



Independence Living History Center

Demolition Survey

March 12, 2010

JACOBS

Project Background

On November 12, 2009, Jacobs Engineering traveled to the Independence National Historic Park in Philadelphia, PA to survey the existing living history visitor's center and central chilled water plant. The building owner is investigating the effects of a partial demolition of the visitor center structure. When demolition is complete, the central chilled water plant and education/command center spaces only will remain. The central chilled water plant serves all Independence Square national historic buildings, and the education wing. The command center monitors the safety/security of this historic campus. The purpose of the site survey was to inspect the facility and report any findings which may add costs to the demolition phase while maintaining the continual operation of the central chilled water plant and education/command center spaces.



Architectural Conclusions

The main area of concern will be the opening left by the removal of the existing bridge structure. This correction will require brick/cmu installation where bridge rails are removed and installation of a curtain wall system at the bridge opening. Trim, grind, and patch work will be required along the exposed edge of the first level structural slab. Additional infill and trim work will be required in the newly-exposed brick veneer and at the junctures with the pavilion glass walls to maintain the exterior appearance of the chilled water plant/command center complex.

Structural Conclusions

A hazardous materials survey must be conducted prior to demolition of the pavilion. A geotechnical study is required prior to demolition to determine the potential rebound of the foundation system due to reduced load. A cast grade beam must be installed between two footings prior to demolition. Temporary shoring of the stair landing is required prior to removal of the bridge section that extends into the building. Demolition and removal of the existing tower structure can be accomplished without impacting the visitor center structure or the chilled water plant/command structure.

Mechanical Conclusions

The loss of the reheat water system for the command center and chiller plant must be corrected by installation of a new district steam service into the chiller plant. A new pressure reducing station, converter, hot water pumps, and piping connections are necessary to re-establish the reheat system. New DDC controls will be required for this equipment.

Electrical Conclusions

The removal of the existing emergency power will result in a loss of emergency power for the command center. A new diesel generator package must be installed in the chiller plant to correct this loss. The package includes a diesel oil tank, piping, a transfer switch, conduit and wiring. Demolition of the tower structure will require disconnecting the electric power service for lighting in the tower.

Fire Suppression

The visitor's center is partially protected by an automatic sprinkler system. There are no sprinklers or water hose stations within the main visitor's area which contains two auditoriums, main utility room, mechanical room, the high ceiling area for artifact restoration, public restrooms, and other miscellaneous spaces. A sprinkler system was recently installed within the central chilled water plant and education/command center, according to as-built drawings dated June 6, 2000. Jacobs confirmed that the sprinkler system partially protects the first and second floors of the visitor's center and protects the entire central chilled water plant. A 6-inch underground main enters the Water Chilled Plant (room #108), connects to a sprinkler backflow preventer, and feeds several levels of the existing to remain spaces.

Fire Alarm

The entire visitor's center facility has a fire alarm system installed and monitored by the command center. A Simplex fire alarm control panel (FACP) is located in Mechanical Room #118 (just outside the main utilities room). This FACP is within the portion of the facility to be demolished. This panel receives signals from the initiating devices and activates notification appliances within the visitor's center facility. A National Park Service (NPS) life safety specialist, Dawn, indicated that there may be devices within the education wing which are connected to the old Simplex FACP.

A second FACP, Simplex model 4020, is located within the command center on the second floor. This panel lies within the existing to remain portion of the project. According to the fire alarm technician on-site, this panel receives signals from the initiating devices and activates the notification appliances within the education/command center areas and the central chilled water plant. Located adjacent to the Simplex 4020 panel is a Network Display Unit (NDU). The NDU receives signals from all NPS buildings on this campus via fiber connection or radio antenna. The NDU also sends an alarm signal from the Simplex 4020 to a notification appliance circuit (NAC) power supply panel, located adjacent to the NDU, to the Simplex panel in Mechanical Room #118. As-built drawings of the fire alarm system in the education/command center and central chilled water plant were not available during the site survey. Jacobs was unable to confirm where power for the Simplex 4020 and NDU was supplied from. Also, Jacobs could not confirm if any devices in the education wing were connected to the Simplex panel in Mechanical Room #118. According to the Visitor's Center as-built drawings, dated March 1978, fire alarm devices were installed in the education wing and connected to the Simplex FACP in Mechanical Room #118.

Fire Protection Conclusions

Overall, a small amount of work will be needed to maintain the sprinkler and fire alarm systems. The sprinkler system is completely isolated from the areas which will be demolished in the visitor's center. Once the demolition phase is complete, the contractor will be required to install sprinklers in the existing public restroom areas in order to meet building code requirements. Currently, these spaces are not protected by the sprinkler system. The fire alarm system will require inspection of the existing initiating and notification devices within the education/command center. Any devices/circuits connected to the Simplex panel in Mechanical Room #118 shall be reconnected to the existing Simplex 4020, located in the command center. Additionally, power verification of Simplex 4020 panel and NDU will be required. If power is fed from the demolished breakers within the Utilities Room, then power for the Simplex 4020 and NDU panels within the command center shall be reconfigured such that power to these panels are maintained during demolition.

Required Supplemental Services

A geotechnical study should be conducted prior to demolition to provide recommendations with regard to potential rebound of the remaining foundation system caused by a reduced load. In particular, the impact to the footings located at D-2 and D-7 should be addressed. The survey fee will vary depending on level surveying, sampling and testing requested under the scope of the survey. Order of magnitude cost is estimated at \$20,000.

An engineering study and identification of hazardous material that may be of concern during demolition will be required prior to initiating the removal of the facility. Cost will vary depending on level of destructive sampling, testing and scope requirements requested for the study. Order of magnitude cost is estimated at \$25,000.

Independence Living History Center

Recommendations & Cost Estimates



INDEPENDENCE LIVING HISTORY CENTER: identification of required building modifications for demolition of the Independence Living History Center

ITEM NUMBER: (located on floor plan for reference)	DISCIPLINE FP: Fire Prot AR: Architectural ST: Structural MEP: Mech Elec Plu DM: Full site demo	DESCRIPTION OF RECOMMENDATION	QTY	UOM	MATERIAL (RSMean)	LABOR (RSMean)	TOTAL MATERIAL & LABOR	DEMO / DISPOSAL (RSMean)	DIRECT COST SUB TOTAL	NPS location factor (1.310)	Design Cont (20%)	General Cond (10%)	Overhead (8%)	Profit (10%)	Bond (1.5%)	*TOTAL DIRECT and INDIRECT COSTS
100	FP	Power reconfiguration for Simplex 4020 fire alarm control panel in command center.	1	EA	\$0	\$4,902	\$4,902	\$0	\$4,902	\$1,520	\$980	\$490	\$392	\$490	\$74	\$8,848
101	FP	Power reconfiguration for Network Display Unit in command center.	1	EA	\$0	\$5,032	\$5,032	\$0	\$5,032	\$1,560	\$1,006	\$503	\$403	\$503	\$75	\$9,083
102	FP	Demolition of fire alarm initiating circuits connected to Simplex FACP (Mech Rm #118). Reconnect the initiating devices to the Simplex 4020 fire alarm control panel in command center.	1	EA	\$4,800	\$8,625	\$13,425	\$0	\$13,425	\$4,162	\$2,685	\$1,343	\$1,074	\$1,343	\$201	\$24,232
103	FP	Demolition of fire alarm notification circuits connected to Simplex FACP (Mech Rm #118). Reconnect the notification appliances to the Simplex 4020 fire alarm control panel in command center.	1	EA	\$5,275	\$8,075	\$13,350	\$0	\$13,350	\$4,139	\$2,670	\$1,335	\$1,068	\$1,335	\$200	\$24,097
104	FP	Installation of new manual pull station where ETR restrooms are located. NFPA 72 requires a pull station at each exit of a building. Connect this pull station to Simplex 4020 fire alarm control panel.	1	EA	\$219	\$234	\$453	\$0	\$453	\$140	\$91	\$45	\$36	\$45	\$7	\$817
105	FP	Recommend testing each initiating device within education/command center after demolition has completed to ensure all devices send a signal to the Simplex 4020 fire alarm control panel. Also, verify all notification appliances operate during an alarm condition.	1	EA	\$0	\$964	\$964	\$0	\$964	\$299	\$193	\$96	\$77	\$96	\$14	\$1,740
106	FP	Installation of new sprinklers within existing public restrooms.	8	EA	\$448	\$200	\$5,184	\$0	\$5,184	\$1,607	\$1,037	\$518	\$415	\$518	\$78	\$9,357
107	FP	Installation of new branchlines and sprinkler main within existing public restrooms. New piping should be fed from existing sprinkler system in central chilled water plant.	150	LF	\$22	\$10	\$4,814	\$0	\$4,814	\$1,492	\$963	\$481	\$385	\$481	\$72	\$8,690
200	AR	Bridge area: Remove & store First Level paving bricks (3'W x 15'-7"L) in proximity of Col Line D at pre-existing passage area.	47	SF	\$7	\$56	\$2,971	\$0	\$2,971	\$921	\$594	\$297	\$238	\$297	\$45	\$5,363
201	AR	Bridge area: Remove HM door and frame at Stair #1 bridge landing	1	EA	\$0	\$951	\$951	\$0	\$951	\$295	\$190	\$95	\$76	\$95	\$14	\$1,717
202	AR	Bridge area: Trim, grind and patch newly exposed edge of First Level structural slab along demolition line between Columns D-2 and D-5 (35 LF). [Ref primary demolition for Independence Living History Center(ILHC)]. Install concrete curb for curtainwall along Col line D at wall opening of pre-existing bridge (15'-7"L).	1	EA	\$286	\$9,259	\$9,545	\$0	\$9,545	\$2,959	\$1,909	\$955	\$764	\$955	\$143	\$17,229
203	AR	Bridge area: Infill 4" brick veneer/8"CMU backup wall at demolished east and west bridge rail beams (2'-1" H x 6'-7" L x 2 sides) [Ref Structural line item 302].	28	SF	\$8	\$4	\$342	\$0	\$342	\$106	\$68	\$34	\$27	\$34	\$5	\$618
204	AR	Bridge area: Install curtainwall system w/ insulated glazing along Col line D at wall opening of pre-existing bridge (15'-7" W x 20' H).	302	SF	\$13	\$5	\$5,362	\$0	\$5,362	\$1,662	\$1,072	\$536	\$429	\$536	\$80	\$9,679
205	AR	Bridge area: Salvage, clean and reinstall First Level paving bricks along inside of curtainwall.	47	SF	\$5	\$42	\$2,228	\$0	\$2,228	\$691	\$446	\$223	\$178	\$223	\$33	\$4,022
206	AR	Bridge area: Install interior HM frame/tempered glass window (3'-8" W x 7'-2") at Stair #1 bridge landing in wall opening of pre-existing HM door. Include window railing at stair landing side (5' L).	1	EA	\$576	\$129	\$705	\$0	\$705	\$218	\$141	\$70	\$56	\$70	\$11	\$1,272
207	AR	Toilet wing: Abandon-in-place the roof access ladder sections from the masonry wall and roof hatch in/above the existing Janitor Closet. Because of available roof access from Chilled Water Plant roof, lock/secure hatch cover from inside and abandon hatch in place.	2	EA	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
208	AR	Toilet wing: Remove duct grille (40" H x 64" W) serving pre-existing pavilion space at north wall.	1	EA	\$0	\$686	\$686	\$0	\$686	\$213	\$137	\$69	\$55	\$69	\$10	\$1,237
209	AR	Toilet wing: Trim, grind and patch newly exposed edge of First Level structural slab along demolition line between Columns D-6 and D-7 (18 LF) [Ref primary demolition for ILHC].	18	LF	\$10	\$309	\$5,727	\$0	\$5,727	\$1,775	\$1,145	\$573	\$458	\$573	\$86	\$10,337
210	AR	Toilet wing: Install double HM door and frame 6'-4W x 7'-4 1/2 into pre-existing corridor opening at north wall.	1	EA	\$458	\$89	\$547	\$0	\$547	\$170	\$109	\$55	\$44	\$55	\$8	\$987
211	AR	Toilet wing: Install exterior louver (40" H x 64" W) w/ blank-out pane into wall opening of pre-existing duct grille at north wall	18	SF	\$69	\$76	\$2,619	\$0	\$2,619	\$812	\$524	\$262	\$210	\$262	\$39	\$4,727

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212	AR	Pavilion roof structure attachment: Remove limited areas of upper masonry walls (4' brick/2" cavity/8" CMU/2" cavity/4" brick) around Columns D-2 & D-7 to allow disconnection of the upper pipe columns at the roof truss system from the lower wide flange columns in the masonry walls. Masonry removal extends from bottom of the pipe column spherical bearings at EL 42'-10 to top of walls at EL 44'-7 3/8" (2 @ 4 SF). [Ref primary demolition for ILHC]	11	CF	\$5	\$1	\$61	\$0	\$61	\$19	\$12	\$6	\$5	\$6	\$1	\$111
213	AR	Pavilion roof structure attachment: Infill and patch limited areas of upper masonry walls (4' brick/2" cavity/8" CMU/2" cavity/4" brick) at pre-existing upper pipe Columns D-2 & D-7 at the roof truss system (2 @ 4 SF).	11	CF	\$5	\$4	\$102	\$0	\$102	\$31	\$20	\$10	\$8	\$10	\$2	\$183
214	AR	Pavilion glass wall junctures: At junctures to pre-existing pavilion upper glass wall between Columns D-2 & D-5 (35 LF) and Columns D-6 & D-7 (18 LF), remove <u>level</u> top-of-wall (4' brick/2" cavity/8" CMU/2" cavity/4" brick) brick cap and upper courses of CMU/back-of-parapet brick. Remove existing single-ply roof membrane counterflashing at back of parapet to accommodate this work. [Ref primary demolition for ILHC]	53	LF	\$1	\$3	\$252	\$0	\$252	\$78	\$50	\$25	\$20	\$25	\$4	\$455
215	AR	Pavilion glass wall junctures: At junctures to pre-existing pavilion upper glass wall between Columns D-2 & D-5 (35 LF) and Columns D-6 & D-7 (18 LF), install <u>sloped</u> top-of-wall (4' brick/2" cavity/8" CMU/2" cavity/4" brick) brick cap and associated upper courses of CMU/back-of-parapet brick with internal sheet metal wall flashing. Install new single-ply roof membrane counterflashing at back of parapet. New cap and flashing systems are to extend the adjacent existing parapet assemblies that are appropriate for exterior exposure. Maintain existing roof warranty.	53	LF	\$3	\$4	\$399	\$0	\$399	\$124	\$80	\$40	\$32	\$40	\$6	\$719
216	AR	Pavilion glass wall junctures: At junctures to pre-existing pavilion glass walls with vertical blind system <u>recessed</u> into masonry walls -- Column D-2 (north wall face) and Column D-7 (north wall face), infill the continuous vertical pockets (1'-9" W x 30" H) with 4" face brick, including welded anchor ties and spray fireproofing patching, at columns. [Ref primary demolition for ILHC - coordinate removal of glass-wall, blind-track and cover-plate anchors within the pockets]	105	SF	\$10	\$8	\$1,923	\$0	\$1,923	\$596	\$385	\$192	\$154	\$192	\$29	\$3,470
217	AR	Pavilion glass wall junctures: At junctures to pre-existing pavilion glass walls with vertical blind system <u>not recessed</u> into masonry walls -- Column D-5 (east wall face) and Column D-6 (west wall face), cover the continuous vertical pockets (5"W x 30"H) with painted galvanized heavy gauge metal closures. [Ref primary demolition for ILHC - coordinate retention of existing internal glass-wall anchorages]. Patch bricks at adjacent pre-existing surface-mounted blind tracks/masonry anchors.	60	LF	\$6	\$5	\$631	\$0	\$631	\$195	\$126	\$63	\$50	\$63	\$9	\$1,138
300	ST	A grade beam between footings located at D-6 and D-7 is to be integrally cast prior to demolition of the foundation in the nearby area. It should be approximately 16" wide by 2'-6" deep by 15'-0" long. It can likely be cast without any ramifications to architectural components of the building.	1	EA	\$1,554	\$567	\$2,121	\$0	\$2,121	\$658	\$424	\$212	\$170	\$212	\$32	\$3,828
302	ST	Demolition of the bridge section between grid lines 2.1 and 4, that extends into the building south of grid line D. The extent of this bridge is approximately 7 feet beyond the building line, 16 feet wide consisting of 6 1/2 inch slab. Along the sides there is a beam 1 foot wide extending 1'-4" below the slab and at the end, for the width of the bridge, the beam extends 1'-4" below the slab and 2'-8" above the slab. Removal of this bridge section should be clean since existing drawings indicate 1/4 inch joints separating it from the building and slide bearing pads where it is supported by a grouted brick column.	1	EA	\$678	\$1,388	\$2,066	\$393	\$2,459	\$762	\$492	\$246	\$197	\$246	\$37	\$4,439
303	ST	Minor patching of the roof deck where four angle braces will be removed.	1	EA	\$3,120	\$2,560	\$5,680	\$0	\$5,680	\$1,761	\$1,136	\$568	\$454	\$568	\$85	\$10,252

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305	ST	Provide a lintel at the interior door adjacent to the bridge beam prior to infill with masonry above. Length of the opening is approximately 3'-8".	1	EA	\$97	\$182	\$279	\$0	\$279	\$86	\$56	\$28	\$22	\$28	\$4	\$503
306	ST	Provide shoring of the stair landing prior to removal of the bridge as required until the masonry void is infilled	1	EA	\$2,586	\$1,264	\$3,850	\$0	\$3,850	\$1,194	\$770	\$385	\$308	\$385	\$58	\$6,949
400	MEP	Installation of new generator package with all necessary equipment, i.e. fuel storage tank with containment, respected piping, new transfer switch, wiring and conduit, etc.	1	EA	\$66,589	\$8,119	\$74,708	\$0	\$74,708	\$23,160	\$14,942	\$7,471	\$5,977	\$7,471	\$1,121	\$134,848
401	MEP	Installation of new steam service equipment to provide heat for Chiller Plant and Command Center and cutting of services provided through Visitor Center.	1	EA	\$129,361	\$12,569	\$141,930	\$0	\$141,930	\$43,998	\$28,386	\$14,193	\$11,354	\$14,193	\$2,129	\$256,183
500	DM	Demolition of existing Visitor Center. Secure all existing utilities at property line to include, steam, electric, water, and sewer. Excavate and remove abandoned utility lines. Remove and save rooftop HVAC Package Unit. Remove major mechanical equipment and piping in the main mechanical room. Remove main electrical switchgear (note that the high voltage switchgear and transformers is the property of the commercial power provider). Remove all windows and doors. Remove roof and roof substructure. Remove masonry floor and wall material. Properly remove and dispose of all materials and debris. NOTE: Does not include any site work post-demolition.	1	EA	\$195,951	\$347,332	\$543,283	\$64,675	\$607,958	\$188,467	\$121,592	\$60,796	\$48,637	\$60,796	\$9,119	\$1,097,364
501	DM	Demolition of existing tower structure. Assumes use of scaffolding for removal. Disconnect and secure electrical service for lighting. Remove roof and substructure. Remove approximately 8000 sq ft of brick. Dispose of all material and debris. Does not include removal of foundation/footings.	1	EA	\$31,352	\$55,573	\$86,925	\$10,348	\$97,273	\$30,155	\$19,455	\$9,727	\$7,782	\$9,727	\$1,459	\$175,578
502	DM	There were no surveys or testing required for hazmat materials. The order of magnitude to remove any such materials is estimated by SF and obtained from RS Means. Approx 17,500 SF. Costing includes 2 suits and 1 respirator filter/day/worker.	17,500	SF	\$0.17	\$2.30	\$43,225	\$350	\$43,575	\$13,508	\$8,715	\$4,358	\$3,486	\$4,358	\$654	\$78,653
TOTAL									\$1,063,007							\$1,918,728

* Indirect Costs shown DO NOT include the following markups:

1. Remoteness Factor (not applicable - not a remote location)
2. Sales Tax
3. Historic Preservation Factor (not applicable - not a historic facility)
4. Federal Wage Rate Factor (not applicable - not a federal construction contract)
5. Government General Conditions Factor (not applicable - not a federal construction contract)
6. Contracting Method Adjustment Factor (not applicable - not a federal construction contract)
7. Escalation Adjustment Factor

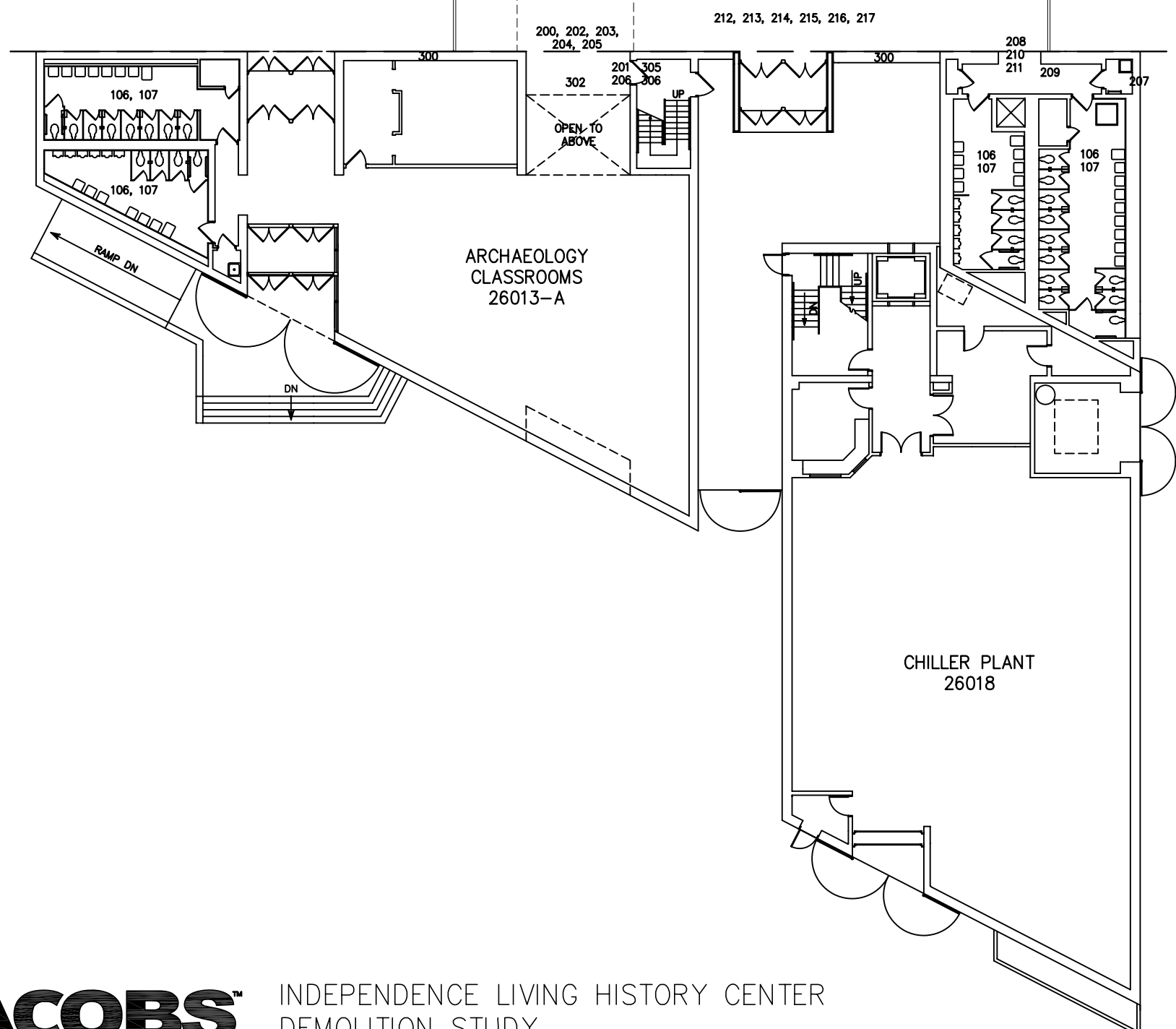
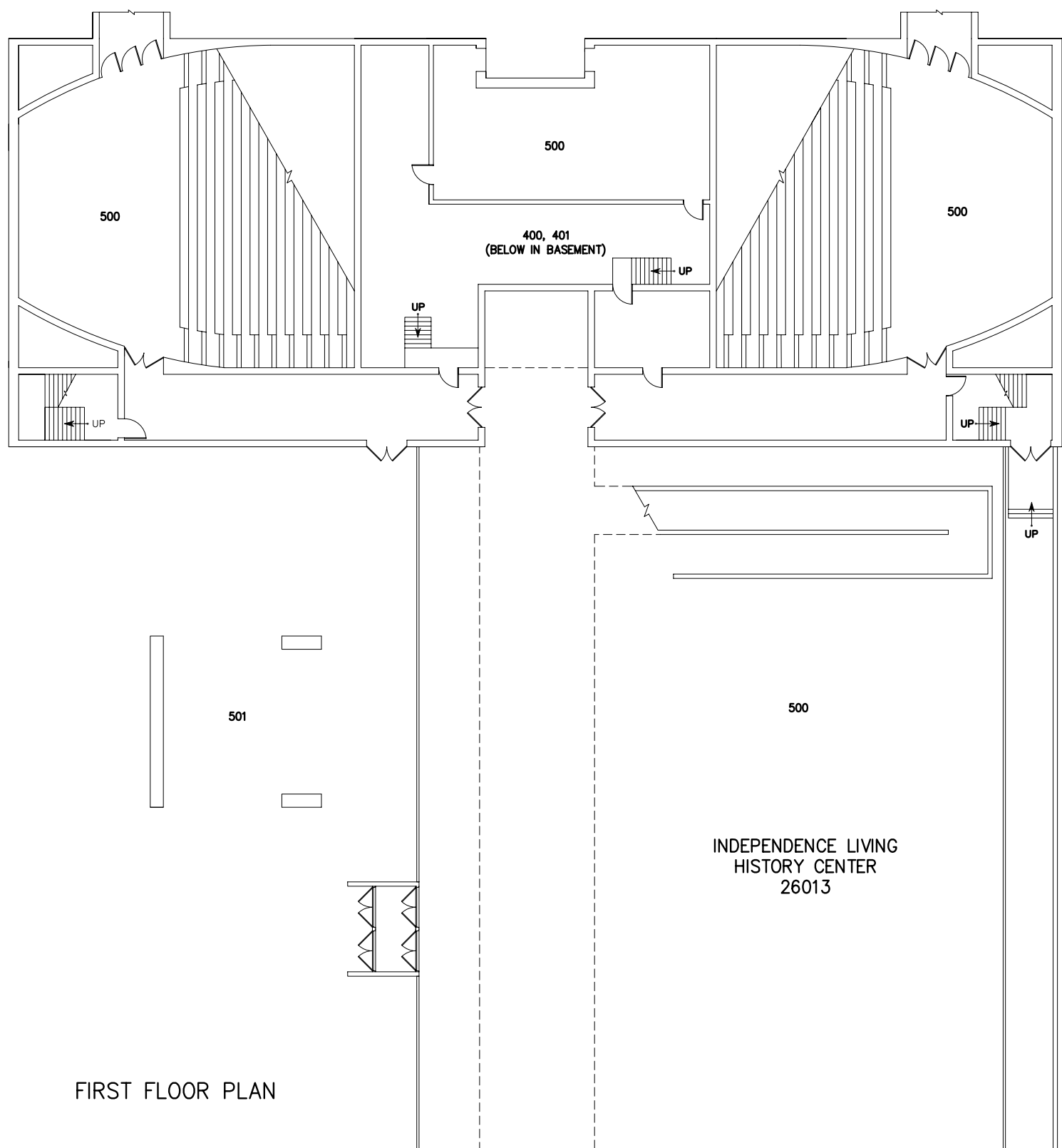


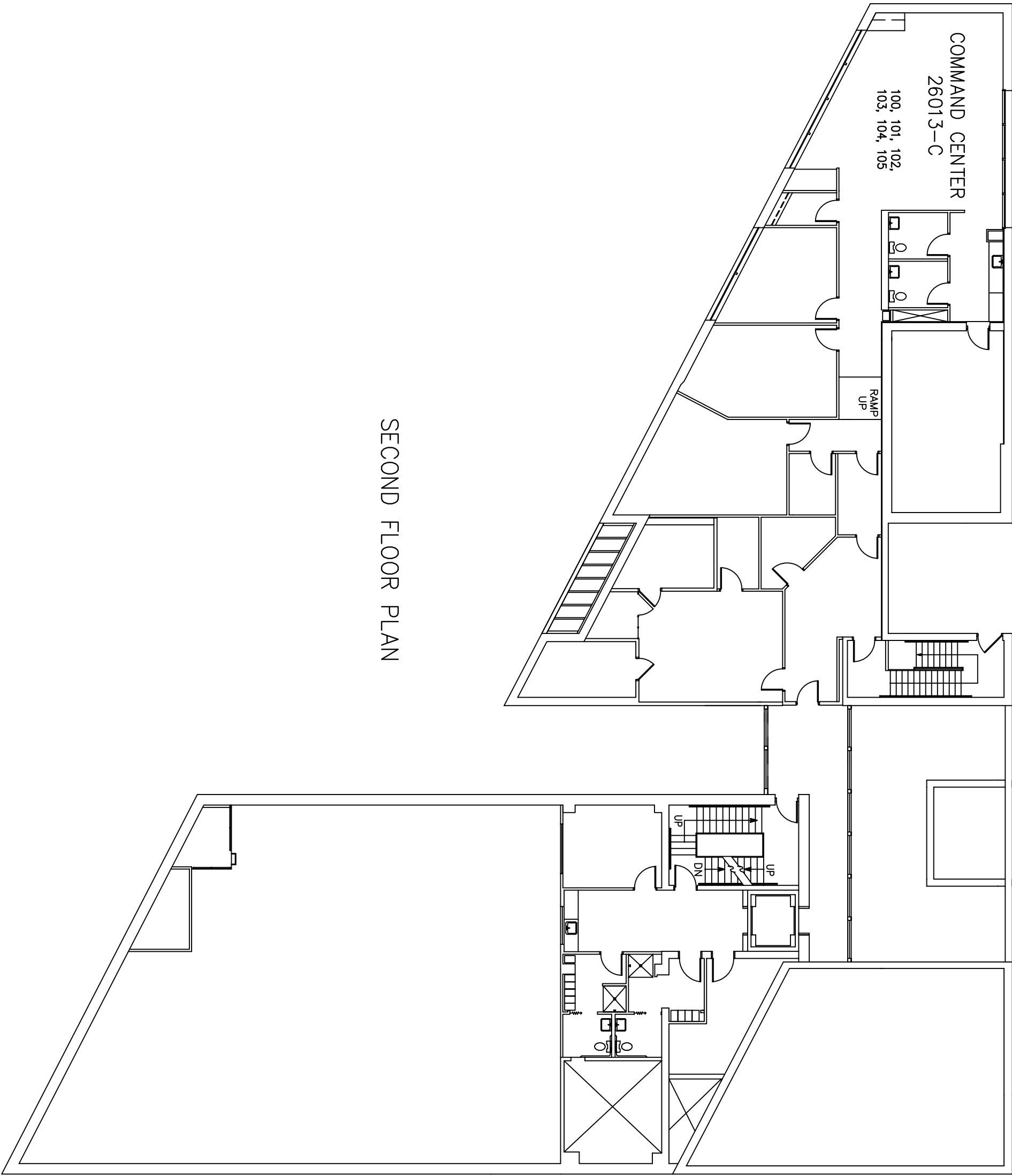
Independence Living History Center

Locations of
Recommendations

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Floor Plans





SECOND FLOOR PLAN

