

# Setting up and running needs scripts

Wednesday, November 29, 2023 11:12 AM

Most of the process of creating the 2023 needs is automated using python scripts. The final output of these scripts is a geodatabase that contains an event table containing all of the needs as well as a feature class created from the event table. Each of the individual needs have their own subfolder which contains a python script for that need as well as the page from the technical guide that covers that need. In addition, each need has a subfolder in the A1 - Common Datasets folder that contains data relevant to that need, including the output from the script. The folder itself has an "A1" prefix to ensure that it is the first folder in the list for easy access in ArcGIS Pro.

The individual needs event tables are merged together by another script (create\_final\_needs\_layer.py). The general workflow for creating the needs layer looks like this:

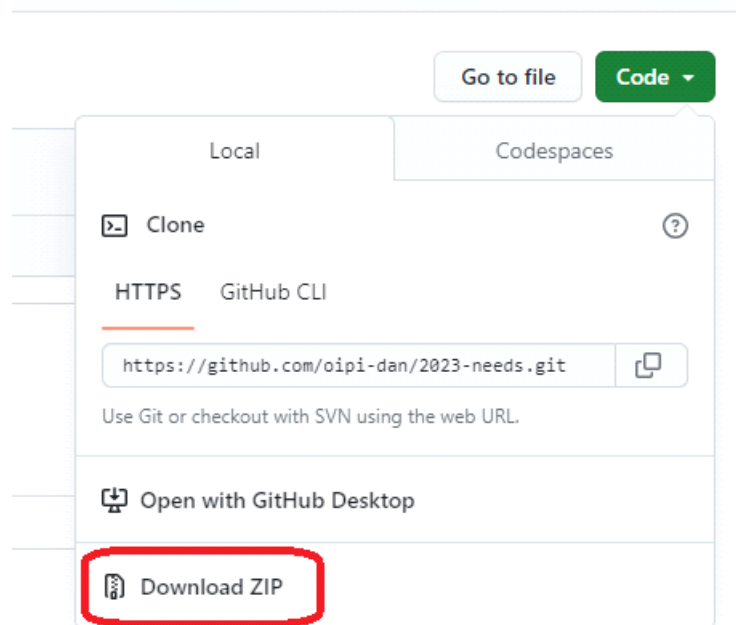
1. Ensure that input datasets are correct and the individual needs scripts reference the correct datasets.
2. Ensure that the scripts for the individual needs correctly identify the location of that need as described in the technical guide.
3. Run each script to generate an event table for that need in its data/output.gdb
4. Run create\_final\_needs\_layer.py to overlay the event tables from all of the needs to create the final event table that contains all of the needs. This is located in Create Final Needs Layer/2023\_Vtrans\_MidTerm\_Needs.gdb

This workflow can be automated by running the run.bat file in the main folder. It will run all of the individual needs scripts before creating the final output table.

## Installing needs scripts

The scripts are located on GitHub here: <https://github.com/oipi-dan/2023-needs>

It can either be cloned using Git or downloaded as a zip



## Running Scripts

All of the python scripts must be run using ESRI's Pro Python environment as they rely on arcpy.

### Run needs individually

As described in the workflow above, each need has a script that will create an event table containing the location of the needs on the LRS. Note that the following needs were either created manually or do not otherwise have a script to quickly recreate them:

- Access to Industrial and Economic Development Areas (IEDAs) - The event table was manually created
- Improved Reliability (Intercity and Passenger Rail) - The event table was manually created
- Urban Development Areas (UDAs) Needs - These were imported from the previous version manually

### Using run.bat

This workflow can be simplified by running the run.bat file. Note that before this can be run, the propy variable must be set to the path of Pro's Python environment. Run.bat will run each of the individual scripts, then run create\_final\_needs\_layer.py to create the final output. It will take 30-40 minutes to run.

Keep in mind that using run.bat isn't always needed. For example, if only the create\_final\_needs\_layer.py file is modified, then only that file needs to be run since none of the underlying needs event tables would have changed. Similarly if only the script for congestion was modified, then just the congestion.py and create\_final\_needs\_layer.py would need to be run. On the other hand if an underlying dataset that effects many needs like CoSS is modified, then it would be safest to re-run all needs using run.bat.

### Modify run.bat

If only some of the scripts need to be run, then run.bat could be modified by commenting out the unneeded scripts to save time. For example, if the RN layer was updated, then only the needs that reference that layer need to be run (the others can be commented out by inserting two colons (::) in front of the line that calls that script), followed by create\_final\_needs\_layer.py.

### Finding the final output

The final output is in the 2023\_Vtrans\_MidTerm\_Needs.gdb located in the main folder. The geodatabase contains both an event table and a line feature class.

# Needs Scripts and Required Datasets

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## 1. Congestion Mitigation

- a. Fields - CoSS\_Congestion, RN\_Congestion
- b. Folder Name - Congestion Mitigation
- c. Script Name - congestion\_mitigation.ipynb
- d. Datasets
  - i. CoSS Event Table (tbl\_coss\_2023)
  - ii. Regional Network Event Table (tbl\_regional\_networks)
  - iii. Limited Access Event Table (tbl\_limited\_access)
  - iv. Overlap LRS (SDE\_VDOT\_RTE\_OVERLAP\_LRS\_DY)
  - v. Master LRS (SDE\_VDOT\_RTE\_MASTER\_LRS\_DY)
  - vi. TMC-LRS Conflation (tbl\_tmc\_lrs\_2023\_master)
  - vii. PECC (PECC\_2022.csv)
  - viii. TTI Weighted Average (2022\_TTI\_WA.csv)

## 2. Improved Reliability (Roadway)

- a. Fields - CoSS\_Reliability, RN\_Reliability
- b. Folder Name - Improved Reliability (Roadway)
- c. Script Name - identify\_reliability\_needs.ipynb
- d. Datasets
  - i. CoSS Event Table (tbl\_coss\_2023)
  - ii. Regional Network Event Table (tbl\_regional\_networks)
  - iii. Overlap LRS (SDE\_VDOT\_RTE\_OVERLAP\_LRS\_DY)
  - iv. MC-LRS Conflation (tbl\_tmc\_lrs\_2023\_master)
  - v. LOTTR Weighted Average (2022\_LOTTR\_WA\_updated.csv)

## 3. Improved Reliability (Intercity and Passenger Rail)

- a. Fields - CoSS\_Rail\_Reliability
- b. Folder Name - Improved Reliability (Intercity and Passenger Rail)
- c. Script Name - None - manually created output event table based on station needs. OTP data shows that all intercity and passenger rail stations have need for improved reliability.

## 4. Transportation Demand Management (TDM)

- a. Fields - CoSS\_TDM, RN\_TDM
- b. Folder Name - Transportation Demand Management (TDM)
- c. Script Name - Identify\_TDM\_Needs.ipynb
- d. Datasets
  - i. Overlap LRS (SDE\_VDOT\_RTE\_OVERLAP\_LRS\_DY)
  - ii. CoSS Event Table (tbl\_coss\_2023)
  - iii. Regional Network Event Table (tbl\_regional\_networks)
  - iv. Limited Access Event Table (tbl\_limited\_access)
  - v. Functional Classification Event Table (tbl\_fc23)

## 5. Capacity Preservation

- a. Fields - CoSS\_Capacity\_Preservation, RN\_Capacity\_Preservation
- b. Folder Name - Capacity Preservation
- c. Script Name - Identify\_Capacity\_Needs.ipynb
- d. Datasets
  - i. Arterial Preservation Network (apn)
  - ii. CoSS Event Table (tbl\_coss\_2023)
  - iii. Regional Network Event Table (tbl\_regional\_networks)
  - iv. Limited Access Event Table (tbl\_limited\_access)

## 6. Bike Access to Activity Centers

- a. Fields - RN\_AC\_Bicycle\_Access
- b. Folder Name - Need for Bicycle Access to Activity Centers

- c. Script Name - identify\_bicycle\_access\_needs.ipynb
- d. Datasets
  - i. Regional Network Boundaries (RegionalNetworks)
  - ii. MPO Boundaries (MPO)
  - iii. Activity Centers (Vtrans\_Activity\_Centers)
  - iv. GTFS Stops (FixedGuideway\_Transit)
  - v. Functional Classification Event Table (tbl\_fc23)
  - vi. Overlap LRS (SDE\_VDOT\_RTE\_OVERLAP\_LRS\_DY)
  - vii. Limited Access Event Table (tbl\_limited\_access)

## 7. Walk Access to Activity Centers

- a. Fields - RN\_AC\_Pedestrian\_Access
- b. Folder Name - Need for Pedestrian Access to Activity Centers
- c. Script Name - identify\_pedestrian\_access\_needs.ipynb
- d. Datasets
  - i. Regional Network Boundaries (RegionalNetworks)
  - ii. MPO Boundaries (MPO)
  - iii. Activity Centers (Vtrans\_Activity\_Centers)
  - iv. GTFS Stops (FixedGuideway\_Transit)
  - v. Functional Classification Event Table (tbl\_fc23)
  - vi. Overlap LRS (SDE\_VDOT\_RTE\_OVERLAP\_LRS\_DY)
  - vii. Limited Access Event Table (tbl\_limited\_access)

## 8. Transit Access to Activity Centers

- a. Fields - RN\_AC\_Transit\_Access
- b. Folder Name - Need for Transit Access to Activity Centers
- c. Script Name - Transit\_Access.ipynb
- d. Datasets
  - i. Regional Network Boundaries (RegionalNetworks)
  - ii. Regional Network Event Table (tbl\_regional\_networks)
  - iii. Overlap LRS (SDE\_VDOT\_RTE\_OVERLAP\_LRS\_DY)
  - iv. Functional Classification Event Table (tbl\_fc23)
  - v. Transit Access Analysis from VDOT (Activity\_Center 2023-09-14.shp)
  - vi. Transit Commute Time (Transit\_Commute\_Time)

## 9. Transit Access for Equity Emphasis Areas

- a. Fields- RN\_Transit\_Equity
- b. Folder Name - Need for Transit Access for Equity Emphasis Areas
- c. Script Names
  - i. Identify EEAs:
    - 1) Identify\_eea.ipynb
    - 2) CreateTable.py - Downloads ACS data
    - 3) StatsDict.py - Determines tables that CreateTable.py will download
  - ii. Identify Needs:
    - 1) identify\_transit\_access\_for\_eea.ipynb
- d. Datasets
  - i. Overlap LRS (SDE\_VDOT\_RTE\_OVERLAP\_LRS\_DY)
  - ii. Functional Classification Event Table (tbl\_fc23)
  - iii. Regional Network Event Table (tbl\_regional\_networks)
  - iv. EEAs (data\intermediate.gdb\Block\_Group)
  - v. Transit Viability/Underserved (data\transit\_viability\_underserved.gdb\transit\_viability\_underserved)

## 10. Roadway Safety

- a. Fields - Safety\_Segments, Safety\_Intersection, Safety\_Pedestrian, CoSS\_Safety\_Intersection, CoSS\_Safety\_Segments
- b. Folder Name - Roadway Safety
- c. Script Name - identify\_roadway\_safety\_need.ipynb
- d. Datasets
  - i. Segment PSI (data\SEG\_PSI\_OIPI.csv)
  - ii. Intersection PSI (data\INT\_PSI\_OIPI.csv)
  - iii. Overlap LRS (SDE\_VDOT\_RTE\_OVERLAP\_LRS\_DY)

iv. Master LRS (SDE\_VDOT\_RTE\_MASTER\_LRS\_DY)

**11. Access to Industrial and Economic Development Areas (IEDAs)**

- a. Fields - IEDA
- b. Folder Name - Access to Industrial and Economic Development Areas (IEDAs)
- c. Script Name - None, event table created manually based on IEDAs downloaded on Sept 25, 2023

**12. UDA Needs**

- a. Fields - Many...
- b. Folder Name - Urban Development Areas (UDAs) Needs
- c. Script Name - Get\_Previous\_UDA\_Needs.ipynb - UDA Needs were imported from previous needs and then manually added for new UDAs
- d. Datasets