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# Analyzing Large SUMS of Data Utilizing GIS , Python, & MS Access

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# Space Use Studies-Background

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- Used by Multiple Services to assist in optimization of space utilization and assignment, energy conservation, footprint reduction, and other uses.
- Snapshot of space user and use information across a military installation(s).
- Multiple database structures, such as S-File, SUMS, and others currently unnamed.
- Combined CAD/GIS product.

# Space Use Studies-Inputs

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Large amounts of field collected data, typically from multiple teams and sources:

- Existing spatial data-floor plans
- Floor plan field markups
- Building and space level attribute data
- Personnel attribute data

# Space Use Studies-Outputs

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Large amounts of field collected data from multiple sources:

- CAD floor plan updates
- SUMS, S-File, or Other adaptations of SDSFIE 2.6
  - building_floor_area
  - building_space_area
  - building_room_area
  - Other layers, ancillary tables, relationship classes
- Final reports in various formats

# CAD to GIS Data Production-Conventional

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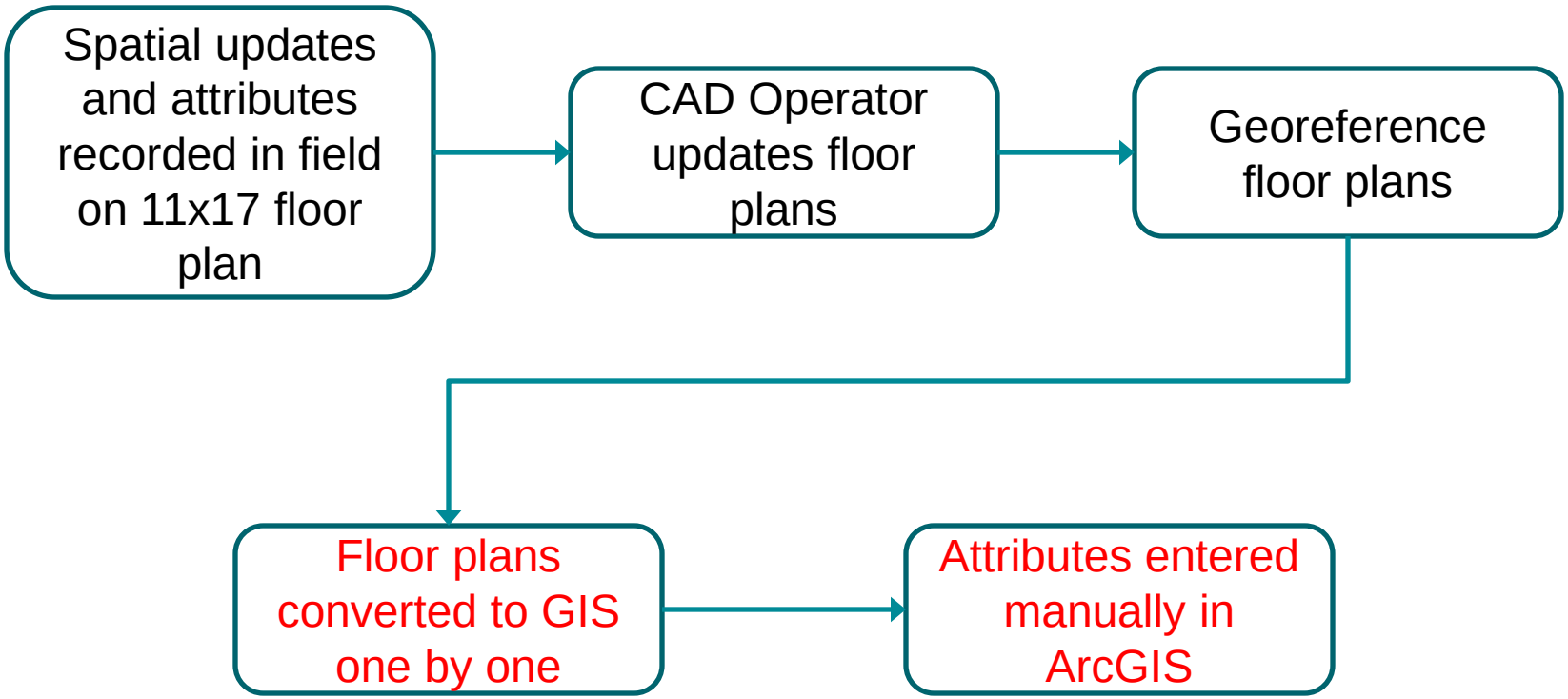

# CAD to GIS Data Production-Current

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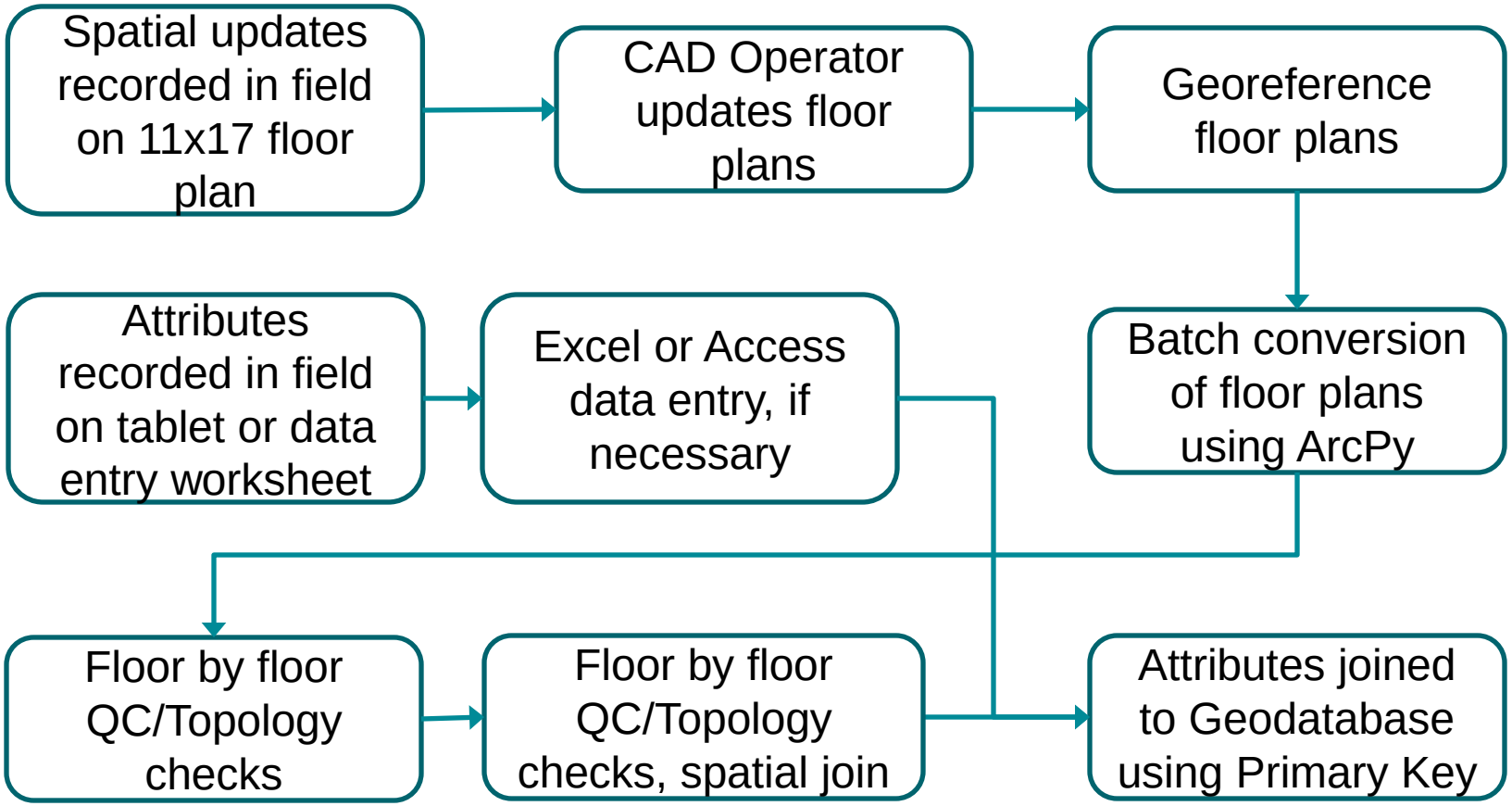

# Batch Conversion: Attribute Extraction

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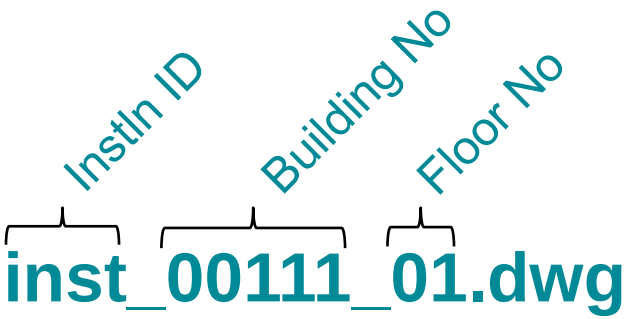
- File Name




- CAD Layer

**A-FLOR-OTLN = building floor area**

**A-FLOR-OTLN-RPRM = building space area**

**Others for exterior spaces, interior obstructions, walls, linework depending on desired output**

- CAD Annotation

**Room or space IDs to be concatenated with building data to build space level primary keys**

# Batch Conversion: Conversion Looping (ArcPy)

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**Merged floor polygons, space polygons, and annotation points by floor**

# Batch Conversion: Floor by Floor Topology Checks

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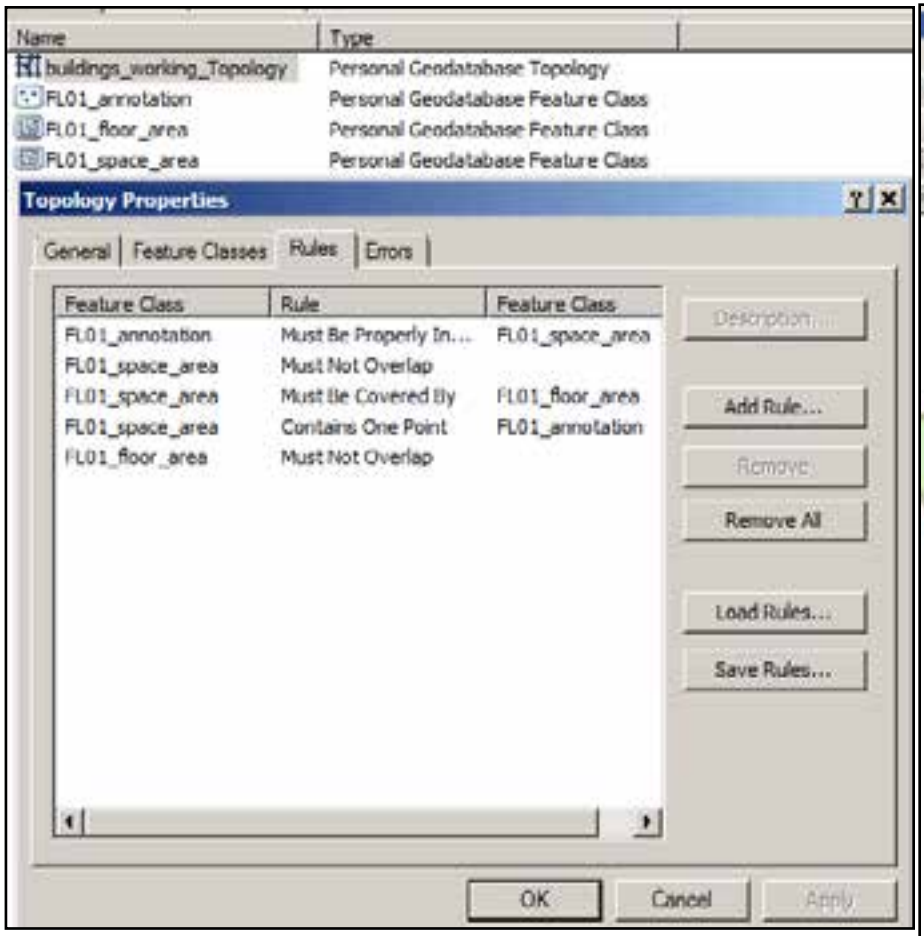


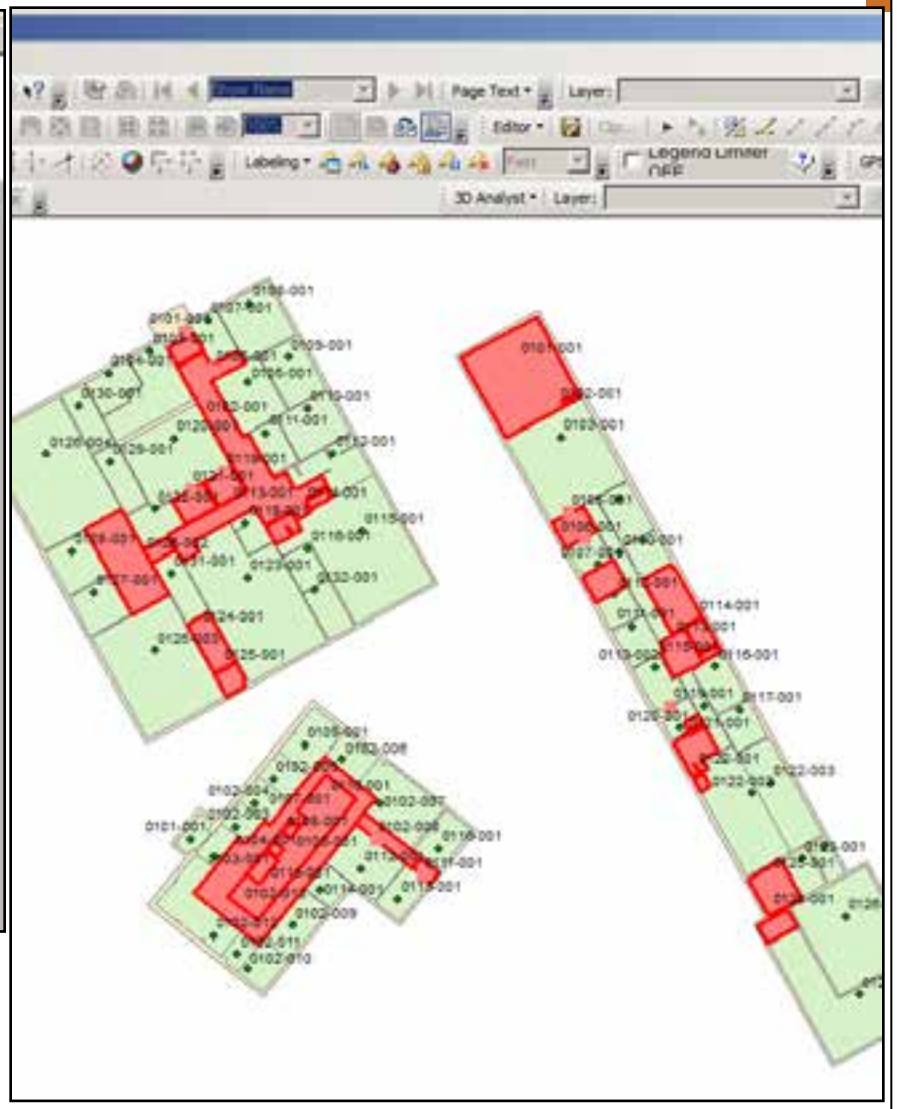

# Batch Conversion: Data Entry Attribute Join

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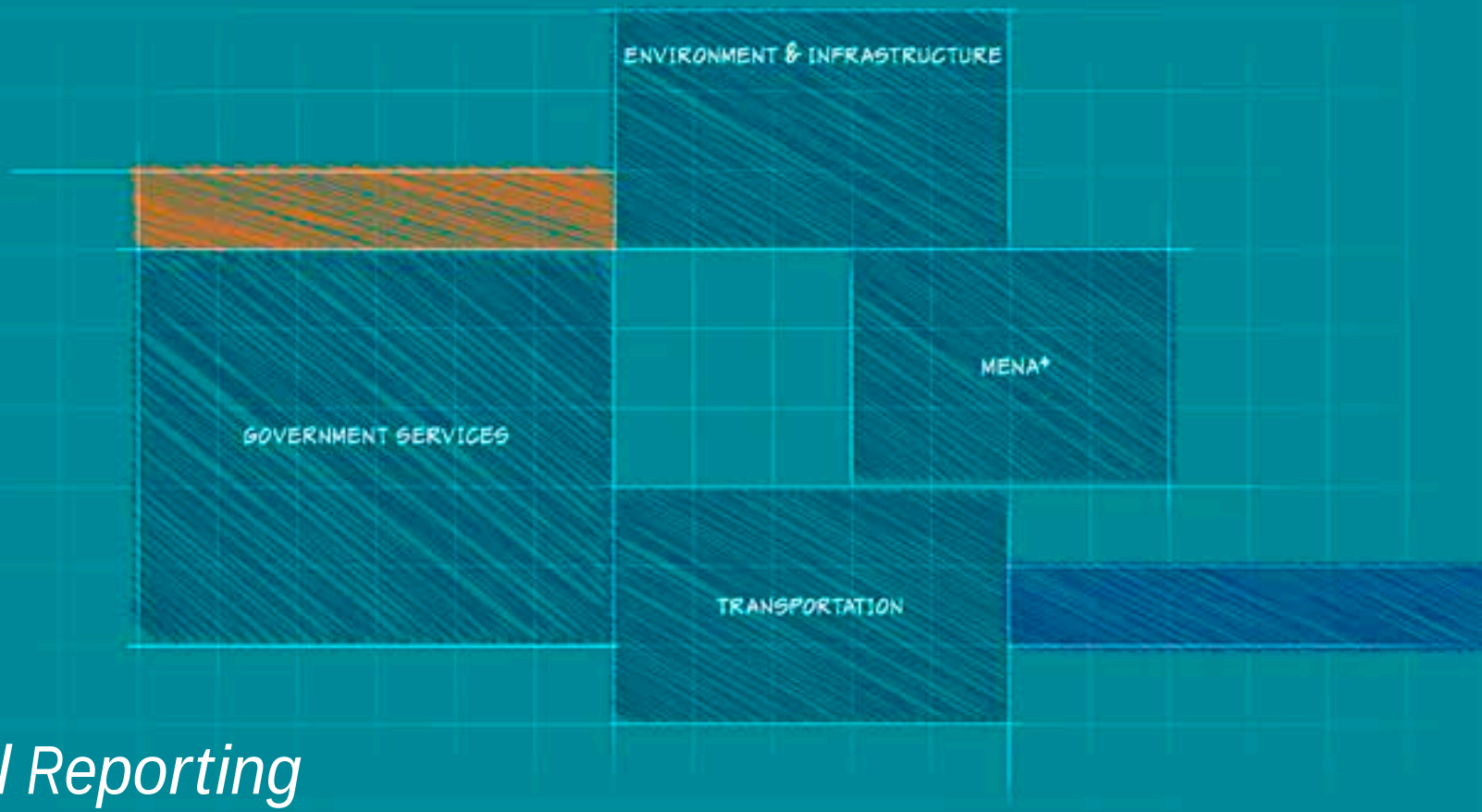
CAD Derived

Attribute Join

CAD Derived

Attribute Join

| BSPACE_ID | ROOM_ID | BUILDNG_ID | FLOOR_ID | SPACE_CUSE | AGENCY_ID | AREA_SIZE | AREA_U_D | INSTLN_ID | FACIL_ID | COMMENTS | OSCRE_L3 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| INST_00001_0106 | 106 | INST_00001 | 001 | 723155 | 99 FS | 134.506939 | SFT | INST | 0001 | None | Storage Admin |
| INST_00001_0103 | 103 | INST_00001 | 001 | 723155 | 99 FS | 122.819439 | SFT | INST | 0001 | None | Kitchen |
| INST_00001_0100 | 100 | INST_00001 | 001 | 999999 | common | 129.416661 | SFT | INST | 0001 | None | Hallway |
| INST_00001_0105 | 105 | INST_00001 | 001 | 723155 | 99 FS | 130.852772 | SFT | INST | 0001 | None | Lounge |
| INST_00001_0104 | 104 | INST_00001 | 001 | 999999 | common | 67.597219 | SFT | INST | 0001 | None | Restroom |
| INST_00001_0102 | 102 | INST_00001 | 001 | 723155 | 99 FS | 1100.732591 | SFT | INST | 0001 | None | Lounge |
| INST_00001_0107 | 107 | INST_00001 | 001 | 999999 | common | 235.68749 | SFT | INST | 0001 | None | Mechanical |
| INST_00001_0101 | 101 | INST_00001 | 001 | 999999 | common | 146.66666 | SFT | INST | 0001 | None | Entry |
| INST_00002_0103 | 103 | INST_00002 | 001 | 724415 | 98 CES Housing | 452.00002 | SFT | INST | 0002 | Private Apartment | Dormitory |
| INST_00002_0102 | 102 | INST_00002 | 001 | 724415 | 98 CES Housing | 452.00002 | SFT | INST | 0002 | Private Apartment | Dormitory |
| INST_00002_100A | 100A | INST_00002 | 001 | 999999 | common | 157.33334 | SFT | INST | 0002 | None | Stairway |
| INST_00002_0101 | 101 | INST_00002 | 001 | 724415 | 98 CES Housing | 452.00002 | SFT | INST | 0002 | Private Apartment | Dormitory |
| INST_00002_0104 | 104 | INST_00002 | 001 | 724415 | 98 CES Housing | 447.888909 | SFT | INST | 0002 | Private Apartment | Dormitory |
| INST_00002_0100 | 100 | INST_00002 | 001 | 999999 | common | 231.00001 | SFT | INST | 0002 | None | Entry |
| INST_00002_0206 | 206 | INST_00002 | 002 | 999999 | common | 127.076259 | SFT | INST | 0002 | None | Stairway |
| INST_00002_0203 | 203 | INST_00002 | 002 | 724415 | 98 CES Housing | 473.277799 | SFT | INST | 0002 | Private Apartment | Dormitory |
| INST_00002_0205 | 205 | INST_00002 | 002 | 999999 | common | 102.777782 | SFT | INST | 0002 | None | Mechanical |
| INST_00002_0200 | 200 | INST_00002 | 002 | 999999 | common | 159.333341 | SFT | INST | 0002 | None | Hallway |
| INST_00002_0202 | 202 | INST_00002 | 002 | 724415 | 98 CES Housing | 452.00002 | SFT | INST | 0002 | Private Apartment | Dormitory |
| INST_00002_0201 | 201 | INST_00002 | 002 | 724415 | 98 CES Housing | 474.444466 | SFT | INST | 0002 | Private Apartment | Dormitory |
| INST_00002_0204 | 204 | INST_00002 | 002 | 724415 | 98 CES Housing | 447.888909 | SFT | INST | 0002 | Private Apartment | Dormitory |
| INST_00003_0113 | 113 | INST_00003 | 001 | 750422 | 97 FSS | 101.996528 | SFT | INST | 0003 | Cooler | Kitchen |
| INST_00003_0112 | 112 | INST_00003 | 001 | 750422 | 97 FSS | 100.694445 | SFT | INST | 0003 | Cooler | Kitchen |
| INST_00003_0111 | 111 | INST_00003 | 001 | 750422 | 97 FSS | 101.996528 | SFT | INST | 0003 | Freezer | Kitchen |
| INST_00003_0114 | 114 | INST_00003 | 001 | 750422 | 97 FSS | 110 | SFT | INST | 0003 | Dry Storage | Kitchen |
| INST_00003_0109 | 109 | INST_00003 | 001 | 750422 | 97 FSS | 953.520836 | SFT | INST | 0003 | None | Kitchen |
| INST_00003_0115 | 115 | INST_00003 | 001 | 750422 | 97 FSS | 1577.993061 | SFT | INST | 0003 | None | Dining |
| INST_00003_0116 | 116 | INST_00003 | 001 | 750422 | 97 FSS | 1303.000004 | SFT | INST | 0003 | Bar | Dining |
| INST_00003_0117 | 117 | INST_00003 | 001 | 750422 | 97 FSS | 774.27778 | SFT | INST | 0003 | Golf Pro Shop | Store |
| INST_00003_0118 | 118 | INST_00003 | 001 | 750422 | 97 FSS | 258.611112 | SFT | INST | 0003 | None | Office |
| INST_00003_0119 | 119 | INST_00003 | 001 | 750422 | 97 FSS | 413.333334 | SFT | INST | 0003 | None | Storage Admin |




*Final Reporting*

# Final Space Use Reporting Tool Live Demonstration

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# Questions?

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