

# Experiences with ArcGIS Pro within Ordnance Survey

Technical Meeting of the EuroGeographics

Data Producers 2018

Ian Rolls

Solution Architect

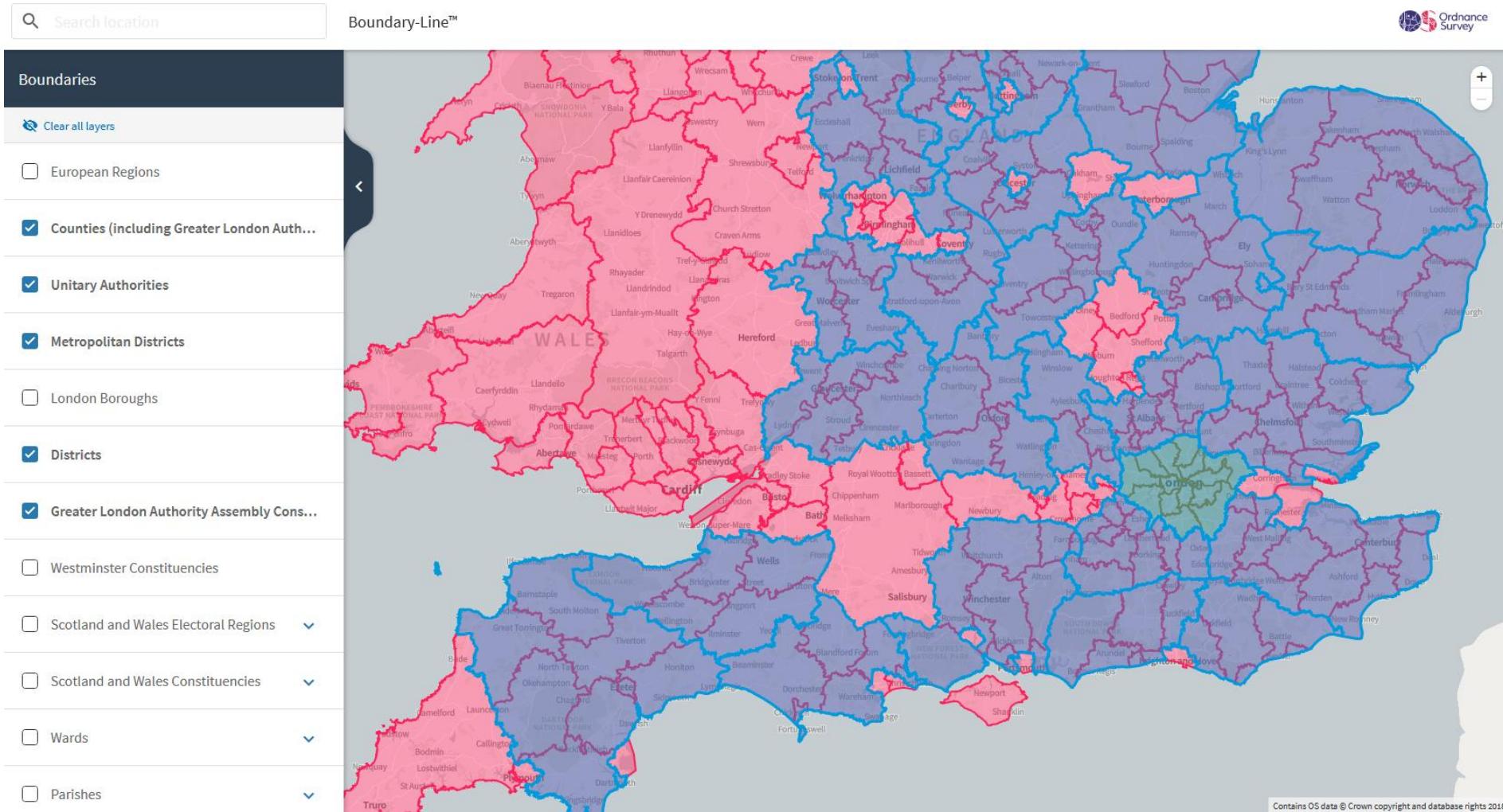
# Overview

- What we do at Ordnance Survey (OS)
- ArcGIS Pro in the Boundary-Line™ system
- Why choose ArcGIS Pro?
- Experience of ArcGIS Pro
- Tips for migrating to ArcGIS Pro
- Q&A

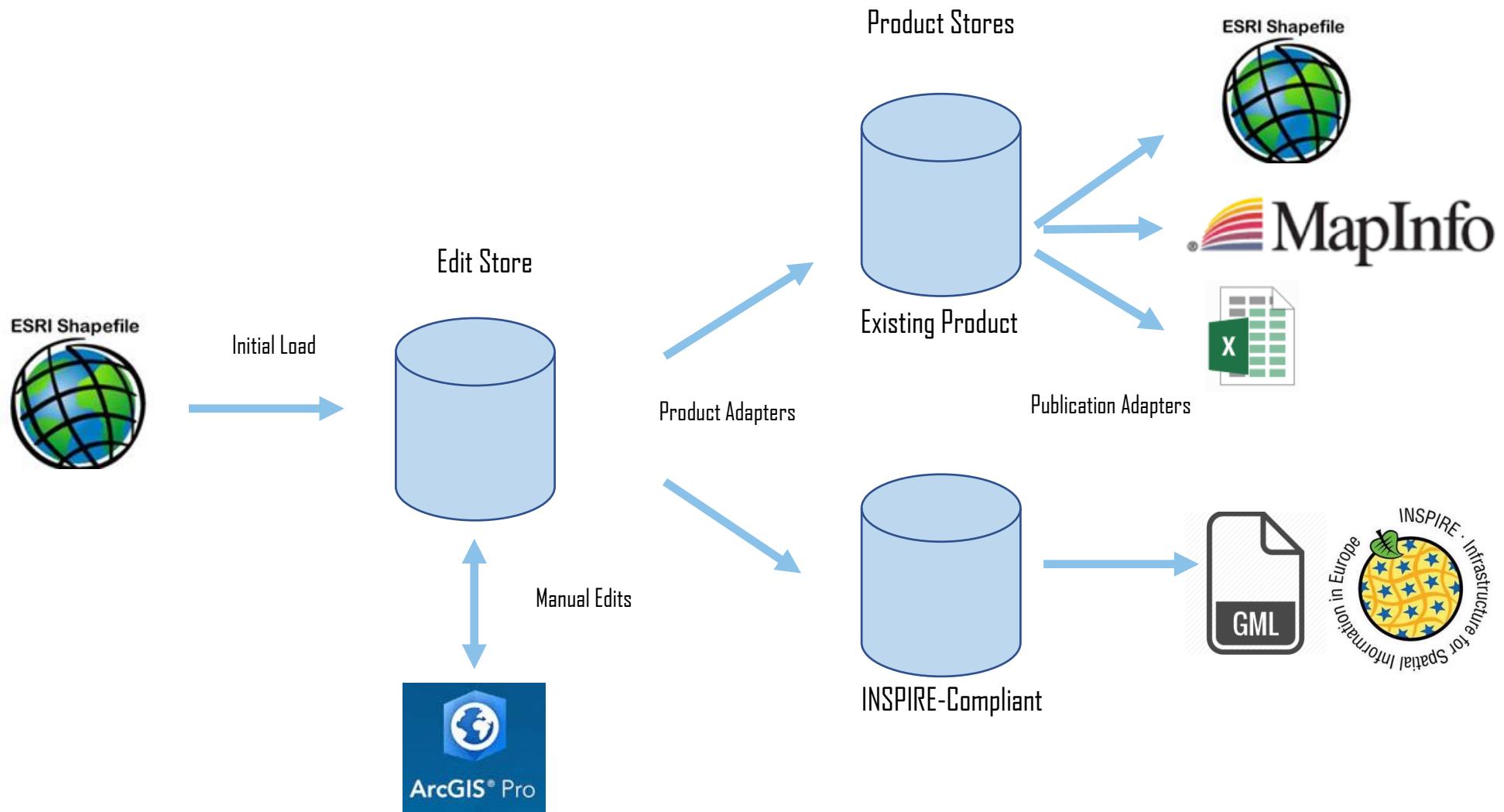
# What we do



# ArcGIS Pro Case Study – Boundary-Line™ Production System



# ArcGIS Pro Case Study – Boundary-Line™ Production System



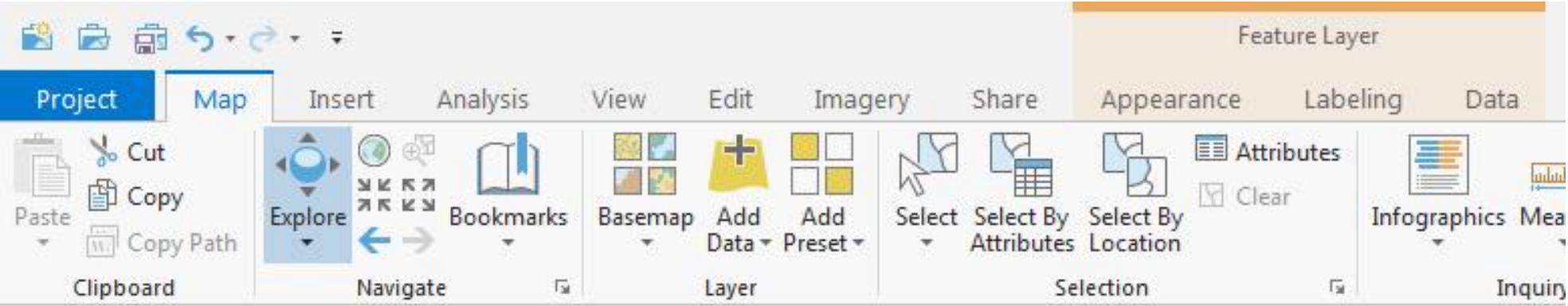


## Why choose ArcGIS Pro?

- Preferred Corporate GIS technology at OS
- Part of ESRI ArcGIS Desktop stack – doesn't cost any extra!
- User friendly modern ribbon-based interface
- Customisable interface i.e. python automation
- Built on .NET architecture and fully 64bit enabled.
- Workflow Manager Integration



# Experience of ArcGIS Pro



Contents Search

Map  Footpath  Topographic

Published  Update Required

**Catalog** **Scene** **Map**

Drawing Order

- Map
- Footpath**
- Topographic

ArcGIS Pro - BL\_Test - WL\_1660

Feature Layer

Project Map Insert Analysis View Edit Imagery Share Workflow Add-In Appearance Labeling Data

Cut Save Discard Error Inspector Snapping Create Modify Delete Attributes Select Move Vertices Reshape Split Line Split Merge Mode No surfaces Mode Manage Quality

Clipboard Manage Edits Snapping Features Selection Tools Elevation Data Reviewer

Contents

Search

Drawing Order

- WL\_1660
  - Working Lines
    - working\_lines\_point
    - working\_lines\_polyline
    - working\_lines\_poly
  - Background
    - VML
      - Boundary
      - Footprint
      - Image
    - OSMM Text Live
    - OSMM Live

osvm1335 WL\_1660 WL\_1660

Geoprocessing

Update Working Lines Geodatabase

Parameters | Environments

Job ID: 1660

Ingest

Points:

Lines:  Export\_Output.shp

Polygons:

Run 

Selected Features: 0

1:338,238 3.8096213°W 54.4275669°N

Contents 1Integrate For ArcGIS

EuroGeoGraphics Data Producers 2018 | 6th – 7th November 2018

Ordnance Survey

ArcGIS Pro - Boundary-Line Production - WL\_1054 St. Edmundsbury W SI. 118

Project Job Insert Analysis View Share Add-In

Clipboard View Assign Workflow Manage Job

Contents osvm1337 WL\_1054 St. Edmundsbury W SI. 118

Job Type - Job ID: Working Lines Ingest - 1054  
Created By: Robbie Franklin at 16/10/2018 14:20  
Assigned to: Robbie Franklin  
Days Active: 1  
LOI Not Defined

Workflow | Descriptive Information | History | Extended Properties | Holds

Working Lines Workflow v0.4

```

graph TD
    A[Create Clean Working Lines Folder] --> B[Create Working Lines Geodatabase]
    B --> C[Copy Working Lines Template]
    C --> D[Quality Check Working Lines]
    D --> E{Validation Complete?}
    E -- No --> F[Create Edit Job/s]
    F --> G{Validation Complete?}
    G -- No --> D
    G -- Yes --> H[Notify]
  
```

Job Status: Working, 0% Complete

Current Step(s): Create Clean Working Lines Folder

Catalog

Project | Portal | Favorites | Notifications

Toolboxes

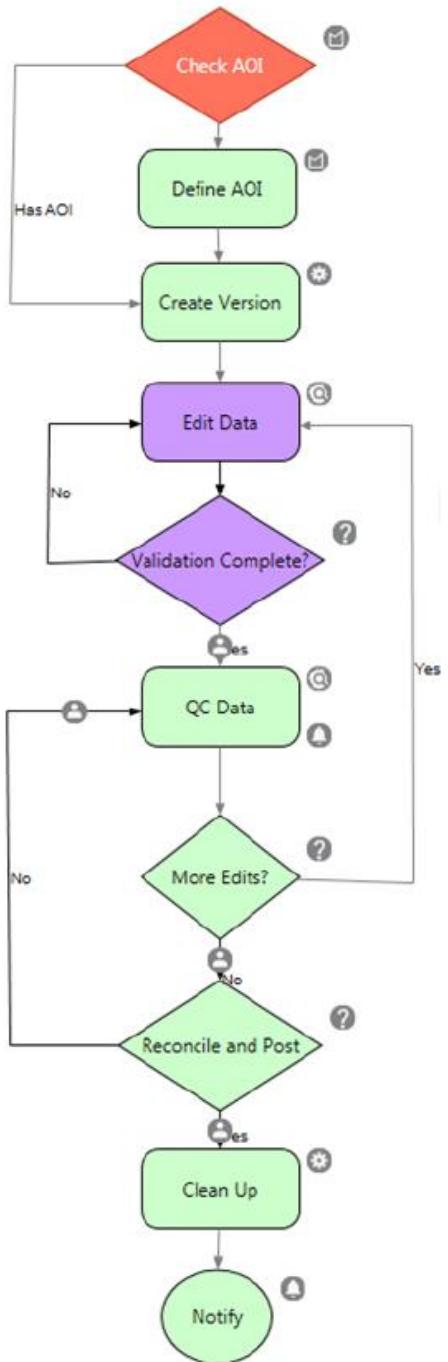
- Boundary-Line Production.tbx
- Boundary\_Line\_Tools.tbx
  - 1.General
    - Update Working Lines Geodatabase
  - 2.Management
    - Compress Boundary Line Database
    - Release Edit to Content
    - Remove Content Records
  - 3.Administration
    - Decode Password from Configuration
    - Encode Password for Configuration F
    - Set NULL constraint on Geometries
    - Setup Boundary Line Databases
    - Tear Down Boundary Line Databases
- Databases
- Geoprocessing History
- Styles
- Folders
- Workflows
- Locators

ArcGIS Pro - Boundary-Line Production - EJ\_1055\*

Project Job Insert Analysis View Share Add-In

Cut Copy Paste Zoom to Current Step Fit To Window Current User Execute Mark Step Complete LOI Attachments Holds Refresh Take Offline Bring Online Clipboard View Assign Workflow Job

Contents osvm1337 EJ\_1055\* Job Type - Job ID Create Edit Job - 1055 Assigned to Unassigned Created By Robbie Franklin at 16/10/2018 14:29 Days Active 1 LOI Defined Job Notes Workflow | Descriptive Information | History | Holds Job Details Job Name EJ\_1055 Priority Medium Assignment Unassigned Parent Job WL\_1054 St. Edmundsbury W SI. 118 Owner Robbie Franklin Dates Scheduled Start Date Actual Start Date Not Started Scheduled Due Date Completion Date Not Completed Select Parent Job None By Job ID 1054 From Job List ID Job Type Name Assigned to OK Cancel Geoprocessing Create New Jobs Parameters Environments Input Database Path (.jtc) C:\Users\rfranklin\Documents\ArcGIS\Projects Job Type Create Edit Job Assignment Type Unassigned Priority LOI Extent BL\_EDIT\_AOI AREAS Merge features to create one LOI Run Create New Jobs Completed successfully Geo... Cat... Loc... Mo... Sym... Cre... Attr... Job Status: Ready To Work, 0% Complete Current Step(s): Check AOI



ArcGIS Pro - BL\_Test - EJ\_1659

Project Map Insert Analysis View Edit Imagery Share Workflow Add-In Appearance

Snapping Create Modify Delete Select Move Vertices Reshape Split Line Split Merge Mode No surfaces Manage Quality

Clipboard Manage Edits Snapping Features Selection Tools Elevation Data Reviewer

Contents osvm1335 EJ\_1659 EJ\_1659

Search

Editing

- EJ\_1659
  - EJ\_1659 AOI
  - Working Lines
    - working\_lines\_point
    - working\_lines\_polyline
  - Boundary Line Editing
  - TIDE LINES
    - Mean High Water
  - ADMINISTRATIVE
  - ELECTORAL
    - WARDS & EDS
      - Ward
      - working\_lines\_poly
      - Electoral Division
  - DEVOLED
  - OTHER
  - POLLING DISTRICTS
  - HISTORIC & CEREMONIAL
  - VML
    - BaseMaps/OSMM\_Live
    - BaseMaps/OSMM\_Text\_Live

ArcGIS Pro - BL\_Test - EJ\_1656

Not signed in

**Project** **Map** **Insert** **Analysis** **View** **Edit** **Imagery** **Share** **Workflow** **Add-in**

**Snapping** **Attributes** **Select** **Move** **Vertices** **Reshape** **Split Line** **Split** **Merge**

**Clipboard** **Manage Edits** **Snapping** **Features** **Selection** **Tools** **Elevation** **Data Reviewer**

**Contents** **osvm1335** **EJ\_1656 Cheshire West and Chester** **EJ\_1656**

**Modify Features** **Merge**

**Existing Feature** | **New Feature**

**Change the selection**

**Layer** **Ward**

**Features to merge** **Neston** **(preserve)** **Parkgate**

**Merged Feature Attributes**

Creator	<Null>
Creation_Date	<Null>
Last_Editor	<Null>
Last_Edited_Date	<Null>
name	Neston
nameAlternate	<Null>
unitID	43565
polygonID	123367
gssCode	E05008686
classification	English Unitary Authority Ward
isDetached	false
linkToDocument	<a href="http://www.legislation.gov.uk/uksi/">http://www.legislation.gov.uk/uksi/</a>

**Merge**

**Selected Features: 3**

1:44,842

3.1492084°W 53.2544090°N

Contents 1Integrate For ArcGIS

Geo... Cata... Creat... Locate Mod... Attri... Sym...

ArcGIS Pro - EJ\_Test - EJ\_1656

Project Map Insert Analysis View Edit Imagery Share Workflow Add-In Appearance Data Mosaic Layer

Cut Copy Save Discard Map Topology Status Error Inspector Snapping Create Modify Delete Select Attributes Snapping Features Selection Tools Move Vertices Reshape Split Line Split Merge Mode Elevation Data Reviewer

Clipboard Manage Edits

Contents osvm1335 EJ\_1656 Cheshire West and Chester EJ\_1656

Search Drawing Order

- EJ\_1656
  - EJ\_1656 Cheshire West and Chester AOI
  - Working Lines
    - working\_lines\_point
    - working\_lines\_polyline
  - Boundary Line Editing
    - TIDE LINES
      - Mean High Water
    - ADMINISTRATIVE
    - ELECTORAL
      - WARDS & EDS
        - Ward
      - working\_lines\_poly
        - Electoral Division
    - DEVOLVED
    - OTHER
    - POLLING DISTRICTS
    - HISTORIC & CEREMONIAL
    - VML
    - BaseMaps/OSMM\_Live
    - BaseMaps/OSMM\_Text\_Live

Modify Features

Reshape

Features Edges

Change the selection.

Ward
 

- Little Neston and Burton
- Neston

Reshape

Edit

Discard

Map Topology

No Topology

Do not use topological editing

Map Topology

Maintain feature contiguity when editing

Map Topology Options

Selected Features: 0

Geo... Cat... Creat... Locate Mod... Attr... Sym...

3.0530698°W 53.2867847°N

ArcGIS Pro - BL\_Test - EJ\_1656

Project Map Insert Analysis View Edit Imagery Share Workflow Add-In Appearance Data

Snapping Create Modify Delete Select Move Vertices Reshape Split Line Split Merge Mode Elevation Data Reviewer

Clipboard Manage Edits Snapping Features Selection Tools

Contents osvm1335 EJ\_1656 Cheshire West and Chester EJ\_1656

Search Drawing Order

- EJ\_1656
  - EJ\_1656 Cheshire West and Chester AOI
  -
- Working Lines
  - working\_lines\_point
  - working\_lines\_polyline
- Boundary Line Editing
  - TIDE LINES
    - Mean High Water
    - ADMINISTRATIVE
  - ELECTORAL
    - WARDS & EDS
      - Ward
      - working\_lines\_poly
      - Electoral Division
    - DEVOLVED
    - OTHER
    - POLLING DISTRICTS
  - HISTORIC & CEREMONIAL
- VML
- BaseMaps/OSMM\_Live
- BaseMaps/OSMM\_Text\_Live

Modify Features

Reshape

Make a selection.

Features | Edges

Change the selection.

Ward

- Little Neston and Burton
- Neston

Reshape

Contents

Search

Editing

EJ\_1659 AOI

Working Lines

- working\_lines\_point
- working\_lines\_polyline

Boundary Line Editing

TIDE LINES

- Mean High Water

ADMINISTRATIVE

- Top Tier Administrative
- Second Tier Administrative
- Lower Tier Administrative

ELECTORAL

WARDS & EDS

- Ward
- working\_lines\_poly
- Electoral Division

DEVOLVED

- Devolved Parliament Constituency
- Devolved Parliament Electoral Region

OTHER

- Greater London Authority Constituency
- Westminster Constituency
- European Region

POLLING DISTRICTS

HISTORIC & CEREMONIAL

VML

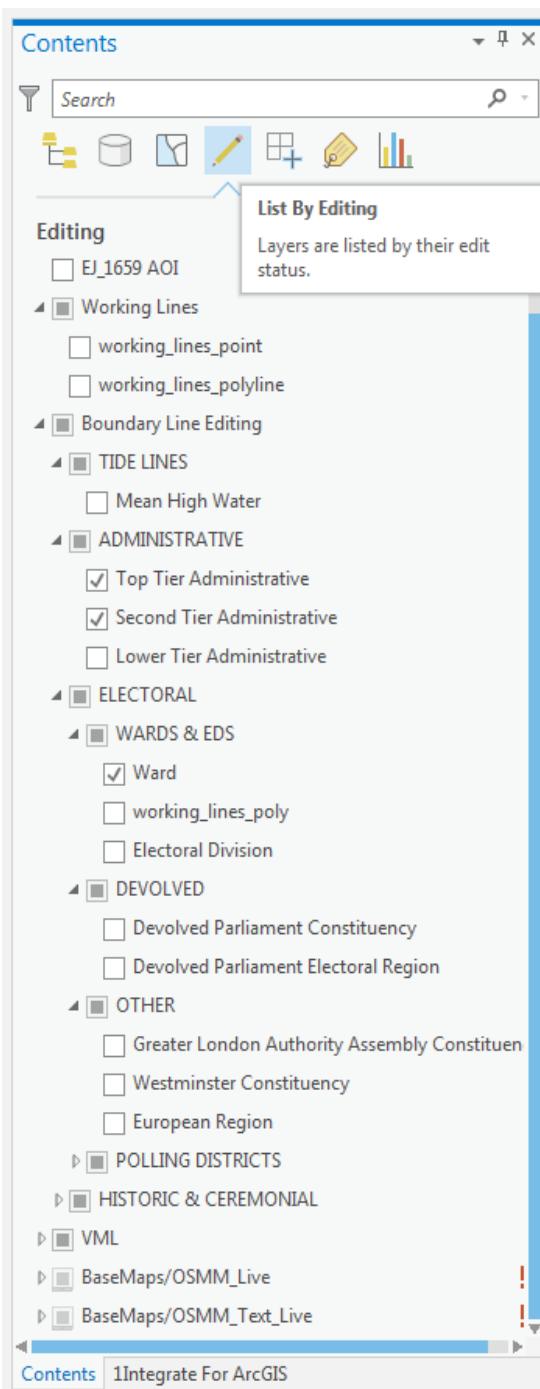
BaseMaps/OSMM\_Live

BaseMaps/OSMM\_Text\_Live

List By Editing

Layers are listed by their edit status.

Contents 1Integrate For ArcGIS



# Options



Project
Current Settings
Units
Tasks
<b>Application</b>
General
Map and Scene
Navigation
Selection
<b>Editing</b>
Geoprocessing
Raster and Imagery
CAD
Display
Layout
Metadata
Indexing
Location Referencing
Language
Customize the Ribbon

Show feature symbology in the sketch

Show the editing toolbar on the map

Position  Left  Bottom  Right

Size  Small  Medium  Large

Magnify Toolbar

**Session**

Automatically save edits

Time interval (minutes)

Number of operations

Save edits when saving project

Show dialog to confirm save edits

Show dialog to confirm discard edits

Deactivate an active editing tool when saving or discarding

Make newly added layers editable by default

**Versioning**

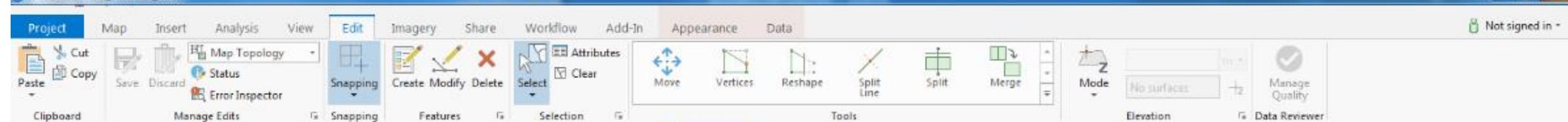
How do you want conflicts to be resolved?

In favor of the edit version

[Learn more about options for saving edits](#)

OK

Cancel



Contents

Search



Drawing Order

- ↳ EJ\_1656
- ↳ EJ\_1656 Cheshire West and Chester AOI
- ↳ Working Lines
  - ↳ working\_lines\_point
  - ↳ working\_lines\_polyline
- ↳ Boundary Line Editing
- ↳ TIDE LINES
  - ↳ Mean High Water
- ↳ ADMINISTRATIVE
- ↳ ELECTORAL
  - ↳ WARDS & EDS
    - ↳ Ward
    - ↳ working\_lines\_poly
    - ↳ Electoral Division
      - ↳ County Electoral Division
      - ↳ English Unitary Authority Electoral Division
      - ↳ Welsh Unitary Authority Electoral Division
  - ↳ DEVOLVED
  - ↳ OTHER
  - ↳ POLLING DISTRICTS
  - ↳ HISTORIC & CEREMONIAL
  - ↳ VML
  - ↳ BaseMaps/OSMM\_Live
  - ↳ BaseMaps/OSMM\_Text\_Live

osvm1335 EJ\_1656 Cheshire West and Chester EJ\_1656

Contents

Features

Selection

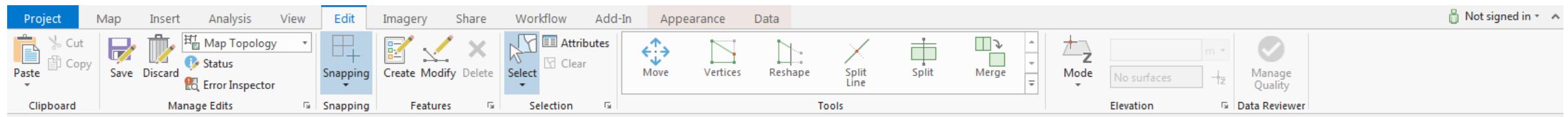
Tools

Elevation

Data Reviewer

Manage Quality

Drawing Order



Contents

Search

Drawing Order

- ▼ EJ\_1656
  - ✓ EJ\_1656 Cheshire West and Chester AOI
  - Working Lines
    - ✓ working\_lines\_point
    - ✓ working\_lines\_polyline
  - Boundary Line Editing
    - TIDE LINES
      - ✓ Mean High Water
    - ADMINISTRATIVE
    - ✓ ELECTORAL
      - ✓ WARD & EDS
        - Ward
        - working\_lines\_poly
        - Electoral Division
      - DEVOLVED
      - OTHER
      - POLLING DISTRICTS
      - HISTORIC & CEREMONIAL
  - VML
  - BaseMaps/OSMM\_Live
  - BaseMaps/OSMM\_Text\_Live

osvm1335 EJ\_1656 Cheshire West and Chester EJ\_1656

Attributes

Make a selection.

Select one or more features

ArcGIS Pro - BL\_Test - EJ\_1656

Feature Layer

Project Map Insert Analysis View Edit Imagery Share Workflow Add-In Appearance Labeling Data

Not signed in

1Integrate For ArcGIS

Allocate New IDs

Enterprise Data Management Manage IDs

1Integrate For ArcGIS

Get Rulesets 002 Boundary C Get Schema

Validation Enhancement

Boundary Geometry Validation

- 002 Check\_OGC\_Valid\_Feature (checked)
- 003 Check\_Kickbacks (checked)
- 004 Check\_Spikes (checked)
- 005 Check\_Duplicate\_Points (checked)
- 006 Check\_Duplicate\_Features (checked)
- 007b Check\_Self-intersections (Polygons) (checked)
- 010 Geometry is larger than a 10m2 in area (checked)

Run

100%

Results

RuleName	FeatureType	FeatureId
Boundary Geometry Validation/002 Check_OGC_Valid_Feature		
Boundary Geometry Validation/004 Check_Spikes		(6 Items)

osvm1335 EJ\_1656 Cheshire West and Chester EJ\_1656

Modify Features

Edit Vertices

Select one feature

Features Edges

Change the selection.

Ward

- Allington
- Beechwood
- Blacon
- Boughton
- Bunbury
- Burton
- Chester City

Validation Enhancement

Fix Essential Geometric Errors

- Remove\_Dup\_Feature (checked)
- Remove\_Kickbacks (checked)
- Remove\_Spikes (checked)

Run

1:101,805 2.9224456°W 53.1303653°N

Selected Features: 52

Geo... Cata... Creat... Locate Mod... Attri... Sym...

ArcGIS Pro - BL\_Test - EJ\_1656

Project Map Insert Analysis View Edit Imagery Share Workflow Add-In

Not signed in

1Integrate For ArcGIS Allocate New IDs

Enterprise Data Management Manage IDs

1Integrate For ArcGIS

Get Rulesets 003 Boundary C Get Schema

Validation Enhancement

Fix Essential Geometric Errors

- Remove\_Dup\_Feature
- Remove\_Kickbacks
- Remove\_Spikes

Run 100%

Results

RuleName	FeatureType	FeatureId

osvm1335 EJ\_1656 Cheshire West and Chester EJ\_1656

Modify Features

Edit Vertices

Select one feature

Features | Edges

Change the selection.

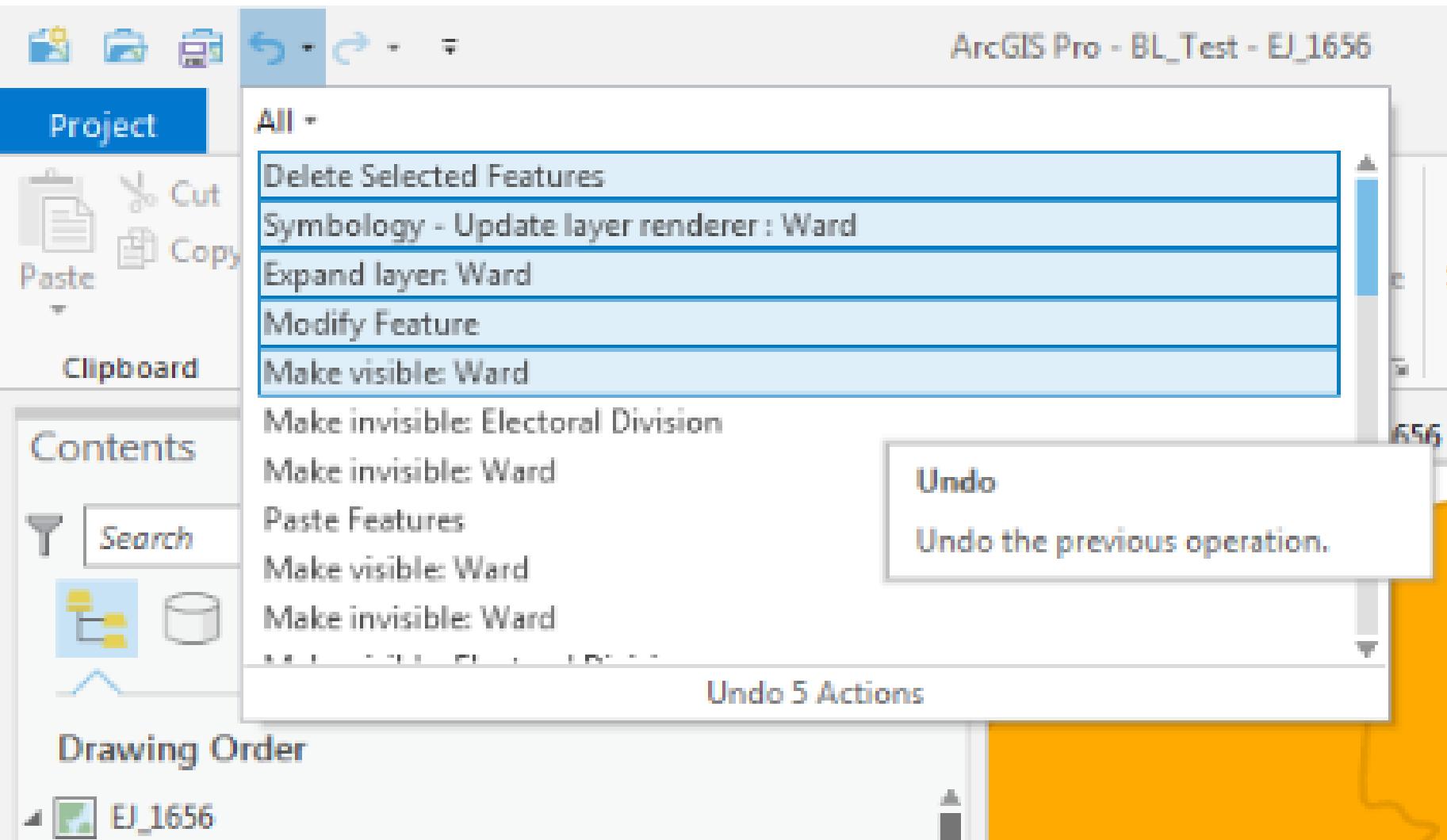
Ward

- Allington
- Beechwood
- Blacon
- Boughton
- Bunbury
- Burton
- Chester City

1:101,805 2.9829255°W 53.1693540°N

Selected Features: 52

Geo... Cata... Creat... Locate Mod... Attri... Sym...



ArcGIS Pro - BL\_Test - EJ\_1659

Project Map Insert Analysis View Edit Imagery Share Workflow Add-In Appearance Data

In Beyond <None> Out Beyond <None> Clear Limits 46.0 % Symbology Stretch Type Resampling Type Masking Band Combination Enhancement Rotate

Visibility Range Effects

Contents osvm1335 EJ\_1659 EJ\_1659

Search Drawing Order

- EL\_1659
  - Working Lines
    - working\_lines\_point
    - working\_lines\_polyline
  - EL\_1659 AOI
- Boundary Line Editing
- TIDE LINES
  - Mean High Water
  - ADMINISTRATIVE
- ELECTORAL
  - WARDS & EDS
    - Ward
    - working\_lines\_poly
    - Electoral Division
  - DEVOLVED
  - OTHER
  - POLLING DISTRICTS
- HISTORIC & CEREMONIAL
- VML
- BaseMaps/OSMM\_Live
- BaseMaps/OSMM\_Text\_Live

43m 42m The Nook

Mosaic Layer

Appearance Data

Rendering

Enhancement

Rotate

Symbology

Image

Symbology RGB

Band Combination

Red	Band_1
Green	Band_2
Blue	Band_3
Alpha	None

Background

Display background value 0 0 0 Nodata

Stretch

Stretch type None

Gamma 1.0 1.0 1.0

Statistics Dataset

Normal

Drag a vertex or segment. To exit this mode, click Finish or another command.

2.9676286°W 53.2519942°N

Selected Features: 0 Catalog Locate Modify Features Symbology

ArcGIS Pro - MyProject - Map

Project Map Insert Analysis View Edit Imagery Share Feature Layer Appearance Labeling Data

Cut Copy Save Discard Status Error Inspector Snapping Create Modify Delete Select Attributes Clear Move Vertices Reshape Split Line Mode No surfaces Manage Quality

Clipboard Manage Edits Snapping Features Selection Tools Elevation Data Re...

Contents Catalog Map

Search Drawing Order

- Map
- working\_highland\_MultipartTo
- working\_highland
- Topographic

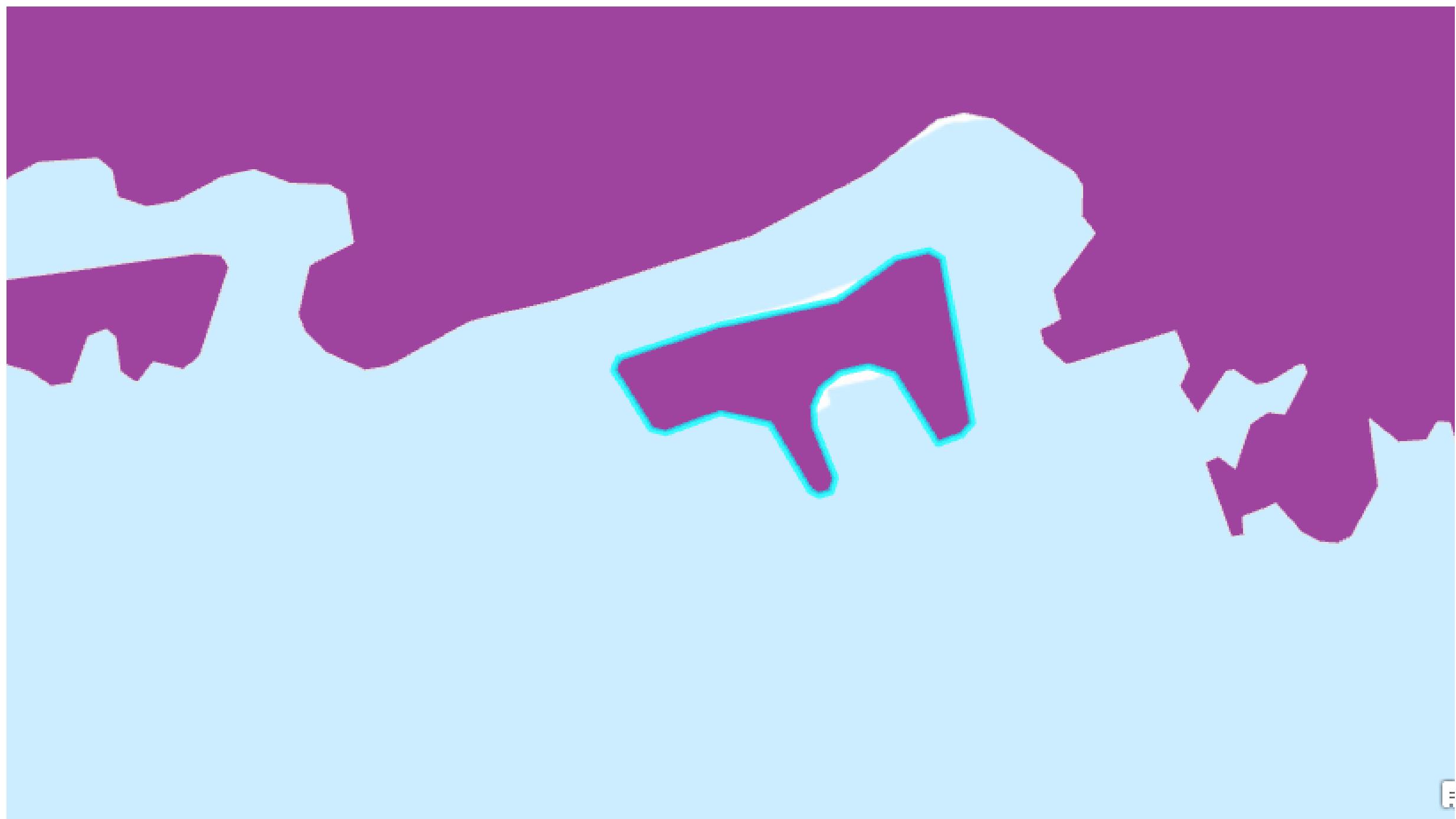
Modify Features

Search Favorites | All Tools

- Alignment
  - Move
  - Rotate
  - Scale
  - Annotation
  - Transform
  - Align Edge
  - Align Features
  - Move To
- Reshape
  - Vertices
  - Reshape
  - Replace Geometry
  - Replace MultiPatch
  - Continue Feature
  - Extend or Trim
- Divide
  - Split Line
  - Split
  - Planarize
  - Clip
  - Explode
- Construct
  - Explode
    - Separate selected multipart features into individual features. These parts become independent features and are assigned identical attributes.
  - Merge
  - Truncate
  - Buffer
- Topology

1:3,171 3.2608651°W 58.2991604°N Selected Features: 1

Catalog Symbology Modify Fe... Geoproc...



# Geoprocessing



Release Edit to Content



Parameters | Environments



① Configuration (INI) File

B:\deployment\1\_0\_5\prd.ini



Release Name

Boundary-Line

Are You Sure?

Yes

▼ Security

Encryption Key

\*\*\*\*\*

Run

Geoprocessing

Catalog

Locate

Modify Features

## Results

- Editing is 60-70% quicker than old legacy system
- No interruption when publishing data
- Publication is now integrated as part of the system.

# Tips for migrating to ArcGIS Pro

- Adoption depends upon maturity level of using ESRI Desktop
- Convert existing Models to Python
- Upgrade Python v2.7 > 3.6
- Minor releases are forward compatible i.e. v. 2.2 features works in v2.3
- Highly recommended to have a physical GPU (Graphics Processing Unit) with a minimum capacity of 2GB

# Thank you

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