



Beyond the Box: Using CDMS for University Analysis

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August 30, 2011



Purpose



- Review best practices and limitations of using CDMS for essential facility updates
- Using USC Beaufort Campus as a Case Study
- Methodology also applies to local governments, other inventory updates



What is CDMS?



- Comprehensive Data Management Systems
- “The CDMS is a complimentary tool to Hazus-MH that provides users with the capability to update and manage statewide datasets, which are currently used to support analysis in Hazus-MH. “ -FEMA
- A tool used to integrate data into Hazus for enhanced inventory and results



Why Do We Use CDMS?



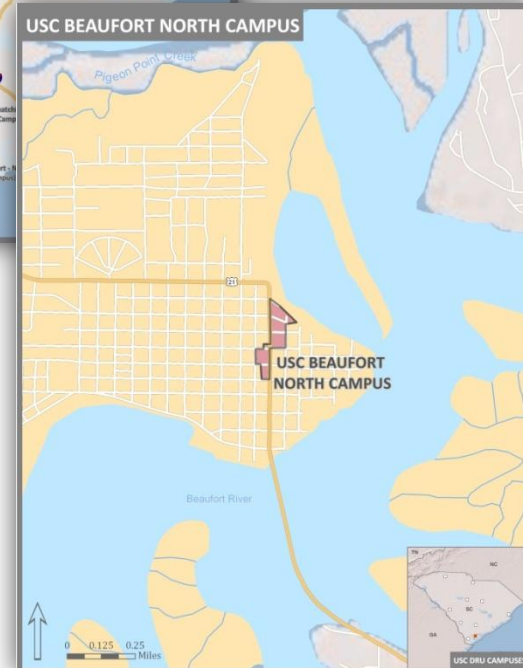
- To Get Beyond the Box of default data!
- Update data:
 - Building Valuations: R.S. Means, 2006
 - Residential Building Counts: Census 2000
 - Non-Residential Counts and Data: Dun & Bradstreet, 2006
 - Demographics: Census 2000
 - Essential Facility location may be inaccurate
- Better inputs = Better results
- Better identify risk and prepare our communities



Essential Facility Update



- **Case Study:** University of South Carolina, *Historic Beaufort Campus*
- **Project Background**
- **Objective:** Update the essential facility inventory
 - EFS2:colleges/universities
- **Purpose:** Review best practices & potential limitations



The Process



- Determine What's In Hazus
- Determine Critical Facilities
 - Site Visits, Discussion
- Data Collection
- Update Data via CDMS
- Run Analysis



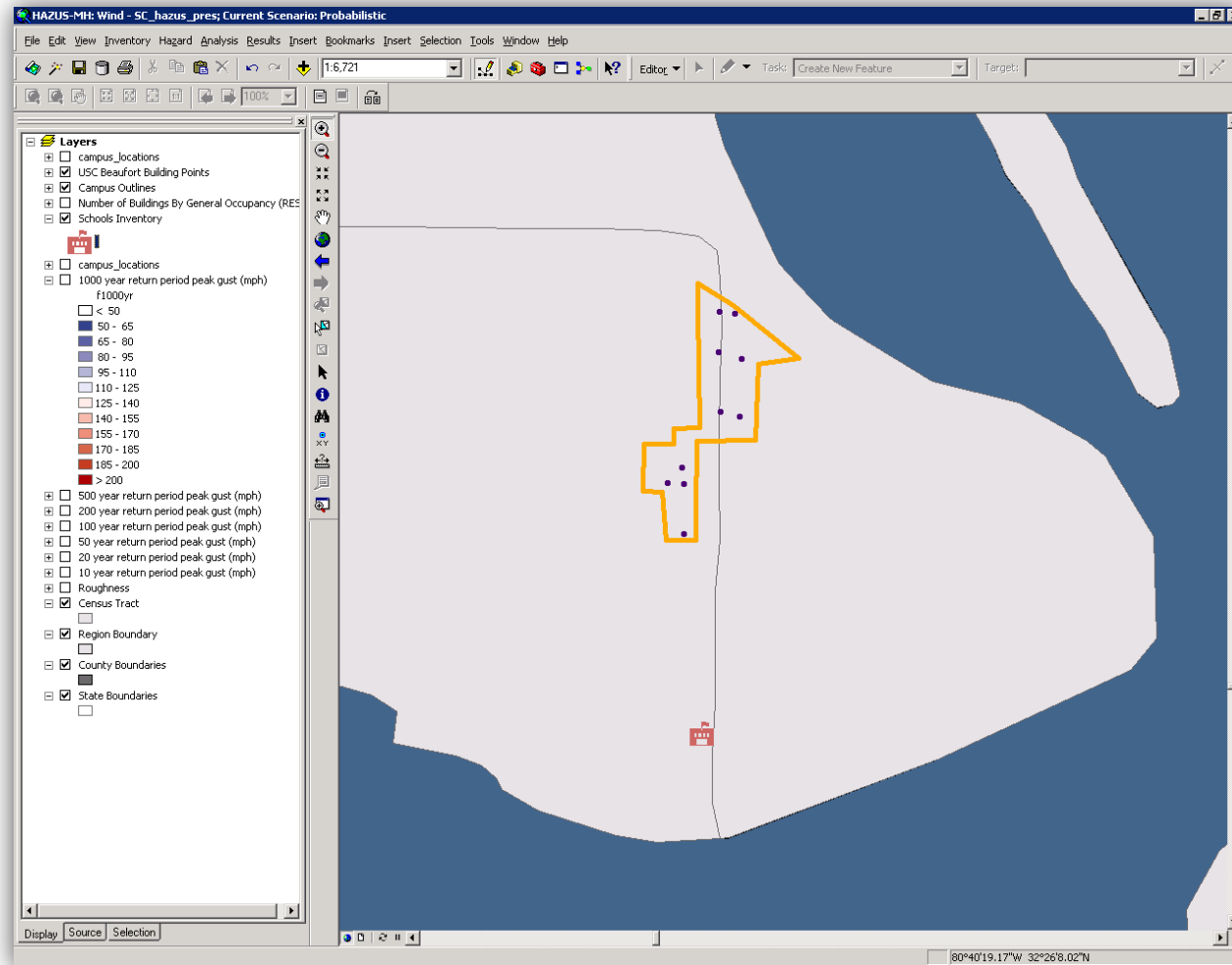
Determining What's in Hazus



- Many avenues
 - Investigate the state dataset on CD/local drive
 - Create a study region and view inventory
 - Query state dataset in CDMS
- Result
 - Colleges are a single point in Hazus (EFS2)
- In actuality, an entire campus

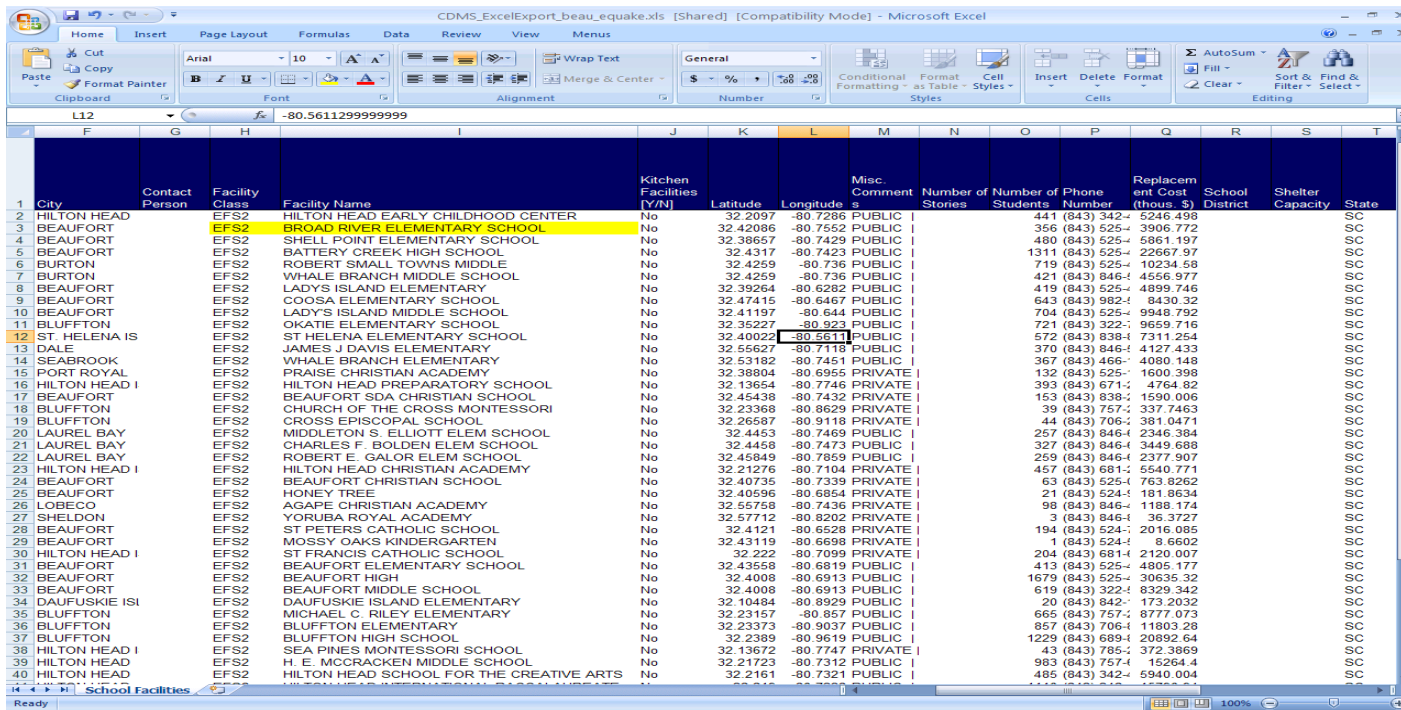


Add Existing Data



Exported EF School Data

- Use CDMS to query dataset for schools
- Export data
- CDMS-ready template



	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T
	City	Contact Person	Facility Class	Facility Name	Kitchen Facilities (Y/N)	Latitude	Longitude	Misc. Comment	Number of Stories	Number of Students	Phone Number	Replacement Cost (thous. \$)	School District	Shelter Capacity	State
1	HILTON HEAD		EFS2	HILTON HEAD EARLY CHILDHOOD CENTER	No	32.2097	-80.7286	PUBLIC		441 (843) 342-	5245.498				SC
2	BEAUFORT		EFS2	BROAD RIVER ELEMENTARY SCHOOL	No	32.42086	-80.7552	PUBLIC		356 (843) 525-	3906.772				SC
3	BEAUFORT		EFS2	SHELL POINT ELEMENTARY SCHOOL	No	32.38657	-80.7429	PUBLIC		480 (843) 525-	5861.197				SC
4	BEAUFORT		EFS2	BATTERY CREEK HIGH SCHOOL	No	32.4317	-80.7423	PUBLIC		1311 (843) 525-	22667.97				SC
5	BURTON		EFS2	ROBERT SMALL TOWNS MIDDLE	No	32.4259	-80.736	PUBLIC		719 (843) 525-	10234.58				SC
6	BURTON		EFS2	WHALE BRANCH MIDDLE SCHOOL	No	32.4259	-80.736	PUBLIC		421 (843) 846-	4556.977				SC
7	BEAUFORT		EFS2	LADYS ISLAND ELEMENTARY	No	32.39264	-80.6282	PUBLIC		419 (843) 525-	4899.746				SC
8	BEAUFORT		EFS2	COOSA ELEMENTARY SCHOOL	No	32.47415	-80.6467	PUBLIC		643 (843) 962-	8430.32				SC
9	BEAUFORT		EFS2	LADYS ISLAND MIDDLE SCHOOL	No	32.41197	-80.644	PUBLIC		704 (843) 525-	9948.792				SC
10	BLUFFTON		EFS2	OKATIE ELEMENTARY SCHOOL	No	32.35227	-80.923	PUBLIC		721 (843) 322-	9659.716				SC
11	ST. HELENA IS		EFS2	ST HELENA ELEMENTARY SCHOOL	No	32.40022	-80.5611	PUBLIC		572 (843) 838-	7311.264				SC
12	DALE		EFS2	JAMES J DAVIS ELEMENTARY	No	32.55627	-80.7118	PUBLIC		370 (843) 846-	4127.433				SC
13	SEABROOK		EFS2	WHALE BRANCH ELEMENTARY	No	32.53182	-80.7451	PUBLIC		367 (843) 466-	4080.148				SC
14	PORT ROYAL		EFS2	PRATHE CHRISTIAN ACADEMY	No	32.38804	-80.6955	PRIVATE		132 (843) 525-	1600.398				SC
15	HILTON HEAD I		EFS2	HILTON HEAD PREPARATORY SCHOOL	No	32.13654	-80.7746	PRIVATE		393 (843) 671-	4764.82				SC
16	BEAUFORT		EFS2	BEAUFORT SDA CHRISTIAN SCHOOL	No	32.45438	-80.7432	PRIVATE		153 (843) 838-	1590.006				SC
17	BLUFFTON		EFS2	CHURCH OF THE CROSS MONTESSORI	No	32.23368	-80.8629	PRIVATE		39 (843) 757-	337.7483				SC
18	BLUFFTON		EFS2	CROSS EPISCOPAL SCHOOL	No	32.26587	-80.9118	PRIVATE		44 (843) 706-	381.0471				SC
19	LAUREL BAY		EFS2	MIDDLETON S. ELLIOTT ELEM SCHOOL	No	32.4453	-80.7469	PUBLIC		257 (843) 846-	2346.384				SC
20	LAUREL BAY		EFS2	CHARLES F. BOLDEN ELEM SCHOOL	No	32.4458	-80.7473	PUBLIC		327 (843) 846-	3449.688				SC
21	LAUREL BAY		EFS2	ROBERT E. GALOR ELEM SCHOOL	No	32.45849	-80.7859	PUBLIC		259 (843) 846-	2377.907				SC
22	HILTON HEAD I		EFS2	HILTON HEAD CHRISTIAN ACADEMY	No	32.21276	-80.7104	PRIVATE		457 (843) 681-	5540.771				SC
23	BEAUFORT		EFS2	BEAUFORT CHRISTIAN SCHOOL	No	32.40735	-80.7339	PRIVATE		63 (843) 525-	763.8262				SC
24	BEAUFORT		EFS2	HONEY TREE	No	32.40596	-80.6854	PRIVATE		21 (843) 524-	181.8634				SC
25	LOBECO		EFS2	AGAPE CHRISTIAN ACADEMY	No	32.55758	-80.7436	PRIVATE		98 (843) 846-	1188.174				SC
26	SHELDON		EFS2	YORUBA ROYAL ACADEMY	No	32.57712	-80.8202	PRIVATE		3 (843) 846-	36.3727				SC
27	BEAUFORT		EFS2	ST PETERS CATHOLIC SCHOOL	No	32.4121	-80.6528	PRIVATE		194 (843) 524-	2016.085				SC
28	BEAUFORT		EFS2	MOSSY OAKS KINDERGARTEN	No	32.43119	-80.6698	PRIVATE		1 (843) 524-	8.6602				SC
29	HILTON HEAD I		EFS2	ST FRANCIS CATHOLIC SCHOOL	No	32.222	-80.7099	PRIVATE		204 (843) 681-	2120				SC
30	BEAUFORT		EFS2	BEAUFORT ELEMENTARY SCHOOL	No	32.43558	-80.6819	PUBLIC		413 (843) 525-	4805.177				SC
31	BEAUFORT		EFS2	BEAUFORT HIGH	No	32.4008	-80.6913	PUBLIC		1679 (843) 525-	30635.32				SC
32	BEAUFORT		EFS2	BEAUFORT MIDDLE SCHOOL	No	32.4008	-80.6913	PUBLIC		619 (843) 322-	8329.342				SC
33	DAUFUSKIE ISI		EFS2	DAUFUSKIE ISLAND ELEMENTARY	No	32.10484	-80.8929	PUBLIC		20 (843) 842-	173.2032				SC
34	BLUFFTON		EFS2	MICHAEL C. RILEY ELEMENTARY	No	32.23157	-80.857	PUBLIC		665 (843) 757-	8777.073				SC
35	BLUFFTON		EFS2	BLUFFTON ELEMENTARY	No	32.23373	-80.9037	PUBLIC		857 (843) 706-	11803.28				SC
36	BLUFFTON		EFS2	BLUFFTON HIGH SCHOOL	No	32.2389	-80.9619	PUBLIC		1229 (843) 689-	20892.64				SC
37	HILTON HEAD I		EFS2	SEA PINOBI MONTESSORI SCHOOL	No	32.13672	-80.7747	PRIVATE		43 (843) 785-	372.3869				SC
38	HILTON HEAD		EFS2	H. E. MCCracken MIDDLE SCHOOL	No	32.21723	-80.7312	PUBLIC		983 (843) 757-	15264.4				SC
39	HILTON HEAD		EFS2	HILTON HEAD SCHOOL FOR THE CREATIVE ARTS	No	32.2161	-80.7321	PUBLIC		485 (843) 342-	5940.004				SC

What are the *required* inputs?



***Refer to the CDMS Data Dictionary**

- Hazus ID
- Essential Facility Type
- Spatial Location
- First Floor Occupied Height (**flood**)
- Foundation Type (**flood**)
- Damage Function ID (**flood**)
- Contents Function ID (**flood**)
- Building Type (**flood**, **earthquake**)
- Design Level (**flood**, **earthquake**)
- Landslide Susceptibility (**earthquake**)
- Liquefaction Susceptibility (**earthquake**)
- Soil Type (**earthquake**)



What are the *optional* inputs?



- Back-up Power
- Contact Information
- Kitchen
- Shelter Capacity
- Comments
- Number of Stories
- Number of Students
- Replacement Cost
- Content Costs
- School District
- Year Built
- EQ Soil Type
- EQ Water Depth



Understand Inputs & Outputs



* Refer to Technical Manual

- EF Results: Loss of Functionality (days), Damage Potential (percentage by category)
- Building Type: very important for earthquake and hurricane, less so for flood
- Location: verify!
- Foundation Type: flood
- Replacement Cost: not an output for EFs
- Perhaps better to use defaults after verification
 - Soil maps, Landslide maps, professors



Building Type



General Building Types

Wood	Wood frame construction
Masonry	Reinforced or unreinforced masonry
Steel	Steel frame construction
Concrete	Cast-in-place or pre-cast reinforced concrete
Manufactured homes	Factory-built residential constructions

Model specific building types - hurricane

CERBL	Concrete, Eng. Residential, Low-Rise
CERBM	Concrete, Eng. Residential, Mid-Rise
CERBH	Concrete, Eng. Residential, High-Rise

Model specific building types - earthquake

RM	Reinforced masonry
URM	Unreinforced masonry



Foundation Type



Foundation Type

Pile

Pier

Solid Wall

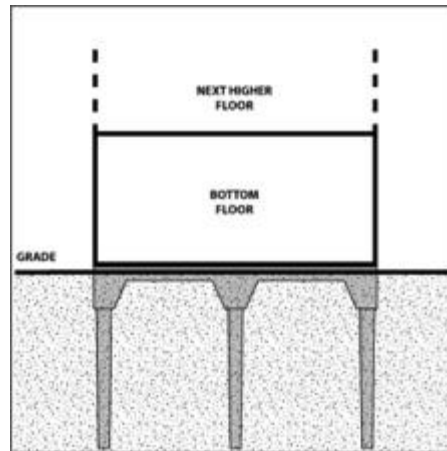
Basement/Yard

Crawl Space

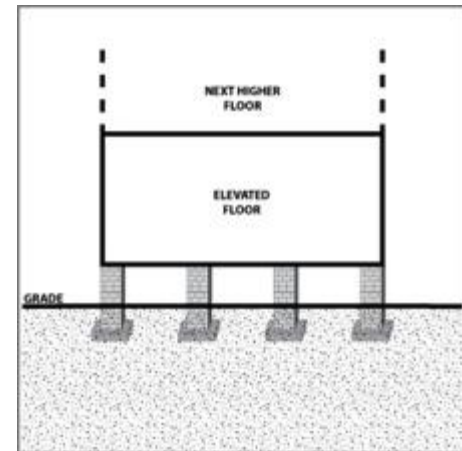
Fill

Slab on Grade

- School Default: Slab on Grade
- Can tell most from a picture but not all
- If an expert is not collecting the data, create guide



Pile



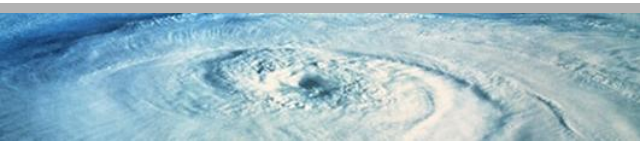
Pier



Miscellaneous



- Hazus ID: let CDMS assign it
- Damage Functions: Review but be cautious to temper with them
- Earthquake inputs: many resources available to check for validity
 - USGS soil maps and landslide susceptibility

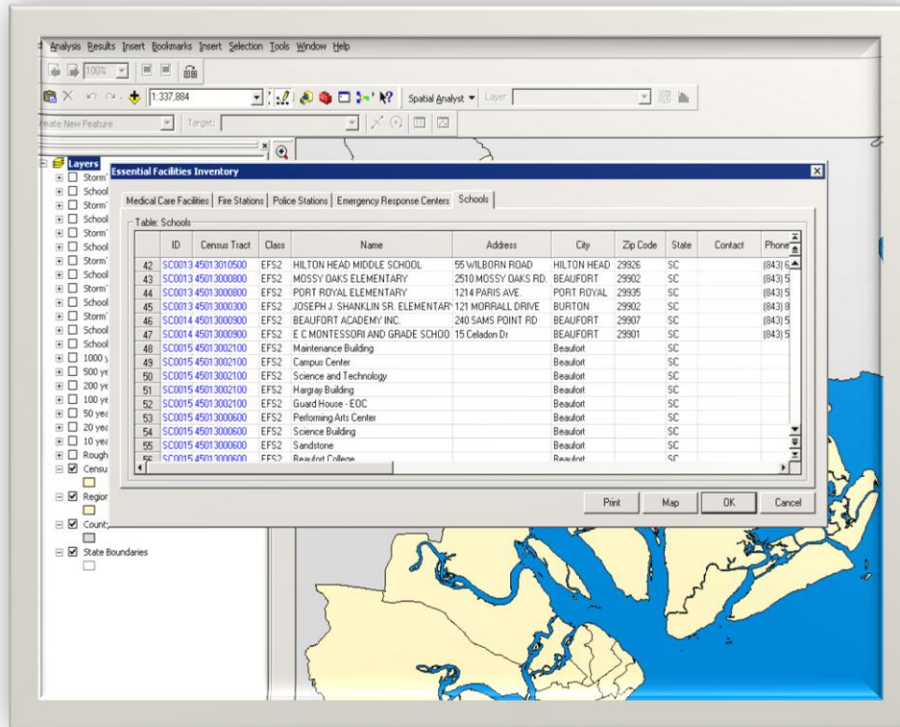


Add New Buildings

- Add new Buildings with attributes
- Import into CDMS
- Identify their spatial location
- Match fields
- Transfer via APPEND

Back-up Power Yes(1) or No(0)	Census	Tract	City	Contact Person	Facility Class	Facility Name	Kitchen	Latitude	Longitude	Misc. Comments	Number of Stories	Number of Students	Phone Number	Replacement Cost (thous. \$)	School District	Shelter Capacity	Year (Date 1500 2100)
			Beaufort		EF52	Maintenance Building - USC		32.30427009410	-80.97620366700	810C	1			1449.42			SC
			Beaufort		EF52	Campus Center-USC		32.30199525140	-80.97618789410	812	2			4700.00			SC
			Beaufort		EF52	Science and Technology-USC		32.30209480240	-80.97404590770	810A	2			5500.00			SC
			Beaufort		EF52	Hargray Building-USC		32.30322277770	-80.97360158920	610	2			9500.00			SC
			Beaufort		EF52	Shark Shack - EOC-USC		32.30216991290	-80.97811723570		1			205.00			SC
			Beaufort		EF52	Performing Arts Center-USC		32.43741636330	-80.66913133730	807	2			5978.26			SC
			Beaufort		EF52	Science Building-USC		32.43816016200	-80.66923903670	806	2			894.49			SC
			Beaufort		EF52	Sandstone-USC		32.43645939040	-80.66915292950	802	1			2882.31			SC
			Beaufort		EF52	Beaufort College-USC		32.43854043680	-80.66948207750	801	2			850.60			SC

Ensure Inventory is Updated



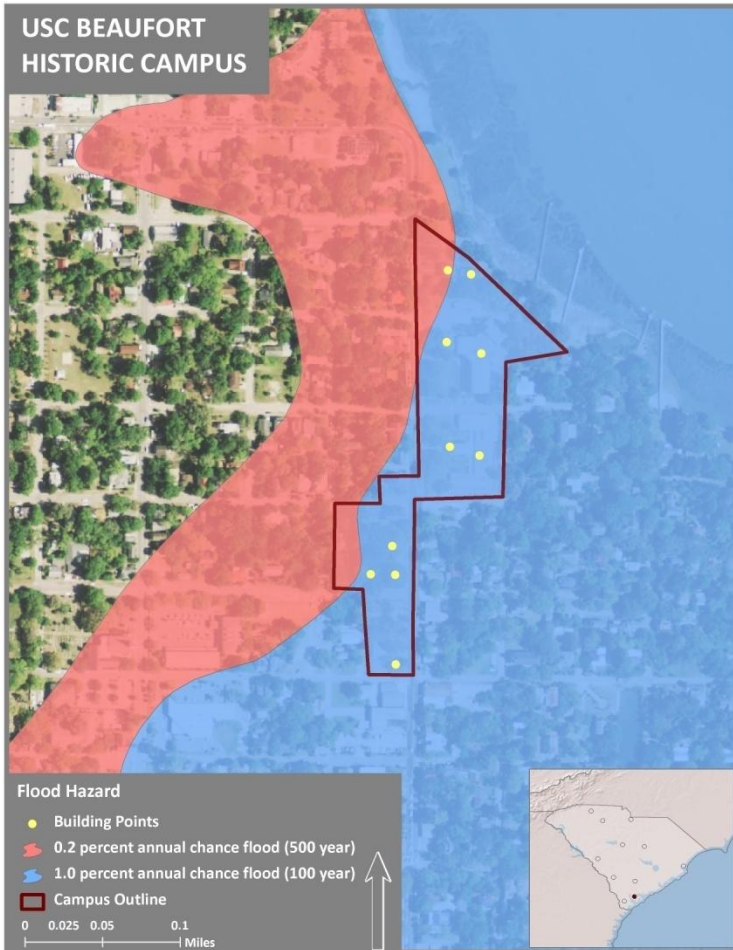
Essential Facilities Update Lessons Learned



- Must update building inventory for university analysis
- Export CDMS Template for a template
- Building site visits are crucial
 - Data Collection
- Have a team
 - Building facilities officials, GIS & Hazus experts, engineers
 - Let them work on the project where it fits their skills
- Know your inputs and outputs
 - Some inputs may be difficult to obtain
 - Use verified defaults; make assumptions if necessary
- Nothing hurricane specific
 - Update hurricane specific building type within study region
- Number of buildings could affect process



Questions?



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