za)
- DSD – Julius Benn (Julius.Benn@westerncape.gov.za)
- DTPW – Nicolas Cilliers (Nicolas.Cilliers@westerncape.gov.za)
- PT –Malcolm Booysen (Malcolm.Booyesen@westerncape.gov.za)
- WCED – Ronald Cornelissen (Ronald.Cornelissen@westerncape.gov.za)
- WCG – Walter Smit (Walter.Smit@westerncape.gov.za)

1.6. What shared resources are available to GIS users

The Spatial Data Warehouse is available to all GIS users and contains all the spatial data of transversal importance. The inventory is maintained by DotP and has a management plan indicating when the datasets are updated. For queries related to any spatial data, send an e-mail to SpatialData.Support@westerncape.gov.za.

1.7. How can you highlight the importance of the use of GIS services and spatial data in your Department?

In the example brochure below, produced by the Department of Environment and Development Planning's Spatial Information Management unit, the important role they play in the management and use of spatial data for decision making is clearly shown (Please see **12.2 Example Brochure of DEA&DP: Spatial Information Management**). Why not create a similar brochure for your specialist GIS unit?

2. GIS software installation and licensing

2.1. What GIS software is available for installation on my WCG computer?

The corporate standard for GIS desktop software is ArcGIS Pro 2.9. The old ArcGIS Desktop (ArcMap) software is only supported as legacy software and cannot be updated. ArcGIS Pro is available at two license levels:

- Advanced
- Basic

Please note:

- ArcGIS Pro 2.9 is only supported on computers running Windows 10
- ArcGIS Pro 2.9 requires a highly capable computer with at least 8gb of RAM

The following nine extensions for ArcGIS Pro are also available.

- **Spatial Analyst** – contains a broad range of powerful raster modelling and analysis features which allow you to create, query, map and analyse cell-based raster data.
- **3D Analyst** - contains three-dimensional visualisation and analysis tools.
- **Network Analyst** - performs advanced routing and network analysis
- **Geo-statistical Analyst** - contains advanced statistical tools for surface generation and analysing and mapping continuous datasets.
- **Schematics** – enables the modelling, design and viewing of any kind of network, from social and economic networks to electric power, traffic light, rail and more.
- **Data Reviewer** – consists of a series of tools that supports both automated and visual analysis of your data and can be used to detect anomalies with features, attributes and relationships in your database.
- **Publisher** - converts ArcGIS map and globe documents to published map files (PMFs) that are viewable with ArcReader, a free application.
- **Workflow Manager** – helps to manage business process as workflows in a consistent manner maintaining accountability
- **Drone to Map** – ingests large raster datasets typically captured by drones. Processes these images to create ortho-mosaics, point clouds, surface models etc.

2.2. Am I eligible to apply for GIS software to be installed on my WCG computer?

In order for the software to be installed on your computer it must be recognised by your supervisor that:

- The use of the software is necessary for you to fulfil the terms of your performance agreement.
- The cost of any training will be covered by your department.
- The GIS lead practitioner has been contacted and informed that you need and will be using the software.

2.3. Who covers the cost of the GIS software installation on my WCG computer?

The cost of a licensed copy of ArcGIS Pro and any of its extension is covered in terms of an Enterprise License Agreement between ESRI South Africa and the WCG. At present this cost is carried by DotP. Departments are responsible for paying for any related skills training.

2.4. How do I apply for GIS software (ArcGIS Pro) installation or upgrade on my WCG computer?

1. Contact GIS.DesktopSupport@westerncape.gov.za to request an assessment/approval.
2. The CGIS team will reply by emailing a copy of the *ArcGIS Desktop Installation Request Form* and the *Ce-I Service Desk Logging Template*.
3. Log onto the computer or laptop on which you want the installation to be done and open the *ArcGIS Desktop Installation Request Form*.
4. Click **Yes** if you are prompted to allow macros to run.
5. Click **Yes** in each popup box while the form automatically enters your user name and computer's name (see box 5 figure 2.1).
Note: this is why you need to be logged onto the computer or laptop on which you want the installation to be done.
6. Fill in your name, email address and telephone number into the appropriate green areas of the form (see box 6 figure 2.1).
7. Select one of the options from the yellow drop-down boxes for your department, ArcGIS Pro license level, and also indicate the extensions you require (see box 7 figure 2.1).
8. Click the **Export To PDF** button near the top of the form
9. Sign and date the terms and conditions section (see box 9 figure 2.1)
10. Ask your supervisor to fill in their details, sign and date the authorisation section (see box 10 figure 2.1)
11. Email the signed copy of the *GIS Desktop Installation Request Form* to GIS.DesktopSupport@westerncape.gov.za.
12. Your request will then be assessed by the CGIS team. If you are approved, the CGIS team will provision a license for your computer and you will be notified via email. This email will also indicate the name of the license server that you should use.
13. You must then arrange with Ce-I Service Desk for the approved software to be installed, by completing the Ce-I logging template (see figure 2.2). Be sure to state which license level and license server you were approved for.
14. The Ce-I Service Desk will provision the software via Microsoft System Center Configuration Manager. Once the package is ready and you have logged into the WCG network, you should get a message on your computer that software is ready to be installed. Since this requires the (very large) software package to be sent to your computer – please ensure that you are on an “uncapped” network and have sufficient time for it to complete.
15. The installation should not require input from you, but you must login to the WCG network for the software to work (via VPN will also work).
16. Once the installation is complete, email GIS.DesktopSupport@westerncape.gov.za to organise that the connections to the WCG spatial data resources are set up. Please see 3.2 *How do I check that my ArcGIS Desktop installation has the correct spatial data resource connections?*

17. In order for the software to function (communicate with the license server) your machine (PC or laptop) must be connected to the WCG network. If you are not physically at the office, your VPN connection must be active. Please see [2.5 How do I check my \(legacy\) ArcGIS Desktop license server connection?](#)
18. Once you have tested your installation and are satisfied please sign and date the final section of the installation form and send it to GIS.DesktopSupport@westerncape.gov.za (see box 17 figure 2.1)

Western Cape Government
BETTER TOGETHER

ArcGIS Desktop Installation Service Form

[Export to PDF](#)
[Support Details](#)

1. The GIS practitioner needs to be logged onto the computer or laptop you need the installation to be done on in order to automatically collect the details of computer and user login
2. Fill your personal details. Complete this form by typing in the details in the blank white area and select one of the options from the Drop down list in Yellow
3. Click the "Export To PDF" button and save and print the PDF document and have it signed by your supervisor
4. Scan Signed document and email to GIS.DesktopSupport@westerncape.gov.za
5. The Cei ServiceDesk technician will confirm availability and will do the ArcGIS Desktop installation
6. The GIS practitioner needs to test to confirm that their ArcGIS Desktop can
7. If the GIS practitioner Lead wishes to have five or more installations done simultaneously this will be regarded as a project and only one Cei ServiceDesk Incident Number is needed
8. If a GIS practitioner requests an installation on a desktop and laptop then two ArcGIS Desktop Installation Service forms will need to be completed
9. In the event of new PC or Laptop hardware being provided the GIS practitioner needs to inform the Cei technician and request the ArcGIS Desktop software to be removed

6. Type in your details

Personal Details	
GIS Practitioner Name	
Department Name	Department of the Premier
WCG Active Directory User ID Currently logged:	
Personal ID No:	
Telephone:	

7. Choose from dropdown lists

Technical Details	
ArcGIS Desktop License Type	Standard
Extensions Required	
☐ Spatial Analyst ☐ 3D Analyst ☐ Network Analyst	☐ Tracking Analyst ☐ Geostatistical Analyst ☐ Schematics
☐ Data Reviewer ☐ Publisher ☐ Workflow Manager	

5. Filled in automatically

Estimated cost if this software was procured by departments (based on R10.00 to \$1); and is used by Cei to demonstrate the value of the ESRI ELA and to substantiate funding provision in their budget	R 122 208.00
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1. The terms of use for this ArcGIS Desktop Software is subject to the Cei Policies and Guidelines (See URL below)
http://www.westerncape.gov.za/Blue_Pages/Approved.asp
 2. The terms of use of access to the Spatial Data Warehouse is subject to the Data Governance Policies and Guidelines (See URL below)
http://www.westerncape.gov.za/Blue_Pages/Approved.asp

9. Print the form and sign and date

Signed Terms & Conditions	
GIS Practitioner Name:	
I agree to comply to the above terms of use and any updates which may be applied	
GIS Practitioner Signature	

10. Supervisor to fill their details, sign and date the form after printing

Supervisor details:

Name: _____

Delegation: _____

Personal no: _____

Telephone: _____

Email Address: _____

Building/Floor/Room number: _____

1. I confirm that the performance agreement of the GIS Practitioner requires ArcGIS Desktop software and access to the Spatial Data Warehouse

2. I have made budget provision for training in ArcGIS Desktop software as part of the GIS Practitioner's personal development plan

Supervisor Signature: _____

Date: _____

17. Test the installation if satisfied sign and date

Cei Service Desk:

Cei Service desk technologist name: _____

I confirm that I have tested the operation of ArcGIS Desktop and am satisfied with the installation

GIS Practitioner Signature: _____

Date: _____

Figure 2.1 The ArcGIS Desktop Installation Request Form illustrating where the user is required to enter information

Personal 'C' or ID number:	
Surname:	
Full names (no abbreviations please):	
Department:	
Directorate/Sub Directorate:	
Building/Location name:	
Building/Location address:	
Floor & Room number:	
Phone Number:	
Cell Number:	
Manager / Supervisor Phone No.:	
Your E-mail address:	
Description of your Request / fault:	

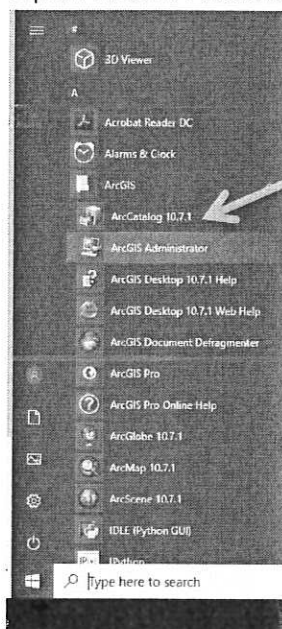
Figure 2.2 The Ce-I Service Desk Logging Template

Please note:

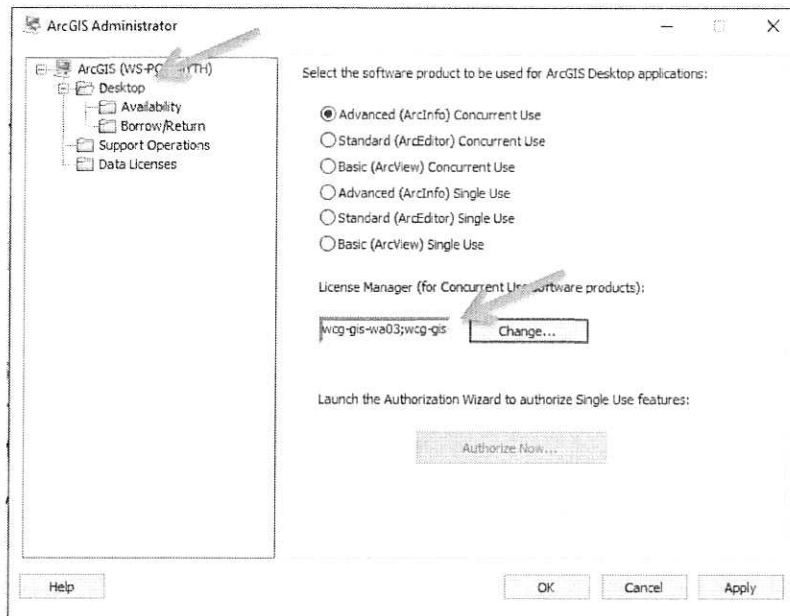
- Before you start using a new desktop or laptop computer please email GIS.DesktopSupport@westerncape.gov.za and request that the ArcGIS software be removed from your old computer.

2.5. How do I check my (legacy) ArcGIS Desktop license server connection?

- Open ArcGIS Administrator by selecting **Start >>ArcGIS >>ArcGIS Administrator**

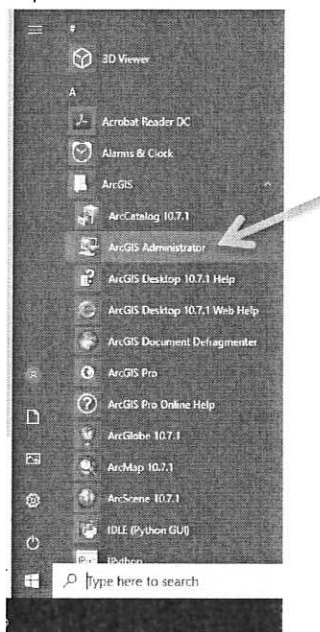


- Click on **Desktop** and tick the check box under **License Manager** this should be set to "**wcg-gis-wa03;wcg-gis-wa04**" as shown below.

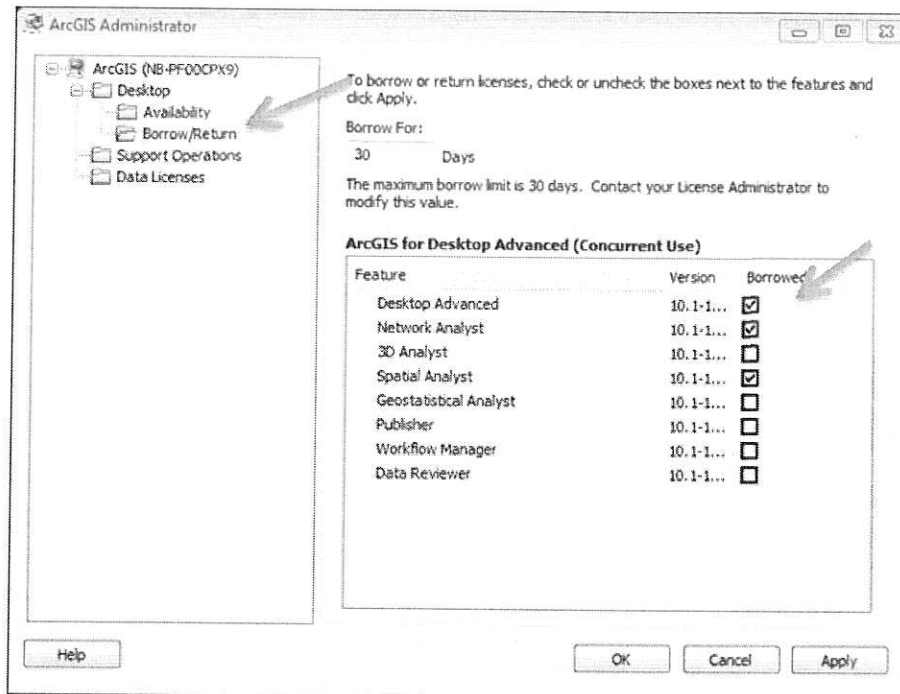


2.6. How do I borrow or renew my ArcGIS Desktop license?

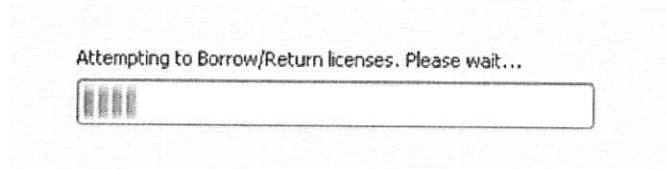
1. Open ArcGIS Administrator by selecting **Start >>ArcGIS >>ArcGIS Administrator**



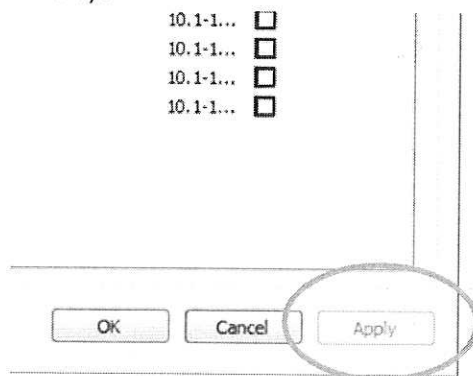
2. Click on **Borrow/Return** then select the features Desktop (Advance, Standard or Basic) and extensions for which you wish to borrow a license by ticking the check box next to each item. Untick the box if you wish to return the license.



- Click **Apply** and ArcGIS Administrator will connect to the licence manager server to attempt to borrow with the response below.



- If successful the **Apply** button will be greyed out and your license will be active for the next 30 days



Please note:

- If you wish to renew your licenses before the 30 days first return the licenses by unticking the check box and click Apply. Then follow steps 2 and 3 above to borrow the licences for another 30 days.
- If you have any problems email GIS.DesktopSupport@westerncape.gov.za with a screen shot of your error.

3. Accessing WCG spatial data resources

3.1. What spatial data resource connections are made available to ArcGIS Desktop users in the WCG?

ArcGIS Desktop users in the WCG are provided with the following spatial data resource connections:

1. WCG shared spatial data resources which are accessed as feature or map services from a GIS Server link.
2. ArcGIS Online, City of Cape Town and Department of Agriculture spatial data resources which are accessed as image and map services from a GIS Server link.
3. Two department specific spatial data resources which are accessed as Database Connections to a production spatial database (SDE) and QA spatial database (SDE).

Access to Spatial datasets provided to GIS practioners using ArcGIS Desktop in the WCG

Cel CGIS 2020/20/11

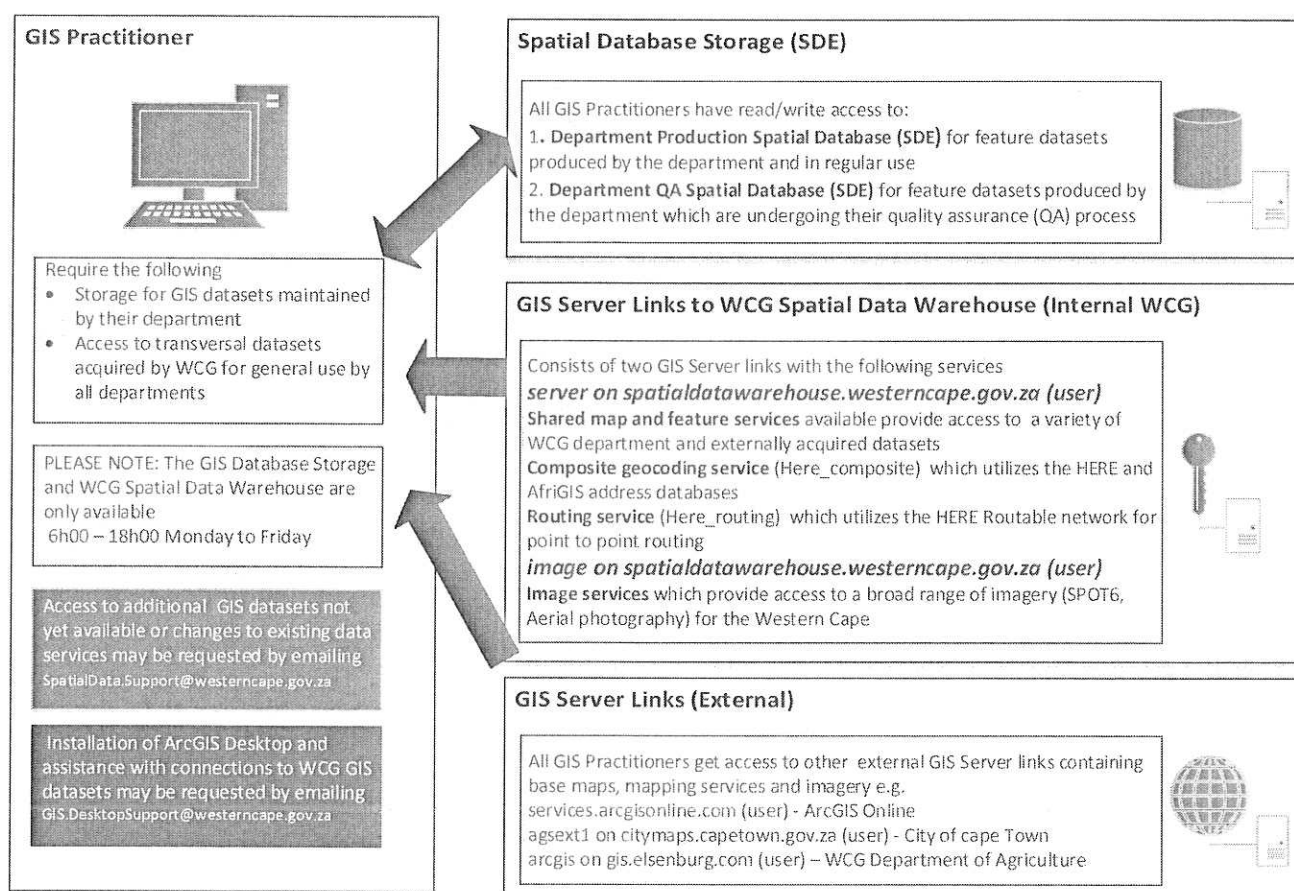


Figure 3.1 Summary of the spatial data resources provided for ArcGIS Desktop users in the Western Cape Government

Please note:

In order to save costs the GIS server links to the WCG Spatial Data Warehouse are only available 6h00 – 18h00 Monday to Friday

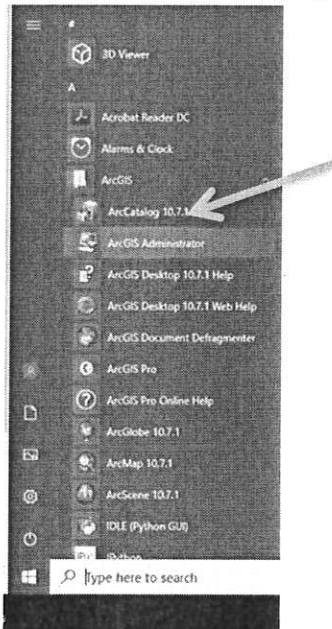
3.2. How do I check that my ArcGIS Desktop installation has the correct spatial data resource connections?

After ArcGIS Desktop is installed on your WCG computer the spatial data resource connections to the GIS servers and spatial databases will be implemented by the Ce-I CGIS team. It is your responsibility to check that these are available by following the steps below.

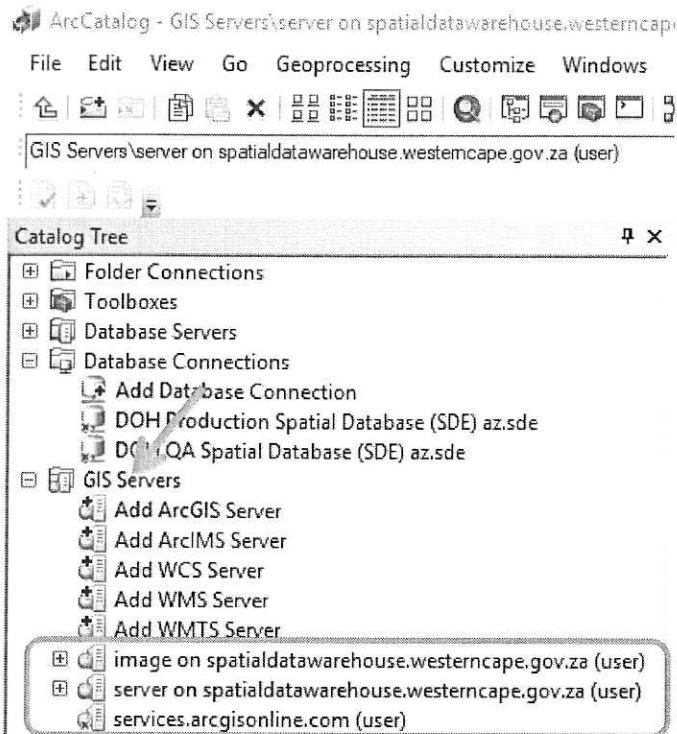
Please send an email to GIS.DesktopSupport@westernCape.gov.za should you require connections to be implemented.

3.2.1. Checking WCG Shared and ArcGIS Online spatial data GIS server connections

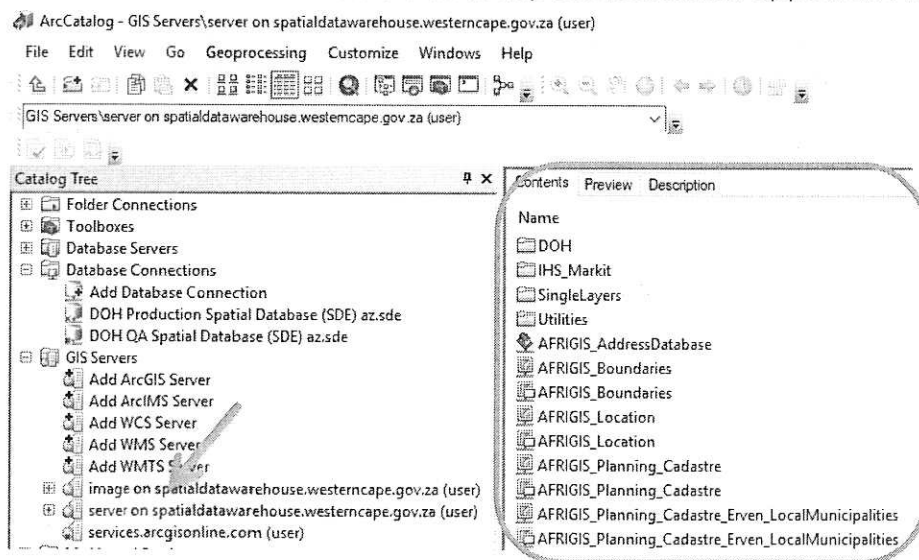
1. Open ArcCatalog by selecting **Start >>ArcGIS >>ArcCatalog**



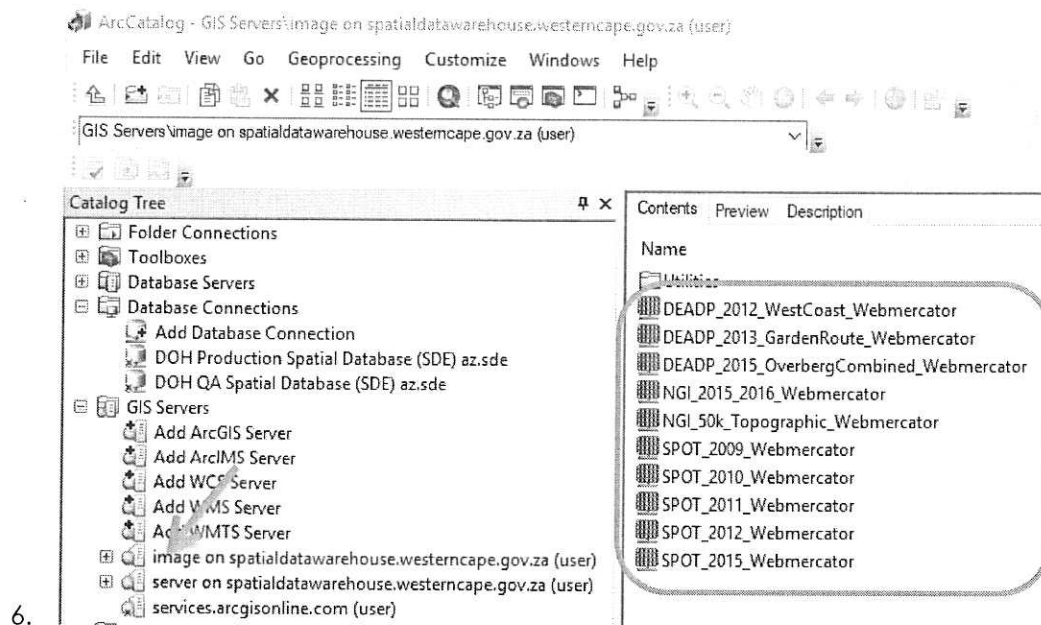
2. Once ArcCatalog has opened expand the GIS Servers folder by clicking on the small + next to the folders.
3. There should be at least three GIS Server connections named as follows:
 - Image on spatialdatawarehouse.westerncape.gov.za (user)
 - sever on spatialdatawarehouse.westerncape.gov.za (user)
 - services.arcgisonline.com (user)



4. Test *server on spatialdatawarehouse.westerncape.gov.za (user)* by double clicking on it. The list of folders and feature and map services should appear in the contents pane.

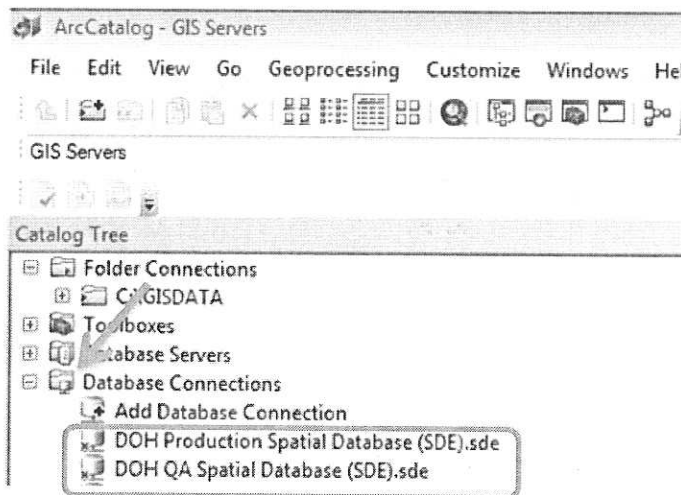


5. Likewise test *image on spatialdatawarehouse.westerncape.gov.za (user)* – a list of image services should appear.



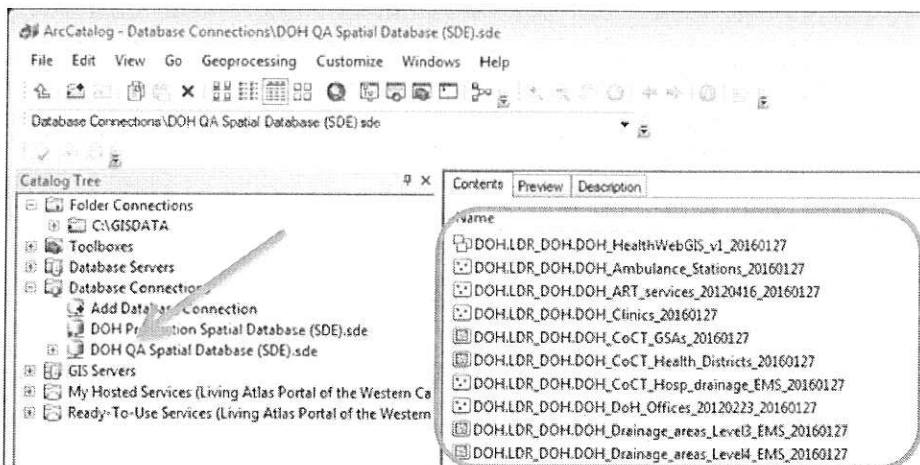
3.2.2. Checking the two department-specific spatial database (SDE) connections

7. Once ArcCatalog has opened expand the Database Connections folder by clicking on the small + next to the folders.
8. There should be at least two database connections named as follows:
 - [Your department's acronym] Production Spatial Database (SDE).sde
 - [Your department's acronym] QA Spatial Database (SDE).sde



In the picture above the database connections for the Department of Health (DOH) are shown.

9. Test that each of the database connections are valid by clicking on it to expand it. It should expand showing all the layers it contains and the small red x next to it will disappear and + will appear. The feature classes (layers) it contains will appear under the contents tab in the main window pane.



10. If any of the database connections fail, make a note of which one it is and email the details to GIS.DesktopSupport@westerncape.gov.za attaching a screen shot of the error.
11. Should all of the database connections open, you have completed testing the spatial data resource connections for your ArcGIS Desktop installation successfully.

Please note:

- Only data which belongs to the WCG department may reside in these departmental databases. Data belonging to other departments or external organisations, if transversal in nature and quality assured, must reside in the WCG shared database and is made available at spatialdatawarehouse.westerncape.gov.za (user) as map and feature services.
- All ArcGIS users who are supplied with the two department specific database connections have editing rights to all the data these two databases contain. The QA spatial database (SDE) is meant to contain spatial data which is being created or quality assured while the production spatial data should contain data in use by the department. **It is up to the each WCG department to develop their own internal procedures regarding the editing and use of their internal data.**

3.3. What is provided in the WCG shared spatial data resources?

Spatial data is provided in four ways as shared resources at the GIS Server links. Three service types are available at server on spatialdatawarehouse.westerncape.gov.za (user).

- **Feature services** –  these provide access to vector feature class (layer) data and give full cartographical editing and analytical access to the data, but not to editing the data itself. The names of the feature services start with the custodian's acronym followed by a few words describing the dataset. There may be several layers included in a single feature service. In the case of important and often used layers these are provided as single layer feature services in a folder **SingleLayers**.
- **Map services** –  provide access to the same spatial data as the feature services and are named in an identical manner. They provide less functionality but faster access to the spatial data for the purpose of viewing and identifying features.

Contents	Preview	Description
Name		
	ImageServices	
	SingleLayers	
	Test	
	Utilities	
	AFRIGIS_Boundaries	
	AFRIGIS_Boundaries	
	AFRIGIS_Location	
	AFRIGIS_Location	
	AFRIGIS_Planning_Cadastre	
	AFRIGIS_Planning_Cadastre	
	AFRIGIS_Transportation	
	AFRIGIS_Transportation	
	AFRIGIS_Transportation_Basic	

- **Geocoding service** which may be used to find the location of addresses in the Western Cape using the dataset from HERE as part of the ELA. It is named **HERE_Composite** and is listed with the feature and map services. A point locator is also build from the AfriGIS National Address Database (NAD) and is added to HERE_Composite geocoding service.

 HERE_Composite

- **Image services** – provide access to raster image data and are available at the GIS server link [Image on spatialdatawarehouse.westerncape.gov.za](http://spatialdatawarehouse.westerncape.gov.za) (user). They include the most recent aerial photography of the Western Cape as well as the most recent SPOT satellite imagery. The names start with the custodian's acronym followed by the year and month and the projection - WebMercator.

Contents	Preview	Description
Name		
	Utilities	
	DEADP_2012_WestCoast_Webmercator	
	DEADP_2013_GardenRoute_Webmercator	
	DEADP_2015_OverbergCombined_Webmercator	
	NGI_2015_2016_Webmercator	
	NGI_50k_Topographic_Webmercator	
	SPOT_2009_Webmercator	
	SPOT_2010_Webmercator	
	SPOT_2011_Webmercator	
	SPOT_2012_Webmercator	
	SPOT_2015_Webmercator	

3.4. How do I search for a dataset in the WCG shared spatial data Inventory?

An inventory of all the WCG shared spatial data layers available at spatialdatawarehouse.westerncape.gov.za (user) can be downloaded from a link on the [WCG spatial data warehouse page](#) of the WCG Intranet. If you have trouble downloading the inventory, please send a mail to spatialdata.support@westerncape.gov.za.

The WCG Shared Spatial Data Inventory contains the name of the dataset, its custodian, a description, tags and the feature service where it may be found. The spatial datasets are ordered by the name which start with the custodian Acronym.

Dataset name	Shared Feature Service	Available as Single Layer Feature Service	Description	Tag
AFRIGIS_AddressDatabase	AFRIGIS_Location	Yes (AFRIGIS_Location)	The NAD is a comprehensive spatial database of phys. Address, NAD; Street Address; Address Point; National Address	
AFRIGIS_BoxCodeDeliveryAreas	AFRIGIS_Boundaries		A proposed delivery area for Box codes as link to the A Box code; Delivery areas; Boundaries	
AFRIGIS_DistrictCouncils	AFRIGIS_Boundaries	Yes (AFRIGIS_Boundaries)	This dataset is an official district municipality layer as Districts, District Council; District Municipality; Boundaries; Ad	
AFRIGIS_Erven	AFRIGIS_Planning_Cadastre	Yes (AFRIGIS_Planning)	The cadastre is a register of the surveyed property bou Erven, Land Parcel; Stand; Erf; Planning_Cadastre; Cadastre	
AFRIGIS_FarmPortions	AFRIGIS_Planning_Cadastre	Yes (AFRIGIS_Planning)	The Farm Portions is a register of the sub-divided farm Farm Portions; Farms; Planning_Cadastre; Cadastre	
AFRIGIS_Farms	AFRIGIS_Planning_Cadastre	Yes (AFRIGIS_Planning)	The Farms is a register of the surveyed historic farm b; Farms; Historic Farms; Planning_Cadastre; Cadastre	
AFRIGIS_GatedCommunities	AFRIGIS_Planning_Cadastre	Yes (AFRIGIS_Planning)	A Western Cape layer of gated communities displaying Gated communities; Planning_Cadastre; Cadastre	
AFRIGIS_LocalMunicipalities	AFRIGIS_Boundaries	Yes (AFRIGIS_Boundaries)	This dataset is an official municipality layer as suppli Local Municipality; Boundaries; Municipalities; Administrative	
AFRIGIS_LocalMunicipalities_PreSep2016	AFRIGIS_Boundaries	Yes (AFRIGIS_Boundaries)	This dataset is an official municipality layer as suppli Local Municipality; Boundaries; Municipalities; Administrative	
AFRIGIS_MagisterialDistricts	AFRIGIS_Boundaries	Yes (AFRIGIS_Boundaries)	This dataset is an official magisterial district layer as Magisterial Districts; Boundaries; Magisterial boundaries; Ad	
AFRIGIS_ParksCadastre	AFRIGIS_Planning_Cadastre	Yes (AFRIGIS_Planning)	The cadastre is a register of the surveyed parks in the Parks; Cadastre; Open areas; Planning_Cadastre	
AFRIGIS_PointsOfInterest	AFRIGIS_Location		A notional layer with literally thousands of points divi Points of Interest; Location; Social statistics	
AFRIGIS_ProvincialBoundary	AFRIGIS_Boundaries	Yes (AFRIGIS_Boundaries)	This dataset is an official province layer as supplied t Boundary; Province; Boundaries; Administrative Boundaries	
AFRIGIS_SectionalSchemes	AFRIGIS_Planning_Cadastre	Yes (AFRIGIS_Planning)	Point layer of the sectional schemes as registered at Sectional Schemes; Complexes; Sectional Titles; Duet houses	
AFRIGIS_SGAdminAreas	AFRIGIS_Boundaries		This layer shows Admin boundaries as determined by Admin Areas; Boundaries; Registration Division; Major Region	

Finding a dataset in the WCG Shared Spatial Data Inventory

1. To find the spatial data you are looking for, you can use the data filter of the Tag column by clicking on the down arrow at the bottom right-hand corner of the green Tag column heading block.
2. The most powerful way to filter is to choose the "Text filters" option and then "Contains..."

The screenshot shows the 'Tag' column header with a dropdown arrow. The dropdown menu is open, showing various filtering options. The 'Text Filters' option is selected, and a sub-menu is visible with options like 'Equals...', 'Does Not Equal...', 'Begins With...', 'Ends With...', 'Contains...', 'Does Not Contain...', and 'Custom Filter...'. The 'Contains...' option is highlighted.

3. In the popup window enter the name of a tag you are looking for e.g. *Farm* and click OK or press Enter. You can expand the search by searching a second term. If And is selected, both strings of text must be in the Tag, and if you select Or, it searches for either string.

Custom AutoFilter

Show rows where:

Tag

contains [Farm]

☒ And ☐ Or

Use ? to represent any single character
Use * to represent any series of characters

OK Cancel

4. All the datasets with the word Farm in the Tag column will be displayed.

	D	E	F	G	H
	Dataset name	Shared Feature Service	Available as Single Layer Feature Service	Description	Tag
11	AFRIGIS_FarmPortions	AFRIGIS_Planning Cadastre	Yes (AFRIGIS_Planning	The Farm Portions is a register of the sub-divided farm	Farm Portions; Farms;Planning_Cadastre,Cadastre
12	AFRIGIS_Farms	AFRIGIS_Planning Cadastre	Yes (AFRIGIS_Planning	The Farms is a register of the surveyed historic farm b	Farms; Historic Farms;Planning_Cadastre,Cadastre
64	SG_PLANNING_CADASTRE_FarmPortions	SG_Planning cadastre	Yes (SG_Planning_Cade	An area of land subdivided from the parent farm and t	Farm Portions; Farms;Planning_Cadastre,Cadastre; Surveyor G
65	SG_PLANNING_CADASTRE_Farms	SG_Planning cadastre	Yes (SG_Planning_Cade	The aggregation of all the surveyed farm portions and	Farms; Historic Farms;Planning_Cadastre,Cadastre; Surveyor C
13					
16					

5. Choose the dataset you wish to use by consulting the description column entry.
6. Locate the feature service which contains it as a layer by consulting the shared feature service column entry.

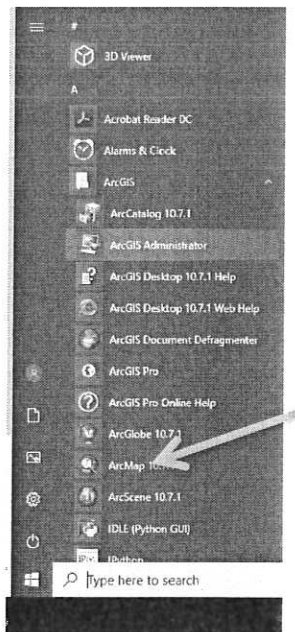
See below for information on using feature, map and image services.

Please note:

If there is spatial data you need to use from another WCG department, National Government or an external organisation it must be made available as a WCG shared spatial data resource. For information on how to request a shared spatial data resource, please see section 5 *Data acquisition and data dissemination*.

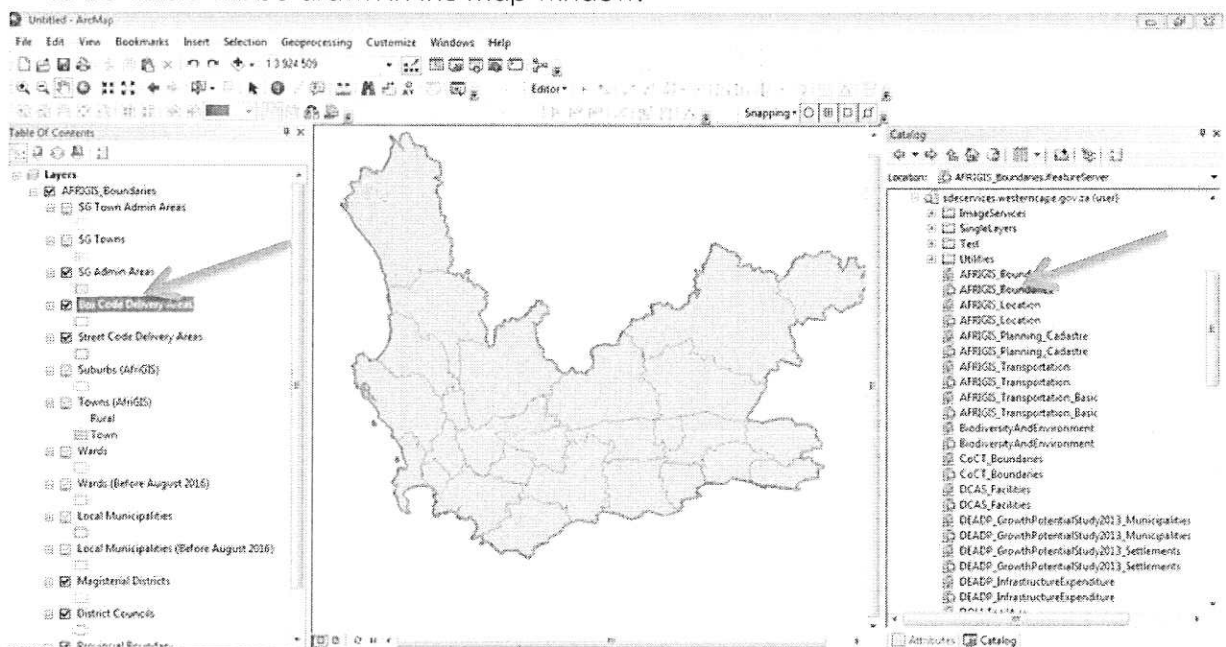
3.5. How do I use the WCG shared spatial data resources as feature, map or image services?

Open ArcMap by selecting **Start >>ArcGIS >>ArcMap**

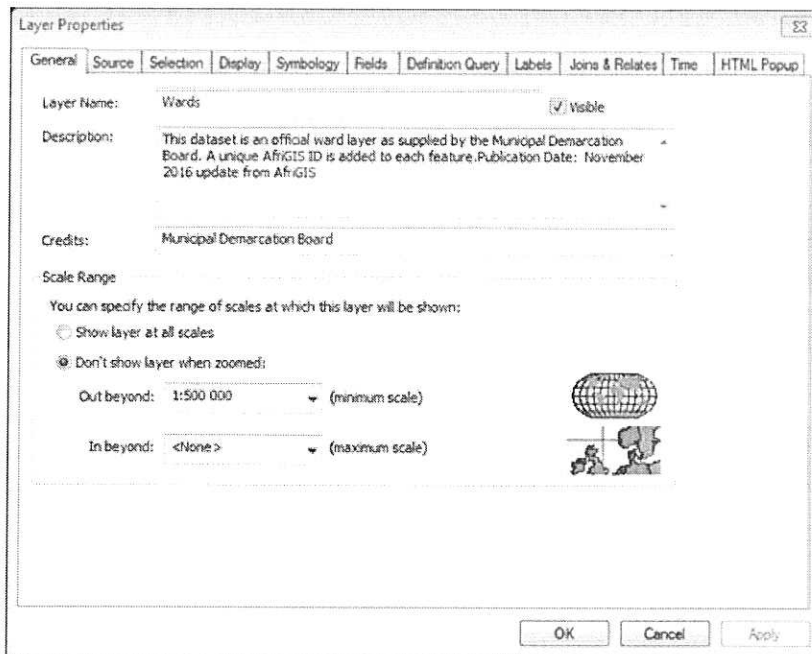


3.5.1. Using a feature service

- 1 Open the GIS Servers in the Catalog window and expand **server on spatialdatawarehouse.westerncape.go.za (user)**.
- 2 Select a feature service that you wish to use by dragging it onto the map. In this example the feature service **AFRIGIS_Boundaries** will be used.
- 3 The layers in the feature service will appear in the contents window and those that are set to be visible will be drawn in the map window.



- 5 Double clicking one of the feature service's layers will open its Layer Properties window.

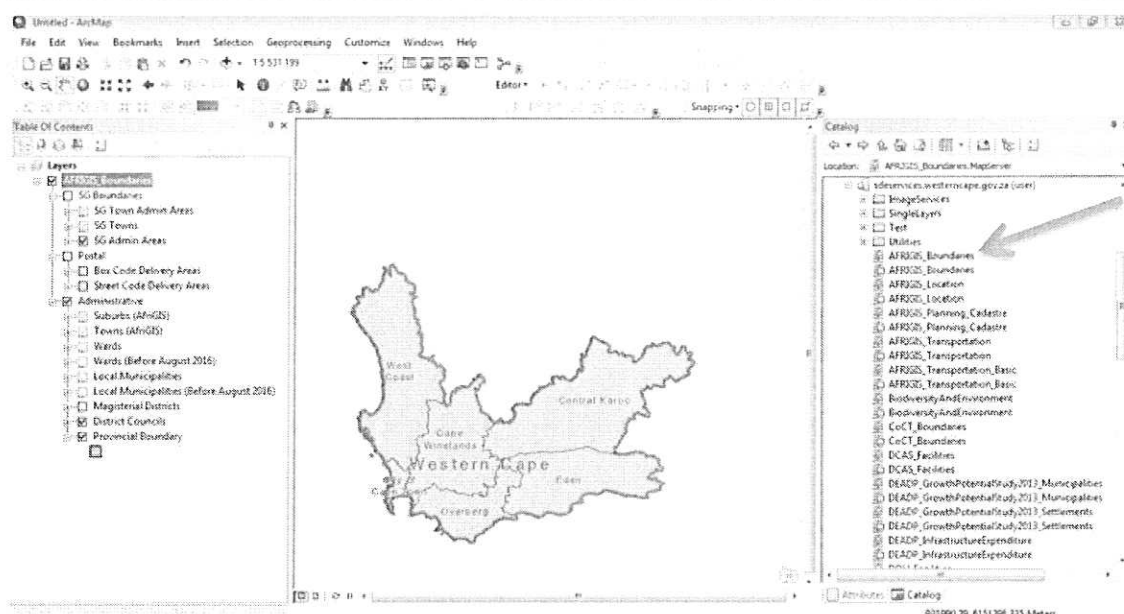


Notice the following:

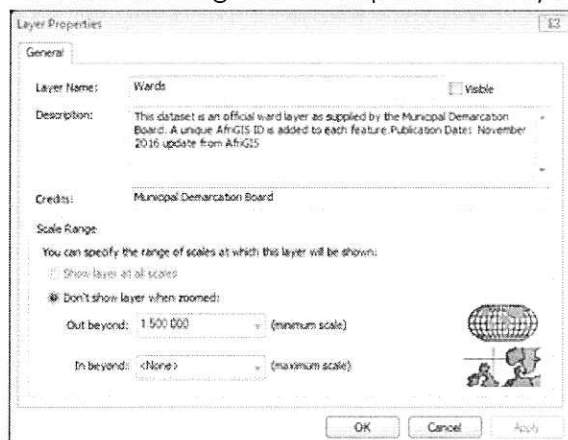
- You have the full set of properties that are available when the feature class is stored locally except editing the data which will require them to be extracted. Please see **4.9 Best practice example of how to edit the geometry and attribute table fields of a feature class**
- Summary metadata and the publication date of the dataset is provided in the Description box of the General tab of the Layer Properties window.
- The order of the layers in the layer list of the Table of Contents may be changed by dragging a layer to another position or the layer can be removed by right-clicking and clicking **Remove**.

3.5.2. Using a map service

- 1 Open the GIS Servers in the Catalog window and expand server on *spatialdatawarehouse.westerncape.go.za (user)* link.
- 2 Select a map service that you wish to use by dragging it onto the map. In this example the map service *AFRIGIS_Boundaries* is used.
- 3 The layers in the map service will appear in the contents window. The layers that are set to be visible will be drawn in the map window.



- 4 Double clicking one of map service's layers will open its Layer Properties

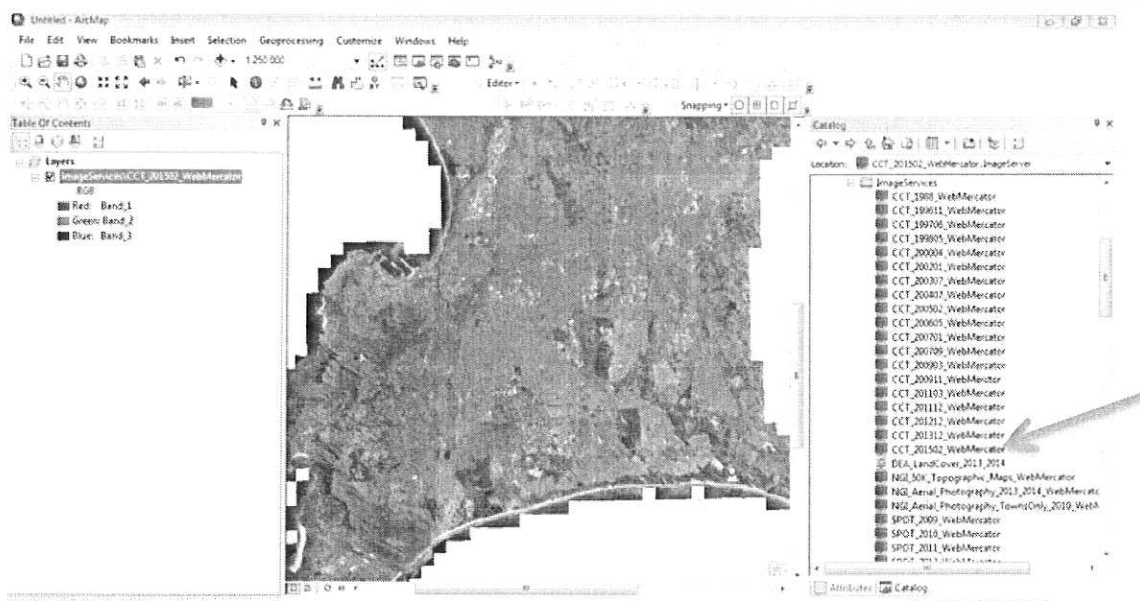


Notice the following:

- The layers are displayed in a different manner to a feature service in the layer list which may need to be expanded to see all the layers it contains. They also cannot be rearranged or removed.
- Only the General tab is available in the layer properties window showing the Description box with its summary metadata.
- A map service provides fixed symbology for its layers and are meant to be used only for viewing and identifying the features they contain.

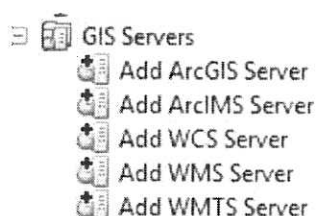
3.5.3. Using image services

- 1 Open the GIS Servers in the Catalog window and expand **image on spatialdatawarehouse.westerncape.go.za (user)** link.
- 2 Drag the image service of your choice onto the map in this example the service CCT_201502_WebMercator is shown which contains the city of Cape Town's aerial photography from 2015

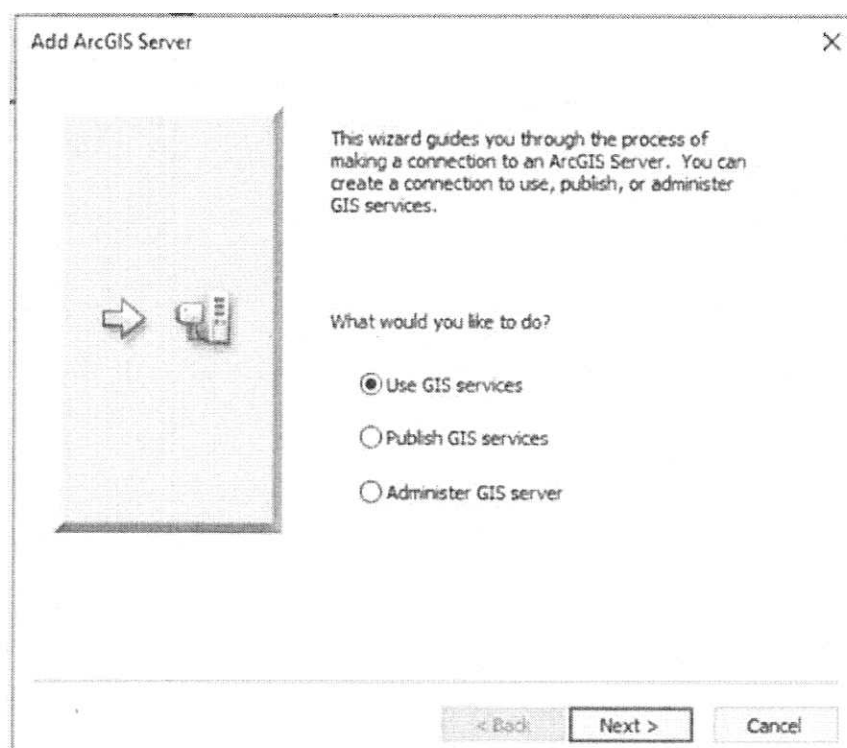


3.6. How do I add additional GIS Server links

1. Open ArcGIS Catalogue
2. Click on "Add a GIS Server" to Open the "Add ArcGIS Server wizard"



3. On the first screen select User and click Next



4. Add the URL of the GIS server you wish to add it should look something like this <https://spatialdatawarehouse.westerncape.gov.za/server/services>

General

Server URL:

ArcGIS Server: http://gisserver.domain.com:6080/arcgis

Authentication (Optional)

User Name:

Password:

☒ Save Username/Password

[About ArcGIS Server connections](#)

< Back Finish Cancel

5. Click Finish to create the GIS Server link and double click on the new GIS Server link to access the spatial data it contains.

3.7. Useful GIS server links

You may add the following GIS server links to access data

WCG spatial data warehouse

This is added to all installations of ArcGIS Desktop and consists of a GIS Server link for vector data

<https://spatialdatawarehouse.westerncape.gov.za/server/services>

and one for imagery

<https://spatialdatawarehouse.westerncape.gov.za/image/services>

WCG's Department of Agriculture at Elsenburg

<https://gis.elsenburg.com/arcgis/services>

City of Cape Town Open Data Portal

<https://citymaps.capetown.gov.za/agsext1/services>

This link contains the aerial photography of the city

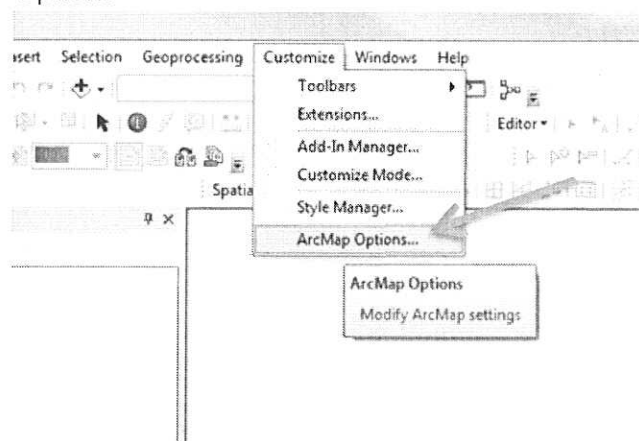
3.8. How do I use the WCG shared spatial data resources in a way that decreases map file (MXD) loading time.

Here are some useful tips to decrease the loading time of a map file (MXD) that contains WCG shared spatial data resources.

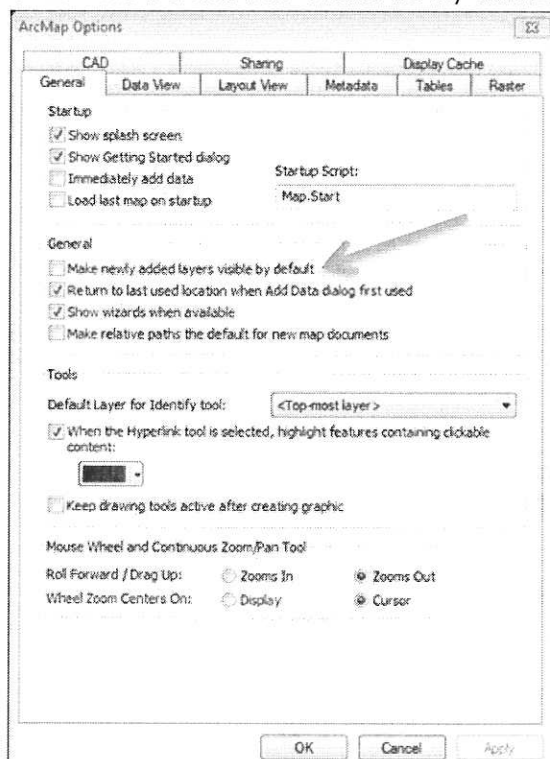
TIP 1: Set ArcMap NOT to make newly added layers visible by default

When adding feature or image services to the map you are creating in ArcMap the software by default makes all the service's layers visible. If it is a feature service with many large dataset layers or an image service it may take a while to load depending on network speed and your computer's resources. ArcMap can be set NOT to make newly added layers visible by default.

1. Open ArcMap and click the customize tab in the top menu and then select ArcMap Options



2. In the ArcMap Options window choose the General tab
3. Untick the box next to "Make newly added layers visible by default" and click OK



TIP 2: Don't save map files (MXD) with large datasets layers or imagery set to visible.

- When saving a map that contains feature services with large datasets such as Erven, image services or ArcGIS background map services set these layers not to be visible. This will save you time when next opening the map file (MXD) as it will load quickly and you can then choose which layers you wish to make visible.
- Add a simple boundary layer such as the local municipalities or wards from a feature service to each map and save the map with this layer visible. This will help you to

orientate yourself when the map opens. You can then zoom or pan to the area you wish to view and make other layers that may be slower to load, visible.

3.9. How do I geocode Western Cape addresses?

Geocoding is the process of taking an address and creating a spatial point from it. In order for the spatial location of the points to be as accurate as possible, the address data needs to be as complete and correct as it can be.

To geocode residential or business addresses, you require a street number, street name and a locality (suburb, town or city) as a minimum.

The table below highlights the minimum input required to geocode to different spatial accuracies:

Spatial accuracy	Minimum input	Example	Expected output
Building level	Street number, street name, locality (suburb, town or city)	4 Dorp St, Cape Town	A point left or right of the street centreline, at the required building entrance.
Street level	Street name, locality (suburb, town or city)	Dorp St, Cape Town	A point in the middle of the street centreline of the required street.
Locality level	Any locality like suburb, town or city	Milnerton	A point in the centre of the required locality
Point of interest	Point of interest name and locality	Cape Town City Hall	A point left or right of the street centreline outside the required point of interest but as close to the public entrance as possible.

3.9.1. Preparing the address data

Address data normally resides in a spreadsheet format and in most cases data will be collected in separate columns as shown below:

	A	B	C	D	E	F	G
1	ID	AddressLine1	AddressLine2	Suburb	Postal_Code	Province	
2	347895	14 DE LAAN	1975	BRIDGTON	6620	Western Cape	
3	140052	PARKERSTR.	91A	PARKERSDAM	6850	Western Cape	
4	363878	43 AZANIA STREET		HAPPY VALLEY	7580	Western Cape	
5	297531	C/O MAITLAND COTTAGE		KILDARE RD	7800	Western Cape	
6	219298	97 MAGNOLIA STR		BELLA VISTA	6837	Western Cape	
7	158545	46 MORAY COURT		HANOVER PARK	7780	Western Cape	
8	254539	SUIKERBOSHOF 582		BRIDGTON	6625	Western Cape	
9	806972	R 216 SITE B		SITE B	7784	Western Cape	
10	235188	27 KARNEOOL STR		HILLVIEW	7100	Western Cape	
11	266336	186 SECTION 5		WILHELMIA	7355	Western Cape	

Although the geocoding engine allows for multiple field input, experience has shown that using a single field provides better results.

Prepare your data:

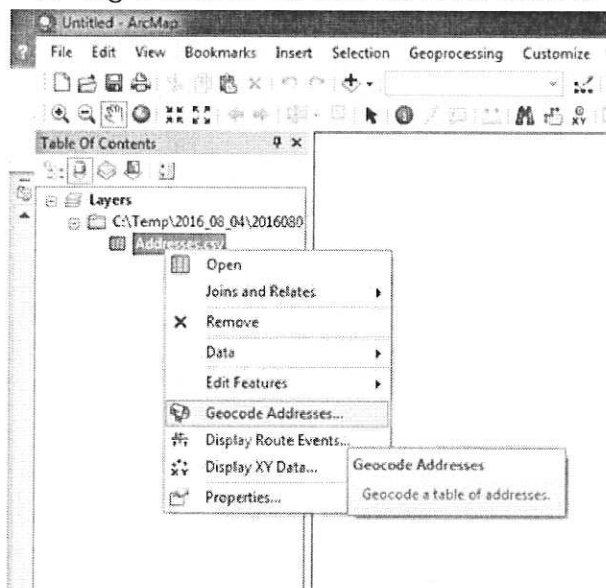
1. In your spreadsheet create a new column and call it something like **Full_Address**

JM X ✓ f =CONCATENATE(B2," ",C2," ",D2," ",E2," ",F2)						
B	C	D	E	F	G	
AddressLine1	AddressLine2	Suburb	Postal Code	Province	Full Address	
14 DE LAAN 1975	BRIDGTON	OUTDSHOORN	6620	Western Cape	=CONCATENATE(B2," ",C2," ",D2," ",E2," ",F2)	

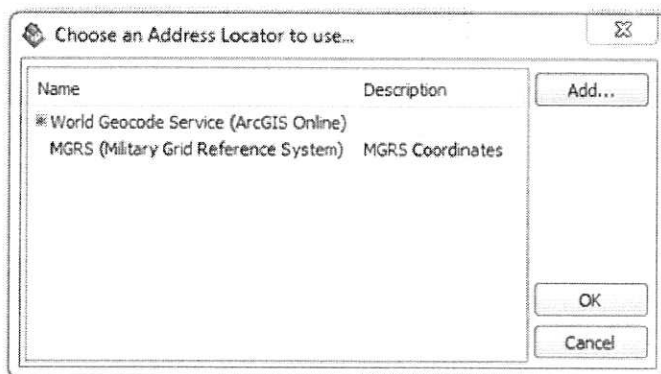
2. Create a concatenated version of you address data in this column. For Excel you can type the formula =CONCATENATE(text1,text2,text3...) making sure you separate each field with a space (" ")
3. Copy the formula down through every record in your data. A quick way is to double-click on the dot at the bottom-right of he selected cell. This will autofill the content or formula down to the next blank row in the list.
4. Save your spreadsheet as a .CSV (Comma delimited) file.

3.9.2. Add your data to ArcMap and create points

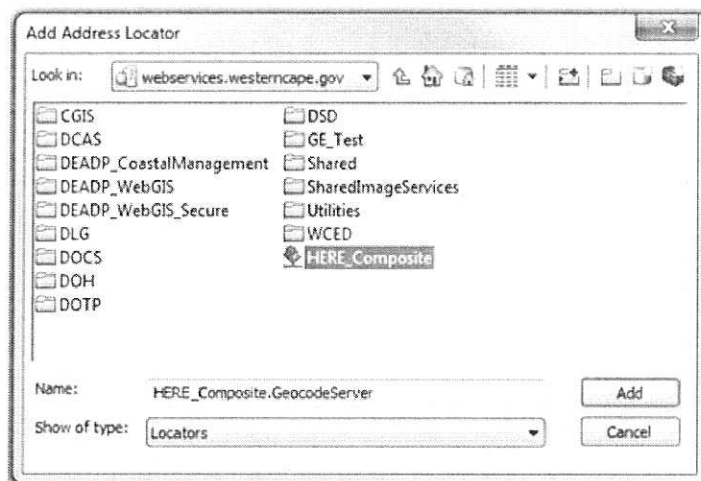
1. In ArcMap add your CSV file to the table of contents.
2. Right click on the CSV file in the table of contents and choose **Geocode addresses**



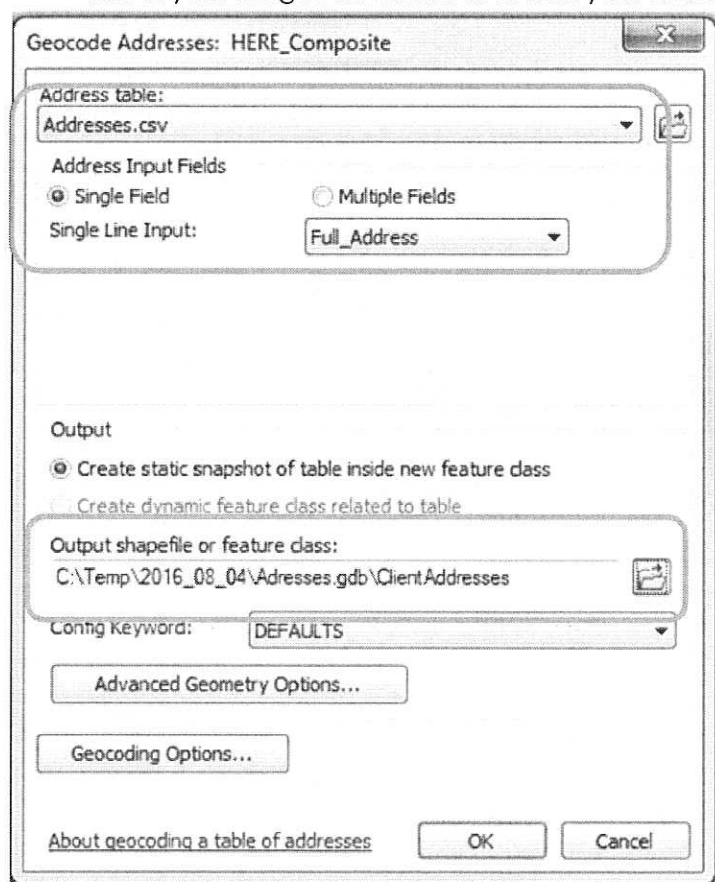
3. The address locator manager window opens and asks you to choose the address locator to use.



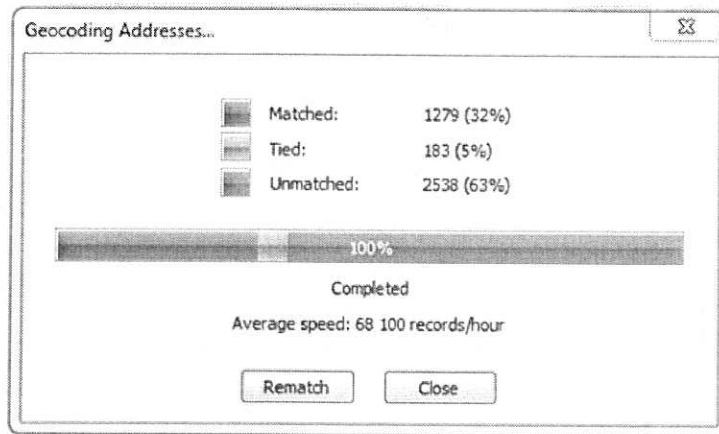
4. Click **Add...**
5. Navigate to [GIS Servers/spatialdatawarehouse.westerncape.gov/HERE_Composite](https://gis.servers.spatialdatawarehouse.westerncape.gov/HERE_Composite) and click **Add**



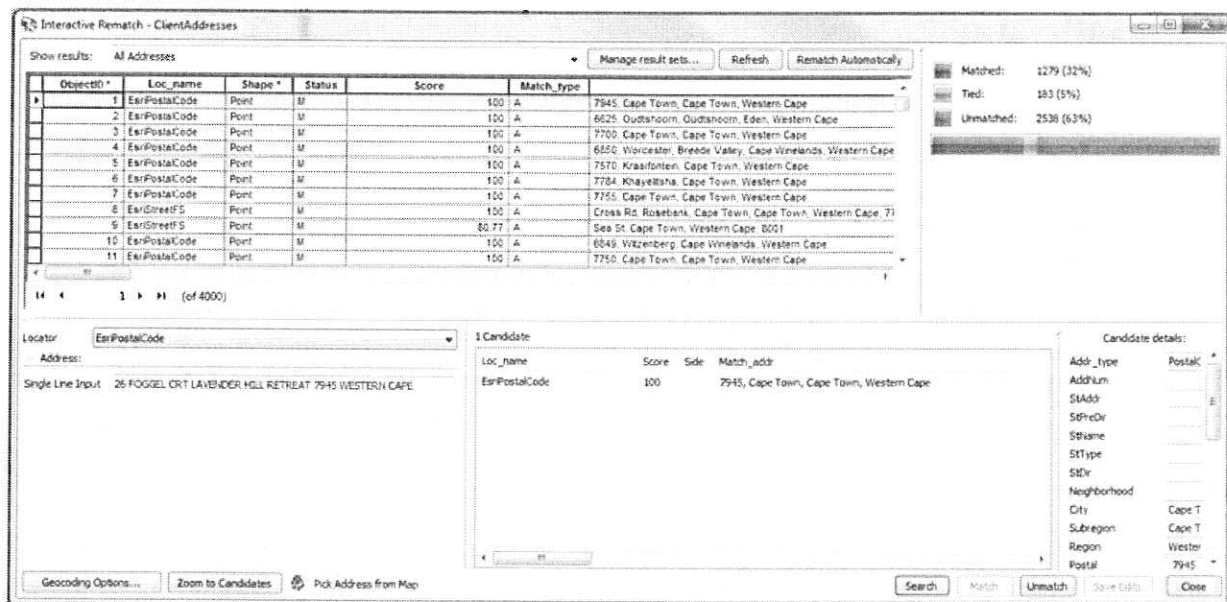
6. The HERE Geocoding engine is added to the locator manager window. Click **OK**
7. In the next window, select **Single Field** as your address input fields and map the Single Line Input to your concatenated field name (in this case Full_Address). Provide an output feature class. Click **OK**. Hint: It is better to create a feature class in a file Geodatabase than using a Shape file. In the Saving Data pop up box choose "File and Personal Geodatabase feature classes" in the Save As type dropdown list. Then select your file geodatabase and add your feature class name.



8. The geocoding progress window appears. The progress window provides information on the number of records matched, tied and unmatched as well as an estimated completion time. This will depend on the number of records you are trying to geocode.
9. Once the geocoding is complete, you will be provided with a result window



10. Click on **Rematch**



11. The Interactive Rematch window opens (you can also open this window by right-clicking on your geocoding result layer in the **Table of Contents** and selecting **Data** and then **Review/Rematch Address**).

12. In this window you are able to look at unmatched records, tied records and matched records using the different **Show Results** filter options at the top.

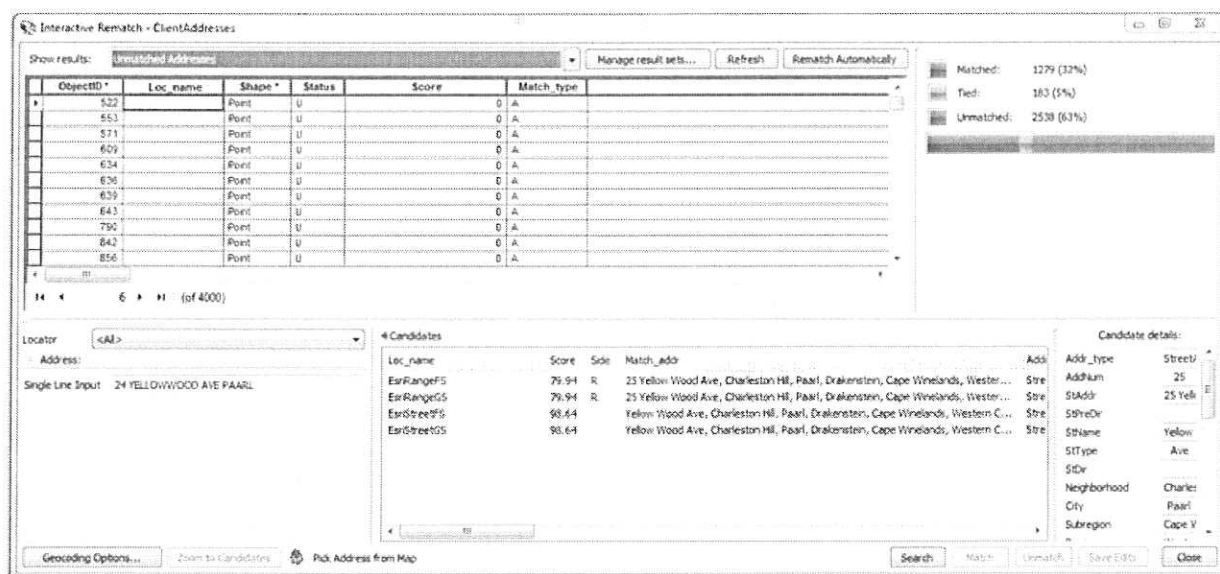
13. The spatial accuracy of the matched and tied data are also provided in the **Loc_name** field, the spatial hierarchy is as follow:

- PointAddress
- RangeAddress
- StreetAddress
- Locality
- Postcode

14. Using the Show results: dropdown, select Unmatched Address

15. You now have the opportunity to review the unmatched addresses and change the Single Line Input to a more appropriate address that can be located. In the example below the original input address was:

"PROSNO-030 0018491 6 24 YELLOWWOOD AVE NEW ORLEANS ;PAARL 7464 WESTERN CAPE"
Changing it to "24 YELLOWWOOD AVE PAARL" allows you to pick one of the suggested addresses.



16. Select the most suitable candidate and click **Match**.

17. You can now continue reviewing the rest of your addresses.

Please note:

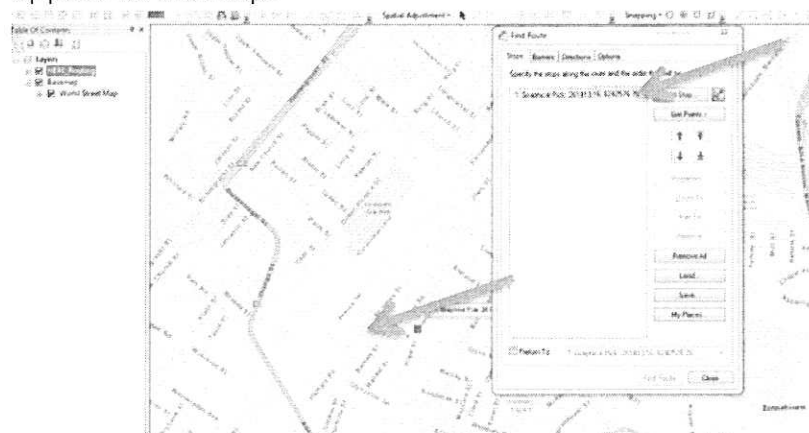
An address that returns a matched status could be incorrect as there is a small possibility that it could have matched to a very similar address (false positive). It is best practice to review at the minimum a sample of your matched addresses to ensure data integrity.

3.10. How do I use the routable network?

The shortest possible route between two or more points on a map located in the Western Cape can be calculated using the network analysis service called HERE_Routing.

Here are some simple steps to show how it works.

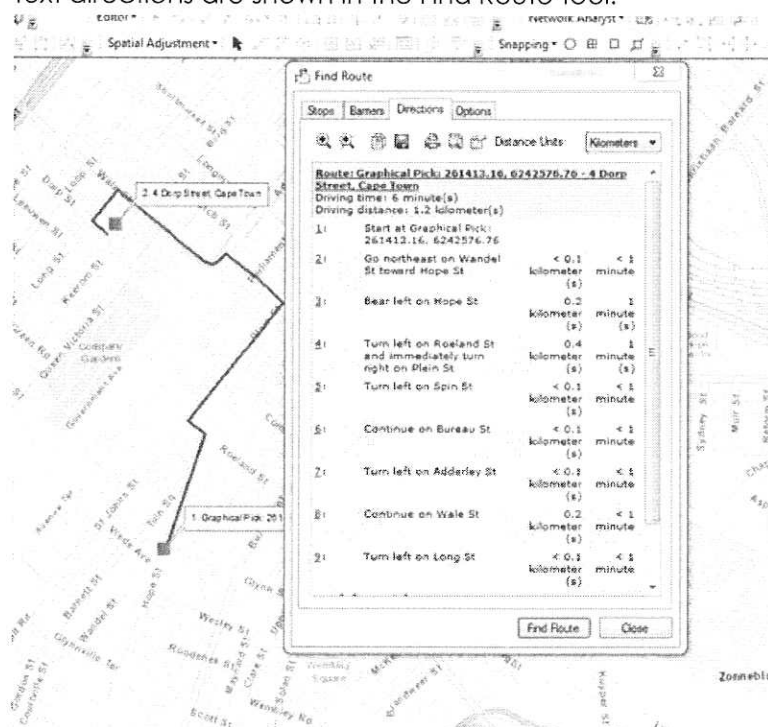
1. In the Catalog window of ArcMap expand the GIS server spatialdatawarehouse.westerncape.gov.za.
2. Find the Network Analysis service called HERE_routing and drag it onto the map.
3. Add the ESRI Streets background map so that you can orientate yourself.
4. Open the Find Route tool and click on the Select Point tool which is next to the "Add stops" button.
5. Click on the map where you want to start your journey, a green square will appear on the map.



6. Either click on the map to indicate your destination or click "Add Stop" to open the Find tool.
7. Enter an address in the text box for single line input and click the Find button.
8. In the results pane right-click on the entry which corresponds best to the address you entered and then click on "Add as stop to Find Route" and a second green square will appear on the map.



9. Click on "Find Route" and the shortest route from the starting point to the address entered as a destination will be shown on the map as a green line. The text directions are shown in the Find Route tool.



4. Creating spatial data, metadata and quality assuring data

4.1. WCG Spatial Data Lifecycle Process

The process which should be followed to create spatial data is illustrated in Figure 4.1 The WCG Spatial Data Lifecycle Process.

Please note

The WCG Spatial Data Lifecycle Process is for the creation of datasets for which the WCG can be considered either the custodian or owner.

- **Step 1:** The GIS practitioner creates or updates spatial data set (e.g. a feature class in a file geodatabase).
- If the dataset is of a sensitive nature and cannot be shared generally with all other GIS users in their department, the dataset should remain on the computer of the creator of the dataset.
- **Step 2&3:** The dataset can be shared with colleagues in the department it should be named according to the WCG spatial data naming conventions and uploaded to the departments QA SDE. Please see **4.5 What are the conventions for naming a newly created feature class and its attribute fields?**
- **Step 4:** If it is a new dataset the WCG Extended Metadata Style must be used to capture all the required metadata elements for the dataset.
- **Step 5:** If it is an existing dataset which is being updated the WCG Extended Metadata Style must be used to update the required metadata elements for the dataset.
- **Step 6:** For existing datasets the previous version should be archived in the departments production SDE by renaming it as follows ARCHIVE_[dataset name]_[Date in format YYYYMMDD] e.g. ARCHIVE_DOH_EMSSFacilities_20171028.
- **Step 7:** Upload the new data set to the department's production SDE.
- If the dataset cannot be shared with users outside the department it should remain in the departments Productions SDE.
- If it can be shared with the whole WCG send an email to SpatialData.Support@westerncape.gov.za so that the data can be QA'd and shared as a feature and map service in the server on spatialdatawarehouse.westerncape.gov.za (user) GIS server link.

WCG Spatial Data Lifecycle process

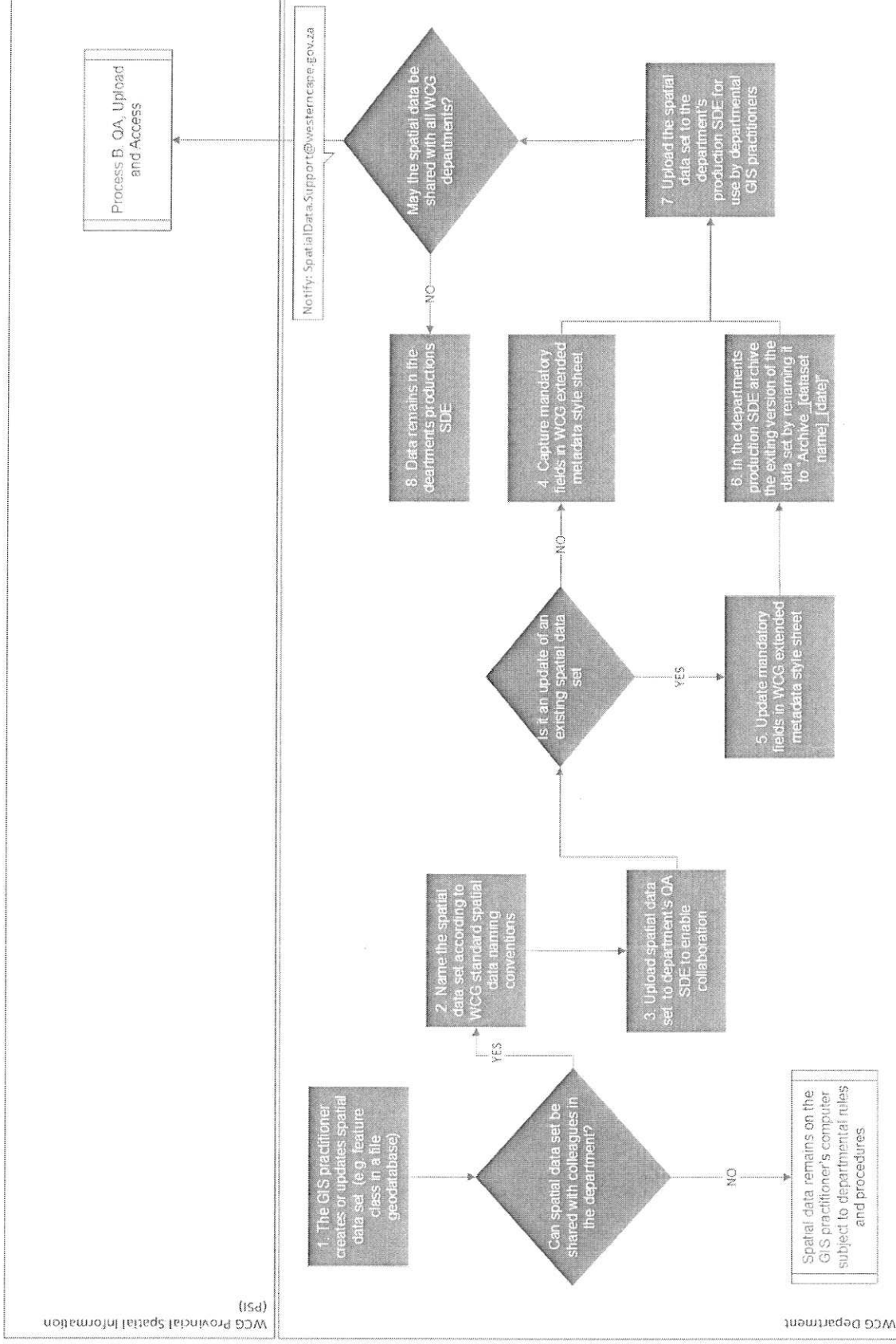


Figure 4.1. WCG Spatial Data Lifecycle process

4.2. In which file format should I save the spatial dataset I create?

Spatial data should be saved in ESRI supported spatial formats preferably a feature class in a file geodatabases, your departmental SDE or Shape files.

Table data may be uploaded and exported as:

- **.XLS** file format i.e. Microsoft Excel 97-2003 format or
- **.CSV** file format comma separated value file which is commonly used by most databases including Excel spreadsheets

Please note

XLSX file format of Microsoft Excel 2013 cannot be read by legacy ArcGIS Desktop 10 the file should be converted to .XLS or .CVS file formats.

4.3. What is the official WCG projection?

Data should have fully defined coordinate reference systems readable by ESRI software (shapefiles must have the PRJ file present). If this is not possible, the coordinate reference system should be fully defined in the metadata supplied with the data.

Unprojected (geographic) is where latitude (Y-coordinate) and longitude (X-coordinate) will be specified in degrees of arc, and projected is where X and Y coordinates will normally be specified in metres.

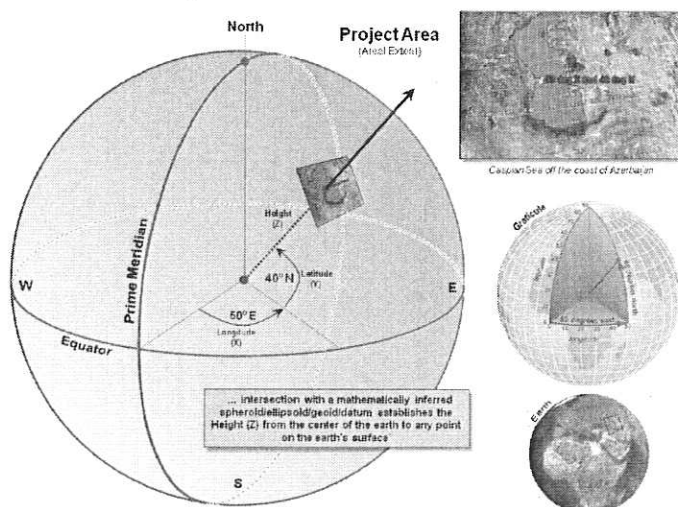
Coordinate Reference System

Datum: WGS 1984

Projection: UTM 34 S

The spatial reference for data to be shared should be projected in UTM34S.

In ArcGIS projected datasets, X-coordinates generally define the distance from the central meridian, Y-coordinates generally define the distance from the equator and Z-coordinates define the height above mean sea level.



Remember for all places in the Western Cape, Longitude will always be positive, and latitude will always be negative.

4.4. How should measurements be captured when creating WCG spatial data?

4.4.1. Standards for attribute data

Some common field types are shown in table 4.1.

Table 4.1 Common attribute table field types

Field type	Description
Text fields	Normally limited to 50 characters, except for descriptions which may be longer
Numeric fields	All numbers, including currency (unit of measure is specified separately)
Date fields	Dates are entered in the following format (YYYY-MM-DD)
Selection fields	Drop down with pre-set list of selectable options (text or numeric)
Multi-selection	Drop down with pre-set selectable options (user can select more than one)
File	Question type where the upload path for a document is specified

4.4.2. Units of measurements

Coordinates

The standard for incorporation into a spatial database is decimal degrees of latitude and longitude. Data supplied in decimal degrees should contain at least 6 decimal places to ensure accuracy to one metre. No zero values may be used as significant digits to make up the 6 values.

Example:

Latitude: 34.252833°S expressed as -34.252833

Longitude: 18.176889°E expressed as 18.176889

If the raw data coordinates are in degrees, minutes and seconds format the data should be converted to Decimal Degrees. Data in degrees, minutes and seconds format should contain at least two decimals of a second to ensure accuracy to one metre.

Example

Latitude: 34°15'10.24"S (should be expressed as -34.252833)

Longitude: 18°10'36.83"E (should be expressed as 18.176889)

Height

Elevation must be given in metres above mean sea level. Where data is captured from sources using other units of measure this must be specified in the metadata.

Distance

Distances must be given in metres (m) or kilometres (km).

Area

Areas must be given as Hectares (Ha) or square kilometre (km²).

Temporal Attributes

The standard for date and time is as follows:

Date

Dates must be given in the sequence year, month, day: YYYYMMDD

Example 19 December 2017 would be written as: 20171219

Time

Time must be given in the sequence hour, minute, second, in a 24-hour clock format.

Example 23 seconds after 6:30 pm would be written as: 18:30:23

Note: "dashes" and "colons" may be used as separators for date and time respectively, with a space between the date and time parameters: YYYY-MM-DD HH:MM:SS

If the date and time parameters are part of other attributes, the same rules apply.

4.5. What are the conventions for naming a newly created feature class and its attribute fields?

4.5.1. Naming conventions for feature classes:

Feature class names must follow the format:

[Custodian]_[Grouping]_[Description]

- The **custodian** must be the official acronym of your department using upper case letters these are listed in section below.
- The **grouping** must be one word, a noun starting with an uppercase letter and containing only the letters A-Z or numbers 0-9 (No other special characters @!#\$% etc.).
- The **description** must be no more than six words, adjectives and nouns each starting with an uppercase letter and containing only the letters A-Z or numbers 0-9 (No other special characters @!#\$% etc.).
- Between each of these section above must be an underscore "_".

Examples:

DSD_Demographics_SocioEconomicIndex

DCAS_Facilities_Libraries

The following abbreviations should be used for WCG Departments:

DCAS - Department of Cultural Affairs and Sport

DEADP - Department of Environmental Affairs and Development Planning (Please note that although the official abbreviation is DEA&DP the ampersand "&" should left out as it may cause anomalous behaviour in the ESRI software.)

DEDAT - Department of Economic Development and Tourism

DHS - Department of Human Settlements

DLG - Department of Local Government

DOA - Department of Agriculture

DOCS - Department of Community Safety

DOH - Department of Health

DOTP - Department of the Premier

PT - Provincial Treasury

DSD - Department of Social Development

DTPW - Department of Transport and Public Works

WCED - Western Cape Education Department

4.5.2. Naming conventions for attribute fields of feature classes.

Feature class names must follow the format:

[Word]_[Words/Numbers]

- The **first part** of the field name must be a word starting with an uppercase letter containing only the letters A-Z (NO numbers 0-9 and NO other special characters @!#\$% etc.).
- The **second part** of the field name should be a word starting with an uppercase letter and/or numbers. It must contain only the letters A-Z or numbers 0-9 (NO other special characters @!#\$% etc.).
- The first and second part of the field name may be separated by an underscore "_".
- The second part may be repeated.
- The word "None" should never be used as a field name as it causes anomalous results in the ESRI software.

Examples:

DC_Name

SP_Code

NoEnergy1

StreetAddress

EmailAddress1

4.6. What is the prescribed minimum metadata that must be captured for WCG spatial data?

4.6.1. WCG Concise Metadata Standard

The prescribed minimum metadata for spatial datasets for which the WCG is **NOT** the owner or custodian adheres to minimum requirements of the Denver Core standard. The Denver Core standard or Metadata-lite is considered a minimum searchable set of metadata elements that must always be present in any form of metadata. These basic elements are shown in table 4.1 and can be captured and viewed using the WCG Concise Metadata Style.

Table 4.1 WCG Concise Metadata Standard elements

Elements requiring input
• Title: Name or title of dataset, name by which the cited resource is known. • Description/Abstract: A narrative summary of the content of the resource. • Summary/Purpose: One-line description of the dataset, summary of the intentions with which the resource was developed, summary of the data's content. • Tags: Descriptive keywords • Credits: Recognition of those who created and contributed to the resource. Can be the owner of the data. • Use Limitation: A short statement describing general, legal and/or security limitations on the usage of the data, limitations affecting the fitness of use of the resource, e.g. license agreements or navigational suitability such as "Not to be used for navigation."

• Published Date: Reference date for cited resource (yyyy-mm-dd)
Elements automatically capture by ArcGIS
• Feature Type: Point, Line, Polygon, Raster • Bounding Box: Extent information of dataset- Minimum bounded rectangle (MBR) (decimal degrees)

4.6.2. WCG Expanded Metadata Standard:

The metadata for spatial data for which the WCG is the owner or custodian complies with the SANS 1878-1:2005 which is a South African profile based on ISO 19115. Below is a full list of all the elements which make up the standard. All the WCG concise metadata elements are included as WCG expanded metadata elements. Only some of these elements require input by the data owner the rest are captured automatically by ArcGIS or centrally by PSI when the data is shared.

The WCG Expanded Metadata Style must be used to capture or update spatial data for which the WCG is either custodian or owner. The capturing is explained below.

Table 4.2. WCG Expanded Metadata Standard elements

Elements requiring input
• Topic Category: The main theme categories associated with the dataset e.g. Farming, Biota, etc. • Resource Contact: Name, position, role and contact information of an individual at an organisation that is responsible for the resource; either <i>custodian</i> or <i>owner</i>. • Scale Resolution: Level of detail expressed as the scale of a comparable hardcopy map or chart, e.g. 1:10 000. • Lineage statement: A description of how dataset was created including data capture techniques or procedures followed to create dataset and analytical methods applied to the data. • Attribute information: The field names used in the dataset attribute table with a definition for each field. Any unique Identifier e.g. EMIS-no for schools should be indicated. • Description of extents: A text description of the geographic extent of the resource. • Maintenance: Update frequency of the resource. These are additional to the six elements also included in the WCG Concise Metadata Standard see table 4.1.
Automatically captured by ArcGIS
• Bounding box: Extent information of dataset- Minimum bounded rectangle (MBR) in decimal degrees. • File name: Name of file • Language of resource: Language used within the dataset e.g. "English" (eng).

- **Character set of resource:** Full name of the character coding standard used for the dataset e.g. utf8
- **Spatial representation:** Digital representation of spatial information in the dataset, e.g. vector, grid/raster, text.
- **Dataset format name:** Technical format of the resource. Example: TIFF, JPEG, ESRI-shape, GML etc.
- **Reference system:** Description of the spatial and temporal reference systems used in the dataset, coordinate system, map projection and datum used.
- **Geometric objects:** Object count/feature count
- **Language of metadata:** Language used for documenting metadata.
- **Character set of metadata:** Full name of the character coding standard used for the metadata set e.g. UTF-8.

These are additional to the two elements also included in the concise standard see table 4.1

Captured by PSI when data is shared

- **File identifier:** Globally unique identifier for this metadata file.
- **Metadata point of contact:** Name, position, role, and contact information of an individual at an organisation that is responsible for the metadata information.
- **Online resource:** Information about online sources from which the dataset and metadata elements can be obtained.
- **Metadata date stamp:** Date that the metadata was created or last updated (yyyy-mm-dd).

4.7. Who is responsible for complying with National regulations for WCG spatial metadata?

It is a national requirement that the metadata of all spatial datasets for whom the WCG Departments are either the custodians or owners of, be entered into the SASDI electronic metadata catalogue (EMC), which is hosted by SAEON. The WCG expanded metadata style contains all the required elements. The electronic metadata catalogue is kept updated on your behalf by PSI as part of the Data acquisition and access process. Please see 5.2.1 Data acquisition and access processes

Should you have any questions or enquiries please email SpatialData.support@westerncape.gov.za

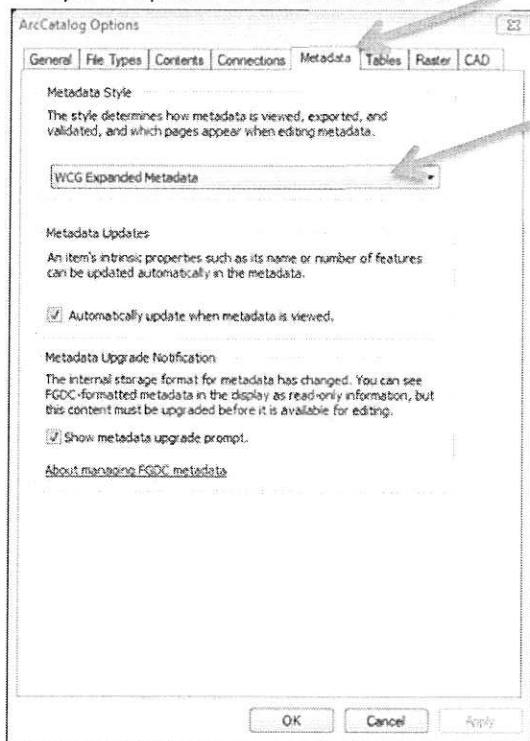
4.8. How do I capture and edit metadata for WCG spatial data?

Before you can view or edit metadata using either WCG Metadata Style (as shown below) you will need to check whether it has been implemented and activated for your ArcGIS Desktop installation.

4.8.1. Activating the WCG Metadata Style

1. Open **ArcCatalog** and click the **Customize** tab on the top menu and select **ArcCatalog Options**.

2. Choose the Metadata tab in the ArcCatalog Options window.
3. Select either *WCG Concise Metadata* or *WCG Expanded Metadata* from the Metadata Style dropdown list and click OK.

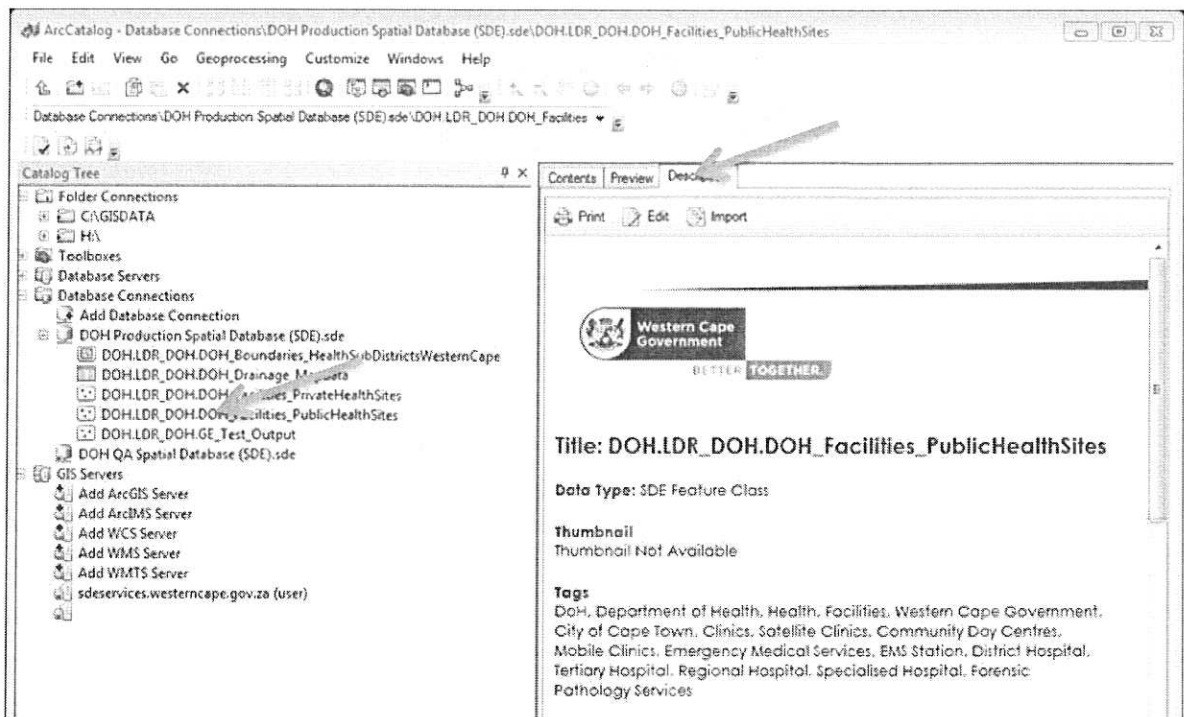


Please note

- If "WCG Concise Metadata" or "WCG Expanded Metadata" is not listed in the Metadata Style dropdown list it will need to be implemented for your ArcGIS Desktop installation.
Please see **4.8.1 Activating the WCG Metadata Style**
- If you create or update spatial data which is shared both inside or outside the WCG you **MUST** use the WCG Expanded Metadata style to capture the metadata.

4.8.2. Viewing metadata using the WCG Metadata Styles in ArcCatalog

1. To view the metadata for an item in ArcCatalog first search for the item in the Catalog tree.
2. Choose the **Description** tab of the main ArcCatalog window and the metadata for the item is shown in a metadata display page using either WCG Metadata Styles.

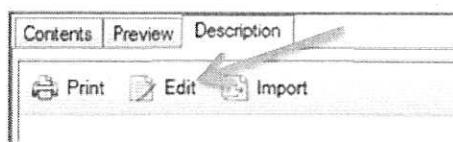


- When viewing metadata with either the WCG Concise or Expanded Metadata Style the Item Description is shown with the WCG logo at the top of the page. Only in the case of the WCG Expanded Metadata Style can all the ArcGIS metadata elements be viewed by clicking and expanding either heading at the bottom of the Item Description section.



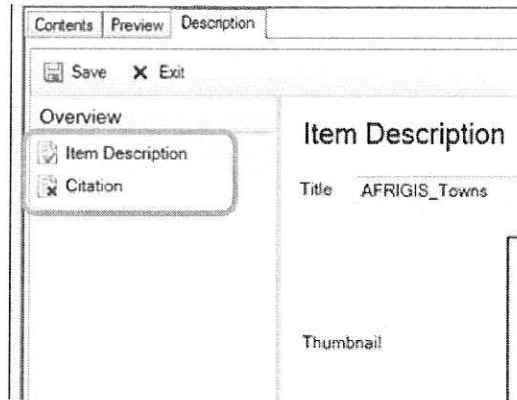
4.8.3. Editing metadata using the WCG Metadata Style in ArcCatalog

- Click on the **Edit** button at the top of the metadata sheet to open the WCG Metadata style sheet in edit mode. It opens by default on the Item Description page.

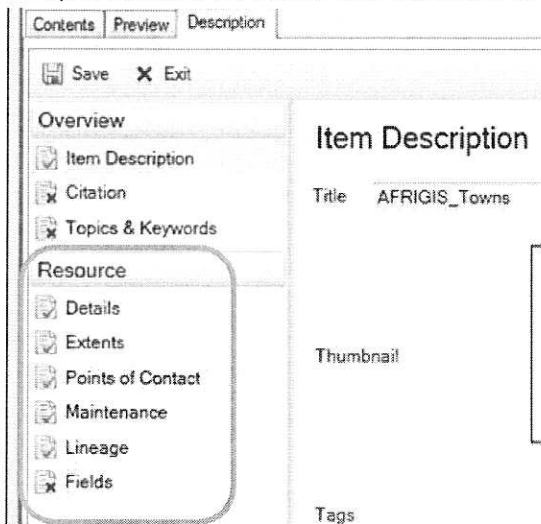


- The items that need to be completed on each of the ArcGIS metadata editing pages are described below.
 - If you are capturing metadata using the WCG Concise Metadata Style only the Item Description and Citation pages will be available as links on the left.

Remember this metadata style is for spatial data for which the WCG is **NOT** the custodian or owner. Ideally the complete metadata will be provided by the external data source owner or custodian, but on occasion data will be sourced without metadata. This is when you need to capture the metadata or refer to any metadata documents that may be stored outside the SDE.

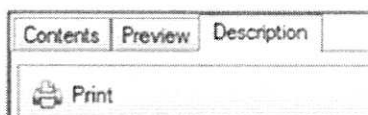


- If you are capturing metadata using the WCG Expanded Metadata Style there are links to seven additional pages on the left. Each of these has one or two items which need to be completed (see below). Remember this **MUST** all be completed for spatial data for which the WCG **IS** the owner or custodian.



Please note

- If you can only see the Print button and not the Edit and Import buttons it means that you do have editing rights to the item and cannot edit its metadata.



Item Description page

1. You can now add or edit the item description information in the boxes provided, these are:

- **Title:** The name of the dataset is automatically added here and you should check that the item complies with WCG naming standards. Please see *4.5 What are the conventions for naming a newly created feature class and its attribute fields?*
- **Thumbnail:** Not mandatory, but you may upload an image of the dataset to give users an idea of what it would look like on a map.
- **Tags:** Add a few descriptive key words for the item separated by commas. These tags are used when people search for your data. The tags aid data discoverability. See 10.4 List of tags and keywords (words are separated by a comma)
- **Summary (Purpose):** Add a short description of the dataset and its purpose.
- **Description:** Give a more detailed description of the dataset and how it was created.

If there is an associated report which is available on the WCG Intranet or Internet site you should also add a link to it here.

- **Credits:** WCG Department and the directorate or unit or the custodian.
- **Use limitation:** Add any limitations or restrictions on use of the dataset. Enter "No limitation" if there are no limitations. It may be necessary to click on the heading "New Use Limitations" to show the text box.

The screenshot shows a web-based metadata entry form. At the top, there are tabs for 'Contents', 'Preview', and 'Description'. The 'Description' tab is active. On the left, there is a sidebar with a tree view containing 'Overview', 'Item Description' (with a red X icon), 'Citation', 'Topics & Keywords', 'Resource', 'Details', 'Extents', 'Points of Contact', 'Maintenance', 'Lineage', and 'Fields'. The main content area is titled 'Item Description' and contains the following fields:

- Title:** DHS_HumanSettlements_InformalSettlement(WesternCapeDec2016)
- Thumbnail:** A placeholder box with a small thumbnail image and buttons for 'Delete' and 'Update'.
- Tags:** A text area for entering tags.
- Summary (Purpose):** Informal Settlement Database from 2016 including older settlements from 2014 not covered in the RAP 2016 study (104 settlements). So Data age range is from 2014 to 2016. Some information is outdated.
- Description (Abstract):** A rich text editor with a toolbar. The content is: Informal Settlement Database from 2016 including older settlements from 2014 not covered in the RAP 2016 study (104 settlements). So Data age range is from 2014 to 2016. Some information is outdated.
- Publication Date:** December2016
- Credits:** DoHS, NDHS, NUSP, CORC
- New Use Limitation:** A button with a plus icon and the text 'New Use Limitation'.

2. When all of these boxes have been completed, the red X next to Item Description link on the left will be replaced by a green tick, indicating that the description metadata is complete. The list of required fields with red exclamation marks next them will disappear at the top of the Item Description page.

Citation page

1. Click on the **Citation** link on the left to open the Resource Citation page which will list Publication Date as required at the top, if it has not been captured.
2. Expand the **Dates** section of the page and choose a publication date using the date selector. The red X next to the Citation menu will be replaced with a green tick and required item list at the top will disappear.

Contents Preview Description

Save X Exit

Overview

- Item Description
- Citation
- Topics & Keywords

Resource

- Details
- Extents
- Points of Contact
- Maintenance
- Lineage
- Fields

Resource Citation

Titles DHS_HumanSettlements_InfomalSettlementWesternCapeDec2016

Title DHS_HumanSettlements_InfomalSettlementWesternCapeD

Alternate Title

Collective Title

Presentation Form Digital Map

FGDC Geospatial Data Presentation Form Empty

+ New Identifier

ISBN

ISSN

Dates

Created 15

Published 2016-12-01 15 00:00:00 X

Revised 15

▼ Edition

▼ Series

Topics & Keywords page

1. Click on the **Topics & Keywords** link on the left to open the Topics and Keywords page which may list topic category as a required element at the top if one has not been captured. These Topic categories are in line with the SANS 1878 metadata standard categories.
2. Tick the box next to one or more of the items under the heading "Topic Categories" into which your data falls. The red X next to the Topics and Keywords link will be replaced with a green tick and required item list at the top will disappear.

You may also add additional keyword information here to further aid data discoverability.

Contents | Preview | Description

Save X Exit

Overview

- Item Description
- Citation
- Topics & Keywords

Resource

- Details
- Extents
- Points of Contact
- Maintenance
- Lineage
- Fields

! topic category is required

Topics and Keywords

Topic Categories

☐ Farming	☐ Military & Intelligence
☐ Biota	☐ Inland Waters
☐ Boundaries	☐ Location
☐ Atmospheric Sciences	☐ Oceans
☐ Economy	☐ Planning & Cadastral
☐ Elevation	☐ Society
☐ Environment	☐ Structure
☐ Geoscientific	☐ Transportation
☐ Health	☐ Utilities & Communication
☐ Imagery & Base Maps	

Content Type: Downloadable Data

+ New Theme Keywords

+ New Place Keywords

+ New Temporal Keywords

+ New Discipline Keywords

Resource Details page

1. Click on the **Details** link on the left to open the Resource Details page.
2. On this page it is only necessary to fill the largest scale at which the data may be accurately used which will depend on how the data was captured.
3. In the scale resolution text box type in the scale denominator e.g. 20000 or 50000. If the data is accurate to the level of building use 5000. (Spaces are not allowed.)

Contents | Preview | Description

Save X Exit

Overview

- Item Description
- Citation
- Topics & Keywords

Resource

- Details
- Extents
- Points of Contact
- Maintenance
- Lineage
- Fields

Resource Details

+ New Status

+ New Credit

Languages: English

Character Set: utf8

Spatial Representation Type: Vector

Scale Resolution: 5000

Distance Resolution: Empty

+ New Browse Graphic

Processing environment: Microsoft Windows 7 Version 6.1 (Build 7601) Service Pack

+ New Usage

Supplemental Information

Resource Extents page

1. Click on the **Extents** link on the left to open the Resource Extents page.

2. On this page it is only necessary to enter a description of the area covered by the data.
3. Click on Extent to reveal the Description text box.
4. Describe the area covered by the dataset. It is best to use an accepted geographic boundary name such as a municipality or district. If it covers the whole of the province enter "Western Cape Province". Refer to **12.4 Tags or Key Words for metadata** for more boundary names.

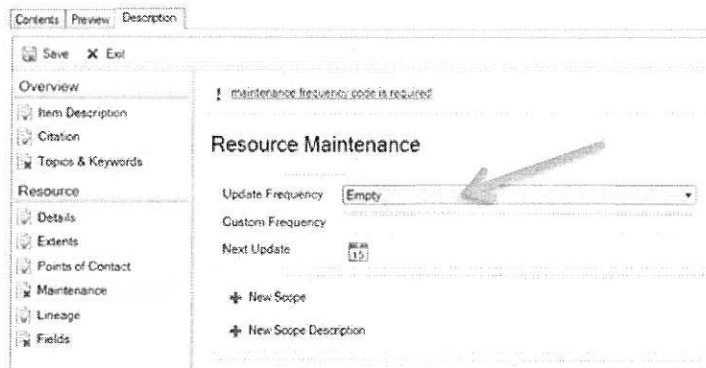
Contacts page

1. Click on the **Points of Contact** link on the left to open the Contacts page.
2. Two entries are required here, one with the role of "Point of contact" and the other "Owner" or "Custodian". Both are required even if even if they are the same person.
3. Click on "New contact" to capture the details of the person who will have the role of "Point of contact".
4. Under Contact enter your/his/her:
 - Name
 - Organisation (WCG Department)
 - Position
5. From the Role dropdown list select "Point of contact".
6. Click on Contact Information to reveal the text boxes in which to capture the person's contact details. The following items must be completed:
 - Email
 - Address
 - Phone (example: +27 21 483 XXXX)

7. Click on "New contact" again to capture the details of the person who will have the role of owner or custodian if this is someone different. Complete the information as above but choose "Owner" or "Custodian" from the role dropdown list.
8. If it is the same person as the point of contact select their name from the "Load a contact" dropdown list and click Load to load their details. Then choose "Owner" or "Custodian" from the role dropdown list.
9. Once all the items have been completed the red X next to the Points of Contact link will be replaced with a green tick and required item list at the top will disappear.

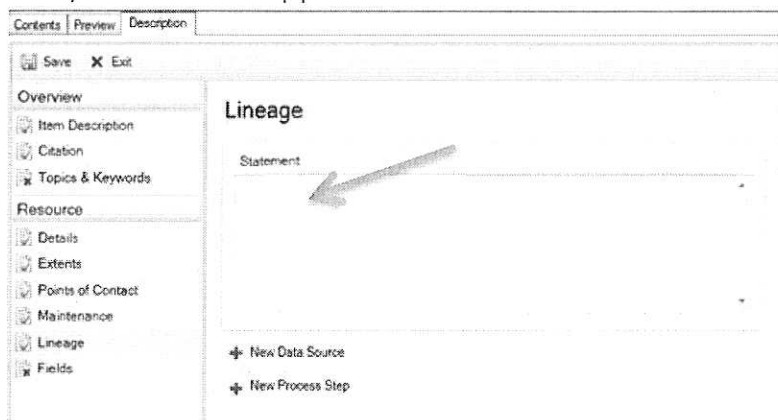
Resource Maintenance page

1. Click on the **Maintenance** link on the left to open Resource Maintenance page.
2. On this page it is only necessary to select an update frequency from the drop-down list. Once selected the red X next to the Maintenance link will be replaced with a green tick and required item list at the top will disappear.



Lineage page

1. Click on the **Lineage** link on the left to open the Lineage page.
2. In the Statement text box enter description of how the dataset was created including data capture techniques or procedures followed to create dataset and analytical methods applied to the data.



Entity and Attribute Information page

1. Click on the Fields link on the left to open the Entity and Attribute Information page.
2. Click on Details: [dataset title] to reveal all the attributes (fields) in the dataset attribute table.
3. Click on each field in turn to reveal its properties
4. For each Attribute enter a definition in the Definition text box.
5. The list of required attribute definitions at the top of the page will get shorter as definitions are added. When they are all completed the red X next to the Topics and Keywords link will be replaced with a green tick and required item list at the top will disappear.

A useful tip is to use the list of required attribute definitions as links to locate any which are still missing.

Entity and Attribute Information

Details: DHS_HumanSettlements_InformalSettlementWesternCapeDec2016

Label: DHS_HumanSettlements_InformalSettlementWesternCapeDec2016

Entity Type: OBJECTID

Attribute: Shape

Attribute: settlement_id

Attribute: campaign_year

Attribute: is_name

Label: is_name

Alias: is_name

Definition: Informal settlement name

Definition Source: Saving

Type: 55

Finally click on **Save** at the top to save your edits and return to the metadata viewing page.

4.8.4. Adding the WCG Metadata Style Sheet (Advanced)

Please note this is an advanced topic

Contact GIS.DesktopSupport@westerncape.gov.za to have this implemented for your ArcGIS installation.

The WCG Metadata Style comprises two customised components used for displaying and capturing metadata for spatial datasets in ArcGIS Desktop, these are:

- A metadata viewing template for showing the prescribe metadata elements;
- A metadata capturing and editing template for use in ArcCatalog.

In order to install the WCG Metadata Style in ArcGIS Desktop the following configuration files must be copied to the location indicated in each case, assuming that the ArcGIS Desktop "installation folder" is C:\Program Files (x86)\ArcGIS\Desktop10.2.

- File 1: and 2 WCGexp_general.xstl and WCGexp.xlst**

File copy location: [installation folder]/Metadata/Stylesheets/ArcGIS_Imports;

Description: this is the viewing configuration file, which determines the styling and formatting of the metadata description and which elements will be displayed when the metadata is viewed in ArcCatalog or ArcGIS Desktop.

- File 3: WCG_banner.jpg**

File copy location: [installation folder]/Metadata/Stylesheets/ArcGIS_Imports;

Description: this is an image file of the WCG logo, it is included at the top of metadata viewing template.

- File 4 and 5: ArGIS_ItemDescription_WCG.xls and WCGexp_ArcGIS.xls**

File copy location: [installation folder]/Metadata/Stylesheets;

Description: this is the style definition that defines how the metadata is viewed, exported and validated and which pages appear when editing metadata. This component refers to the Viewing Configuration component in a <xsl:import> tag.

- **Files 6 and 7: WCG Concise Metadata.cfg and WCG Extended Metadata**

File copy location: [installation folder]/Metadata/Config;

Description: these are the Validation Configuration files that set validation rules for the metadata elements during the capturing/editing process. This component refers to the Style Definition component in the <viewerXslt> tag.

Once the files have been copied into their respective locations, the WCG metadata stylesheet may be activated by following the steps described above.

Please note:

You may not have editing rights on your computer for the C:\Program Files (x86)\ folder. In this case you must send an email to GIS.DesktopSupport@westerncape.gov.za to ask for it to be implemented.

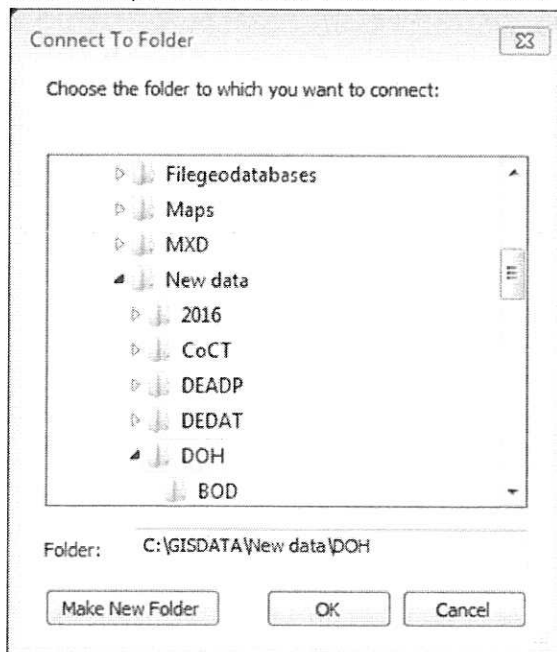
4.9. Best practice example of how to edit the geometry and attribute table fields of a feature class

In this best practice example, a polygon feature in an existing feature class is split into two polygons and their attribute fields' information is edited.

For more examples of how to edit feature classes please consult the ArcGIS Desktop help.

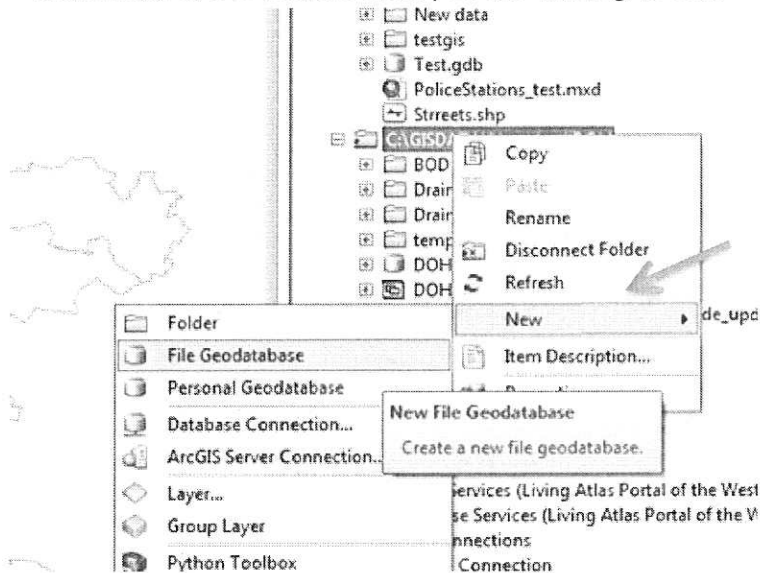
4.9.1. Creating a work environment for editing

1. Create a new folder connection to the folder on your computer where you wish to store the feature class you want to edit. Right click **Folder Connections** in the Catalog window of ArcMap and choose **Connect To Folder** then browse to a folder of your choice.

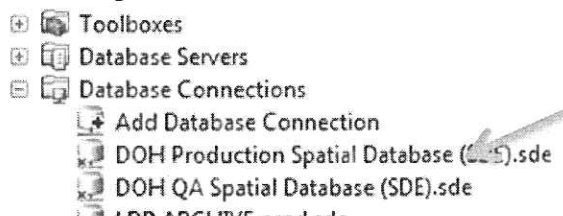


2. Create a new file geodatabase which will store your work by right-clicking your folder connection and choosing **New** and then **File Geodatabase**.

3. Give your new file geodatabase an appropriate name.
4. You can use this as a scratch patch to learn how to edit the geometry and attribute table fields of the feature class you are wishing to edit.

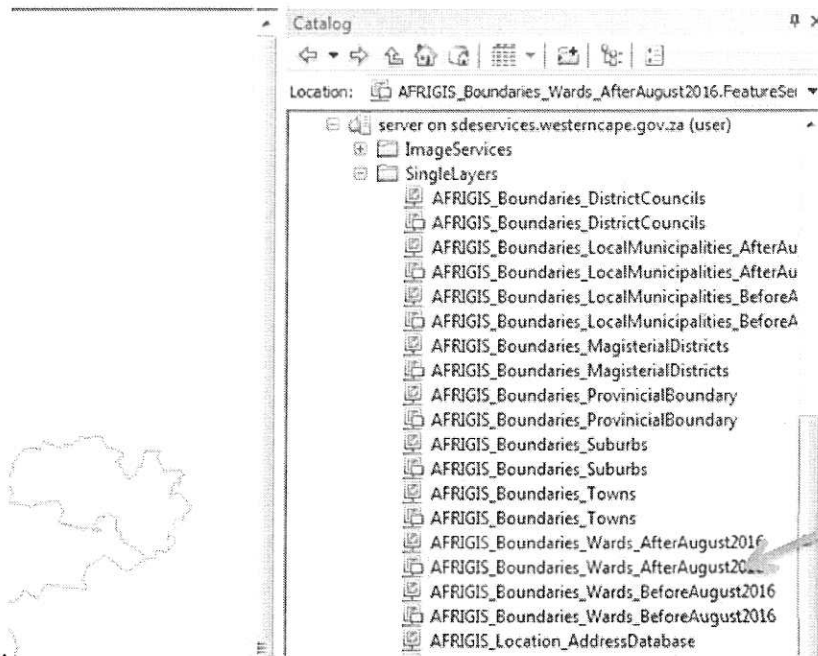


5. When you are happy with your edits and you want to share the feature class with others in your department you can copy it to your department's QA spatial database (SDE) or Production spatial database (SDE) depending on your department spatial data management procedures. These connections are added to your ArcGIS Desktop after installation and may be found by expanding the Database Connections folder in the Catalog window.

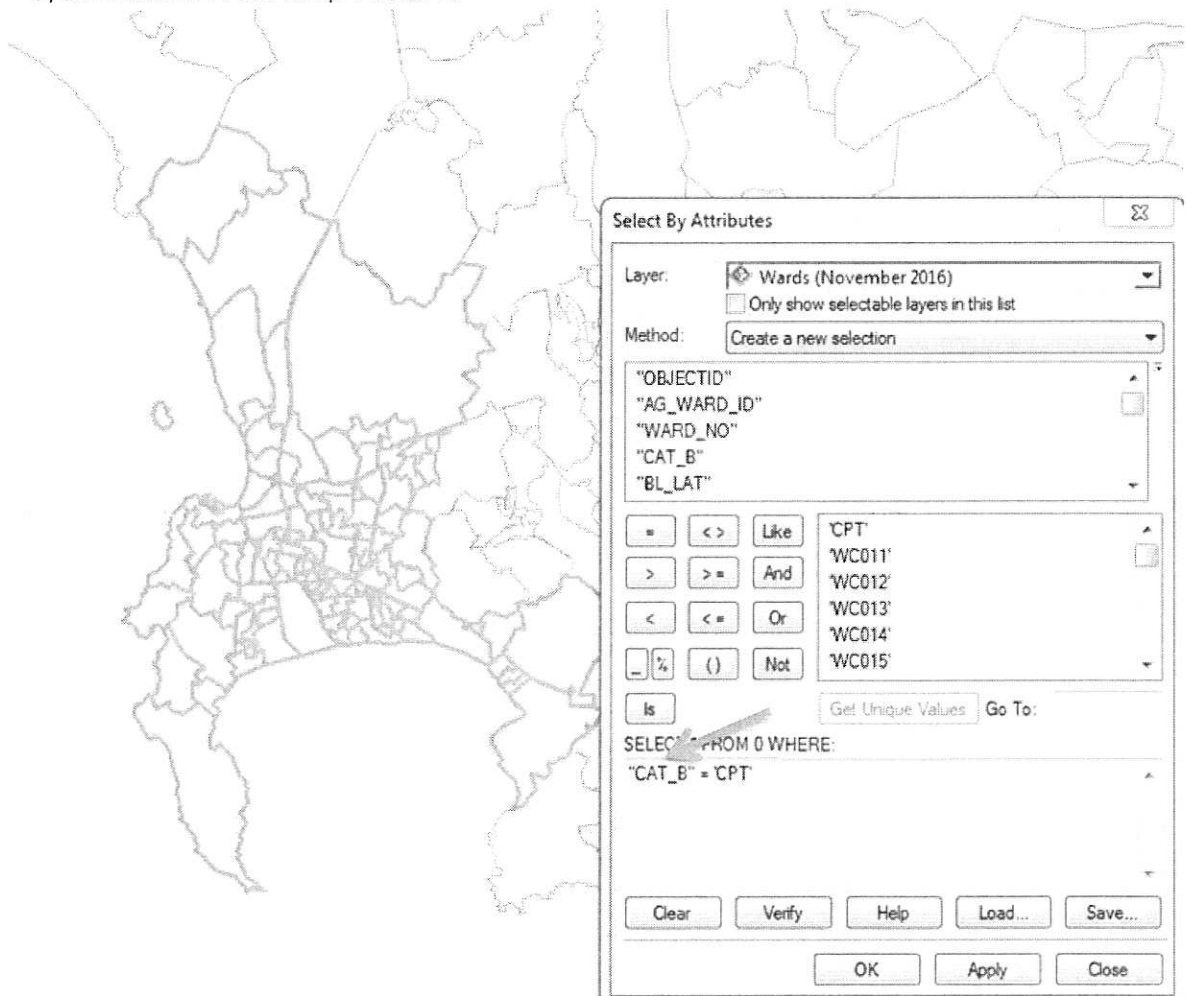


4.9.2. Extracting the spatial data for editing

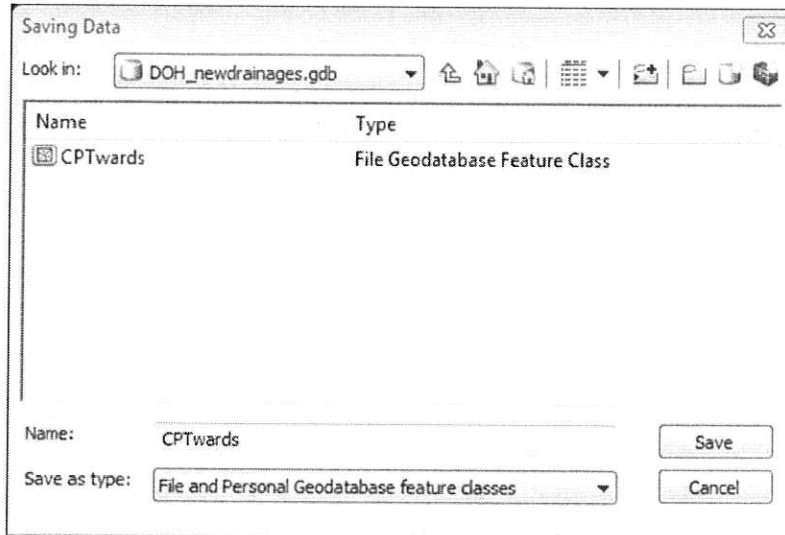
1. Open the **GIS Servers** in the Catalog window and expand `spatialdatawarehouse.westerncape.go.za (user)`.
2. Select a feature service that you wish to extract data from for editing by dragging it onto the map. In this example the feature service `AFRIGIS_Boundaries_Wards_AfterAugust2016` in the `SingleLayers` folder will be used. We will extract all the wards in the City of Cape Town as we wish to edit their boundaries.



3. In the top menu choose **Selection** and then **Select By Attributes**
4. Use the wizard to construct the WHERE clause ""CAT_B" = "CPT". This will select all the ward polygon feature which are in the Cape Town Metro. These will be highlighted in cyan outlines in the map window.

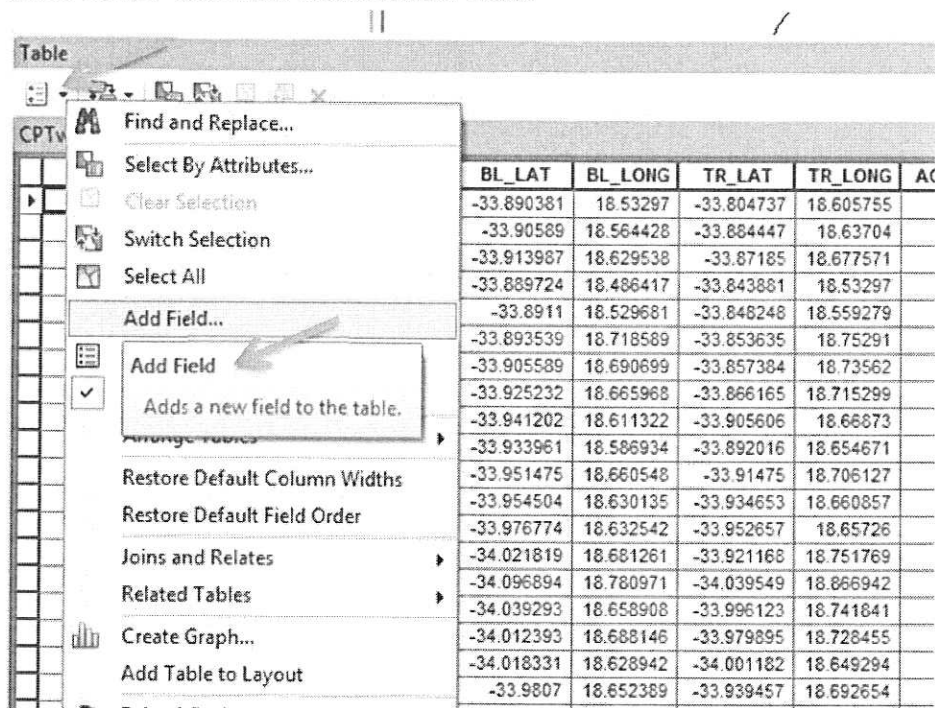


5. Right click on the Wards (November 2016) layer in the **Table of Content**, choose **Data** and then **Export Data**.
6. In the Export Data window browse to the file geodatabase you created above and save it as type "File and Personal Geodatabase feature classes". Give it an appropriate name and click **Yes** when prompted to add the exported data to the map.
7. You now have extracted all the wards in the Cape Town Metro and will be able to edit both the geometry and attributes of this new feature class.

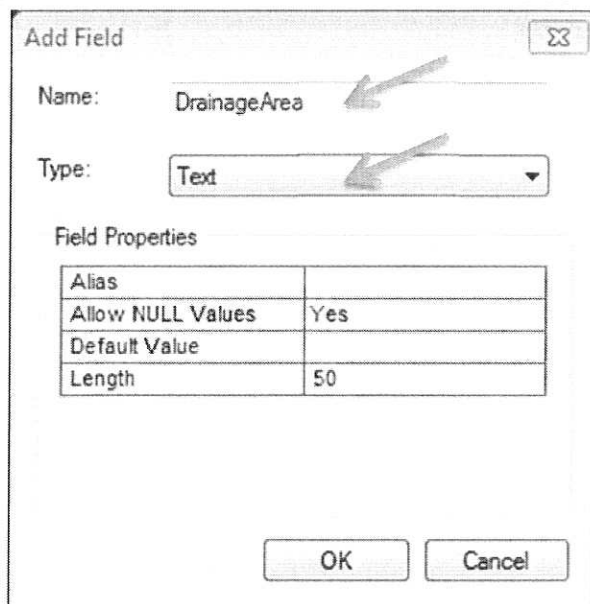


4.9.3. Add a new field in the attribute table

1. Before you start editing the new feature class you must add the fields to its attribute table into which you will capture information about the polygon features you add or edit. This cannot be done once the feature class is set to edit mode as described in the next section.
2. Right click on the new feature class created above and click on **Open Attribute Table**. In the Table window open the Table Options menu by clicking on the icon in the top left hand corner and then click on **Add Field**.



3. Fill in the new field name and choose a data type.



Add Field

Name:

Type:

Field Properties

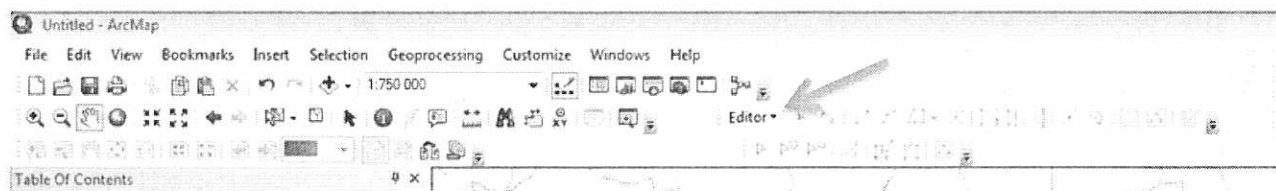
Alias	
Allow NULL Values	Yes
Default Value	
Length	50

OK Cancel

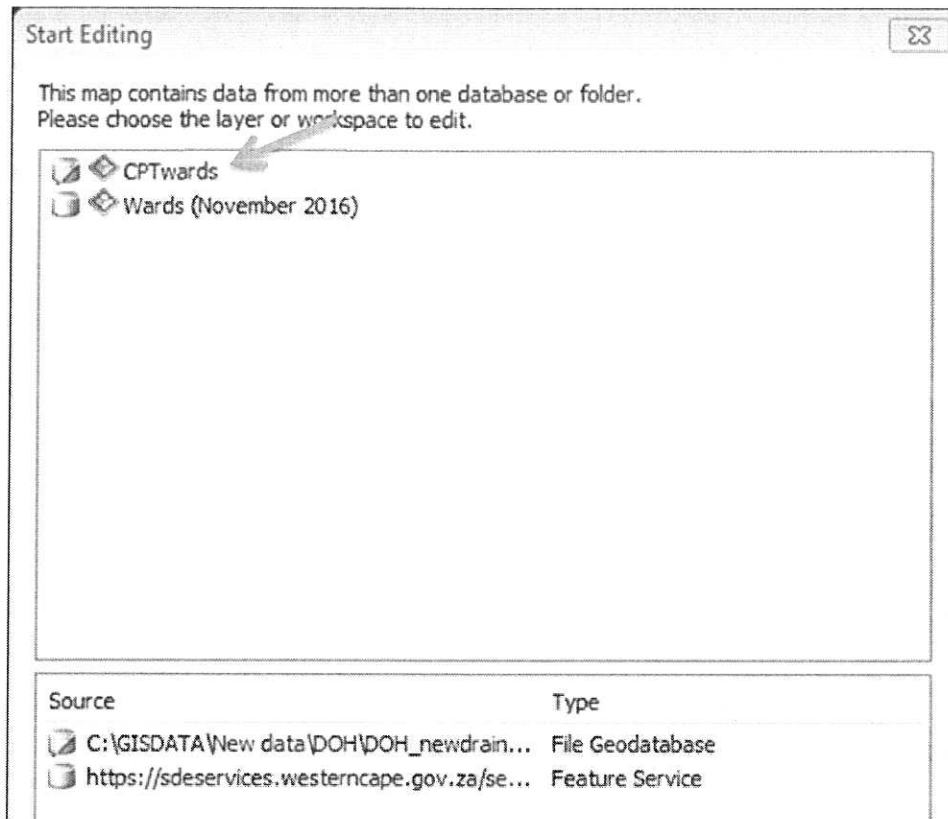
4. The new field will appear in the table with no entries. You are now ready to start editing the feature class.

4.9.4. Editing the geometry of a polygon feature e.g. splitting it into two

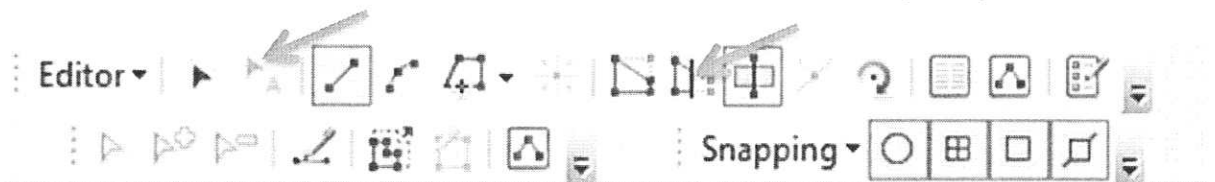
1. Add the editor tool bar to ArcMap if it is not visible. Click the **Customize** tab then tick the check box next to Editor. The Editor toolbar will appear and can be dragged where you want it.



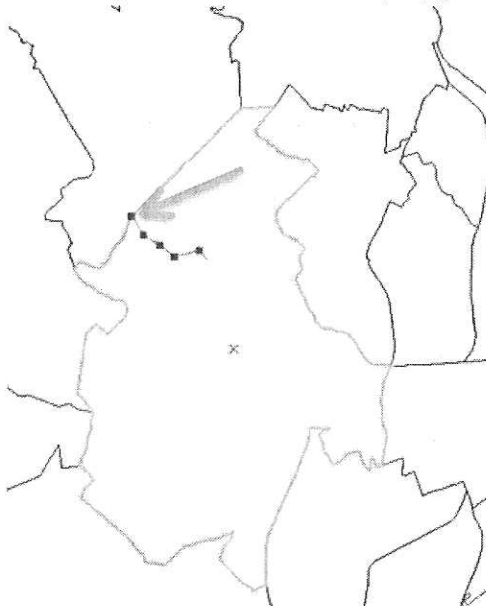
2. Pan and zoom the map to the polygon feature (Ward) which you would like to split and select it by clicking on it using the **Select Features** tool . The polygon feature will be highlighted in cyan.
3. On the Editor toolbar click **Start Editing** and select the layer you wish to edit if prompted (i.e. if you have more than one layer available in the map) in this case CPTWards which contains the ward data extracted in the steps above.



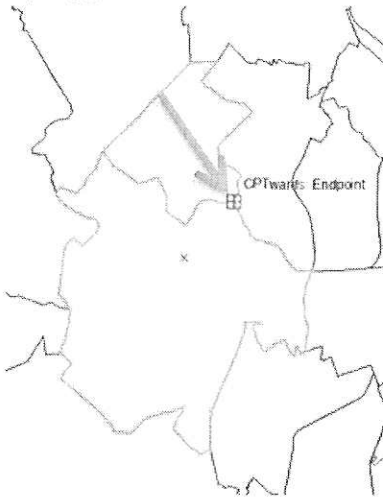
4. Select the **Cut Polygons** tool on the Editor toolbar and then the **Straight Segment** tool.



5. Click on the boundary of the selected polygon feature where you would like to start cutting,
6. Click repeatedly across the polygon feature where you want to split it.



7. Double-click on the selected polygon feature boundary where you would like to stop cutting.
8. The selected polygon will split along the line you drew and now shows two selected polygons.



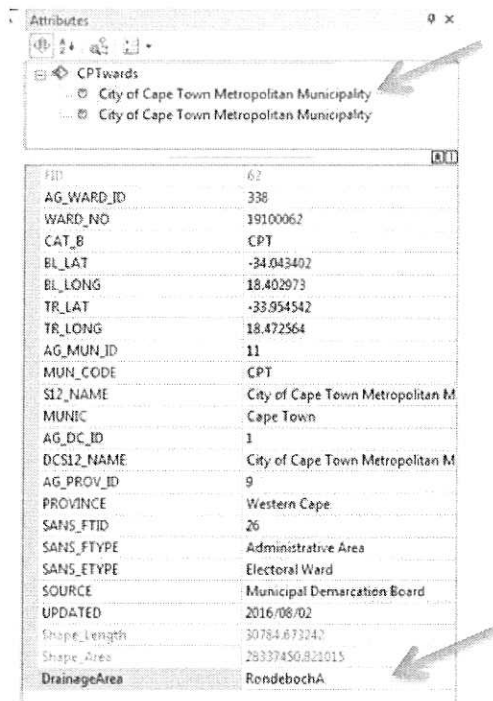
9. If you are happy with your edits you can click on **Editor** on the Editor toolbar then **Save Edits**.

Note: If you are not happy with your changes use the **Undo** tool found in the top toolbar Edit tab.



4.9.5. Editing the attributes of a feature

10. Click on the **Attributes** tool on the Editor toolbar which will open the Attributes window.
11. Select the first polygon feature from the list at the top.
12. Add the details into the box next to the new field name you added above.



Attributes	
CPTwards	
City of Cape Town Metropolitan Municipality	
City of Cape Town Metropolitan Municipality	
[RT]	
FID	62
AG_WARD_ID	338
WARD_NO	19100062
CAT_8	CPT
BL_LAT	-34.043402
BL_LONG	18.402973
TR_LAT	-33.954542
TR_LONG	18.472564
AG_MUN_ID	11
MUN_CODE	CPT
S12_NAME	City of Cape Town Metropolitan M
MUNIC	Cape Town
AG_DC_ID	1
DCS12_NAME	City of Cape Town Metropolitan M
AG_PROV_ID	9
PROVINCE	Western Cape
SANS_FTID	26
SANS_FTYPE	Administrative Area
SANS_ETYPE	Electoral Ward
SOURCE	Municipal Demarcation Board
UPDATED	2016/08/02
Shape_Length	30784.673242
Shape_Area	26337450.821015
DrainageArea	RondebochA

13. Click on the second polygon in the list and add an entry for it as well.
14. When you are finished editing the information in the attribute fields of the two polygons, save the edits by clicking **Editor** on the Editor toolbar and then **Save Edits**. The two new polygon features you created now have their attribute information updated as well.

5. Data acquisition and data dissemination

5.1. What is the understanding of custodianship, ownership and stewardship in the Western Cape Government?

Dataset Custodian

The Accounting officer or delegated senior official, representing the Accounting Officer, who takes full responsibility and claim ownership of the data and is accountable for it due to a prescribed mandate. They can authorise or deny access to certain data, and are accountable for its accuracy, integrity, and timeliness.

Dataset Owner

The most senior official who represents the Data Custodian, as delegated by the Accounting Officer, who is responsible to look after the data within a specific functional area.

Dataset Steward

Official who works with the data on a day-to-day basis. A person who captures, maintains, manages, integrates, distributes information and/or data. Person is also responsible for the metadata.

5.2. How do I request spatial data from other WCG Departments, National Government or external organisations?

5.2.1. Data acquisition and access processes

Please see Figure 5.1 Data Acquisition: Process A – Sourcing Internal, External or Vendor datasets and Figure 5.2. Data Acquisition: Process B. QA, Upload and Access

Data Acquisition: Process A – Sourcing Internal, External or Vendor Datasets

- **Step 1:** A requirement for a new dataset is identified within a department (usually the Department's GIS practitioner). They do not have the dataset on their own SDE environment.
- They send a request to SpatialData.Support@westerncape.gov.za
- **Step 2-4:** PSI and CGIS confirm whether the dataset is amongst the WCG shared spatial data resources available at spatialdatawarehouse.westerncape.gov.za as a map, feature or image service.
- **Step 5 & 6:** Should the data be available at spatialdatawarehouse.westerncape.gov.za the department will be notified.
- If it is not available in the shared environment, and needs to be acquired or sourced, three options are available as steps 7, 8 or 9.
- **Step 7:** If the data is available within the WCG (either spatially in another department's SDE or non-spatially) the relevant department will be contacted and the data governance process followed. Permission to access the data will be required. If permission is given and the data are spatial, it will either be moved to a shared environment, or provided as a Shapefile or geodatabase. If non-spatial, the data could be geocoded if possible. If permission is denied, the requesting department would negotiate via the Data Competency Centre or ePTM.

OR

- **Step 8:** If the data is available at no cost from an external organisation (e.g. national government department or other organ of state), the dataset will be requested from

them; the dataset and any governance procedures they may require will be followed.

OR

- **Step 9:** If the data is available externally from a data vendor the necessary procurement procedure will need to be followed to acquire the data.

In all three cases, should it be possible to share the dataset with all users within the WCG, it will be made available in a map and feature service on spatialdatawarehouse.westerncape.gov.za (see Process B – Data Upload and Access). Otherwise, if access restrictions apply, it will be made available to the requesting department via their departmental SDE.

Data Acquisition: Process B. QA, Upload and Access

After a new dataset has been received from an owner or custodian it enters a process in which it is quality assured, uploaded to the shared SDE and made available in a map and feature services at spatialdatawarehouse.westerncape.gov.za.

- **Step 1:** Receive the dataset from the owner or custodian and upload it to the Shared QA SDE.

A Quality assurance process ensues in which the following are checked:

- A. Are all the necessary metadata elements present?
- B. Is all appropriate data governance in place?
- C. Are there any geometry issues?

Please note:

External datasets only require the WCG concise metadata elements, WHEREAS WCG datasets require all the WCG extended metadata elements.

- **Step 2 & 3:** Should the dataset fail either A, B or C in the QA process, the custodian or owner is contacted to make the relevant changes.
- **Step 4 & 5:** The dataset's metadata (extended or concise see note above) is captured and validated. The WCG metadata in the SASDI electronic metadata catalogue is updated. PSI notify CGIS that the metadata has been QA'd.
- **Step 6 & 7:** If it is an existing dataset, the previous version is archived. The new dataset is uploaded to the shared SDE.
- **Step 8 & 9:** The new dataset is published, either created or updated, as a map and feature service on spatialdatawarehouse.westerncape.gov.za.
- **Step 10 & 11:** The WCG shared spatial data inventory and documentation on the PSI SharePoint site are updated.
- **Step 12:** The WCG community of GIS users is notified periodically of any new or updated shared datasets.

Spatial Information and Location Services SOP

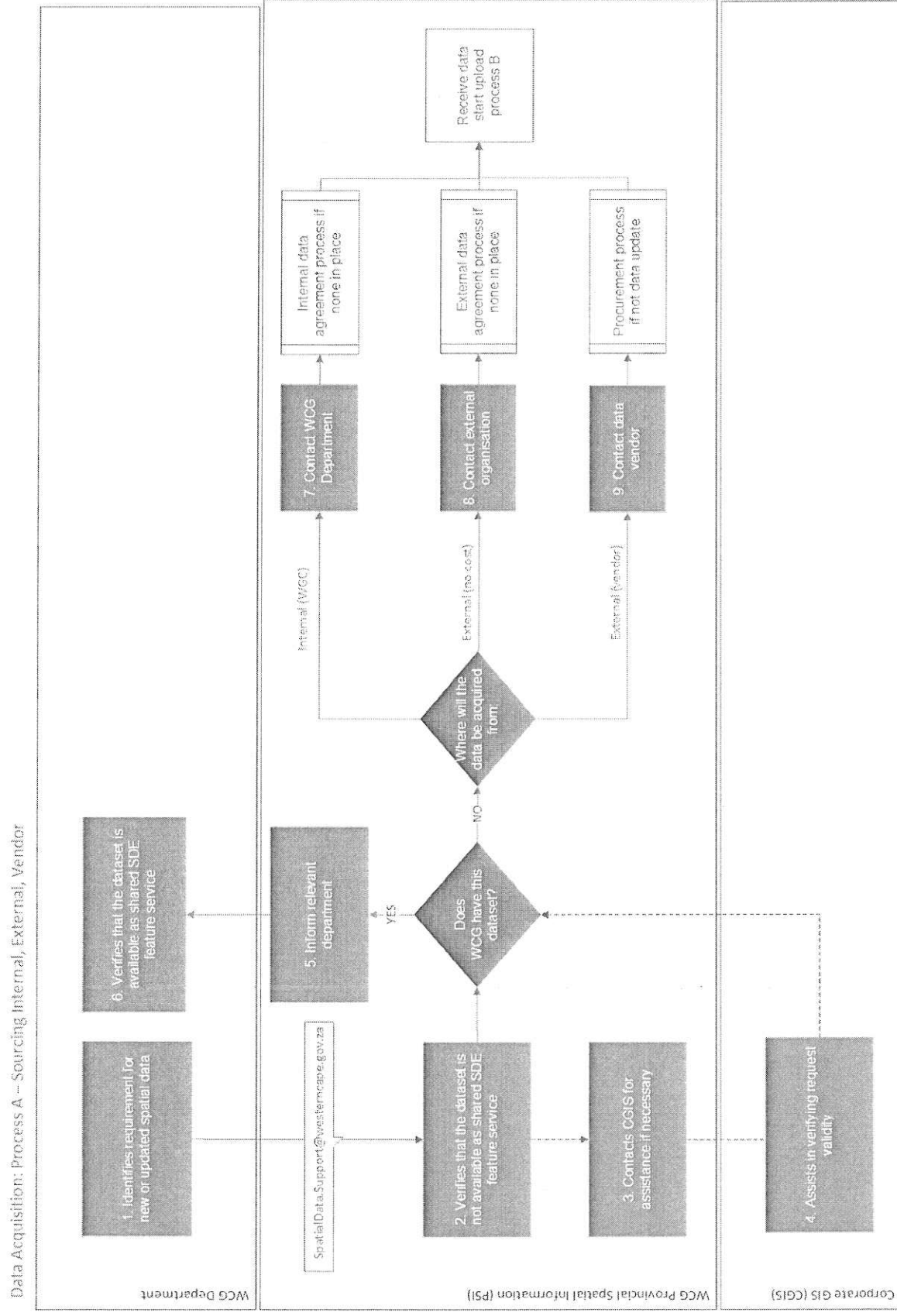


Figure 5.1 Data acquisition: Process A – Sourcing Internal, External, Vendor

Spatial Information and Location Services SOP

Data Acquisition: Process B. QA, Upload and Access

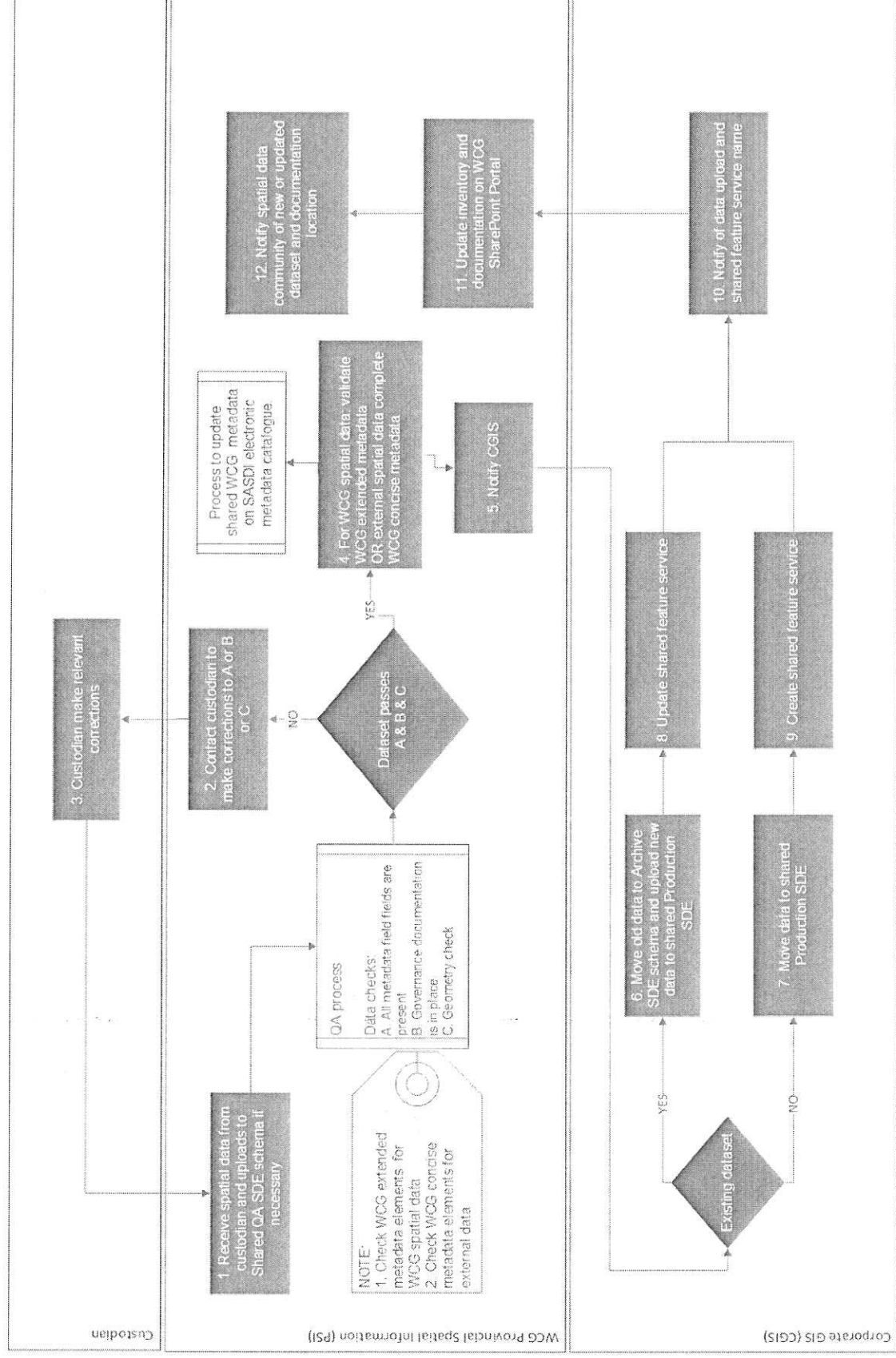


Figure 5.2. Data Acquisition: Process B. QA, Upload and Access

5.3. What happens if spatial data is requested from my department from an external organisation or person?

When a request from an external organisation or person is received by one of the WCG Departments, the process described below and illustrated in figure 5.3 is followed.

WCG Spatial Data Dissemination Process

- **Step 1:** A request from external organisation or person is received by a WCG Department. The WCG department refers the request to PSI through SpatialData.Support@westerncape.gov.za.
- **Step 2:** PSI consult the inventory of spatial datasets for which the WCG is either owner or custodian.
- **Step 3:** If it is on the WCG Open Spatial Data Portal the requesting organisation or person is referred to its URL.
- **Step 4:** Extract statistics from open data portal periodically
- **Step 5 & 6:** If the dataset in the WCG Shared SDE and available to the general public, it can be extracted and given to the requesting organisation or person. If the data is not available to the public **or** not in the WCG Shared SDE, the requester is referred to the relevant WCG Department. The requester could then enter into an agreement before the data could be given to them as the data may also be protected and not available at all.
- **Step 7:** complete data dissemination register in the Request Log.

WCG Spatial Data Dissemination Process

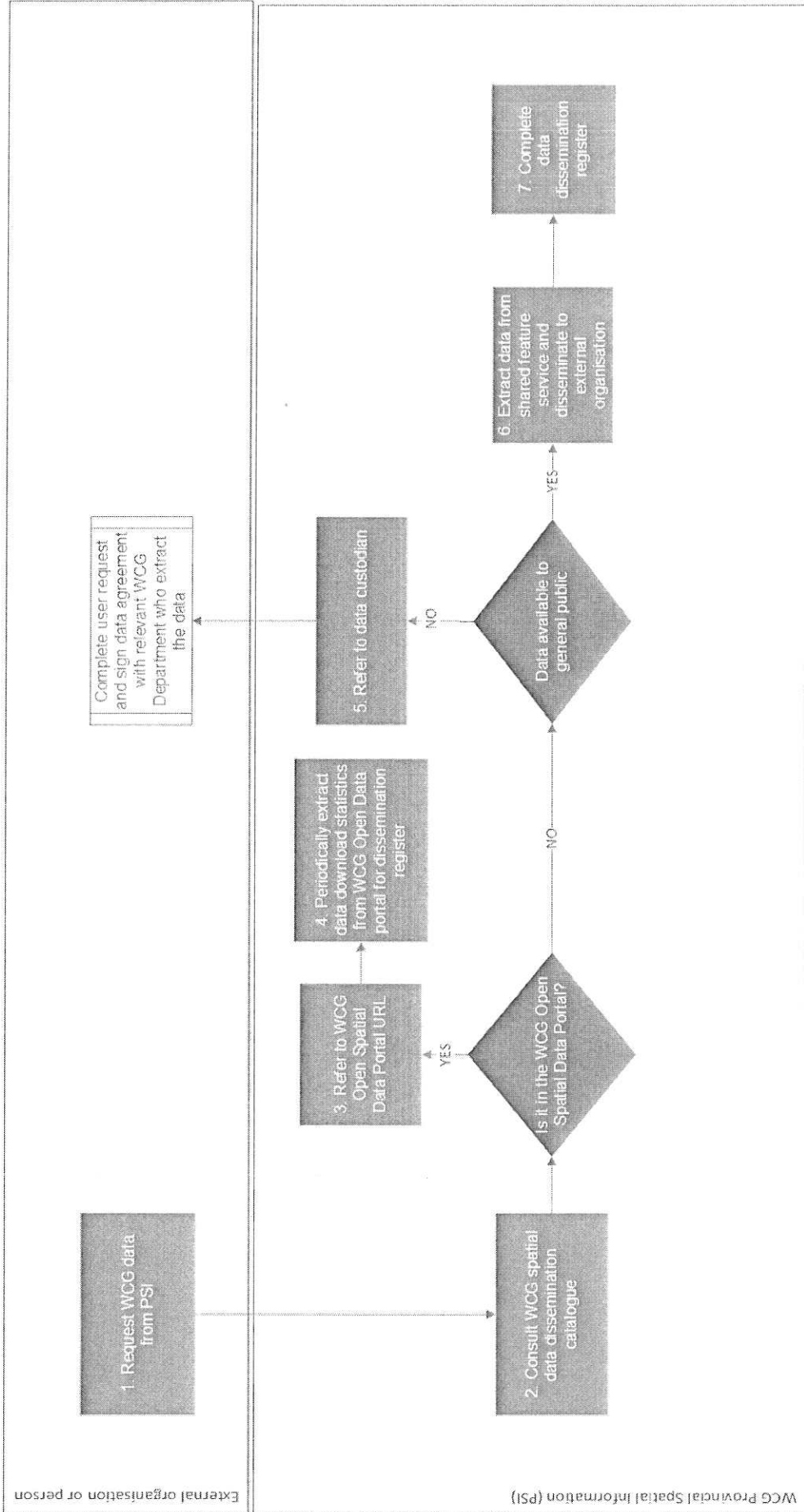


Figure 5.3 WCG Spatial Data Dissemination Process

5.4. Can we provide WCG shared spatial data resources to consultants who work offsite?

Access may be granted to consultants who have access to the WCG Network, i.e. they have a contract number (Persal number). In some cases, a consultant working for a WCG Department has to work offsite and can't access the WCG intranet and therefore the shared WCG spatial data resources at spatialdatawarehouse.westerncape.gov.za.

Access could be given to any of the spatial dataset by emailing

SpatialData.Support@westerncape.gov.za with the following details.

- The letter of appointment from the department containing the consultant's name and details of the project they are working on.
- A list of the datasets from the WCG shared spatial data resources they require. Please see *3.4 How do I search for a dataset in the WCG shared spatial data Inventory?*
- PSI will reply with a data agreement, which the consultant will have to sign after which the datasets listed may be provided.

Please note:

Should the consultant only require datasets for which the WCG is either the owner or custodian it is not necessary to follow the steps above. They can simply request these datasets from

SpatialData.Support@westerncape.gov.za and the WCG Spatial Data Dissemination Process will be followed. Please see *5.3. What happens if spatial data is requested from my department from external organization or person?*

6. Guidelines on printed map presentation and layout

The purpose of developing an official map template is to attain a higher degree of uniformity with regards to spatial products produced by the Western Cape Government. As per the current Corporate Communication standards, there are certain criteria applicable across the board, namely:

- Font: Century Gothic
- Use of departmental logos

6.1. Does the WCG have a standard printed map template?

Yes. The WCG uses templates. This section provides guidelines for the use of a standard map template accommodating both landscape and portrait layouts. Both layouts may be divided into two areas, namely:

- **Map Extent Area:** The area in which the spatial data is visually portrayed. This section aims to provide guidance on the placement of map elements (north arrow, inset map and scale) so as to not intrude on or impair the representation of spatial data in the Map Extent. Maps can be orientated within the Map Extent, as required for optimal representation; however, both portrait and landscape templates are available and should be used appropriately.
- **Map Information Area:** The area contains the map's descriptive and supporting information. Information in this area should be concise and to the point. Visually, the area should be uncluttered as the templates allow for a degree of freedom whereby users should use their discretion.

Please note the following minimum applicable criteria apply:

- Century Gothic should be used as the default font in the Map Information Area
- As far as possible, Century Gothic should be used as the default label font in the Map Extent Area
- Departmental logos should not be resized / changed – Corporate Communications was consulted regarding the placement, sizing etc. of the logo, ensuring compliance with the existing corporate standards

[Download The WCG Printed Map Template MXDs \(if you cannot access the SharePoint site, please contact \[SpatialData.Support@westerncape.gov.za\]\(mailto:SpatialData.Support@westerncape.gov.za\)\)](#)

6.1.1. Paper sizes

The preferred templates can be used for the following paper sizes (a guide to paper sizes is provided in Figure 6.1).

Table 6.1 Template size guide

Paper size	Landscape Template	Portrait Template
A4	✓	✓
A3	✓	✓
A2	✓	✓
A1	✓	✓
A0	✓	✓

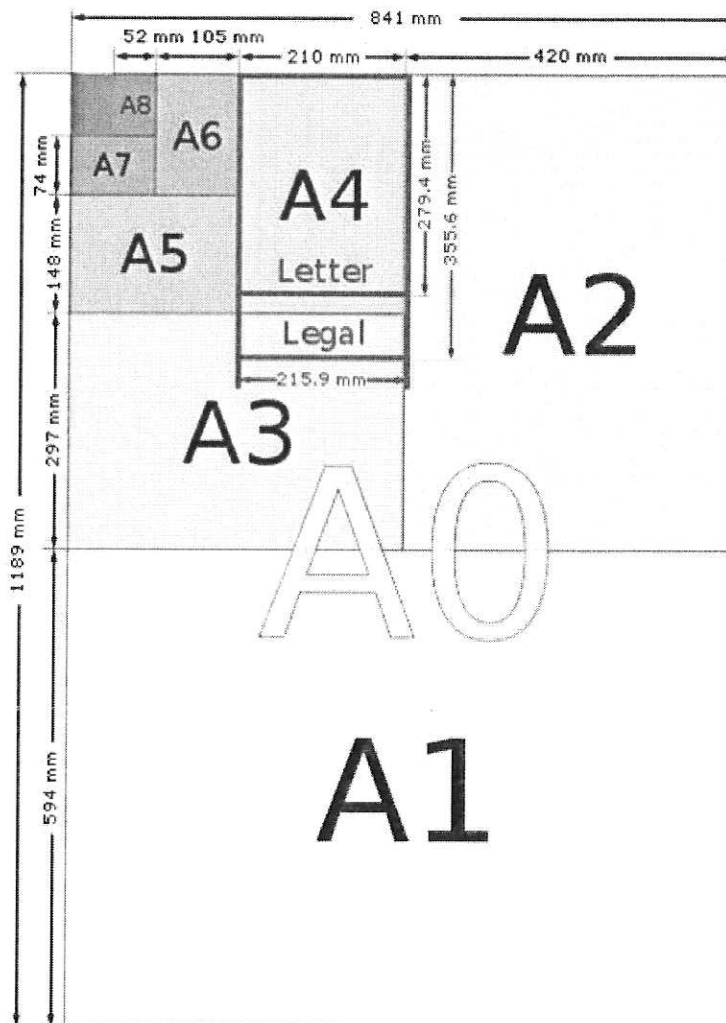


Figure 6.1 Guide to paper sizes

6.1.2. Landscape and Portrait Layout Template

The suggested placements for map elements are indicated in Figure 6.2 and Figure 6.4 below.

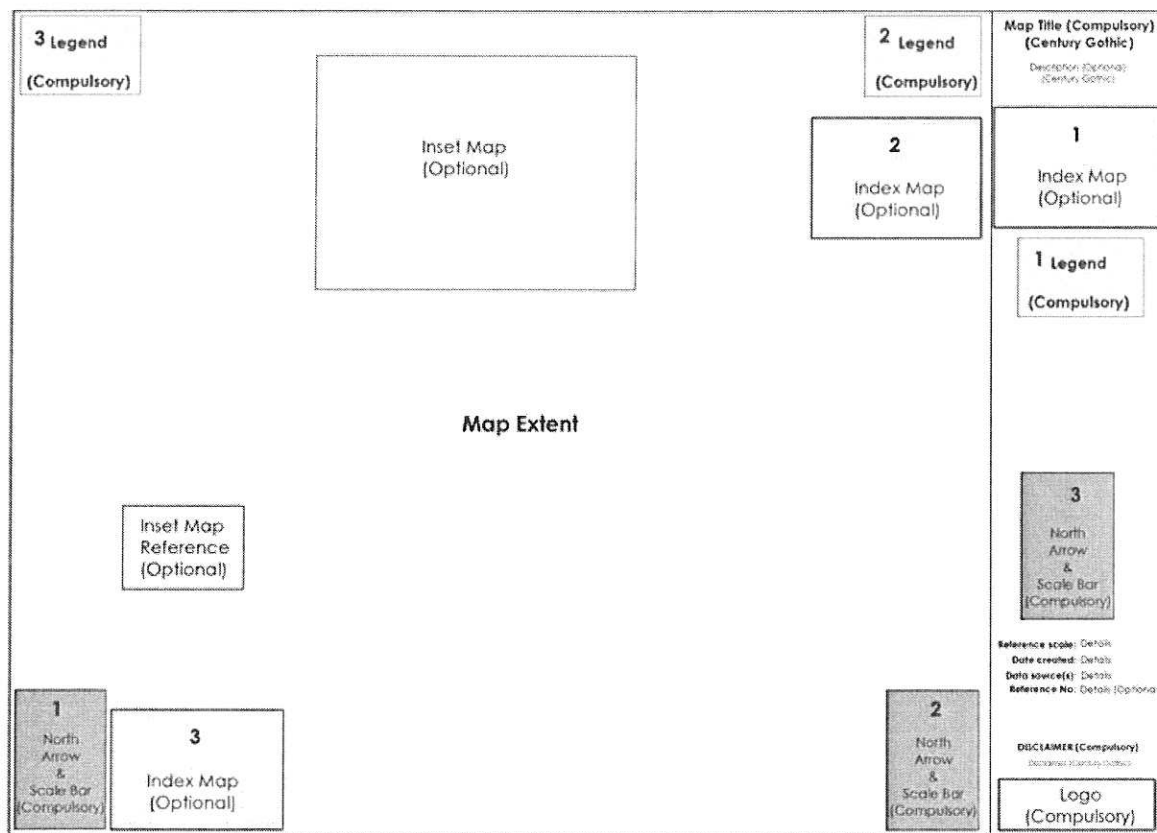


Figure 6.2 Landscape map layout: Blank



Figure 6.3 Landscape map layout: Example

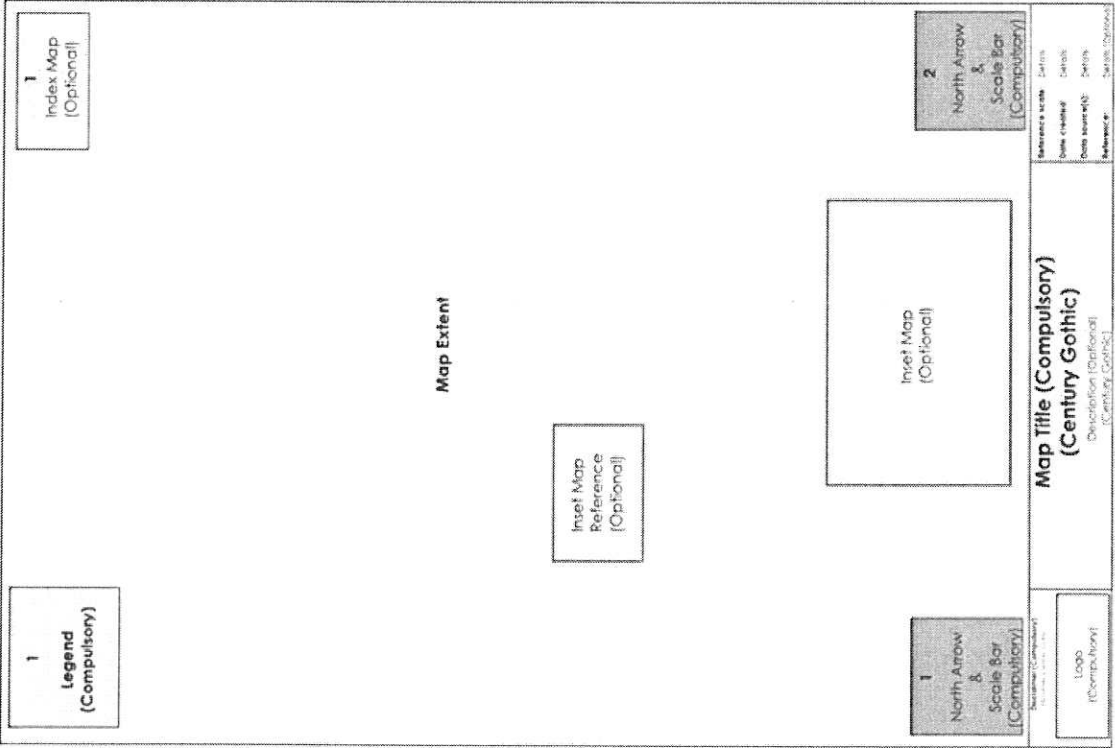


Figure 6.4 Portrait map layout: Blank

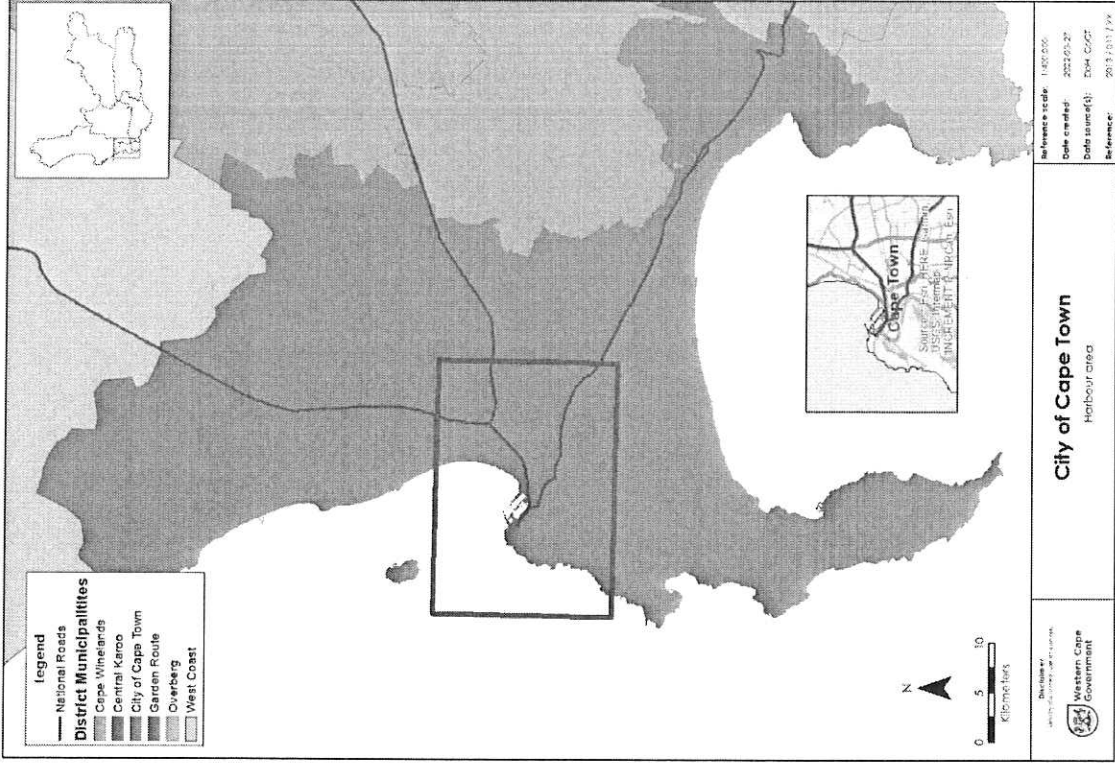


Figure 6.5 Portrait map layout: Example

6.2. Elements you should include in the map extent area of your map

6.2.1. North arrow

A north arrow is used to orientate the reader. **In all instances it should be placed above and grouped with the scale bar.** With reference to the red boxes in Figure 6.2 and Figure 6.4, the preferred locations to position these elements are provided in Table 6.2 below.

Table 6.2 North arrow placement guide

Preferred Placement	Landscape	Portrait
Position 1	Bottom left hand corner	Bottom left hand corner
Position 2	Bottom right hand corner	Bottom right hand corner
Position 3	In the Map Information Area, below the legend. This location is favourable when the map contains lots of information or so as to not obscure aerial photos or satellite imagery	Most appropriate place in the Map Extent so as to not obscure any map detail.

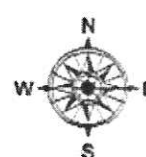
Besides the abovementioned preferred positions, users should use their discretion as to where the most appropriate placement should be. In the event that the map detail in the Map Extent Area hides the north arrow and scale bar, the two elements can be grouped and assigned a white background for contrast.

GIS users have the choice of using either of the north arrows listed below (note that ESRI North 19 **must** be used for orientated maps i.e. where north is not 'up'):

ESRI North 2:

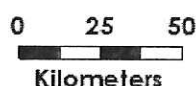


ESRI North 19:



6.2.2. Scale bar (compulsory)

The scale bar is to be used in the Map Extent Area and should be positioned below the north arrow. ESRI's Alternating Scale Bar 1 should be used, with the numbers above the bar, and units of measurement below the bar. All values on the bar should be integers and the end values should either be in increments of 10 or 100.



6.2.3. Inset map (If required)

An Inset map is a section of the Map Extent Area depicted at usually a bigger scale, to highlight some detail in the area that would not be visible at the scale being used in the

Map Extents. In other words, it shows a magnification on a specific portion of the main map. Inset maps must be oriented in the same direction as the main map. An Inset Map should be representative of the overall style of the main map.

The Inset Map is placed in the Map Extent Area such that it will not obscure any important detail in the Map Extent Area. Use an arrow or box to indicate the area that the Inset Map refers to. All features in the Inset Map must appear in the Map Extent. The size and complexity of the map should guide the decision to use an Inset Map.

6.3. Elements you should include in the of the Map Information Area of your map

All text used in this area should be **Century Gothic** font in accordance with corporate standards.

6.3.1. Map title (Compulsory)

The map title should be the focus of the Map Information Area. This is accomplished by using large bold text that will stand out from any other text on the map. The lettering size can be adjusted to suit the size of the map. The length of the title should be considered when the lettering size is selected.

6.3.2. Description (If required)

A description of the map or supporting information is only provided if the subject matter requires further explanation or to ensure that information is not misinterpreted. It is placed in between the Map Title and the Index Map, however, if there is no need for the inclusion of an index map then the description is to be placed between the Map Title and the Legend. The descriptive text should be minimal, only providing essential information.

6.3.3. Index map / Locality reference map (If required)

An index map is an optional addition to the map layout and is only required to provide an overview of the geographic context e.g. location of a farm in the context of the Cape Winelands District. It is not needed to represent the location of the province in relation to South Africa, unless the client specifically requests it.

With reference to Figure 6.2 and Figure 6.46.4 (yellow boxes), the preferred placement for the Index Map is:

Table 6.3: Index map / Locality reference map placement guide

Preferred Placement	Landscape	Portrait
Position 1	In the Map Information Area between the description and legend. This is the most preferred placing of the index map	Top right hand corner
Position 2	In the top right hand corner of the Map Extent, provided it does not conflict with legend (assuming a floating legend is employed)	Appropriately placed in the Map Extent, preferable in one of

Preferred Placement	Landscape	Portrait
Position 3	In the bottom left hand corner of the Map Extent, provided it does not conflict with the north arrow and scale bar (assuming this is where the north arrow and scale bar is placed)	the four corners, without obstructing any map detail

If it is impossible to accommodate the Index Map in the suggested areas, the Index Map should be placed in an appropriate area in the Map Extent so as to not obscure any map details.

6.3.4. Legend (Compulsory)

Avoid using too many legend elements. As far as possible legend elements should depict the feature that is represented e.g. rivers are represented by a thin blue line. The generally accepted order of vector legend items is points, lines, polygons, unless this order is not logical for the purpose of the map. Rasters resulting from spatial analyses should be described in the legend. Imagery is generally not required in the legend, however the sources are to be acknowledged.

The legend can either appear in the Map Information Area or in the Map Extent as a floating legend. Referring to Figure 6.2 and Figure 6.4, the preferred locations for the legend (green boxes) are:

Table 6.4: Legend placement guide

Preferred Placement	Landscape	Portrait
Position 1	In the Map Information Area below the index map, however, if an index map is not used, the legend should be placed below the description	Floating legend positioned in the top right hand corner. A white background with gap spacing (X & Y) of at least 5 should be used as well as a black 0.5pt border
Position 2	A floating legend should be placed in the top right hand corner of the Map Extent, provided it does not conflict with Index Map (assuming a floating legend is employed)	Placed at the practitioner's discretion. A white background with gap spacing (X & Y) of at least 5 should be used as well as a black 0.5pt border
Position 3	In the top left hand corner of the Map Extent as a floating legend, provided that it does not obscure any map detail	

Should the above suggested locations be insufficient, the GIS Practitioner should use their discretion in placing the legend so as to not obscure any map detail.

6.3.5. Map details

Reference scale

In order to conceptualize the size of features and distances on a map, we must establish and indicate a consistent relationship between size on the map and size in real life. This relationship is the map's reference scale. The reference scale is expressed as a mathematical ratio or fraction where the unit on the map is expressed as the number one (numerator).

In ArcMap, the reference scale is displayed in the tool bar. As far as possible, users are encouraged to produce maps at the defined scales (indicated in the drop down menu), however, if those scales are inappropriate, users are required to round off their scales to the nearest thousand (or if less than 1000, round to the nearest hundred).

Date

All users are required to provide the date that the map was produced using the YYYYMMDD format. If the date is included in the reference number, it is not necessary to duplicate.

Data sources

All users are required to acknowledge the data sources (including sources for aerial / satellite imagery). Data source and date (where possible, or as according to copyright) should be mentioned.

Additional data

This is an optional category and can be used to indicate internal reference numbers or any additional information relevant to the product.

Suggested ref. no.: YYYYMM_SequenceNo_InitialsOfMapProducer (e.g. 202002_001_HS).

Disclaimer

A disclaimer has been provided by legal services and is included in the template. This disclaimer should appear on all spatial products and should not be modified in any way.

The following **one-liner disclaimer** should appear on documents and maps which external users may access: **"Liability disclaimed. Use subject at own risk."** WCG full disclaimer may be viewed at <http://intranet.pgwc.gov.za/disclaimer.asp>.

Logo

It is compulsory to add the relevant WCG departmental logo in the prescribed area and size as indicated in the template. The placement and size should be strictly adhered to as it forms part of the WCG's corporate image and branding (please refer to the WCG branding document).

Note: The sizes of the logo to be used for the different page sizes, will be obtained from Corporate Communication. Please refer to

http://intranet.pgwc.gov.za/Blue_Pages/CorrespondenceTemplate.asp

The method for inserting logos to preserve the colour is to copy the logo from a word document and paste into ArcGIS. Do not use the 'insert' option in ArcGIS as the logo colour tends to be altered.

6.4. Does the WCG have a standard map template for maps in documents and / or presentations?

The standard map template for maps in documents and presentations are similar to the printed map template. The only difference is that the map elements differ slightly.

6.4.1. Map Orientation

Maps in presentations should preferably have a landscape orientation, but the content could subscribe a different orientation. Maps should also use the extent of the slide surface, but smaller maps combined with text and other graphics are also acceptable.

6.4.2. Map Elements

The elements referred to include North Arrow, Scale Bar, and Inset map, as already discussed in 6.2 above. They should be included if possible, but may be avoided if a map is too cluttered or space is of an essence.

6.5. General considerations for your map

As per the corporate standard, **Century Gothic** is to be used as the basic font for all map elements (labels, headings, descriptions, legend etc.), unless the situation dictates the need to make use of an alternative font.

When creating basic maps that do not require the use of Digital Elevation Models (DEMs), topography, etc. the basic colours to be used for the districts, ocean and surrounding provinces are listed below (the level of transparency can be adjusted accordingly).

Table 6.5 Colour palate guide for basic maps

District	R	G	B	Original	R	G	B	75%
Cape Winelands	115	175	182		210	230	230	
West Coast	213	209	14		250	250	175	
Overberg	248	151	40		250	225	195	
Garden Route	92	135	39		210	235	185	
Central Karoo	158	102	20		245	220	180	
Metro	149	110	142		225	215	225	

In addition, the preferred ocean and masking colours should be used as far as possible:

Table 6.6 Additional preferred colours

Other	R	G	B	Original
Ocean colour (if not making use of base maps)	212	242	255	
Mask for surrounding provinces	10% grey – the transparency can be set as required			

Please note:

- The most important principle to adhere to is to ensure that the map conveys a message that is clear to the audience.
- Mask areas that are not part of the map's focus.

7. Managing your workspace

7.1. Why should I have an ordered work environment?

A standard folder structure for GIS projects has been designed. The purpose of this folder structure is to guide users to work in a formal standardised manner in their data storage and workspace environment. This is directed towards all GIS users within WCG and can be applied in a project environment or a formal operations environment. The folder structure along with a standard folder naming convention will enable consistent management of files, aid in the referencing of data and products, and will ensure corporate standardisation and continuity of spatial data management.

7.2. What is the suggested layout for my workspace?

The GIS workspace folder structure should consist of a data component and a workspace environment. Folders should contain all GIS data, MXDs and related files.

Name	Description
A. Data (Raster or Vector)	Folder where you save all your data as obtained from the custodian, as well as all supportive documentation e.g. standards and metadata.
B. Work (Operational Workspace)	The workspace is a structured environment on a local system where all GIS related tasks are done. This section consists of the different folders required in the workspace, like Maps, MXDs and other project related files (Operational).
B.1 Maps	Maps/Products created
B.2 MXD	MXDs created
B.3 Working folders	All other GIS related work

7.3. How should I name my files and directories?

7.3.1. GIS Data

Folder names for the **GIS Data** folder are equivalent to the custodian name.



7.3.2. Operational Workspace

The names of folders in the **Operational Workspace** are grouped as indicated in 7.2 above. Content can be in order in folders by date (YYYYMM_MMMM format). The files within the folders could have the following format - *YYYYMM_SequenceNo_InitialsOfMapProducer* (e.g. 201706_001_HS). Alternatively you may wish to the work by project name and then in order of date.

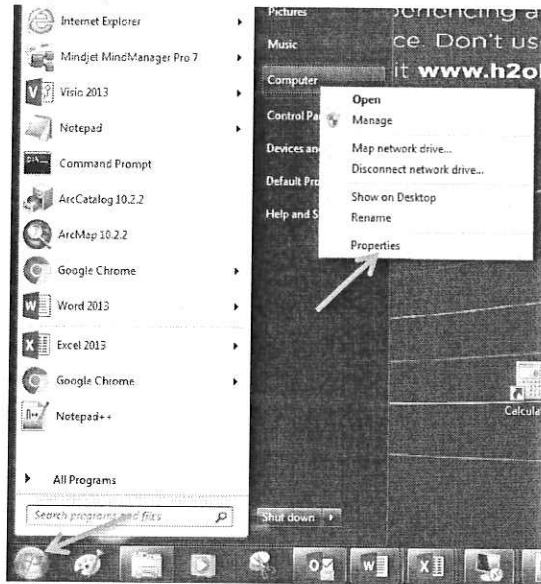
- ▲ GIS Work
 - ▲ Maps
 - 201701_January
 - 201703_March
 - 201704_April
 - 201705_May
 - 201706_June
 - 201707_July
 - 201708_August
 - ▶ 201709_September
 - 201710_October
 - 201711_November
 - 201712_December
 - ▲ Mxd
 - 201701_January
 - 201702_February
 - 201703_March
 - 201704_April
 - 201705_May
 - 201706_June
 - 201707_July
 - 201708_August
 - 201709_September
 - 201710_October
 - 201711_November
 - 201712_December
 - ▲ Working
 - 201701_January
 - 201702_February
 - 201703_March
 - 201704_April
 - 201705_May
 - 201706_June

8. WCG specialised tools, hints and tips

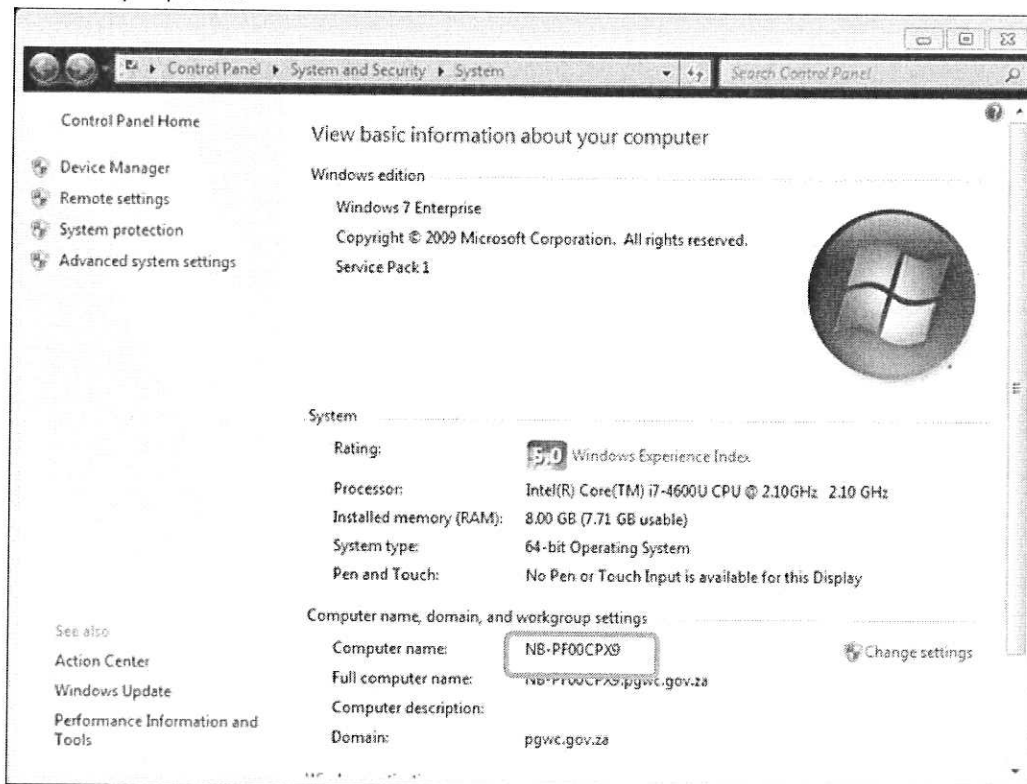
8.1. General computer

8.1.1. How do I find my computer's name?

1. Click on the Start menu, then right-click on Computer in the left hand window which pops up.



2. Choose properties



Your computer name is shown under the heading "Computer name, domain and workgroup settings" about one third of the way down in the left-hand pane of the window that pops up.

8.2. Specialised features

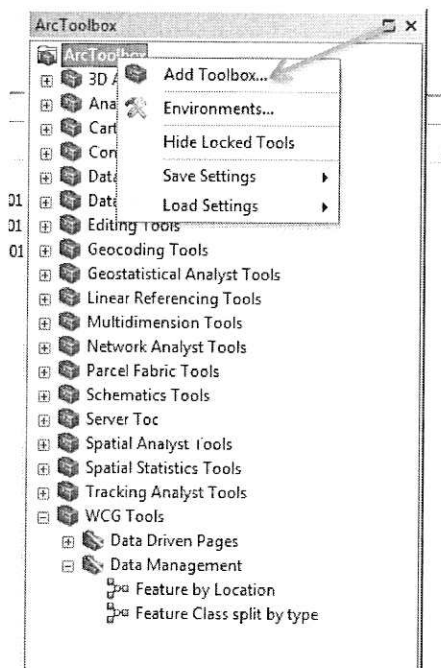
8.2.1. The feature split tool

You can download WCG Tools.tbx file from the PSI Sharepoint site

Adding the feature split tool

1. Open ArcToolbox in ArcMap by clicking on the icon .
2. Right click on "ArcToolbox" at the top of the ArcToolbox window and choose **Add Toolbox**
3. Browse to where you saved the tool box file and click Open and the toolbox will appear at the bottom of the list as shown above.

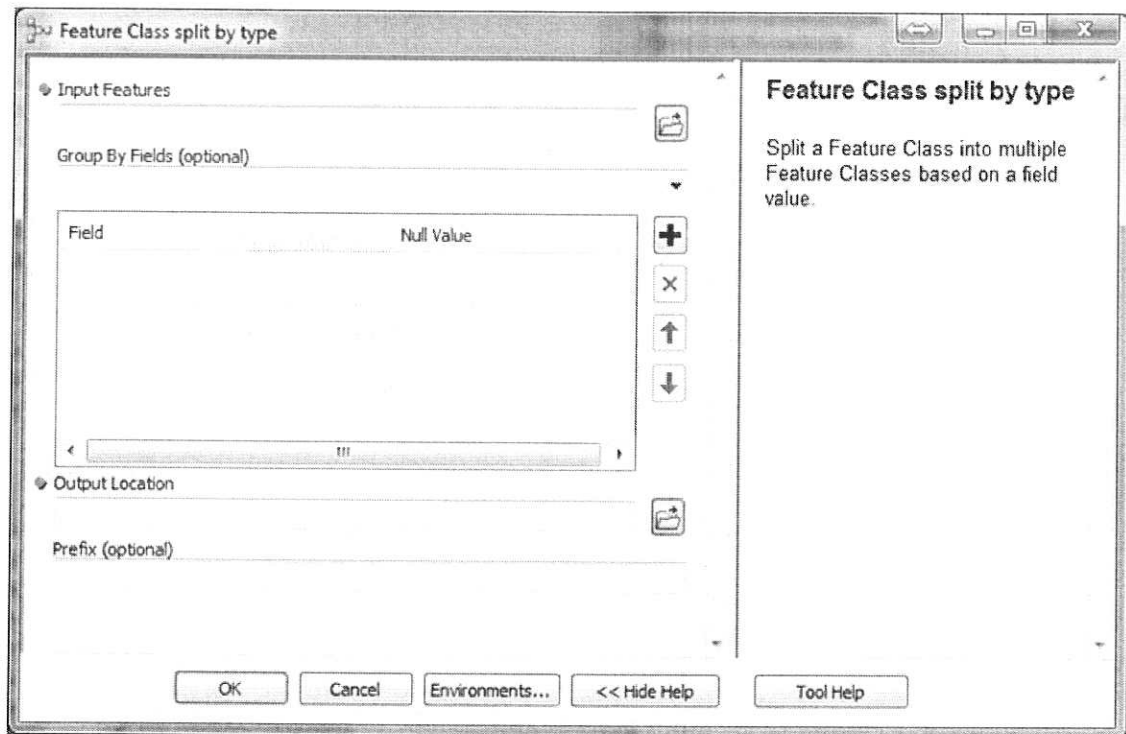
The tool splits a feature class/shape file into multiple feature classes/shape files by using a 'field value'. For example, split infrastructure feature class into different feature classes like abattoirs, dams, pack houses, etc. It can also be used as an alternative to 'definition query'.



Using the feature split tool

1. Select the feature class which you want to split [Input Features].
2. Select the field which should be used to split the feature [Group by fields].
3. Select the location where feature classes must be saved (folder or file geodatabase [Output Location]).
4. Optional: type a prefix to identify the new feature class.

To add the tool to your toolbox, save attached and add:



9. GIS software training

9.1. If I have no GIS experience and want to use GIS software is training in the use of the software a prerequisite?

Yes, and the training needs to be signed off by your manager (see ArcGIS Desktop Installation Service Form). Your manager must indicate whether you need ArcGIS Desktop training and whether it has been budgeted. It must also be part of your personal development plan (see row 51 of form).

9.2. Who will cover the cost of my GIS software training and how do I apply?

Firstly, a very large amount of training is free. Secondly, as a member of WCG there are several training courses freely available to you, which are not free to the general public. If you however choose to take a course that will incur costs - then the training costs must be covered by your department.

To procure ESRI training:

- Decide on the course you wish to attend by visiting the ESRI website where course schedules and outlines are available <http://www.esri-southafrica.com/professional-development> ;
- Write a submission (*Please see 10.2 Example submission for GIS training*); and
- Book the required course.

9.3. What GIS software training courses are available for me to access?

There are several ways to upskill yourself through various online resources. Many are free, but as part of WCG ELA with ESRI there are also a few courses (which are not free to the public) which you can access as a member of WCG.

- A. Useful help guides and orientation resources are available on the ESRI websites. A useful tip is to search either using Google and include ArcGIS Pro as one of your search criteria or browse through <https://www.esri.com/training/>
- B. ArcGIS tutorials can be viewed:
<http://www.gis.harvard.edu/training/non-credit-training/virtual-training/arcgis-desktop-and-server-tutorials>
<http://grindgis.com/blog/top-7-arccgis-tutorials-websites>
<https://community.esri.com/docs/DOC-2994>
- C. GIS capacity building material on SharePoint: [WC Data Portal](#) (Capacity Building under Data Ecosystem)

For more information on GIS related training, contact PSI:
SpatialData.support@westerncape.gov.za

10. ArcGIS Online and Portal

ArcGIS Online (AGOL) is a cloud-based mapping and analysis solution. Your data and maps are stored in a secure and private infrastructure (on the ESRI cloud) and can be configured to meet your requirements. It is a collaborative web GIS that allows you to use, create, and share maps, scenes, apps, layers, analytics, and data.

ArcGIS Online enables you to connect people, locations, and data using interactive maps. It allows you to work with smart, data-driven styles and intuitive analysis tools to produce location intelligence and sharing it with the world or specific groups.

ArcGIS Portal is all of the above, except that it is not ESRI public cloud based. It runs on WCG infrastructure, hence storing data on Portal does not cost any credits. It resides inside the WCG domain network, hence is mostly reserved for WCG members.

10.1. Some important concepts

10.1.1. User accounts

To create content on AGOL and Portal, a user must firstly have a "Named User Account". This is basically login credentials to the online/sharing platform/organisation. Secondly, that account must have rights to create content. Generally, most users will only have rights to access/use content, but not create new content/data.

You can apply for a user account via SpatialData.support@westerncape.gov.za. It is generally the same process as applying for software installation. CGIS will approve the appropriate level/rights of the account, create it and the ESRI platform will email the applicant with the details/next steps.

User accounts are monitored by CGIS, to ensure that:

- The account is actively being used, otherwise it will be de-activated
- Credits are not unnecessarily used
- No superfluous content is being created

Note that user accounts are not the same as software licenses. Just because a user might have an account with many rights, does not mean they are entitled to a software license. Even though some software can be provisioned/licensed via Named User Accounts, WCG prefers to use concurrent licenses, managed by an ESRI license server.

10.1.2. Types of content

There are various types of content that can be created, but the main types are:

Web Maps – these are basically what the name implies. You create a map in ArcPro (using whatever content/data you want, but preferably existing services) and then share this map to your organization. Users (who you have allowed access to) will then be able to use this map service to view the content you have shared. Usually, they will have the capability to use only a few of your layers, or just use the map (along with your symbology) as-is. Make sure that you do not unnecessarily upload data to the cloud, most data is already there (in services like Spatial Data Warehouse).

Pre-configured web maps are shared on the Intranet website:
<https://mygov.westerncape.gov.za/services/development-web-maps>

Web Layer – these are similar to Web Maps, but it consists only of the data layer and symbology (not several layers as in a map). Please do not create web layers of content that are already available as services.

Hosted feature layer – these are similar to web layers, except they are stored in the ESRI cloud (AGOL) and consume credits. Avoid creating these as much as possible!

Web apps – these are applications/webpages on which webmaps and/or web layers are displayed and interacted with. Usually this is for consumption by people who only have a browser (not GIS software, which can access webmaps, services and web layers directly). You decide which widgets/tools to enable on these webapps. This is much more complex than just making a webmap. You will typically use WebApp Builder to create these web apps.

Please note that creating a web app should ideally include a proper User Requirements Specification phase, which should be done via the standard software application development structures.

Web Viewer – Every registered user has access to this (online) GIS “application”. It is essentially a basic GIS software package with which users can view and interact with spatial data shared with them (web maps, layers etc). Along with data from other sources like: Spatial Data Warehouse, NGI, ArcGIS Online and any other public mapping services (like ArcGIS services, WMS, WFS etc).

Credits - Credits are like money, so if you/your app is consuming credits, you are using WCG's budget. WCG only has a limited number of credits. It is imperative that you know what types of content and usage consume credits and that you actively avoid using it.

Storage credits – By far the biggest consumer of credits is storage on AGOL. Please refrain from loading data (layers) into AGOL. Be sure to use the existing services/web layers/web maps. Do not load massive datasets (like cadastre) as a new layer into AGOL. Imagery should basically never be uploaded to AGOL – always fetch imagery from a service.

Analysis credits – Some types of analysis, like routing, consume credits. Generally, this is much less “expensive” than storage. Please be sure to investigate if the type of analysis widgets that you add to your web apps are going to use credits or not.

11. Spatial data capturing applications

ESRI has several apps that can be used to capture data in the field. These include:

- Survey123 – form/questionnaire centric
- Collector – geographic feature centric
- Workflow Manager – task allocation
- Field Maps – combination of all the above (newest app)

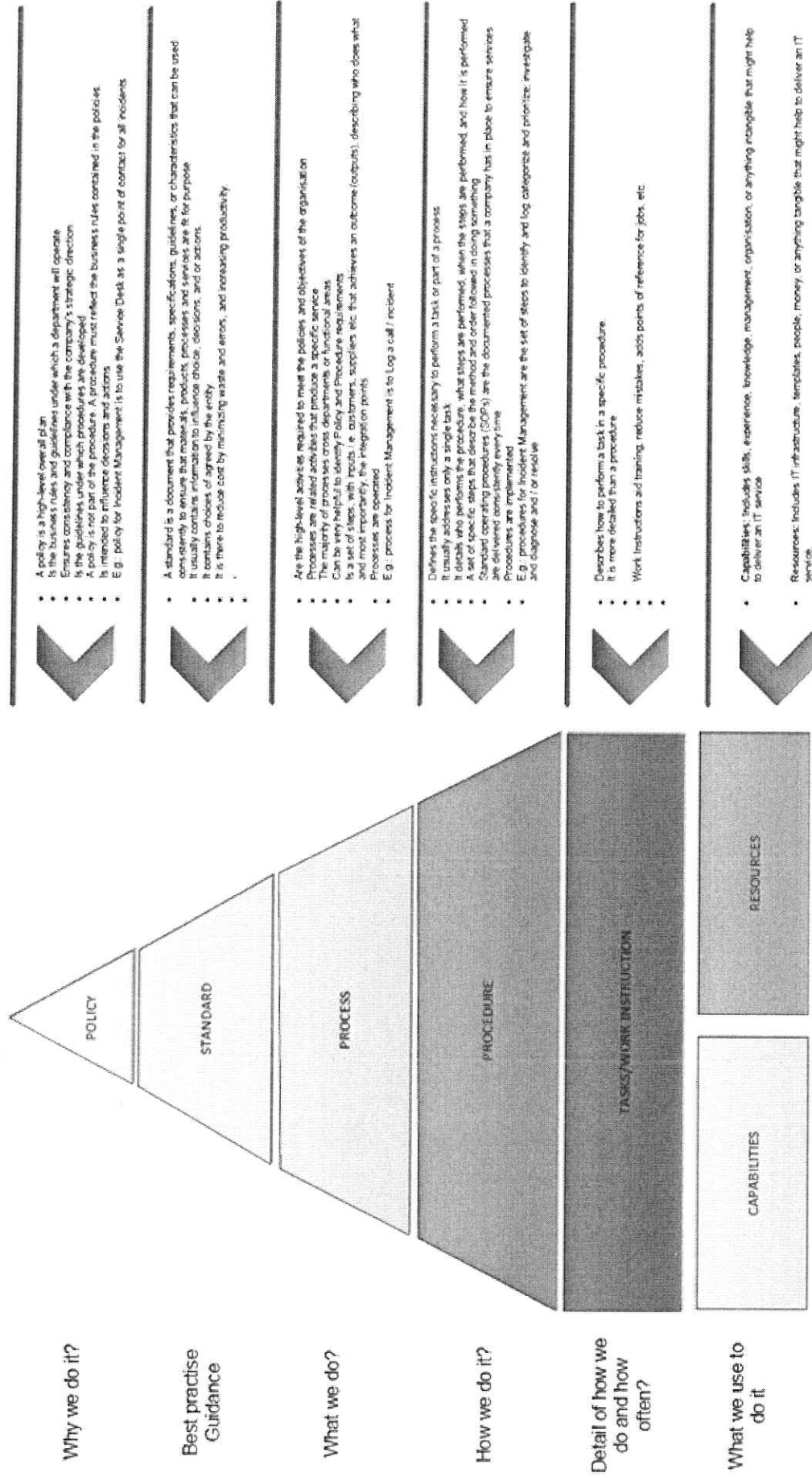
11.1. Using ArcGIS Survey 123

This is a set of tools that enable you to capture information (including spatial information) via a form, in the field. It typically has three main components:

- **ArcGIS Survey123 Connect** – this is a desktop application that you install on your computer and use to set up your questionnaire and publish it.
- **Survey123.arcgis.com** – the web interface where you manage the data received via the questionnaire and settings for security and sharing etc.
- **Survey123 for ArcGIS** – a smartphone app in which you open the questionnaire and capture data.

12. Appendix 1: Useful example documents

12.1. The governance pyramid with details.



12.2. Example Brochure of DEA&DP: Spatial Information Management



Western Cape Government
Environmental Affairs & Development Planning

BETTER TOGETHER.



GIS: Geographic Information Systems
Your guide to Spatial Information Management

INTRODUCTION

Mapping services can be incorporated into almost every aspect of our Department as an information and decision-making tool. The charting of physical locations and linking these to a wide range of programmes and projects can be made possible by this sub-directorate. Maps indicating anything from the location of indigenous species within a region, to the most suitable sites for sustainable development, can be created.

Within our Department, the Sub-directorate Spatial Information Management is responsible for providing these services to all internal stakeholders by:

- Effectively managing Geographical Information Systems (GIS); and
- Rendering a GIS service to the Department as a whole

In a nutshell, this Sub-Directorate takes specific government data and translates it into a tangible visual representation thereof. In addition, the team supports the following Provincial Strategic Goals by providing GIS support, as well as Global Positioning System (GPS) and Web GIS training to directorates and interested staff members:

- **Goal 1:** Create opportunities for growth and jobs
- **Goal 4:** Enable a resilient, sustainable, quality and inclusive living environment
- **Goal 5:** Embed good governance and integrated service delivery through partnerships and spatial alignment

Please feel free to contact us if you require any GIS assistance so as to render a more efficient service to the public, and to make spatially informed and sound management decisions.

The following services are offered:

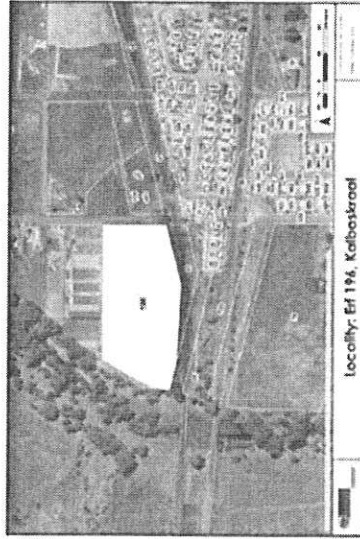
- Map Production;
- Spatial Data Provision; and
- GIS Awareness campaigns

Your Guide To Spatial Information Management **1**

MAP PRODUCTION

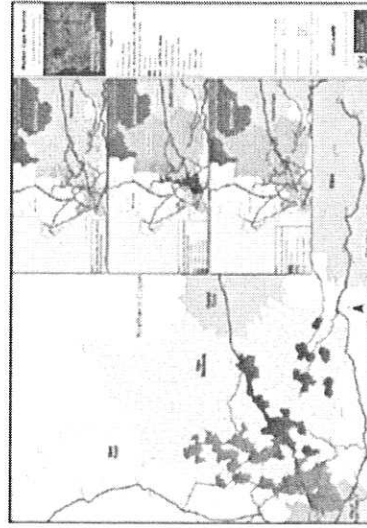
LOCALITY MAPS:

These maps are created for environmental officers and development planners to use in their planning application recommendations.



ANALYTICAL MAPS:

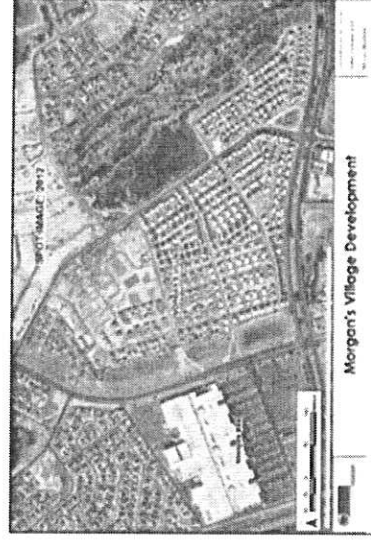
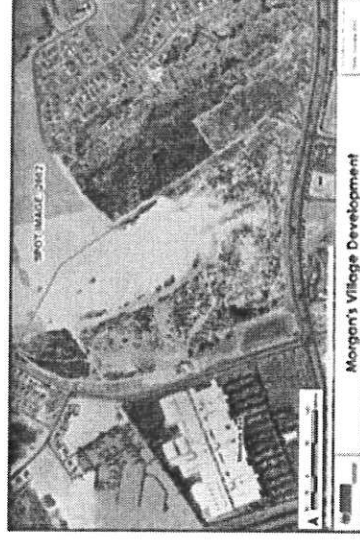
These maps are created by analysing various spatial layers and criteria to derive a 'thematic' map as below



MAP PRODUCTION (cont)

TIME-BASED AERIAL PHOTOGRAPHY:

Aerial images are provided to assist with change detection in land use.

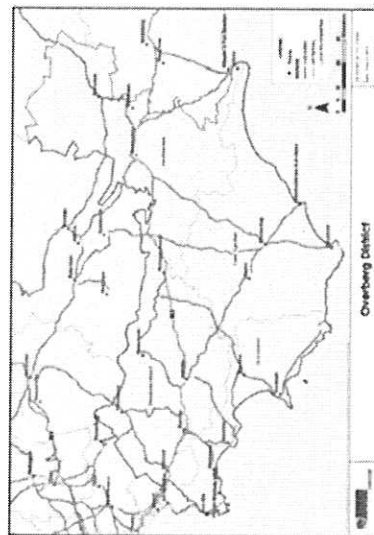
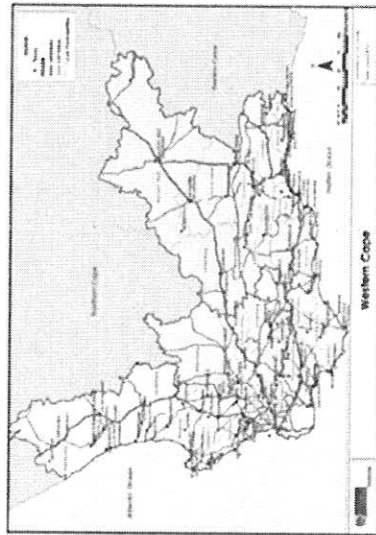


Aerial photography showing how a location has developed over time.
Top image: 2002. Bottom image: 2012.

MAP PRODUCTION (cont)

PROVINCIAL MAPS:

Standard Western Cape Provincial maps are created showing District- and Local Municipalities and Towns



4 Western Cape Government Environmental Affairs and Development Planning

SPATIAL DATA PROVISION:

Spatial data is constantly sourced and created, and categorised as follows:

MAIN DATA THEME	SUB THEME
BUILT ENVIRONMENT	Energy
	Telecommunications
	Pollutions Management
	Hydrology/Water Supply
	Transport
SOCIO-ECONOMIC CONTEXT	Growth Potential
	Settlements
	Disaster Management
	Housing
BIO PHYSICAL CONTEXT	Tourism
	Safety and Security
	Health
	Education
	Land Reform
	Demography
	Public Sector
	Economy and Investment
	Biodiversity
	Mining
	Geology and Soils
	Coastal Management
	Topography/Typology
	Climate
	Protected Areas
	Agriculture and Forestry
	Heritage

5 Your Guide To Spatial Information Management

GIS AWARENESS

- GIS assistance is provided with Departmental campaigns such as Greenest Municipality Competition, World Wetlands Day, World Environment Day
- GIS assistance is provided with departmental projects such as Wind Farm Assessment Project, Boat Launching Sites, Waste Water Treatment Sites, etc
- Web GIS and GPS training is offered/provided to departmental users.

FOR MORE INFORMATION

Please feel free to contact us if you require any GIS assistance so as to render a more efficient service to the public, and to make spatially informed and sound management decisions

MEET THE TEAM



ANDRÉ VAN DER MERWE
Head, Sub-Directorate Spatial Information Management
021 483 5499 Email: Andre.vanderMerwe@westerncape.gov.za

12.3. Example submission for GIS training

The example submission below is for the course Building Geodatabases offered by ESRI South Africa.

For Attention: XX
Chief Director: XXX

REQUEST FOR APPROVAL OF OFFICIALS TO ATTEND ARCGIS COURSES OFFERED BY ESRI SOUTH AFRICA IN CAPE TOWN ON [Date]

1. Purpose

To obtain approval for officials to attend a course offered by ESRI South Africa, Cape Town, on [Date] under Delegation of [Powers xxx and supply Chain Management xxx].

2. Motivation

The reason for using Supply Chain Management 5.1 is per the following reasons:

- The WCG standardised on ESRI ArcGIS software for GIS.
- The WCG entered into an ELA (Enterprise Licence Agreement) which allows for discounted rates for courses.
- ESRI is the only provider of training for ArcGIS software. This course is not offered by the Provincial Training Academy at Kromme Rhee or any other training provider.

The course "Building Geodatabases" is essential to the optimal utilisation of the ESRI software. The course will teach essential skills to efficiently create geodatabases and to model the real-world spatial relationships inherent to the data as well as rules to ensure spatial and attribute integrity of geographic data. Through this submission, the CD facilitates standardisation in spatial data and GIS applications in the WCG.

Topics included in the training programme relate directly to the functions of the officials and is part of their personal development plans. Attendance will enhance the officials' ability to perform their functions more efficient and effectively. Attached is a copy of the course outline.

A special fee has been negotiated with ESRI to provide training for groups of 10. [Number] officials from other departments will also be trained on this course. This is part of the Chief Directorate: XXX's GIS advocacy towards promoting better use of spatial information for policy development, integrated strategic planning and better governance.

XX1 and XX2 [people to attend the course have this course on their Personal Development Plan of their Performance Agreement.

3. Personnel Implications

Internal office arrangements have been made to accommodate for the absence of the officials.

4. Financial Implications

The total estimated cost for attending the abovementioned course is:

Official	Course	Date	Rate
XX1, [WCG Department], [Persal number 1]	Building Geodatabases	[Date]	R [Cost]
XX2, [WCG Department], [Persal number 2]			
		TOTAL (VAT incl.)	R [Sum Cost]

Funding is available in the [Unit name] Budget for [Year].

5. Recommendation

It is recommended that approval be granted for the officials to attend the Building Geodatabases Course offered by ESRI South Africa during [Date] in Cape Town.

XX
Director: xxx Date:

 Recommend / Not Recommend

XX
Chief Director: xxx Date:

 Recommend / Not Recommend

I herewith certify that:

- The application complies with the relevant financial, procurement and legal prescripts,
- The expenditure has been budgeted for,
- The application supports the strategic plan of the Department and its budget programme.

XX
Chief Financial Officer: xxx Date:

 Approved / Not Approved

XX
Director-General: xxx Date:

12.4. Tags or Key Words for metadata

Theme	Tag / Key word
Employment	agriculture basic services boundaries boundary climate change crime crops demographics demography economic economic activities economical economy education environment EPWP governance health labour migration non-economic activities people poverty prices quality of life skills skills development spatial sustainability sustainable transport travel unemployment weather youth
Economic	economy employment EPWP GDP GVA income inequality labour poor poverty price skill unemployment
Education	children

Theme	Tag / Key word
	early childhood development ECD educate literacy numeracy pass rates retention skill teacher
Health	Aids HIV human rights patients QOL quality of life substance abuse TB wellness
Transport	accident alcohol collisions maintenance N1 N2 N7 road route travel
Safety	CPF crime police policing forum security statistics
Environment	agricultural agriculture biodiversity crop energy land cover land use pollution protected areas PSDF renewable SDF spatial development sustainability waste

Theme	Tag / Key word
	weather wind farm
Demographics	economically active elderly employment gender households human rights people statistics unemployment youth
Governance	citizen democracy FOSAD FSDM MPAT MSCOA
Location	Beaufort West Bergrivier Bitou Breede Valley cadastre Cape Agulhas Cape Winelands Cederberg Central Karoo City of Cape Town Drakenstein Eastern Cape Free State Gauteng George Hessequa Kannaland Kaw-Zulu Natal Knysna Kwa Zulu Natal KwaZulu Natal Laingsburg Langeberg Limpopo Matzikama Mossel Bay Mpumalanga municipal North West Northern Cape Oudtshoorn Overberg

Theme	Tag / Key word
	Overstrand Prince Albert profile Saldanha Stellenbosch Swartland Swellendam Theewaterskloof West Coast Western Cape Witzenburg
Settlements	formal housing housing demand human settlements informal housing
Infrastructure	assets built environment bulk CAMP electricity Giama property sanitation service centers service centres UAMP water
Services	electricity refuse removal sanitation water
Strategic / Strategy	PSG 1-5 PSO 1-10 SDG 1-17