

Chapter 4 - Recommendations

Domestic Water

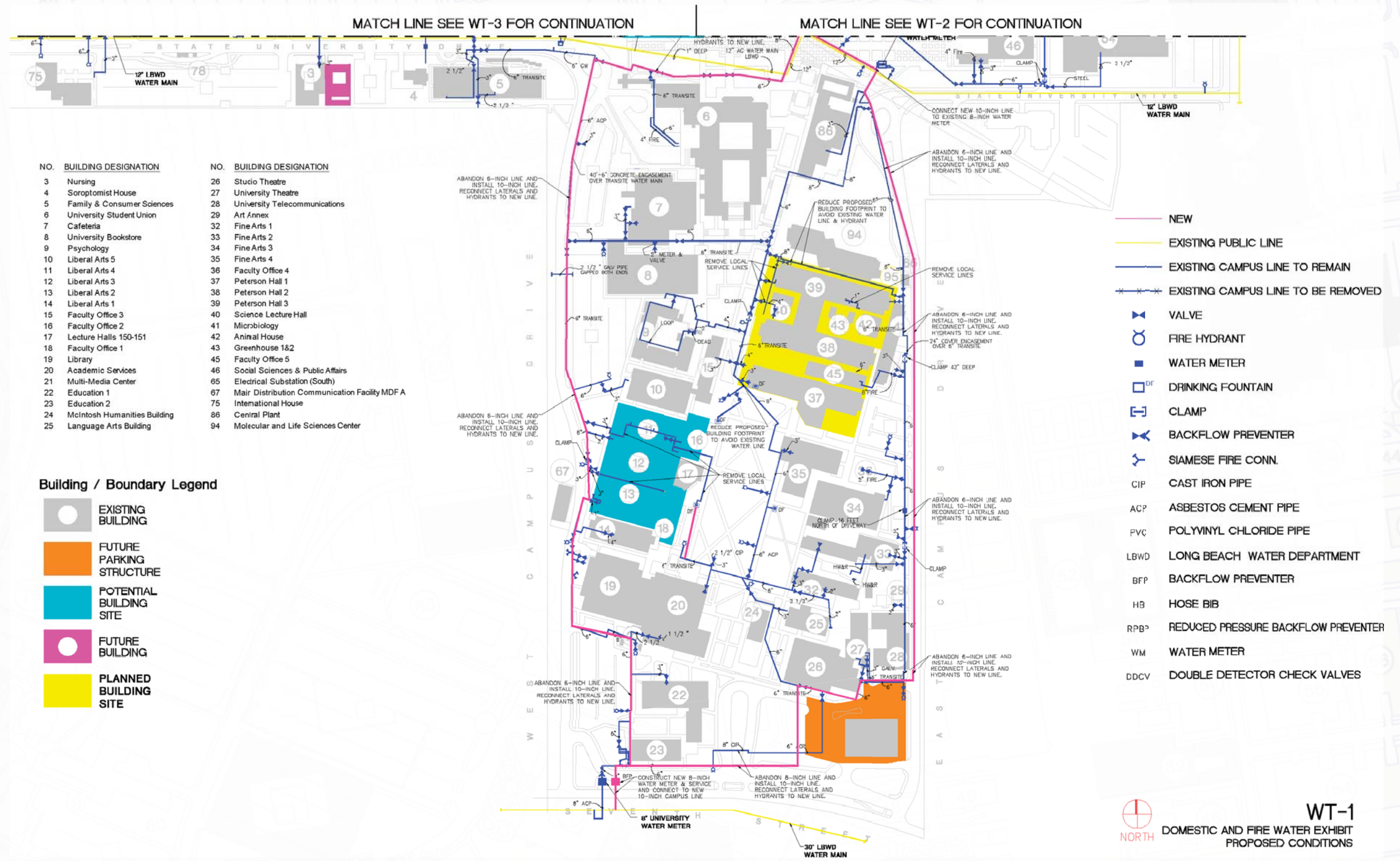
In order to prevent maintenance and failure problems in the future it is a general recommendation to replace the old transite and ACP mains with DIP mains throughout the Campus, which would also allow for upsizing of pipes, where necessary. The transite and ACP lines are nearing the end of their expected lifespans and should be replaced before they fail. The Campus could use PVC Class 900 pipe in lieu of DIP if they so desired, provided there are no conditions that would prohibit the use of PVC. In order to better address the growth the Campus has experienced over the past 60 years, as well as to allow for expansion in the future, upsizing of some lines will help provide better pressures and flows. However, upsizing an entire Campus' network of water pipes can be a difficult and expensive task. A better approach would be to replace lines in the vicinity of new construction projects to bring portions of the network to a more functional level. In certain areas, some additional backbone lines that are not immediately adjacent to the new projects should also be replaced in order to upgrade a branch of the network, not just a small individual section of pipe. The following table lists the proposed buildings and discusses the recommendations necessary to accommodate each of them, as well as recommendations for improvements to water mains, both nearby and not immediately adjacent.

Additional improvements to the water network in the south portion of Campus will also be required in order to complete the upgrades to the southern loop. A new water meter and service should be constructed to provide additional flow and pressure to the southern loop. A good location for this new 8-inch service is to connect it in parallel with the existing 8-inch service in Seventh Street. Backflow preventers should be installed on the fire sprinkler systems at the buildings that do not have them, the Library, Psychology, Faculty Office 5, Engineering Technology and Vivian Engineering Center.

Recommendations to Domestic Water System

Building/ Location	Area (SF)	Description of Impact to Campuswide Utilities
Peterson Hall 3 Replacement Building	160,000	The work limit of the proposed replacement building for Peterson Hall 3, Microbiology and Science Lecture Hall should shrink along the northern edge so that it no longer conflicts with the existing 8-inch line that connects two existing 6-inch lines running north/south on the east and west sides of the Peterson Halls. There is also a fire hydrant to the north of the project site that should be avoided. By reducing the project limits slightly, the only modifications necessary to the water system will be removal of local service lines to existing buildings that will be demolished as part of the project. Potholing should be performed to verify the location of the 8-inch line. Service to the project can be provided from either of the 6-inch lines to the east and west of the project or the 8-inch to the north. Some improvements to the Campus mains should also be constructed as part of this project, including replacement of the 6-inch line in East Campus Drive with a 10-inch line from the water meter near the Central Plant to Microbiology.
Liberal Arts Building (Phases 1 and 2)	155,000	The work limit of the proposed replacement building for Peterson Halls 1 & 2 and Faculty Office 5 should shrink in the southwest corner to avoid conflicting with the existing 6-inch main on the west side of the Peterson Halls. Potholing should be performed to verify the location of the 6-inch line. Service to the project can be provided from either of the 6-inch lines to the east and west of the project. Some improvements to the campus mains should also be constructed as part of this project, including replacement of the 6-inch line in the East Campus Drive with a 10-inch line, from Microbiology to Studio Theatre.
Parking Structure 3	416,000	No modifications to the existing water network are necessary to accommodate the proposed Parking Structure 3. Service to the project can be provided from the 8-inch line to the south.
Student Recreation Center	120,000	No modifications to the existing water network are necessary to accommodate the proposed Recreation Building. Service to the project can be provided from the 8-inch lines to the north, west and south.
Nursing Building Addition	5,000	It is recommended to replace the 6-inch ACP line that conflicts with the site of the proposed Nursing School Expansion with a DI pipe, but moved slightly to the north. The ACP line is old and should be replaced soon. The replacement could be confined to the portion conflicting with the proposed building or could expand to include the entire Residence Commons 6-inch ACP loop. Potholing should be performed to verify the location of the 6-inch line.
Outpost Replacement Building	8,000	No modifications to the existing water network are necessary to accommodate the proposed building.
Liberal Arts Complex	155,000	No modifications to the existing water network are necessary to accommodate the proposed replacement building for Liberal Arts 2, 3 & 4, Instructional Resources, Lecture Hall and Faculty Office 2. Service to the project can be provided from the 6-inch transite line to the west. The service connections to the existing buildings can be removed with the construction of the proposed building. There is also a drinking fountain located to the east of Instructional Resources that will need to be removed or reconnected to the 6-inch line to the south during the construction of the proposed building. Some improvements to the Campus mains should also be constructed as part of this project, including replacement of the 6-inch line in West Campus Drive with a 10-inch line running from the 8-inch water meter on Seventh Street to Parking Lot 3.
Student Services Complex	70,000	No modifications to the existing water network are recommended to accommodate the proposed Student Services Complex. Service to the project can be provided from the 6-inch line to the south. Some improvements to the campus mains should also be constructed as part of this project, consisting of replacement of the 6-inch line to the south with a 10-inch line being constructed in West Campus Drive to the existing 8-inch water meter by the Central Plant.
Engineering 3 & 4	80,000	The work limit of the proposed replacement building for Engineering 3 & 4 should shrink along the northern and western edges so that it doesn't conflict with the 6-inch mains in those areas. It should also shrink in the southeastern corner to avoid conflicting with the existing 4-inch line between Engineering 2 and ECS. Potholing should be performed to verify the location of the 4-inch and the 6-inch lines. Service to the project can be provided from either of the 6-inch lines to the north and west of the project.
Corporate Yard Expansion	71,000	No modifications to the existing water network are necessary to accommodate the proposed expansion.
Parking Structure 5 (Lot 7)	-	The western edge of the work limit of the proposed Parking Structure conflicts with an existing 6-inch water line. However, the 6-inch water line is undersized and should be replaced with a 10-inch line. The replacement water line can be constructed further to the west of the Parking Structure. There is also an existing fire hydrant in the current Parking Lot that will need to be removed and relocated along East Campus Drive. The extent of the new 10-inch line should cover from the 10-inch line being constructed in East Campus Drive as part of Peterson 1 and 2 and extend to the existing 8-inch water meter on Seventh Street.
Parking Structure 4 (Lot 14)	-	The proposed structure does not interfere with any of the existing water lines.
Satellite Dining Facility (Lot 15)	-	The proposed building is in conflict with a 8-inch line to the south. The 8-inch lines will need to be relocated to accommodate the proposed building. The relocated 6-inch lines could potentially serve the proposed building.
Miscellaneous	-	Replace existing transite water pipes on the south side of the campus.

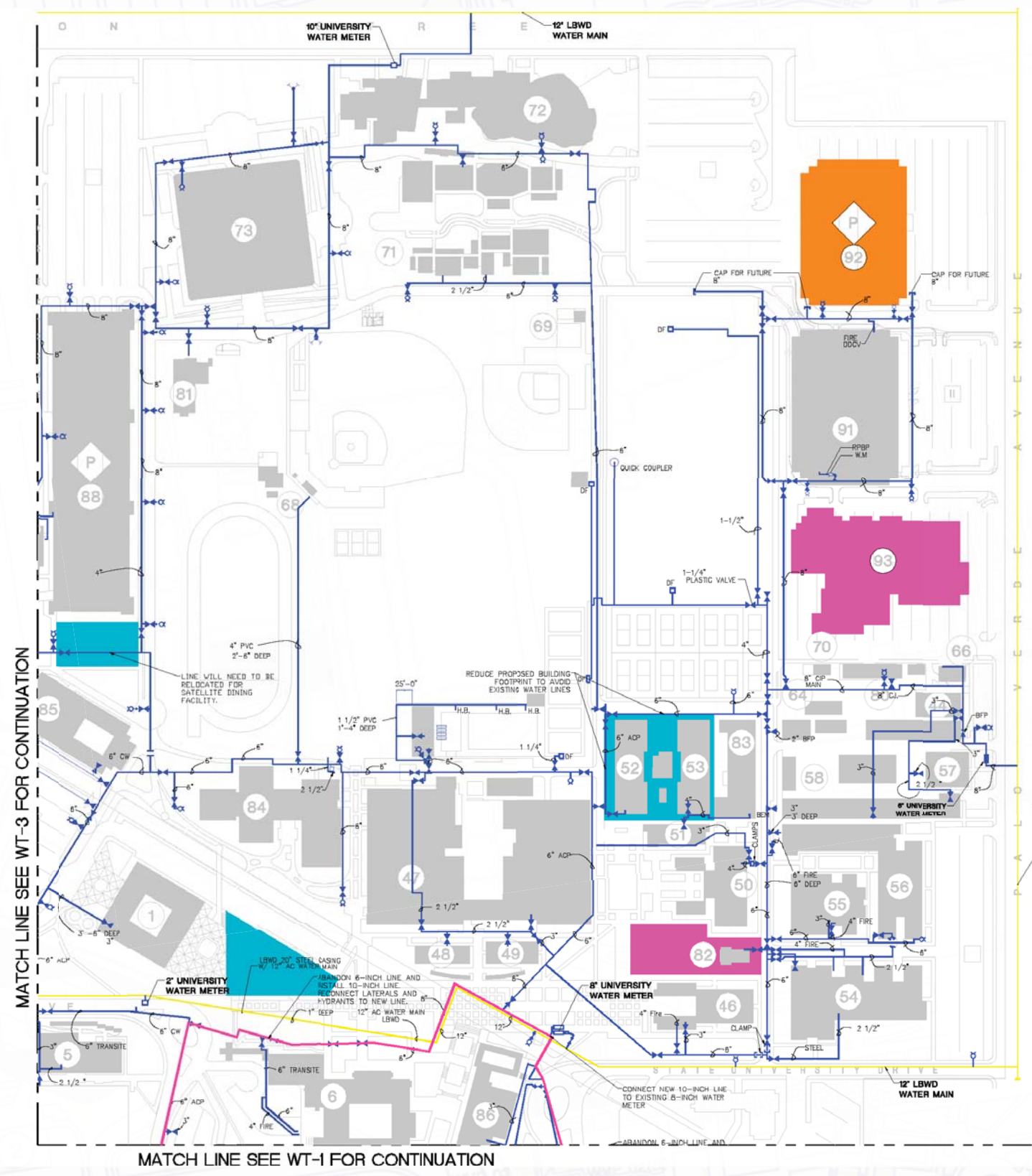




NO.	BUILDING DESIGNATION
1	Brotman Hall
5	Family & Consumer Sciences
6	University Student Union
44	Electrical Substation (North)
46	Social Sciences & Public Affairs
47	University Gymnasiums
48	Health & Human Services Classrooms
49	Health & Human Services Offices
50	Vivian Engineering Center
51	Engineering 2
52	Engineering 3
53	Engineering 4
54	Design
55	Human Services & Design
56	Engineering Technology
57	Facilities Management
58	Corporation Yard
64	Greenhouse 3
66	Reprographics
68	Restrooms/Storage
69	Softball Field Restroom
70	Main Distribution Communications Facility MDF B
71	University Music Center
72	Carpenter Performing Arts Center & Dance Center
73	Mike and Arline Walter Pyramid
80	University Police
81	Parking Office Building
82	Outpost Food Service
83	Engineering / Computer Science
84	Steve and Nini Hom Center
85	College of Business
86	Central Plant
88	Parking Structure No. 1
91	Parking Structure No. 2
92	Parking Structure No. 3
93	Student Recreation Center

Building / Boundary Legend

- EXISTING BUILDING
- FUTURE PARKING STRUCTURE
- POTENTIAL BUILDING SITE
- FUTURE BUILDING
- PLANNED BUILDING SITE



Legend

- NEW
- EXISTING PUBLIC LINE
- EXISTING CAMPUS LINE TO REMAIN
- EXISTING CAMPUS LINE TO BE REMOVED
- VALVE
- FIRE HYDRANT
- WATER METER
- DRINKING FOUNTAIN
- CLAMP
- BACKFLOW PREVENTER
- SIAMESE FIRE CONN.
- CAST IRON PIPE
- ASBESTOS CEMENT PIPE
- POLYVINYL CHLORIDE PIPE
- LONG BEACH WATER DEPARTMENT
- BACKFLOW PREVENTER
- HOSE BB
- REDUCED PRESSURE BACKFLOW PREVENTER
- WATER METER
- DOUBLE DETECTOR CHECK VALVES

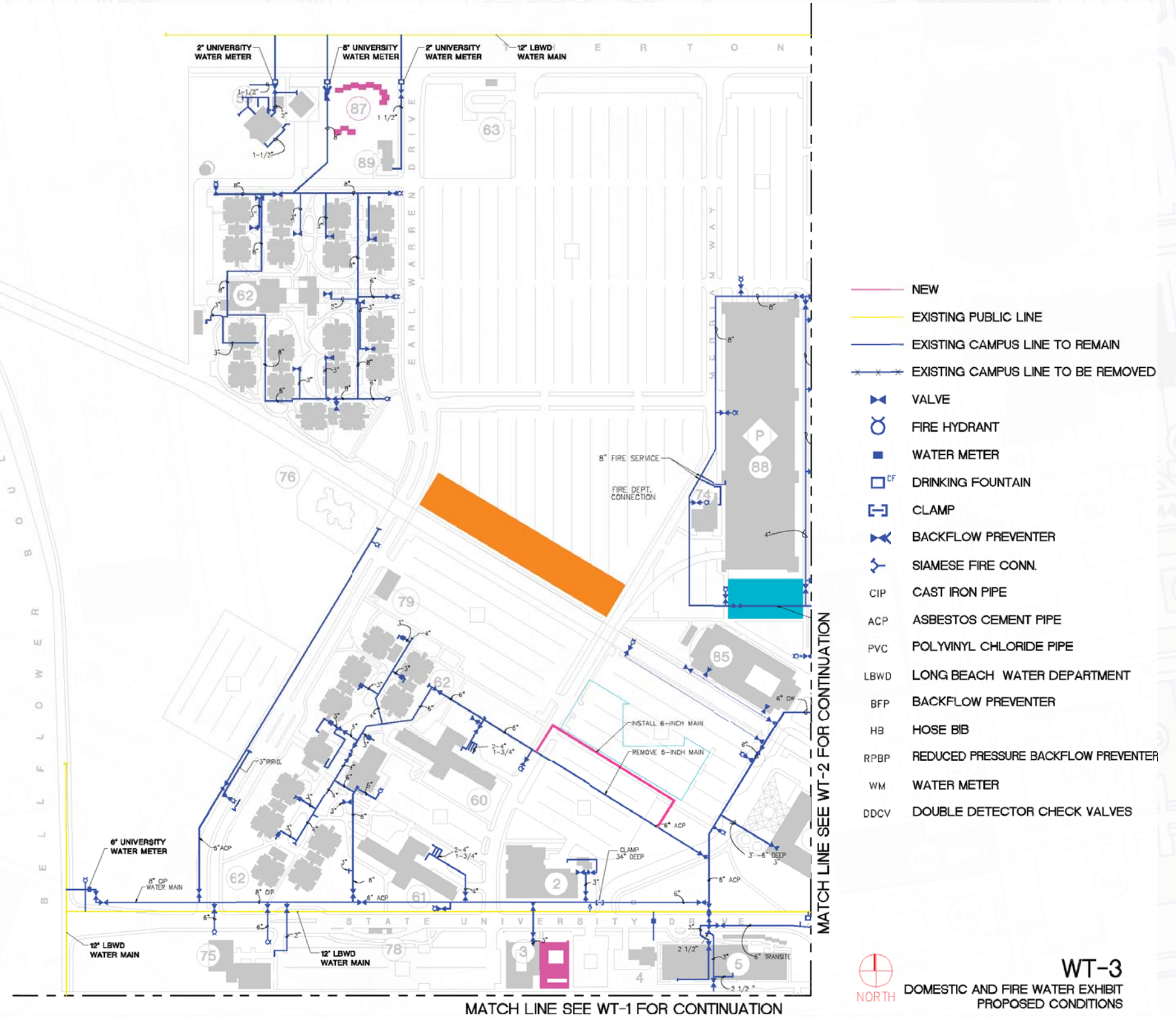
WT-2
DOMESTIC AND FIRE WATER EXHIBIT
PROPOSED CONDITIONS



NO.	BUILDING DESIGNATION
2	Student Health Services
3	Nursing
4	Soroptomist House
5	Family & Consumer Sciences
59	Patterson Child Development Center
60	Los Alamos Hall
61	Los Cerritos Hall
62a	Residence Commons
62b	Parkside Commons
63	Recycling Center
74	Parking and Transportation Services
75	International House
76	Earl Burns Miller Japanese Garden
78	Visitor Information Center
79	Main Distribution Communications Facility MDF C
85	College of Business
88	Parking Structure No. 1
89	Housing & Residential Life

Building / Boundary Legend

-  EXISTING BUILDING
-  FUTURE PARKING STRUCTURE
-  POTENTIAL BUILDING SITE
-  FUTURE BUILDING
-  PLANNED BUILDING SITE



Sanitary Sewer

The following table lists the proposed buildings and provides our recommendations necessary to accommodate each of them.

Recommendations for Sanitary Sewer System

Building/ Location	Area (SF)	Description of Impact to Campuswide Utilities
Peterson Hall 3 Replacement Building	160,000	The work limit of the proposed replacement building for Peterson Hall 3 and Science Lecture Hall should shrink along the western edge so that it no longer conflicts with the existing 10-inch main to the west of the project. The proposed building can be served from either the existing 10-inch line to the west or the existing 8-inch line to the east. As shown in the sewer video, there are some instances of severe root intrusion and pipe cracking in the downstream 10-inch line (see Appendix: Inspection Report from MH 28 to MH 41). Based on the added usage caused by the proposed projects and the existing condition of the 10-inch line, it is recommended that the 10-inch line be replaced with a 12-inch line from the connection point with the 12-inch line in West Campus Center Drive to the project site.
Liberal Arts Building (Phases 1 and 2)	155,000	The work limit of the proposed replacement building for Peterson Halls 1 & 2 and Faculty Office 5 should shrink along the western edge so that it no longer conflicts with the 10-inch main to the west of project. The proposed building can be served from either the existing 6-inch line to the south or the existing 10-inch line to the west. The remainder of the 10-inch line not replaced by the Peterson Hall 3 project should be replaced with a 12-inch line. The 6-inch line was found to have several locations with minor to major root intrusion (see Appendix: Inspection Report from MH 48 to MH 47) and should be replaced with a new 8-inch line.
Parking Structure 3	416,000	The location of the proposed Parking Structure 3 does not conflict with any existing sanitary sewer mains. There is a 24-inch LACSD main to the west that could provide a sewer service* to the proposed Structure, or 6-inch and 8-inch Campus lines further to the west that could provide service.
Student Recreation Center	120,000	The work limit of the proposed Recreation Building should shrink along the western edge so that it no longer conflicts with the existing 24-inch LACSD main to the west of the project. The proposed building can be served from either the existing 24-inch main* to the west or the 8-inch Campus line to the south.
Nursing Building Addition	5,000	The work limit of the proposed Nursing School Expansion should shrink along the northeast edge so that it no longer conflicts with the 12-inch LACSD sewer main to the northeast of the project. The Structure could potentially be served by the 12-inch main* or by the existing 6-inch Campus line to the west of the building.
Outpost Replacement Building	8,000	No modifications to the existing sanitary sewer network are necessary to accommodate the proposed building.
Liberal Arts Complex	155,000	The proposed replacement building for Liberal Arts 2, 3 & 4, Instructional Resources, Lecture Hall and Faculty Office 2 conflicts with the existing 3-inch main that can be removed at the same time as the Liberal Arts buildings in the construction of the proposed building. The proposed building could potentially be served by the 6-inch Campus line to the west of the Liberal Arts buildings.
Student Services Complex	70,000	The proposed Student Services Complex is not in conflict with of any existing sewer lines. The Structure could potentially be served by the 12-inch Campus line to the southwest of the building.
Engineering 3 & 4	80,000	The proposed replacement building for Engineering 3 & 4 is not in conflict with any existing sewer lines. The Structure could potentially be served by the 6-inch Campus line to the west of the building. Due to the moderate to severe cracks found in several locations along the 6-inch line (see Appendix: Inspection Report from MH 71 to MH 70), it should be replaced with an 8-inch line from the new building to the connection with the 8-inch Campus sewer to the south.
Corporate Yard Expansion	71,000	No modifications to the existing sanitary sewer network are necessary to accommodate the proposed expansion.
Parking Structure 5 (Lot 7)	-	The proposed structure does not interfere with any of the existing sewer lines.
Parking Structure 4 (Lot 14)	-	The proposed structure does not interfere with any of the existing sewer lines.
Satellite Dining Facility (Lot 15)	-	The proposed building does not interfere with any of the existing sewer lines. The proposed building could potentially be served by a 4" line located on the south side of the proposed facility.
Miscellaneous	-	Replace existing deteriorating sewer pipes per sewer video report.

- Obtaining a new connection permit for one of the existing LACSD mains is not recommended, as it is up to the discretion of the County whether they will consider issuing such a permit. Wherever possible, it would be preferable to connect to existing Campus mains that already tie in to one of the County mains.



In addition to the sanitary sewer lines affected by the proposed buildings, there were other lines that were found by the video inspection to have serious root intrusion problems and should be considered for replacement in the near future to avoid serious problems. The areas are summarized in Table 1:

TABLE 1 Sewer System Pipes Affected by Root Intrusion

Sewer Line	Description of Sewer Problem	Length of Affected Pipe
6-inch VCP in State University Drive serving Nursing	There is severe root intrusion in portions of this line, particularly between the Soroptomist House and Nursing. The line was actually found to be completely blocked at one location and video inspection had to be abandoned (see Appendix: Inspection Report from MH 25 to MH 26). This line should soon be replaced with a 8-inch line at least from Nursing to Family & Consumer Sciences, and eventually also to where the 6-inch line joins with the 12-inch line in West Campus Drive.	850+/- feet
8-inch VCP north of State University Drive	There are moderate circumferential cracks in this line in one location and blockage due to accumulation of what appears to be grease in another location (see Appendix: Inspection Report from MH 64 to MH 63). This line should be considered for replacement in the future but does not require immediate replacement. If the line is not replaced in the immediate future, it should be cleaned and the cause of the accumulation of grease investigated.	50+/- feet
6-inch VCP west of Fine Arts 4, south of Fine Arts 1 and west of McIntosh Humanities Building	There are several locations in these lines with severe circumferential cracks and joint offsets of 0.5 inches, as well as some root intrusion (see Appendix: Inspection Report from MH 50 to MH 49). Additionally, some of these lines were not part of the video inspection because the Campus representatives already knew them to have problems with joint offsets and/or intrusions. These 6-inch lines should be replaced with 8-inch lines	1000+/- feet
6-inch VCP west of the Cafeteria	Campus representatives advised not to include this line in the video inspection because it has problems with joint offsets. The line should be replaced with a 8-inch line between the 12-inch VCP line in West Campus Drive and the Cafeteria.	250+/- feet
6-inch VCP between Faculty Office 3 and Lot 5	Campus representatives advised that this 6-inch line is extremely root bound and in need of replacement. The line should be replaced with a 6-inch line between Faculty Office 3 and Lot 5.	300+/- feet
6-inch VCP north of State University Drive, west of Design	The video inspection was abandoned because of high flow (see Appendix: Inspection Report from MH 76 to MH 75), indicating there is a problem further downstream in the line. The line should be cleaned so that a complete inspection can be conducted. If cracks, intrusion or excessive flows are causing the blockage, the line should be considered for replacement with an 8-inch line between Human Services and Design and State University Drive.	500+/- feet
8-inch VCP running under the Central Plant	Campus representatives have requested installation of a manhole between the stairs near the Central Plant so they can have access to the line to clean it. Existing cleanouts are spaced too far apart to allow access. A manhole should be installed in this location.	N/A

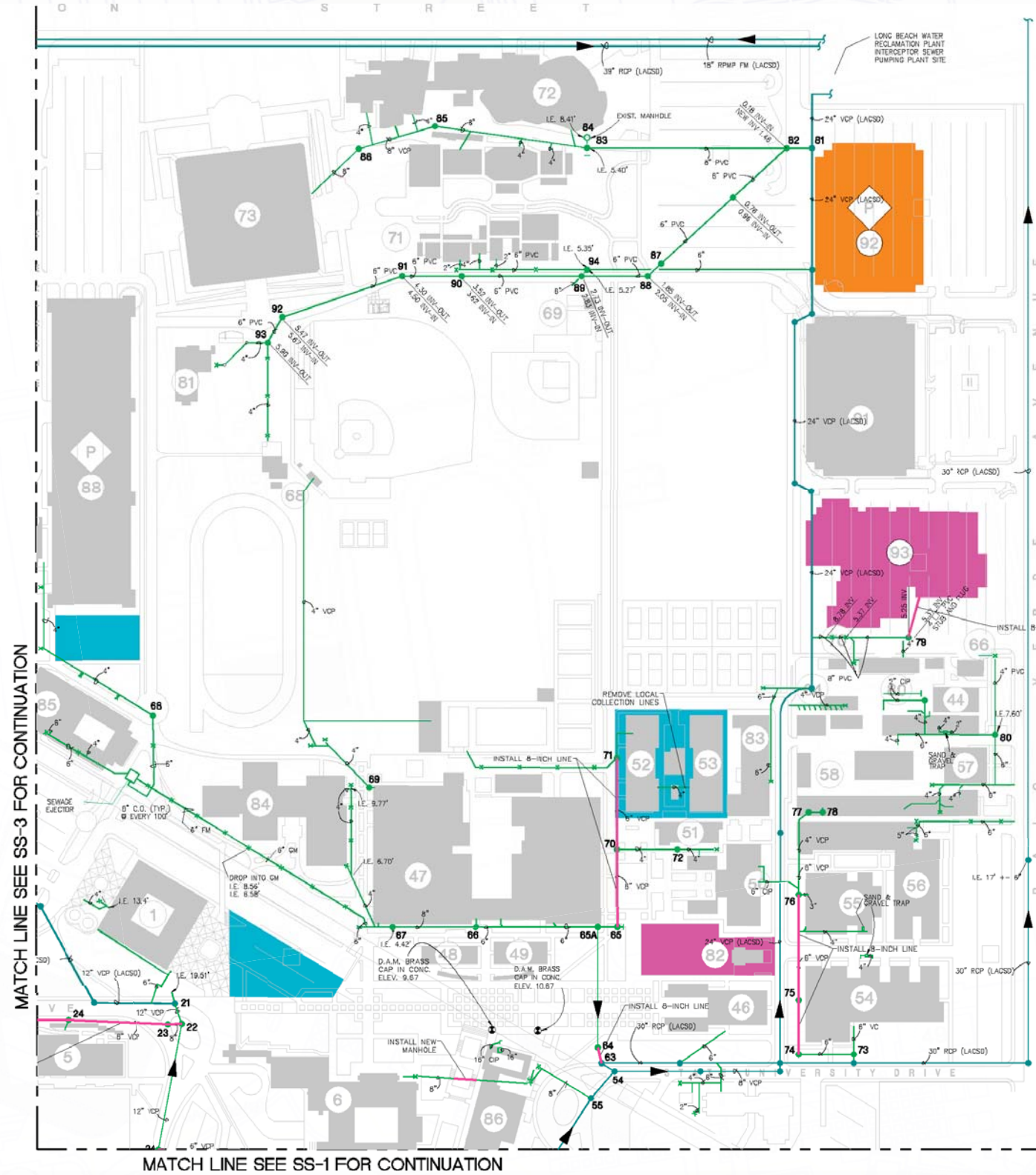















NO.	BUILDING DESIGNATION
1	Brotman Hall
5	Family & Consumer Sciences
6	University Student Union
44	Electrical Substation (North)
46	Social Sciences & Public Affairs
47	University Gymnasiums
48	Health & Human Services Classrooms
49	Health & Human Services Offices
50	Vivian Engineering Center
51	Engineering 2
52	Engineering 3
53	Engineering 4
54	Design
55	Human Services & Design
56	Engineering Technology
57	Facilities Management
58	Corporation Yard
64	Greenhouse 3
66	Reprographics
68	Restrooms/Storage
69	Softball Field Restroom
70	Main Distribution Communications Facility MDF B
71	University Music Center
72	Carpenter Performing Arts Center & Dance Center
73	Mike and Arline Walter Pyramid
80	University Police
81	Parking Office Building
82	Outpost Food Service
83	Engineering / Computer Science
84	Steve and Nini Hom Center
85	College of Business
86	Central Plant
88	Parking Structure No. 1
91	Parking Structure No. 2
92	Parking Structure No. 3
93	Student Recreation Center

Building / Boundary Legend

-  EXISTING BUILDING
-  FUTURE PARKING STRUCTURE
-  POTENTIAL BUILDING SITE
-  FUTURE BUILDING
-  PLANNED BUILDING SITE



-  NEW CAMPUS SANITARY SEWER LINE
-  EXISTING PUBLIC LINE
-  EXISTING CAMPUS LINE TO REMAIN
-  EXISTING CAMPUS LINE TO BE REMOVED
-  SEWER MANHOLE
-  SEWER CONNECTION
-  SEWER CLEAN OUT
-  INVERT ELEVATION
- I.E. 66.0' INVERT ELEVATION
- F.E. 30.0' FLOW ELEVATION
-  FLOW DIRECTION
- FM FORCE MAIN
- GM GRAVITY MAIN
- RPMP REINFORCED PLASTIC MORTAR PIPE
- RCP REINFORCED CLAY PIPE
- VCP VITRIFIED CLAY PIPE
- CIP CAST IRON PIPE
- (28) BUILDING NUMBER
- L.B.W.D. LONG BEACH WATER DEPARTMENT
- L.A.C.S.D. LOS ANGELES COUNTY SANITATION DEPARTMENT
-  DIVISION OF ARCHITECTURAL MONUMENT
-  ABANDONED LINE

 NORTH

SS-2
SANITARY SEWER EXHIBIT
PROPOSED IMPROVEMENTS














NO.	BUILDING DESIGNATION
2	Student Health Services
3	Nursing
4	Soroptomist House
5	Family & Consumer Sciences
59	Patterson Child Development Center
60	Los Alamitos Hall
61	Los Cerritos Hall
62a	Residence Commons
62b	Parkside Commons
63	Recycling Center
74	Parking and Transportation Services
75	International House
76	Earl Burns Miller Japanese Garden
78	Visitor Information Center
79	Main Distribution Communications Facility MDF C
85	College of Business
88	Parking Structure No. 1
89	Housing & Residential Life

Building / Boundary Legend

-  EXISTING BUILDING
-  FUTURE PARKING STRUCTURE
-  POTENTIAL BUILDING SITE
-  FUTURE BUILDING
-  PLANNED BUILDING SITE



-  NEW CAMPUS SANITARY SEWER LINE
-  EXISTING PUBLIC LINE
-  EXISTING CAMPUS LINE TO REMAIN
-  EXISTING CAMPUS LINE TO BE REMOVED
-  SEWER MANHOLE
-  SEWER CONNECTION
-  SEWER CLEAN OUT
-  INVERT ELEVATION
- I.E. 66.0' INVERT ELEVATION
- F.E. 30.0' FLOW ELEVATION
-  FLOW DIRECTION
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- VCP VITRIFIED CLAY PIPE
- CIP CAST IRON PIPE
- (28) BUILDING NUMBER
- L.B.W.D. LONG BEACH WATER DEPARTMENT
- L.A.C.S.D. LOS ANGELES COUNTY SANITATION DEPARTMENT
-  DIVISION OF ARCHITECTURAL MONUMENT
-  ABANDONED LINE

MATCH LINE SEE SS-2 FOR CONTINUATION

MATCH LINE SEE SS-1 FOR CONTINUATION



SS-3
SANITARY SEWER EXHIBIT
PROPOSED IMPROVEMENTS



Storm Drain

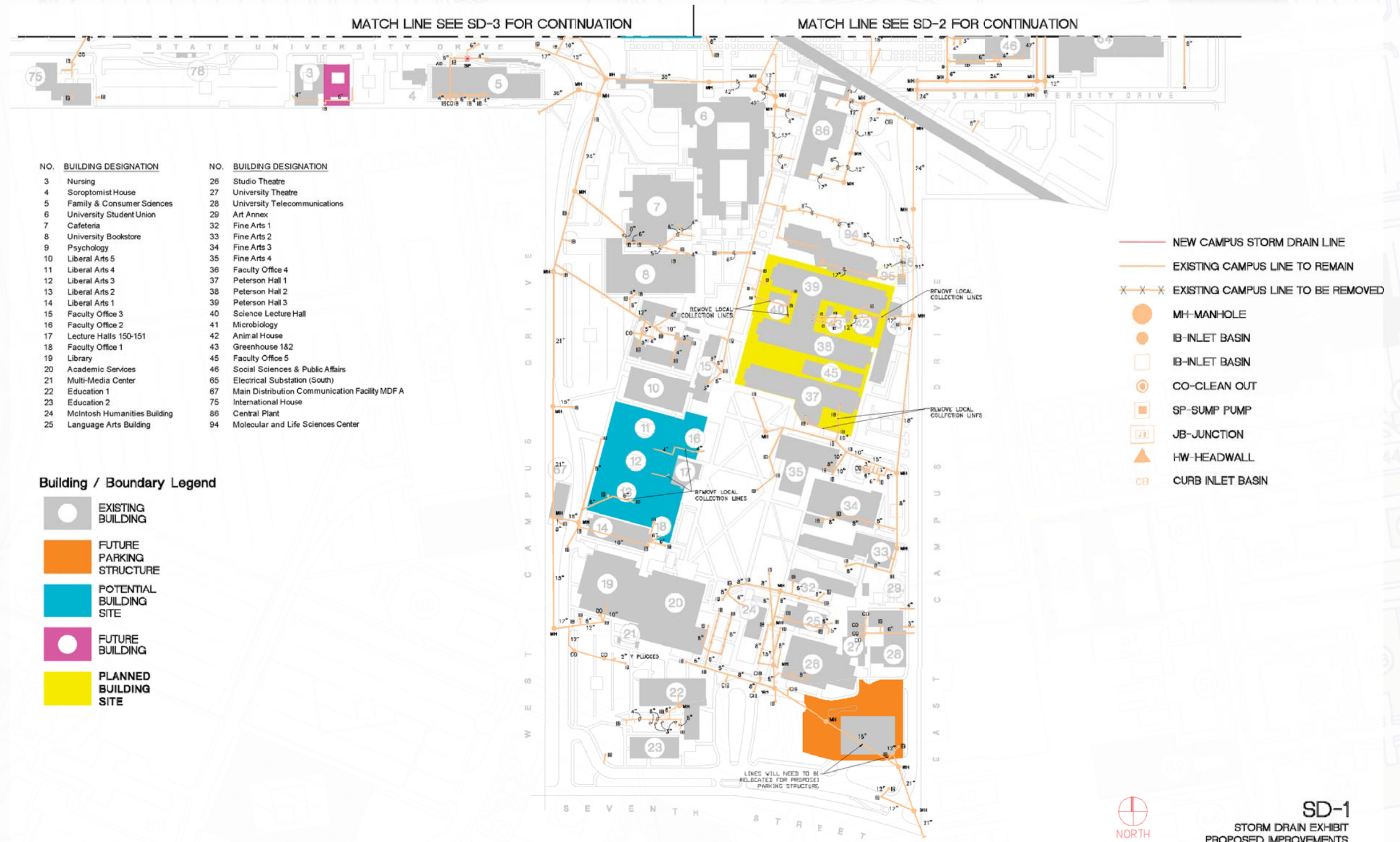
The following table lists the proposed buildings and provides our recommendations necessary to accommodate each of them.

Additional improvements to the storm drain system are also recommended. The 8-inch lines in Lot 9, the 10-inch line that connects it to Deukmejian Way and the 12-inch line in Deukmejian Way should be replaced and manholes should be constructed to allow proper maintenance of the new lines.

Recommendations for Storm Drain System

Building/ Location	Area (SF)	Description of Impact to Campuswide Utilities
Peterson Hall 3 Replacement Building	160,000	The proposed replacement building for Peterson Hall 3 and Science Lecture Hall is located on top of existing 6-inch and 12-inch lines that collect local runoff and tie to the Campus network. The lines and area drains can be removed during the construction of the proposed building. The proposed building could potentially be served by the 12-inch line to the west or the 21-inch line to the east.
Liberal Arts Building (Phases 1 and 2)	155,000	The proposed replacement building for Peterson Halls 1 & 2 and Faculty Office 5 only conflicts with existing local collection lines and area drains that can be removed during construction of the proposed building. The proposed building could potentially be served by the 10-inch line to the south.
Parking Structure 3	416,000	No modifications to the existing storm drain network are necessary to accommodate the proposed expansion.
Student Recreation Center	120,000	The location of the proposed Parking Structure 3 conflicts with the existing 15-inch line that collects local drainage in the northern third of Parking Lot 11. The 15-inch line will need to be removed and the 10-inch line that collects runoff from the eastern portion of the Lot which is to remain will need to be reconnected to the Campus system via the 12-inch line to the south of the proposed building.
Nursing Building Addition	5,000	The proposed Recreation Building conflicts with the existing 10-inch and 12-inch local collection lines and area drains in Parking Lot 11 that can be removed during construction of the proposed building. It also interferes with a 4-inch line that collects runoff from the south and ties into the lines in Lot 11. This 4-inch line will need to be relocated. The proposed building could potentially be served by the existing 15-inch line to the southwest.
Outpost Replacement Building	8,000	The proposed Nursing School Expansion is not in conflict with any existing storm drain lines. The Structure could potentially be served by the 8-inch line to the north or the 12-inch line to the west.
Liberal Arts Complex	155,000	No modifications to the existing storm drain network are necessary to accommodate the proposed building.
Student Services Complex	70,000	The proposed replacement building for Liberal Arts 2, 3 & 4, Instructional Resources, Lecture Hall and Faculty Office 2 only conflicts with existing local collection lines and area drains that can be removed during construction of the proposed building. The proposed building could potentially be served by the 10-inch line to the south or the 8-inch line to the west.
Engineering 3 & 4	80,000	The proposed Student Services Complex conflicts with a storm drain line that collects some local area drainage and outlets to the Channel. It also conflicts with a sump pump that connects to a 6-inch line that also outlets to the Channel. The area drains and storm drain outlet to the Channel will need to be relocated further to the west of the proposed building as will the sump pump.
Corporate Yard Expansion	71,000	The proposed replacement building for Engineering 3 & 4 conflicts with 4-inch, 6-inch and 8-inch storm drain lines that take care of local drainage for the buildings that will be removed as part of the project. The proposed building also conflicts with a 4-inch local drainage line to the east of the building that must be reconnected to the Campus network, either to the 8-inch line to the south or the 6-inch line to the north. The proposed building could potentially be served by the 12-inch line to the west or the 8-inch line to the south.
Parking Structure 5 (Lot 7)	-	The proposed structure conflicts with 18-inch and 12-inch storm drain lines. The same need to be relocated to accommodate the proposed facility.
Parking Structure 4 (Lot 14)	-	The proposed structure does not interfere with any of the existing storm drain lines. However, drainage in parking lot 14 will have to be evaluated as part of the proposed structure project.
Satellite Dining Facility (Lot 15)	-	The proposed building conflicts with 6-inch and 8-inch storm drain lines. The same need to be relocated to accommodate the proposed facility.
Miscellaneous	-	Replace existing deteriorating storm drain pipes.

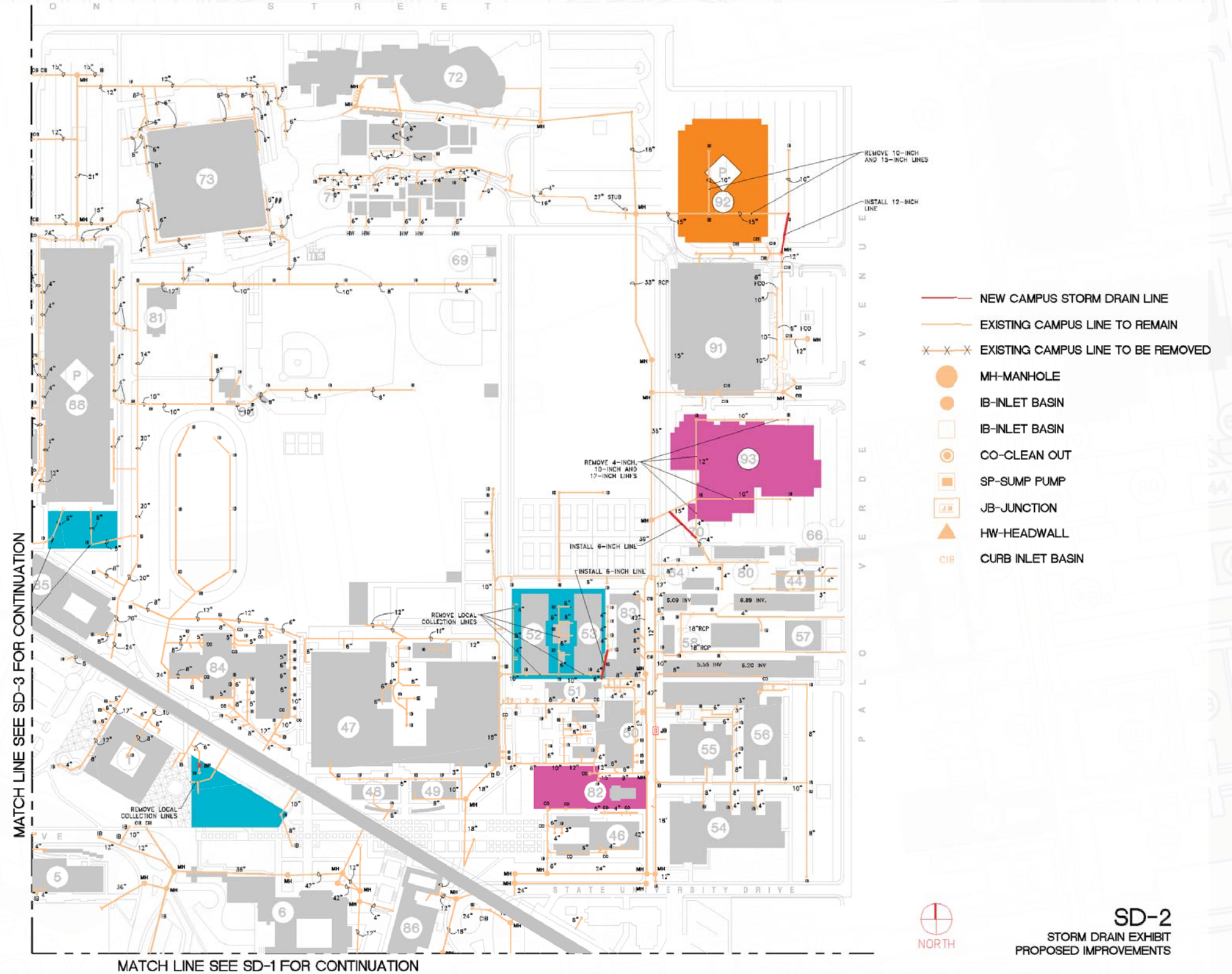




NO.	BUILDING DESIGNATION
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5	Family & Consumer Sciences
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Building / Boundary Legend

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	POTENTIAL BUILDING SITE
	FUTURE BUILDING
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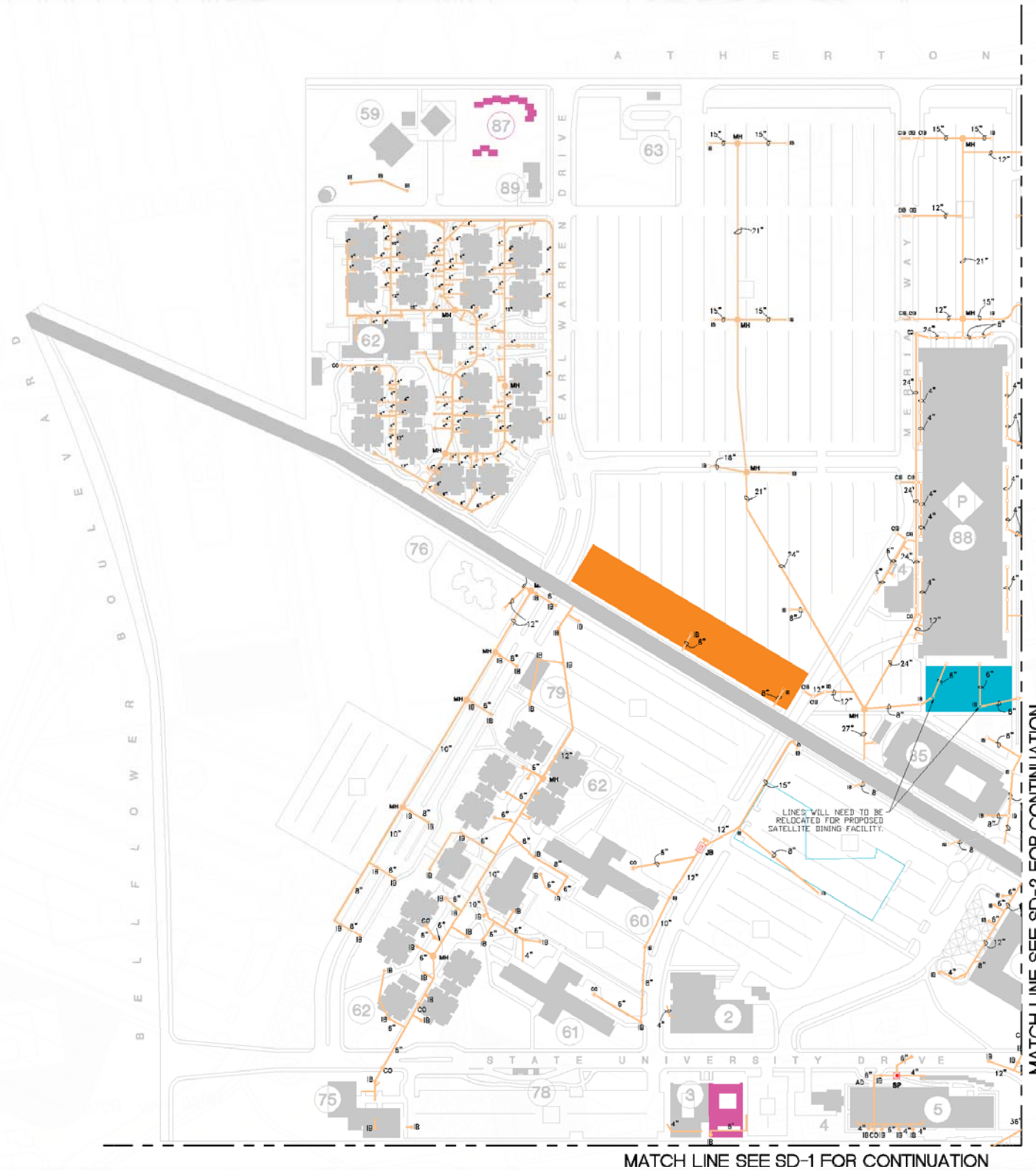
SD-2
STORM DRAIN EXHIBIT
PROPOSED IMPROVEMENTS














NO.	BUILDING DESIGNATION
2	Student Health Services
3	Nursing
4	Soroptomist House
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63	Recycling Center
74	Parking and Transportation Services
75	International House
76	Earl Burns Miller Japanese Garden
78	Visitor Information Center
79	Main Distribution Communications Facility MDFC
85	College of Business
88	Parking Structure No. 1
89	Housing & Residential Life

Building / Boundary Legend

-  EXISTING BUILDING
-  FUTURE PARKING STRUCTURE
-  POTENTIAL BUILDING SITE
-  FUTURE BUILDING
-  PLANNED BUILDING SITE



-  NEW CAMPUS STORM DRAIN LINE
-  EXISTING CAMPUS LINE TO REMAIN
-  EXISTING CAMPUS LINE TO BE REMOVED
-  MH-MANHOLE
-  IB-INLET BASIN
-  IB-INLET BASIN
-  CO-CLEAN OUT
-  SP-SUMP PUMP
-  JB-JUNCTION
-  HW-HEADWALL
-  CIB CURB INLET BASIN



SD-3
STORM DRAIN EXHIBIT
PROPOSED IMPROVEMENTS



Irrigation Water

The reclaimed water networks in the northern portion of Campus would benefit from being connected to form a single network. Combining the two networks into one would provide some redundancy to the system in case repairs are ever needed and would help improve problems with a lack of pressure and flow. There are several locations where the two networks are in close proximity with each other and making a connection or two to join them would require a minimal amount of trenching and construction. Two potentially good locations are southwest of the University Music Center and northwest of the Dance Center. Our recommendation is to connect the two networks in these two locations.

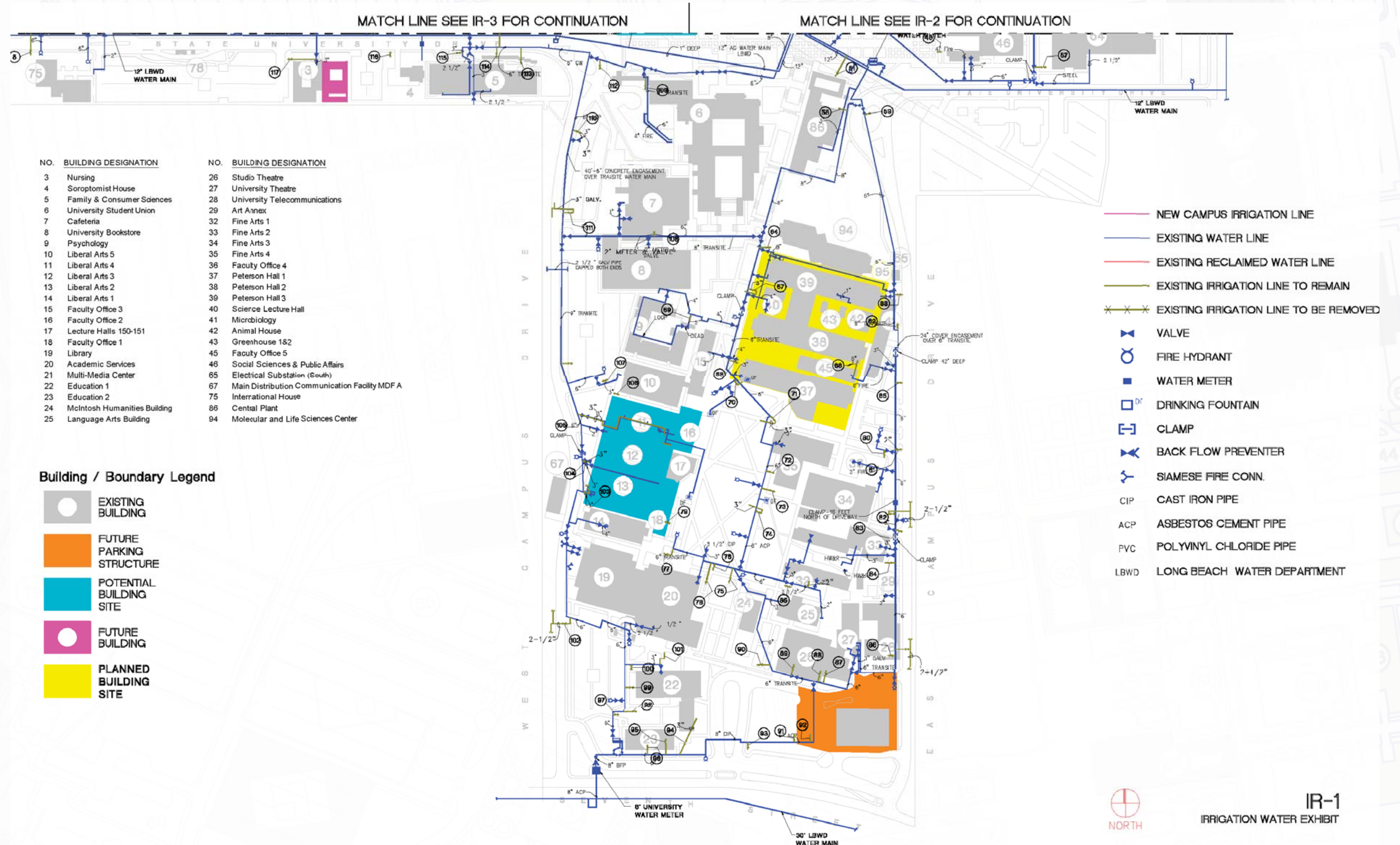
Many of the irrigation lines in the southern portion of Campus are connected to the potable water mains by atmospheric pressure breakers which, depending on the set-up, may not be compliant with local Health Department regulations. Once the water mains in this area of Campus have been improved and the problems with low water pressures somewhat abated, a thorough study of non-backbone system components is warranted to verify Code compliance. Any non-compliant components should be considered for upgrade to backflow preventer systems.

Table 1 lists the proposed buildings and provides our recommendations necessary to accommodate each one of them.

TABLE 1 - Recommendations for Irrigation Water System

Building/ Location	Area (SF)	Description of Impact to Campuswide Utilities
Peterson Hall 3 Replacement Building	160,000	The proposed replacement building for Peterson Hall 3, Microbiology and Science Lecture Hall is located on top of several small irrigation water lines that serve the planted areas surrounding the buildings that will be demolished. Future Irrigation water services can be provided from either of the two existing 6-inch water lines that run north/south on the east and west sides of the Peterson Halls.
Liberal Arts Building (Phases 1 and 2)	155,000	The proposed replacement building for Peterson Halls 1 & 2 and Faculty Office 5 does not conflict with any existing irrigation lines, but is located on top of an existing 6-inch water main on the west side of the Peterson Halls. Section 4.1 discusses recommendations for water lines. Future Irrigation water services can be provided from either the relocated 6-inch water line on the west side or the 6-inch water line on the east side of the Peterson Halls.
Parking Structure 3	416,000	No modifications to the existing irrigation network are necessary to accommodate the proposed expansion.
Student Recreation Center	120,000	The proposed Parking Structure 3 does not conflict with any existing irrigation or domestic water lines. Future Irrigation water services can be provided from either the 6-inch reclaimed water line to the north or the 4-inch reclaimed water line to the west.
Nursing Building Addition	5,000	The proposed Recreation Building does not conflict with any existing irrigation or domestic water lines. Future Irrigation water services can be provided from the 6-inch reclaimed water line to the west.
Outpost Replacement Building	8,000	The proposed Nursing School Expansion does not conflict with any existing irrigation water lines, but it is located on top of an existing 6-inch water line that serves the Residence Commons. Section 4.1 discusses recommendations for water lines. There are several irrigation water valves located around the site of the proposed Structure that could be used to provide irrigation water, otherwise it could potentially come from the relocated 6-inch line.
Liberal Arts Complex	155,000	No modifications to the existing irrigation network are necessary to accommodate the proposed building.
Student Services Complex	70,000	The proposed replacement building for Liberal Arts 2, 3 & 4, Instructional Resources, Lecture Hall and Faculty Office 2 does not conflict with any existing irrigation water lines, but it is located on top of an existing 3-inch water main on running through Liberal Arts 4. Section 4.1 discusses recommendations for water lines. There are several irrigation water valves located around the site of the proposed building that could be used to provide irrigation water, otherwise it could potentially come from the 6-inch domestic water line to the west.
Engineering 3 & 4	80,000	The proposed Student Services Complex is not in conflict with any existing irrigation water lines. The Structure could potentially be served by a 6-inch domestic water line to the south of the building.
Corporate Yard Expansion	71,000	The proposed replacement building for Engineering 3 & 4 does not conflict with any reclaimed water lines. There are several irrigation water valves surrounding the location of the proposed building that could potentially provide irrigation service, otherwise it could potentially come from the 6-inch domestic water line to the north and west.
Parking Structure 5 (Lot 7)	-	Refer to the Recommendations Table in the domestic water section.
Parking Structure 4 (Lot 14)	-	Refer to the Recommendations Table in the domestic water section.
Satellite Dining Facility (Lot 15)	-	Refer to the Recommendations Table in the domestic water section.
Miscellaneous	-	Provide new back flow preventers on the south side of the campus.

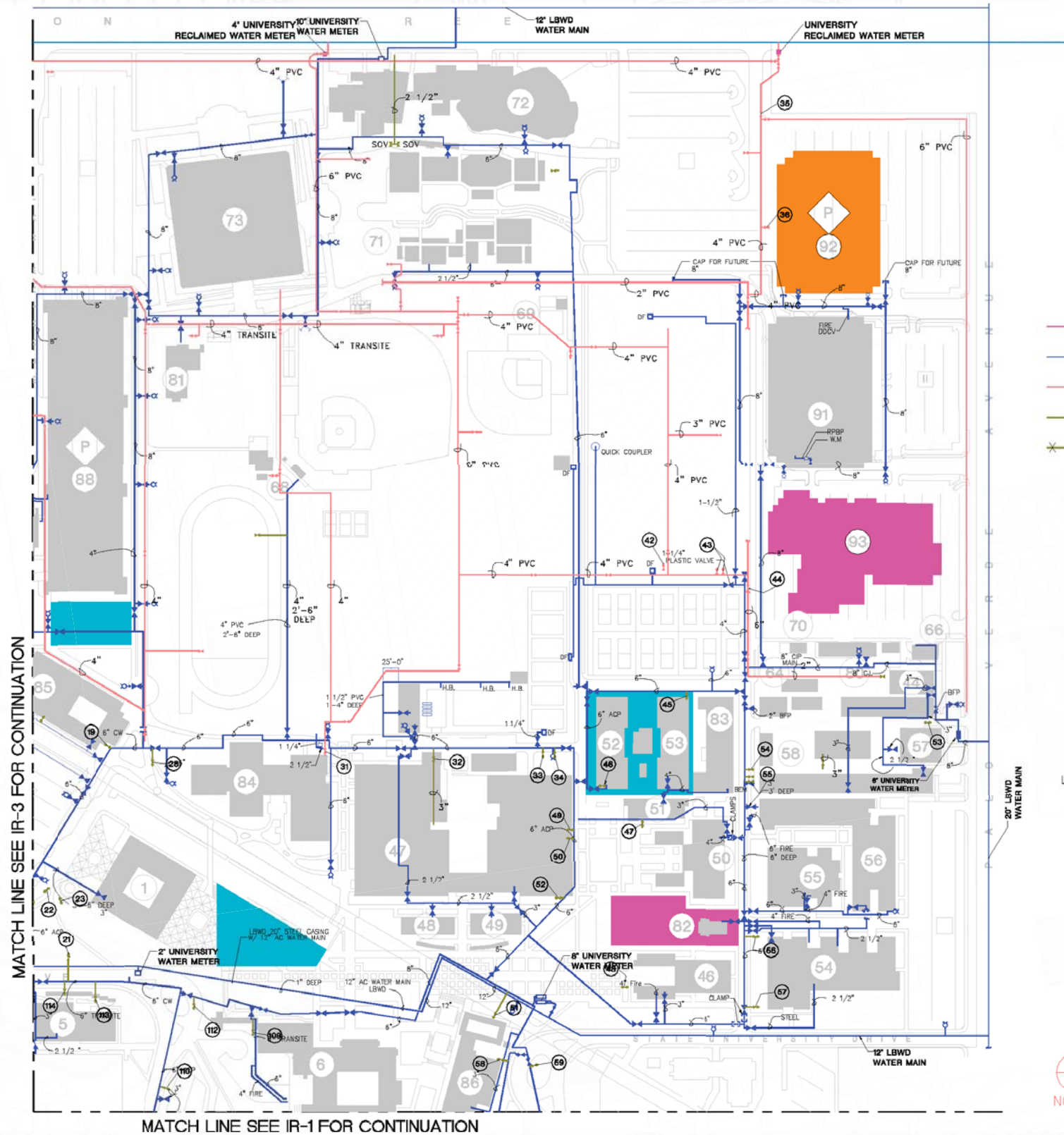




















NO.	BUILDING DESIGNATION
1	Brotman Hall
5	Family & Consumer Sciences
6	University Student Union
44	Electrical Substation (North)
46	Social Sciences & Public Affairs
47	University Gymnasiums
48	Health & Human Services Classrooms
49	Health & Human Services Offices
50	Vivian Engineering Center
51	Engineering 2
52	Engineering 3
53	Engineering 4
54	Design
55	Human Services & Design
56	Engineering Technology
57	Facilities Management
58	Corporation Yard
64	Greenhouse 3
66	Reprographics
68	Restrooms/Storage
69	Softball Field Restroom
70	Main Distribution Communications Facility MDF B
71	University Music Center
72	Carpenter Performing Arts Center & Dance Center
73	Mike and Arline Walter Pyramid
80	University Police
81	Parking Office Building
82	Outpost Food Service
83	Engineering / Computer Science
84	Steve and Nini Hom Center
85	College of Business
86	Central Plant
88	Parking Structure No. 1
91	Parking Structure No. 2
92	Parking Structure No. 3
93	Student Recreation Center

Building / Boundary Legend

-  EXISTING BUILDING
-  FUTURE PARKING STRUCTURE
-  POTENTIAL BUILDING SITE
-  FUTURE BUILDING
-  PLANNED BUILDING SITE



-  NEW CAMPUS IRRIGATION LINE
-  EXISTING WATER LINE
-  EXISTING RECLAIMED WATER LINE
-  EXISTING IRRIGATION LINE TO REMAIN
-  EXISTING IRRIGATION LINE TO BE REMOVED
-  VALVE
-  FIRE HYDRANT
-  WATER METER
-  DRINKING FOUNTAIN
-  CLAMP
-  BACK FLOW PREVENTER
-  SIAMESE FIRE CONN.
-  CIP
-  ACP
-  PVC
-  LBWD



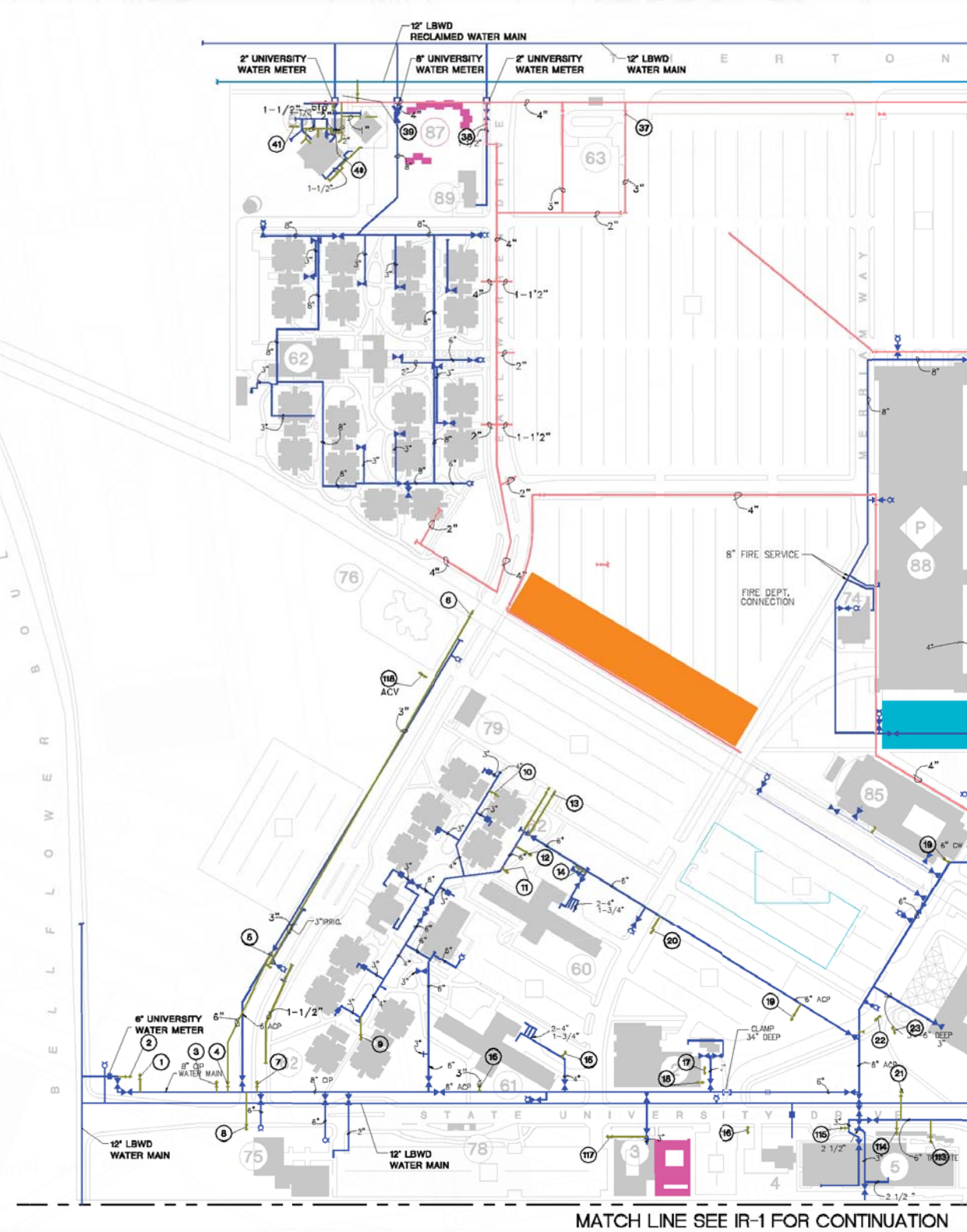
IR-2
IRRIGATION WATER EXHIBIT



















NO.	BUILDING DESIGNATION
2	Student Health Services
3	Nursing
4	Soroptomist House
5	Family & Consumer Sciences
59	Patterson Child Development Center
60	Los Alamitos Hall
61	Los Cerritos Hall
62a	Residence Commons
62b	Parkside Commons
63	Recycling Center
74	Parking and Transportation Services
75	International House
76	Earl Burns Miller Japanese Garden
78	Visitor Information Center
79	Main Distribution Communications Facility MDFC
85	College of Business
88	Parking Structure No. 1
89	Housing & Residential Life

Building / Boundary Legend

-  EXISTING BUILDING
-  FUTURE PARKING STRUCTURE
-  POTENTIAL BUILDING SITE
-  FUTURE BUILDING
-  PLANNED BUILDING SITE



-  NEW CAMPUS IRRIGATION LINE
-  EXISTING WATER LINE
-  EXISTING RECLAIMED WATER LINE
-  EXISTING IRRIGATION LINE TO REMAIN
-  EXISTING IRRIGATION LINE TO BE REMOVED
-  VALVE
-  FIRE HYDRANT
-  WATER METER
-  DRINKING FOUNTAIN
-  CLAMP
-  BACK FLOW PREVENTER
-  SIAMESE FIRE CONN.
-  CIP CAST IRON PIPE
-  ACP ASBESTOS CEMENT PIPE
-  PVC POLYVINYL CHLORIDE PIPE
-  LBWD LONG BEACH WATER DEPARTMENT



IR-3
IRRIGATION WATER EXHIBIT



Chilled and Heating Hot Water Systems

Energy Efficiency

For maximum efficiency, it is recommended that our recommendations provided in our previous January 31, 2006 energy study be implemented.

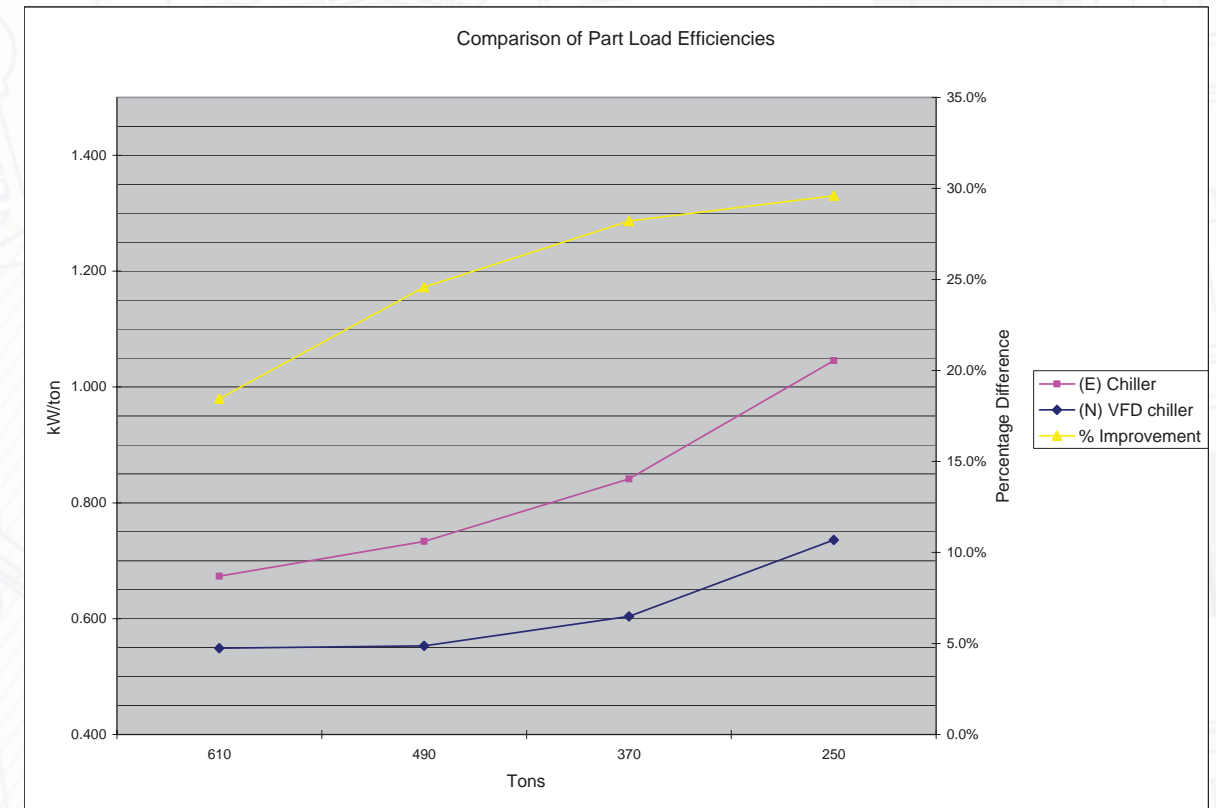
The Central Plant heating and cooling systems are exceptionally well maintained and should have many more years of useful life. There is more than enough chiller capacity to meet the projected loads of the campus, however to continue non-operation of chillers during the peak electrical period of 11:00 am to 6:00 pm during the summer additional thermal energy storage would need to be added. Two steps are recommended to accommodate future loads and increase the efficiency of the plant. The first is to add a small chiller in the 600 ton range and the second is to install additional thermal storage of 10,000 ton-hrs.

The analysis of the future campus loads has determined that the peak cooling capacity will not require the addition of a large 1,200 ton chiller. In the original plant design space and utilities were allotted for another chiller in the 1,200 ton range. However the campus would be better served by a smaller chiller to pick up the fractional loads between 150 to 600 tons that are experience throughout the year. Because the 4 existing chillers loose efficiency drastically when unloaded more than 50%, a smaller chiller would significantly enhance the overall efficiency of the plant. The following graph of kW/ton part load efficiency demonstrates this phenomenon.

This graph shows an increase of between 18% to almost 30% for the same operating conditions (78°F entering Condenser water and 38°F supply chilled water). The overall efficiencies of both chillers improves uniformly as the condenser water temperature decreases, but the percentage improvement stays the same.

The second recommendation for the chilled water system is the installation of additional Thermal Energy Storage capacity. Since the system in ECS building 83 is already configured for additional ice storage tanks, this would be the next logical place to add capacity. However the amount of additional storage is a relatively small 1500 ton-hrs. A total of at least 10,000 ton-hrs of storage capacity would be required for the future building loads detailed in Chapter 3.

One method would be a chilled water storage tank located next to the pool. Given a soil loading capability of 1,000 lbs/sq. ft., this tank would be 85 feet in diameter and 32 feet tall. This is the least expensive option, but requires more space than the ice option discussed below. This approach would entail some additional piping and pair of pumps and would use the existing central plant chillers to charge the tank. The chillers would charge the tank at the same time that the Ice Harvesters are also charging the CP ice tank. Since the Ice Harvesters require a minimum condenser water temperature of 75° and the chillers can operate with condenser water temperatures down to 60°F (if modified as planned), a mixing system to maintain the higher condensing temperatures for the ice harvesters would offer substantial energy savings. Twelve degrees of drop in the chiller condenser water temperatures yields 30% savings in compressor power. During nighttime hours the chillers would operate and the chilled water pumped to the storage tank. Natural stratification allows charging and discharging of cooling with a constant tank volume with no physical barrier. A chilled water storage tank offers the lowest operating and maintenance costs of all the options.



The second method of thermal storage is additional ice generation and storage. There is some space available adjacent to the existing tank that could be utilized. The existing cooling towers are sized large enough for this additional ice storage system. See the attached maps for the proposed locations.

In analysis of the secondary pumping has highlighted the need to study the current pumps ability to meet the changing needs of the campus. Further the standby pumps would need to run concurrently with the main pump during peak loads.

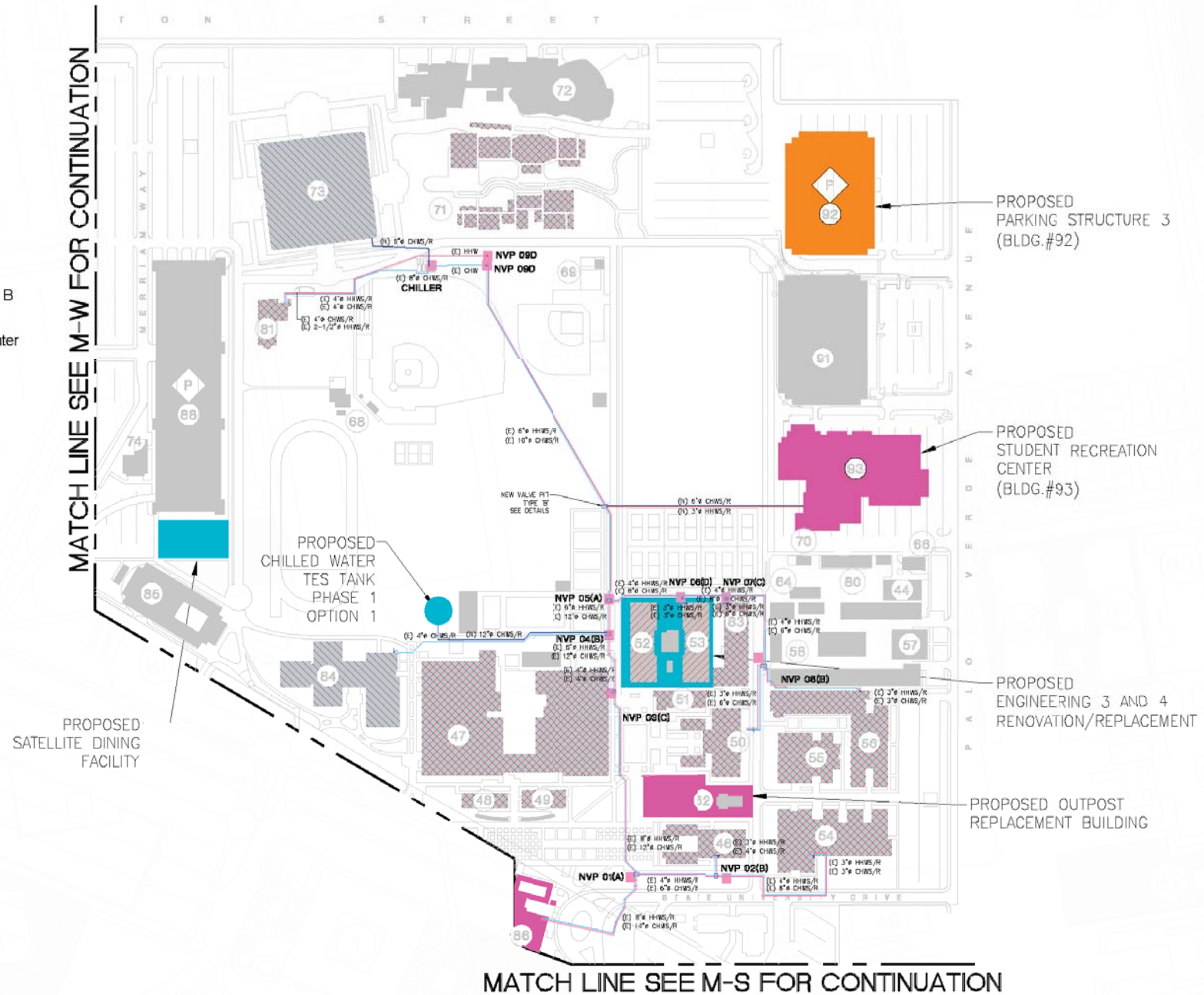
As new systems are added to the Central Plant, the existing expansion tanks need to be reviewed to see if they are adequate for the added volume.



NO.	BUILDING DESIGNATION
44	Electrical Substation (North)
46	Social Sciences & Public Affairs
47	University Gymnasiums
48	Health & Human Services Classrooms
49	Health & Human Services Offices
50	Vivian Engineering Center
51	Engineering 2
52	Engineering 3
53	Engineering 4
54	Design
55	Human Services & Design
56	Engineering Technology
57	Facilities Management
58	Corporation Yard
64	Greenhouse 3
66	Reprographics
68	Restrooms/Storage
69	Softball Field Restroom
70	Main Distribution Communications Facility MDF B
71	University Music Center
72	Carpenter Performing Arts Center & Dance Center
73	Mike and Arline Walter Pyramid
74	Parking Transportation Services
80	University Police
81	Parking Office Building
82	Outpost Food Service
83	Engineering / Computer Science
84	Steve and Nini Horn Center
85	College of Business
86	Central Plant
88	Parking Structure No. 1
91	Parking Structure No. 2
92	Parking Structure No. 3
93	Student Recreation Center

Building / Boundary Legend

-  EXISTING BUILDING OR PARKING STRUCTURE NOT SERVED BY CENTRAL PLANT
-  CP SUPPLIED HHW
-  CP SUPPLIED CHW
-  POTENTIAL BUILDING SITE
-  PLANNED BUILDING SITE
-  PLANNED PARKING STRUCTURE
-  BOILER
-  CHILLER













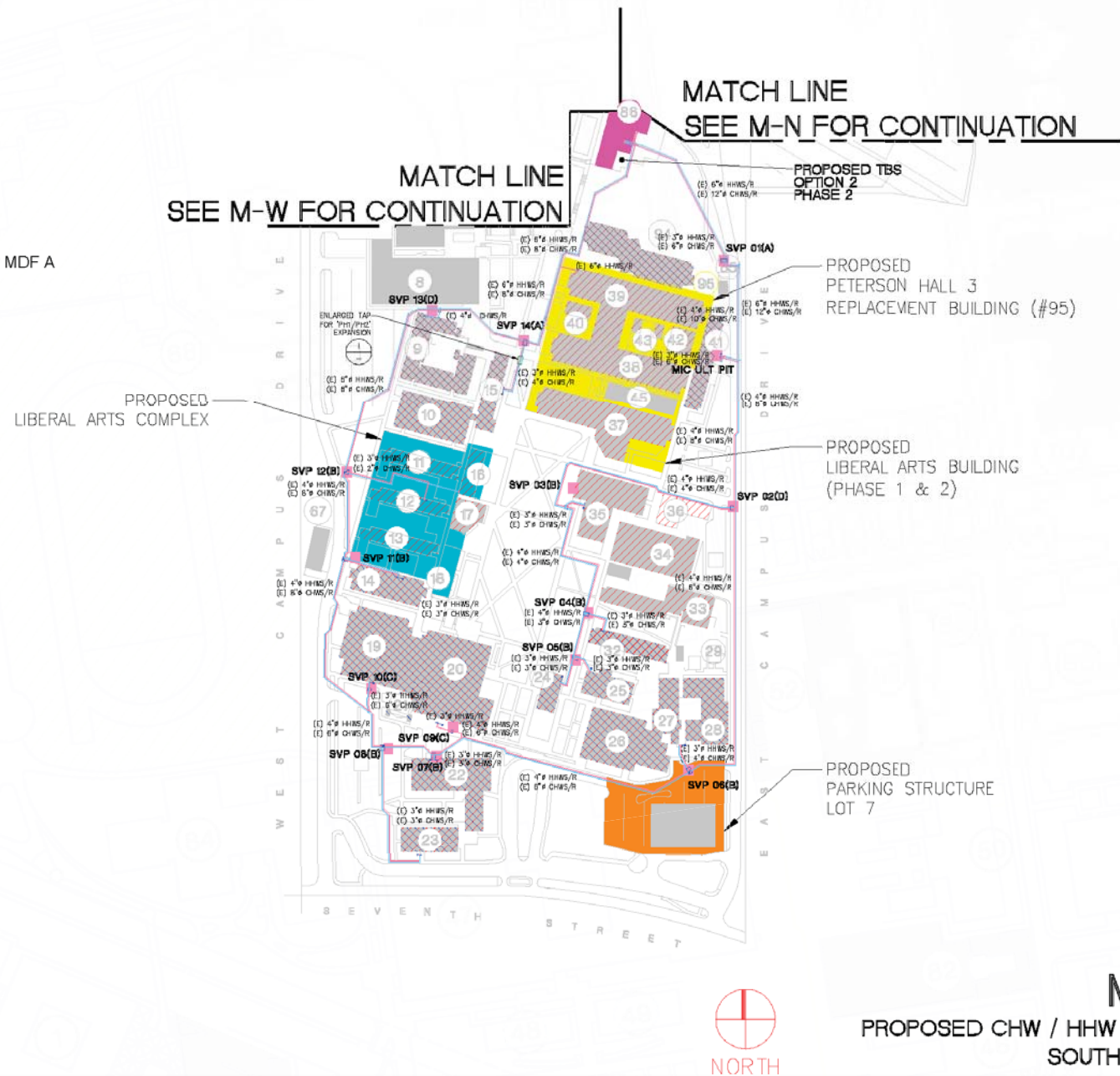
M-N
PROPOSED CHW / HHW PIPING
NORTH LOOPS



NO.	BUILDING DESIGNATION	NO.	BUILDING DESIGNATION
8	University Bookstore	28	University Telecommunications
9	Psychology	29	Art Annex
10	Liberal Arts 5	32	Fine Arts 1
11	Liberal Arts 4	33	Fine Arts 2
12	Liberal Arts 3	34	Fine Arts 3
13	Liberal Arts 2	35	Fine Arts 4
14	Liberal Arts 1	36	Faculty Office 4
15	Faculty Office 3	37	Peterson Hall 1
16	Faculty Office 2	38	Peterson Hall 2
17	Lecture Halls 150-151	39	Peterson Hall 3
18	Faculty Office 1	40	Science Lecture Hall
19	Library	41	Microbiology
20	Academic Services	42	Animal House
21	Multi-Media Center	43	Greenhouse 1&2
22	Education 1	45	Faculty Office 5
23	Education 2	65	Electical Substation (South)
24	McIntosh Humanities Building	67	Main Distribution Communications Facility MDF A
25	Language Arts Building	86	Central Plant
26	Studio Theatre	94	Molecular & Life Sciences Center
27	University Theatre		

Building / Boundary Legend

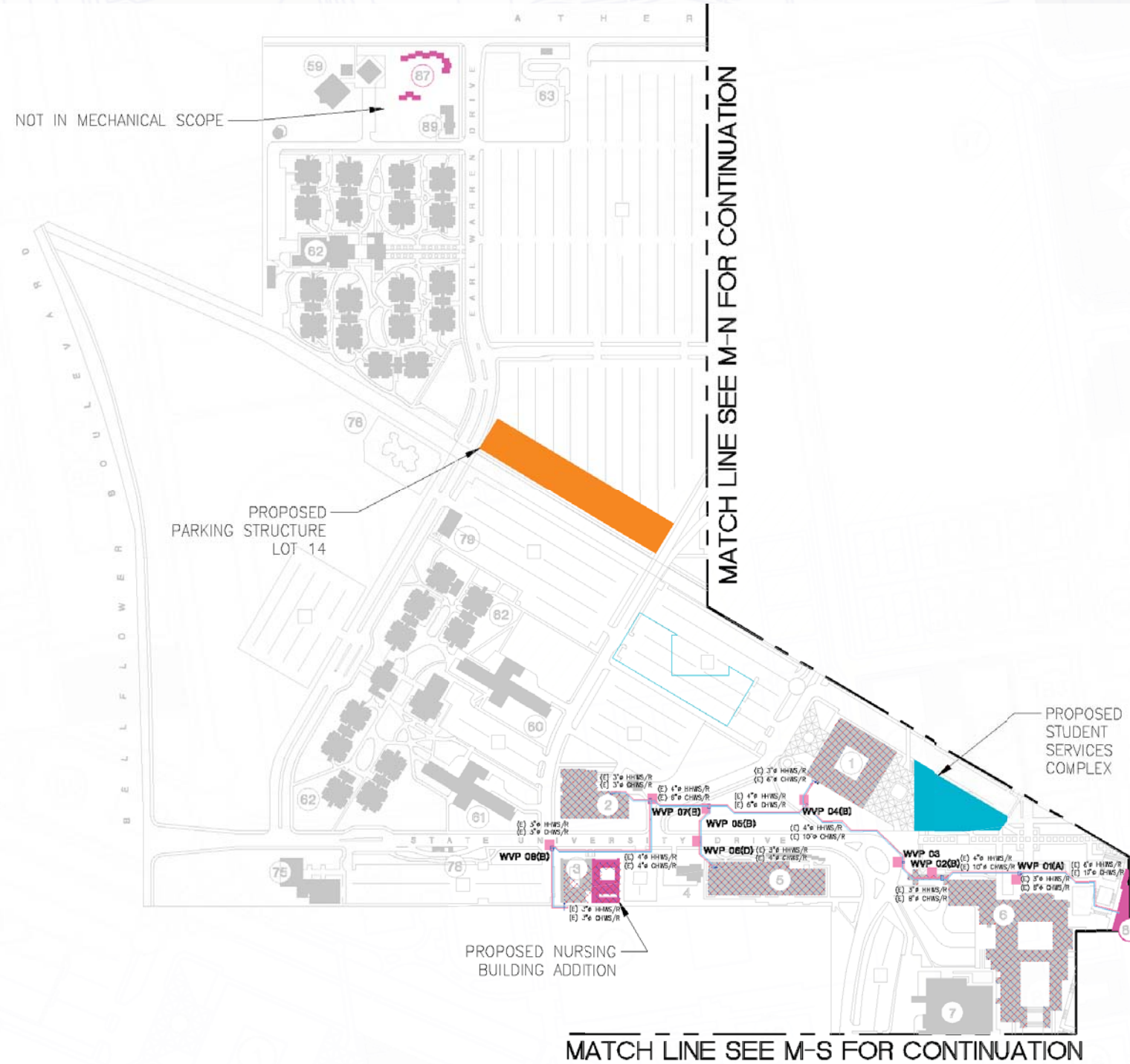
-  EXISTING BUILDING OR PARKING STRUCTURE NOT SERVED BY CENTRAL PLANT
-  CP SUPPLIED HHW
-  CP SUPPLIED CHW
-  POTENTIAL BUILDING SITE
-  PLANNED BUILDING SITE
-  PLANNED PARKING STRUCTURE
-  BOILER
-  CHILLER
-  CHWS
-  HHWS



NO.	BUILDING DESIGNATION
1	Brotman Hall
2	Student Health Services
3	Nursing
4	Soroptomist House
5	Family & Consumer Sciences
6	University Student Union
7	Cafeteria
59	Patterson Child Development Center
60	Los Alamitos Hall
61	Los Cerritos Hall
62a	Residence Commons
62b	Parkside Commons
63	Recycling Center
75	International House
76	Earl Burns Miller Japanese Garden
78	Visitor Information Center
79	Main Distribution Communications Facility MDF C
86	Central Plant
89	Housing & Residential Life

Building / Boundary Legend

-  EXISTING BUILDING OR PARKING STRUCTURE NOT SERVED BY CENTRAL PLANT
-  CP SUPPLIED HHW
-  CP SUPPLIED CHW
-  POTENTIAL BUILDING SITE
-  PLANNED BUILDING SITE
-  PLANNED PARKING STRUCTURE
-  BOILER
-  CHILLER
-  CHWS
-  HHWS



M-W
PROPOSED CHW / HHW PIPING
WEST LOOP



Natural Gas System











The existing PVC and steel pipes in the main campus natural gas distribution system are recommended to be replaced with PE pipe since the existing PVC pipe is not the recommended plastic pipe material to be used for natural gas and the steel pipes are old. The existing PE pipe sections will remain in place.

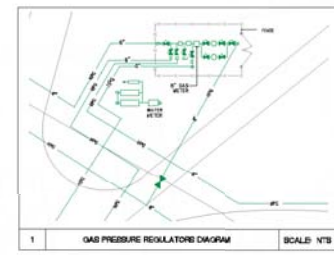
The proposed PE pipe is recommended to be installed parallel with the existing PVC pipes to simplify the pipe connection and maintain the natural gas distribution operation.

The gas needs of the cogeneration plant should be evaluated based on the system capacity recommended as part of a separate feasibility study. Based on the location of the Cogeneration Plant, the connection to the gas infrastructure should be determined.

NO. BUILDING DESIGNATION	NO. BUILDING DESIGNATION
1 Brotman Hall	51 Engineering 2
2 Student Health Services	52 Engineering 3
3 Nursing	53 Engineering 4
4 Soroptomist House	54 Design
5 Family & Consumer Sciences	55 Human Services & Design
6 University Student Union	56 Engineering Technology
7 Cafeteria	57 Facilities Management
8 University Bookstore	58 Corporation Yard
9 Psychology	59 Patterson Child Development Center
10 Liberal Arts 5	60 Los Alamitos Hall
11 Liberal Arts 4	61 Los Cerritos Hall
12 Liberal Arts 3	62a Residence Commons
13 Liberal Arts 2	62b Parkside Commons
14 Liberal Arts 1	63 Recycling Center
15 Faculty Office 3	64 Greenhouse 3
16 Faculty Office 2	65 Electrical Substation (South)
17 Lecture Halls 150-151	66 Reprographics
18 Faculty Office 1	67 Main Distribution Communications Facility MDF A
19 Library	68 Restrooms/Storage
20 Academic Services	69 Softball Field Restroom
21 Multi-Media Center	70 Main Distribution Communications Facility MDF B
22 Education 1	71 University Music Center
23 Education 2	72 Carpenter Performing Arts Center & Dance Center
24 McIntosh Humanities Building	73 Mike and Arline Waller Pyramid
25 Language Arts Building	74 Parking Transportation Services
26 Studio Theatre	75 International House
27 University Theatre	76 Earl Burns Miller Japanese Garden
28 University Telecommunications	78 Visitor Information Center
29 Art Annex	79 Main Distribution Communications Facility MDF C
30 Fine Arts 1	80 University Police
31 Fine Arts 2	81 Parking Office Building
32 Fine Arts 3	82 Outpost Food Service
33 Fine Arts 4	83 Engineering / Computer Science
34 Faculty Office 4	84 Steve and Nini Hom Center
35 Peterson Hall 1	85 College of Business
36 Peterson Hall 2	86 Central Plant
37 Peterson Hall 3	88 Parking Structure No. 1
38 Science Lecture Halls	89 Housing & Residential Life
39 Microbiology	91 Parking Structure No. 2
40 Animal House	92 Parking Structure No. 3
41 Greenhouse 1&2	93 Student Recreation Center
42 Electrical Substation (North)	94 Molecular and Life Sciences Center
43 Faculty Office 5	95 Peterson Hall 3 Replacement Building
44 Social Sciences & Public Affairs	
45 University Gymnasium	
46 Health & Human Services Classrooms	
47 Health & Human Services Offices	
48 Vivian Engineering Center	

Building / Boundary Legend

 EXISTING BUILDING	 GAS VALVE OR COCK
 FUTURE PARKING STRUCTURE	 GAS METER OR REGULATOR
 POTENTIAL BUILDING SITE	HPG HIGH PRESSURE GAS
 FUTURE BUILDING	MPG MEDIUM PRESSURE GAS
 PLANNED BUILDING SITE	IG INDUSTRIAL GAS
	DG DOMESTIC GAS
	PVC POLY-VINYL CHLORIDE
	 CLAMP
	 EXISTING GAS LINE
	 PROPOSED GAS LINE



Electrical

An evaluation of the existing Electrical Distribution System revealed that the main switchgear and the electrical distribution system are in good condition. A few of the 15kV selector switches have rust on their base but an evaluation of the same revealed that this does not affect the reliability or the operation of the switch. However, we would recommend that an anti corrosive coat of paint be applied to minimize rusting.

Due to overloading on Feeder 6, we recommend that a new 600A, 15kV selector switch (S40) be installed on Feeder 5 to serve the proposed Student Recreation Center and Parking Structure 3 as well as the existing loads of George Allen Field and Parking Structure 2 (which are both currently served by S22). We would also recommend that the load of Family and Consumer Science be shifted from feeder '3' to feeder '4' by closing switches S18/S20 and opening switch S17.

An evaluation of the 66kV-12kV main substation revealed that one of the transformers is old and is past its useful life. We recommend that the same be replaced in kind. In addition, we also recommend that the campus contract with SCE to install an additional 66kV breaker in SCE portion of the campus substation to provide isolation of transformers. In addition, to prevent bird roosting, insulation materials be installed on exposed live racks of both transformers.

We also recommend that the 15kV cables be considered for replacement at the end of their lifespan (around 2025).

Following table lists the proposed buildings and provides our recommendations to accommodate each one of them. Table 1 provides the proposed installed capacities by substation/feeder.

Building/Location	Area (SF)	Installed Proposed Capacity (KVA)	Description of Impact to Campuswide Utilities
Peterson Hall 3 Replacement Building	160,000	2000	The proposed replacement building for Peterson Hall 3, and Science Lecture Hall does not conflict with any existing electrical infrastructure systems. Future service to these buildings will be provided by a 15KV, 600A, Selector Switch (S23), Feeder '9' located on north side of the proposed buildings.
Liberal Arts Building (Phase 1 & 2)	155,000	1250	The proposed replacement Liberal Arts building is located on top of existing underground conduit and feeders that should be relocated. Future electrical service to these buildings will be provided through a 15KV, 600A, Selector Switch (S25), Feeder '9' located on north and west side of the proposed buildings.
Parking Structure 3	416,000	1000	The proposed parking structure building does not conflict with the existing electrical infrastructure system. Future electrical power to this building will be provided by a new 15KV, 600A, Selector Switch (S40), Feeder '5' to feed the building.
Student Recreation Center	120,000	2000	The proposed Recreation center does not conflict with the existing electrical infrastructure system. Future electrical power to this building will be provided by a new 15KV, 600A, Selector Switch (S40), Feeder '5' and connecting it to the 12kV network.
Nursing Building Addition	5,000	750	The proposed Nursing building addition does not conflict with the existing electrical infrastructure system. Future electrical service will be provided by upgrading the existing 300 kVA padmount transformer to 500 kVA (currently served from 15KV Selector Switch (S18)) that currently serves the Nursing Building.
Outpost Replacement Building	8,000	225	The proposed Outpost replacement building is located on top of underground feeders that will be relocated. Future electrical service will be provided by a 15KV, 600A Selector Switch (S3), Feeder '1' located on the south side of the proposed building.
Liberal Arts Complex	155,000	2000	The proposed replacement building for Liberal Arts Complex is located on top of existing electrical underground conduit, and feeders that should be relocated. Future electrical service will be provided by 15KV, 600A, Selector Switch (S33), Feeder '11'.
Student Service Complex	70,000	750	The proposed Student Service Complex does not conflict with existing electrical infrastructural system. Future electrical service will be provided by a 15KV, 600A Selector Switch (S19), Feeder '4' located on the north east corner of the proposed building.
Engineering 3 & 4	80,000	1000	The proposed replacement building for Engineering 3 & 4 does not conflict with existing electrical infrastructural system. Future electrical service to this building will be provided by a 15KV, 600 Selector Switch (S7), Feeder '2' located on the south side of the proposed building.
Corporate Yard Expansion	71,000	500	The proposed Corporate Yard Expansion does not conflict with any existing electrical systems. Future electrical power will be provided by a 15KV, 600A, Selector Switch (S2), Feeder '1' located on the north and south side of the proposed expansion layout.
Parking Structure 5 (Lot)	-	1000	The proposed parking structure building does not conflict with existing electrical infrastructural systems. Future electrical power to this building will be provided by a new 5-way 15KV, 600A, Selector Switch (S27), Feeder '10' to feed the building.
Parking Structure 4 (Lot)	-	500	The proposed parking structure building does not conflict with existing electrical infrastructural systems. Future electrical power to this building will be provided by a 15KV, 600A, Selector Switch (S13), Feeder '3' to feed the building.
Satellite Dining Facility	-	225	The proposed satellite dining facility does not conflict with existing electrical infrastructural systems. Future electrical power to this building will be provided by a 15KV, 600A, Selector Switch (S13), Feeder '3' to feed the building.
Miscellaneous	-	-	Replace existing 15kV cables at the end of their lifespan.

In addition, consistent with Executive order No. 987, we recommend that CSULB consider installing PV farms on parking lots and evaluate the feasibility of providing a Cogeneration plant. This will help the campus reduce greenhouse gas emissions, reduce utility dependence and service diversity. The proposed cogeneration plant will be connected to the main 12kV campus electrical distribution system to back feed power to the main campus 12kV distribution system. The connection should be coordinated with SCE and shall comply with Rule 21 of the Utility company.

The exact system capacity and payback should be evaluated as part of a feasibility study.

Emergency generation for serving standby loads in each of the proposed facilities should be accomplished through dedicated diesel generators.

Life safety loads primarily comprising of egress lighting should be served from centralized inverter systems housed in the electrical room of each of the proposed facilities.

TABLE 1 - Proposed Installed Capacities by Substation/Feeder

Substation	Feeders	Installed Capacity in KVA
North Substation	Feeder '1'	6,475
	Feeder '2'	5,800
	Feeder '3'	7,300
	Feeder '4'	6,975
	Feeder '5'	6,475
	Feeder '6'	7,500
South Substation	Feeder '9'	6,250
	Feeder '10'	6,013
	Feeder '11'	6,750
	Feeder '12'	4,901








MATCH LINE SEE E11-C FOR CONTINUATION

MATCH LINE SEE E11-B FOR CONTINUATION








- | | |
|---------------------------------|---|
| NO. BUILDING DESIGNATION | NO. BUILDING DESIGNATION |
| 3 Nursing | 26 Studio Theatre |
| 4 Soroptomist House | 27 University Theatre |
| 5 Family & Consumer Sciences | 28 University Telecommunications |
| 6 University Student Union | 29 Art Annex |
| 7 Cafeteria | 32 Fine Arts 1 |
| 8 University Bookstore | 33 Fine Arts 2 |
| 9 Psychology | 34 Fine Arts 3 |
| 10 Liberal Arts 5 | 35 Fine Arts 4 |
| 11 Liberal Arts 4 | 36 Faculty Office 4 |
| 12 Liberal Arts 3 | 37 Peterson Hall 1 |
| 13 Liberal Arts 2 | 38 Peterson Hall 2 |
| 14 Liberal Arts 1 | 39 Peterson Hall 3 |
| 15 Faculty Office 3 | 40 Science Lecture Hall |
| 16 Faculty Office 2 | 41 Microbiology |
| 17 Lecture Halls 150-151 | 42 Animal House |
| 18 Faculty Office 1 | 43 Greenhouse 1&2 |
| 19 Library | 45 Faculty Office 5 |
| 20 Academic Services | 46 Social Sciences & Public Affairs |
| 21 Multi-Media Center | 65 Electrical Substation (South) |
| 22 Education 1 | 67 Mair Distribution Communication Facility MDF A |
| 23 Education 2 | 75 International House |
| 24 McIntosh Humanities Building | 86 Central Plant |
| 25 Language Arts Building | 94 Molecular and Life Sciences Center |

Building / Boundary Legend

-  EXISTING BUILDING
-  FUTURE PARKING STRUCTURE
-  POTENTIAL BUILDING SITE
-  FUTURE BUILDING
-  PLANNED BUILDING SITE

Legend

-  MANHOLE
-  PULLBOX
-  TRANSFER SWITCH
-  EXISTING
-  TO BE DEMOLISHED

SYMBOL	DESCRIPTION
	1 1-1/2" C. POWER 1-2" SPARE
	2 1-1/2" C. W/ 3-4550 MCM
	3 2-3/4" C. W/ 3-4550 MCM (SKV) EA. 1-42/D EA.
	4 2-1/2" C. W/ 3-4550 MCM (SKV) FORG. C + D
	5 2-1/2" C. W/ 3-4550 MCM (SKV) EA.
	FORG. C. STANDBY; FORG. D. NORMAL
	6 1-1/2" C. W/ 4-410 2-1/4" C.
	7 4-4" C. W/ 3-4550 MCM (SKV) EA. FORG. A, B, C, + D
	1-3" C. W/ 3-4550 (SKV)
	1-3" SPARE; 2-4" SPARE
	15 1-3" C. W/ 3-44 (SKV)
	16 1-2" C. W/ 3-44 (SKV)
	21 1-1/2" C. W/ 3-44 (SKV)
	22 1-1/2" C. W/ 3-44 VCL (SKV) 1-1/2" C. SPARE
	28 1-1/2" C. W/ 3-410 VCL (SKV)
	31 1-2-1/2" C. W/ 4-410
	32 1-2-1/2" C. W/ 3-457
	33 1-3" C. W/ 3-44 VCL (SKV) 1-3" SPARE
	34 4-4" C. W/ 3-4550 (SKV) FORG. A, B, C, + D
	1-4" SPARE
	37 3-4" C. W/ 3-4550 MCM (SKV) FORG. A, B, + C
	38 5-4" C. 3-4550 MCM (SKV)
	39 1-3" C. W/ 3-410 (SKV) FORG. C
	40 8-46 (SKV) LEAD COVERED
	41 1-2-1/2" C. W/ 4-410 2-412
	42 4-4" C. W/ 3-4550 MCM (SKV) FORG. A, B, C, + D

SYMBOL	DESCRIPTION
	67 DIRECT BURIAL CABLE
	105 1-1/2" C. W/ 4-4250 MCM
	1-1/2" C. W/ 3-4550 MCM
	1-1/2" SPARE; 1-2-1/2" SPARE
	106 1-1/2" C. W/ 4-4250 MCM 1-2" SPARE
	107 1-1/2" C. W/ 3-4550 MCM
	108 1-1/2" C. W/ 3-4550 MCM
	1-2-1/2" SPARE
	109 1-1/2" C. W/ 4-4250 MCM
	1-2" SPARE
	110 2-1/2" C. W/ 50450 MCM
	2 2-1/2" SPARE
	132 2-4" C. (POWER)
	1-2" C. TELE. PV
	133 1-1/2" C. PVC POWER C.O.
	1-1/2" C. PVC
	1-2" PVC TELE. C.O.
	1-4/2" BARE CUL. GRD.
	139 1-1/2" C. W/ 3-410
	140 2-4" C. (SKV) FROM B. C. E.
	141 4-4" C. W/ 3-4550 MCM
	8-2" C. W/ 3-410
	2-2" C. W/ 3-410
	143 3-2" C. W/ 3-410
	144 3-2" C. W/ 3-410
	145 1-2" C. W/ 3-410
	152 2-4" C. W/ 4-4500 MCM 1-42 (GRD)



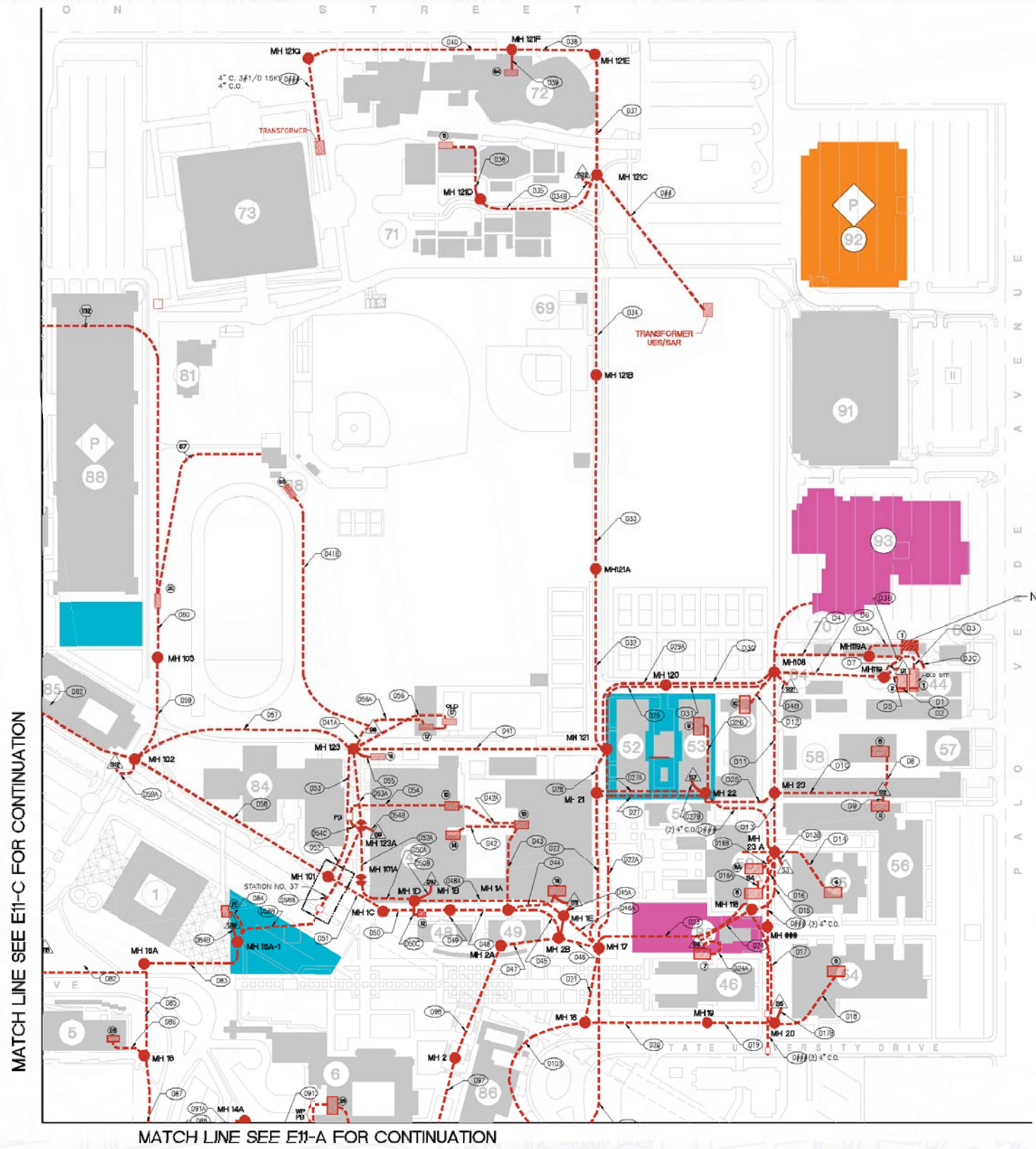
NO.	BUILDING DESIGNATION
1	Brotman Hall
5	Family & Consumer Sciences
6	University Student Union
44	Electrical Substation (North)
46	Social Sciences & Public Affairs
47	University Gymnasiums
48	Health & Human Services Classrooms
49	Health & Human Services Offices
50	Vivian Engineering Center
51	Engineering 2
52	Engineering 3
53	Engineering 4
54	Design
55	Human Services & Design
56	Engineering Technology
57	Facilities Management
58	Corporation Yard
64	Greenhouse 3
66	Reprographics
68	Restrooms/Storage
69	Softball Field Restroom
70	Main Distribution Communications Facility MDF B
71	University Music Center
72	Carpenter Performing Arts Center & Dance Center
73	Mike and Arline Walter Pyramid
80	University Police
81	Parking Office Building
82	Outpost Food Service
83	Engineering / Computer Science
84	Steve and Nini Hom Center
85	College of Business
86	Central Plant
88	Parking Structure No. 1
91	Parking Structure No. 2
92	Parking Structure No. 3
93	Student Recreation Center

Building / Boundary Legend

-  EXISTING BUILDING
-  FUTURE PARKING STRUCTURE
-  POTENTIAL BUILDING SITE
-  FUTURE BUILDING
-  PLANNED BUILDING SITE

Legend

-  MANHOLE
-  PULLBOX
-  TRANSFER SWITCH
-  EXISTING



MATCH LINE SEE E11-C FOR CONTINUATION

MATCH LINE SEE E11-A FOR CONTINUATION

SYMBOL	DESCRIPTION
	1. 1-3" C. POWER, 1-3" SPARE
	2. 1-3" C. W/ 3-4500 MCM
	3. 2-3-1/2" C. W/ 3-4500 MCM (5KV) EA, 1-42" O. EA.
	4. 2-4" C. W/ 3-4500 MCM (5KV) FORB. C + D
	5. 2-4" C. W/ 3-4500 MCM (5KV) EA.
	FORL. C. STANDBY, FORL. D. NORMAL.
	12. 1-2" C. W/ 4-41/0
	2-1/4" C.
	13. 4-4" C. W/ 3-4500 MCM (5KV) EA. FORB. A, B, C, + D
	1-3" C. W/ 3-4500 (5KV)
	1-3" SPARES, 2-4" SPARES
	15. 1-3" C. W/ 3-44 (5KV)
	16. 1-2" C. W/ 3-44 (5KV)
	21. 1-3" C. W/ 3-41/0
	22. 1-2" C. W/ 3-48 VCL (5KV), 1-2" C. SPARE
	28. 1-3" C. W/ 3-41/0 VCL (5KV)
	16. 1-2-1/2" C. W/ 4-41/0
	17. 1-2-1/2" C. W/ 3-42/0
	13. 1-3" C. W/ 3-44 VCL (5KV), 1-3" SPARE
	16. 4-4" C. W/ 3-4500 (5KV) FORB. A, B, C, + D
	1-4" SPARE
	17. 3-4" C. W/ 3-4500 MCM (5KV) FORB. A, B, + C
	18. 3-4" C. 3-4500 MCM (5KV)
	19. 1-3" C. W/ 3-41/0 (5KV) FORB. C
	100. 3-48 (5KV) LEAD COVERED
	12. 1-2-1/2" C. W/ 4-41/0, 2-41/2
	123. 4-4" C. W/ 3-4500 MCM (5KV) FORB. A, B, C, + D

SYMBOL	DESCRIPTION
	67. DIRECT BURIAL CABLE
	100. 1-3" C. W/ 4-4250 MCM
	1-3" C. W/ 3-4500 MCM
	1-2" SPARE, 1-2-1/2" SPARE
	106. 1-3" C. W/ 4-4250 MCM, 1-2" SPARE
	107. 1-3" C. W/ 3-4500 MCM
	108. 1-3" C. W/ 3-4500 MCM
	1-2-1/2" SPARE
	109. 1-3" C. W/ 4-4250 MCM
	1-2" SPARE
	110. 2-3" C. W/ 3-4500 MCM
	2-2-1/2" SPARE
	152. 2-4" C. (POWER)
	1-2" C. TELE. PLY
	103. 1-4" C. PVC POWER C.O.
	1-4" C. PVC
	1-2" PVC TELE. C.O.
	1-4/0 BARE C.L. GFD.
	152. 1-2" C. W/ 3-41/0
	140. 2-4" C. (25KV) FROM B, C, E.
	141. 4-4" C. W/ 12-4500 MCM
	142. 0-2" C. W/ 3-41/0
	2-2" C. W/ 3-42/0
	143. 2-2" C. W/ 3-41/0
	144. 3-3" C. W/ 3-41/0
	145. 1-2" C. W/ 3-42/0
	152. 2-4" C. W/ 4-4500 MCM, 1-42 (GFD)



E11-B
PROPOSED ELECTRICAL PLAN-MDF E






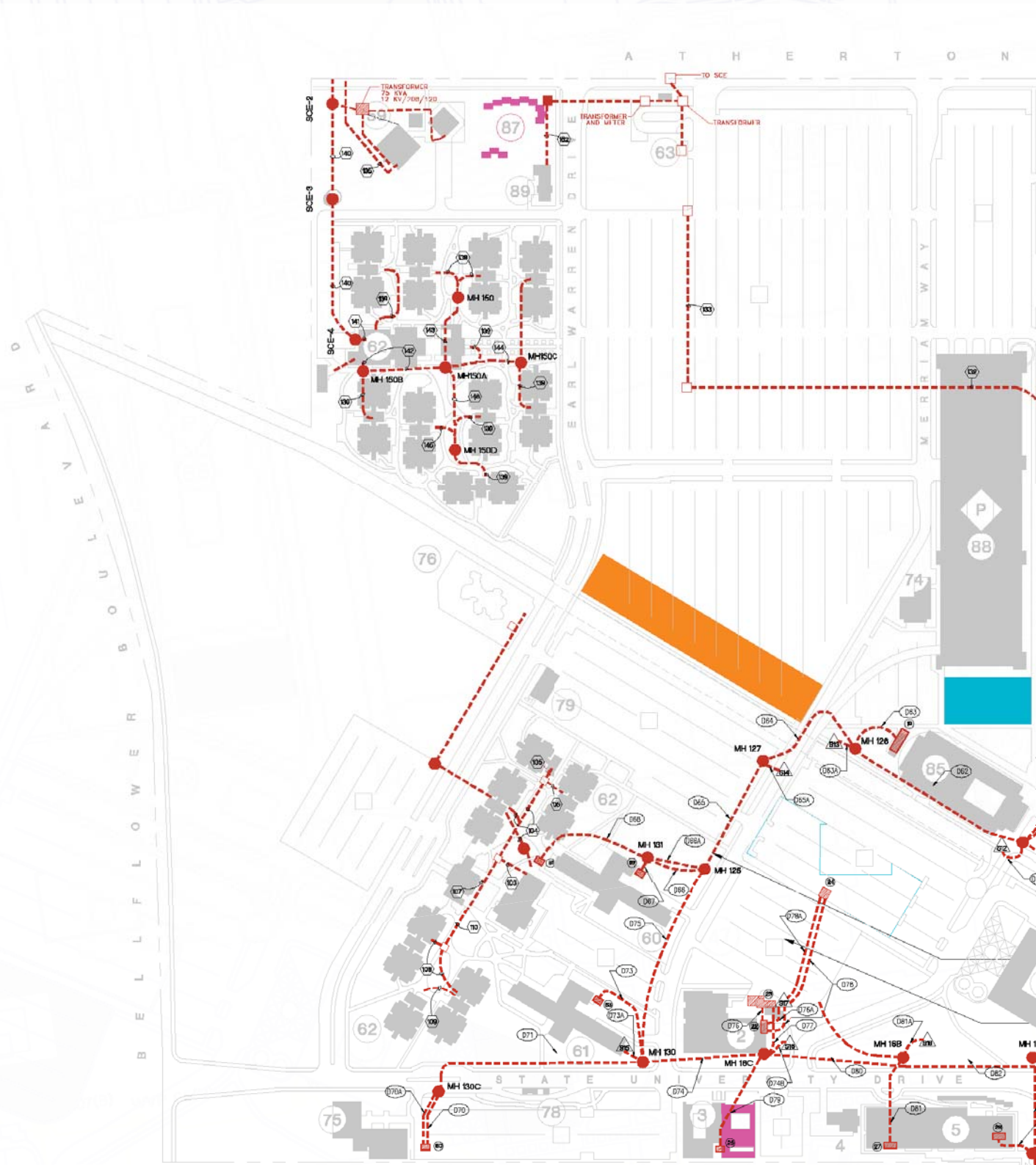
NO.	BUILDING DESIGNATION
2	Student Health Services
3	Nursing
4	Soroptomist House
5	Family & Consumer Sciences
59	Patterson Child Development Center
60	Los Alamitos Hall
61	Los Cerritos Hall
62a	Residence Commons
62b	Parkside Commons
63	Recycling Center
74	Parking and Transportation Services
75	International House
76	Earl Burns Miller Japanese Garden
78	Visitor Information Center
79	Main Distribution Communications Facility MDF C
85	College of Business
88	Parking Structure No. 1
89	Housing & Residential Life

Building / Boundary Legend
























-  EXISTING BUILDING
-  FUTURE PARKING STRUCTURE
-  POTENTIAL BUILDING SITE
-  FUTURE BUILDING
-  PLANNED BUILDING SITE

Legend

-  MANHOLE
-  PULLBOX
-  TRANSFER SWITCH



SYMBOL	DESCRIPTION
	1 1/2" C. POWER, 1-9" SPAFE
	2 1-2" C. W/ 3-4000 MCM
	3 2 3/4" C. W/ 2-1050 MCM (SKV) EA, 1-1/2" EA.
	4 2-4" C. W/ 2-1050 MCM (SKV) FDRS, C + D
	5 2-4" C. W/ 2-1050 MCM (SKV) EA.
	FDR, C STANDBY, FDR D NORMAL.
	1-2" C. W/ 4-1/0
	2-1/2" C.
	13 4-4" C. W/ 3-4500 MCM (SKV) EA, FDRS, A, B, C, + D
	1-8" C. W/ 3-4500 (SKV)
	1-3" SPARE, 2-4" SPARE
	15 1-8" C. W/ 3-44 (SKV)
	16 1-2" C. W/ 3-44 (SKV)
	21 1-8" C. W/ 3-44/D
	22 1-2" C. W/ 3-16 VCL (SKV), 1-2" C. SPARE
	23 1-3" C. W/ 3-16 VCL (SKV)
	11 1-2-1/2" C. W/ 4-1/0
	12 1-2-1/2" C. W/ 3-1/2/D
	13 1-3" C. W/ 3-14 VCL (SKV), 1-8" SPARE
	14 4-4" C. W/ 3-4500 (SKV) FDRS, A, B, C, + D
	1-4" SPARE
	17 3-4" C. W/ 3-4500 MCM (SKV) FDRS, A, B, + C
	18 5-4" C. 3-4500 MCM (SKV)
	19 1-3" C. W/ 3-1/0 (SKV) FDRS, C
	20 3-40 (SKV) LEAD COVERED
	21 1-2-1/2" C. W/ 4-1/0, 2-1/2
	22 4-4" C. W/ 3-4500 MCM (SKV) FDRS, A, B, C, + D

SYMBOL	DESCRIPTION
	87 DIRECT BURIAL, CABLE
	105 1-3" C. W/ 4-1050 MCM
	1-3" C. W/ 3-4000 MCM
	1-2" SPARE, 1-2-1/2" SPARE
	10 1-3" C. W/ 4-1050 MCM, 1-2" SPARE
	107 1-3" C. W/ 3-4000 MCM
	108 1-3" C. W/ 3-4000 MCM
	12-1/2 SPARE
	109 1-3" C. W/ 4-1050 MCM
	1-2" SPARE
	110 2-3" C. W/ 300050 MCM
	2-2-1/2 SPARE
	102 2-4" C. (POWER)
	1-2" C. TELE. PV
	103 1-4" C. PVC POWER C.O.
	1-4" C. PVC
	1-2" PVD TELE. C.O.
	1-4/0 BARE CU. GED.
	104 1-2" C. W/ 3-1/0
	101 2-4" C. (SKV) FROM B, C, E
	111 4-4" C. W/ 12-4000 MCM
	112 6-2" C. W/ 3-1/0
	2-2" C. W/ 3-1/0/D
	113 2-2" C. W/ 3-1/0
	114 3-3" C. W/ 3-1/0
	115 1-2" C. W/ 3-1/0/D
	106 2-4" C. W/ 4-1000 MCM, 1-1/2 (GRD)

PROJECT #14
RESIDENCE HALL
PHASE 1

PROJECT #12
NURSING SCHOOL
EXPANSION PARKING
LOT 18

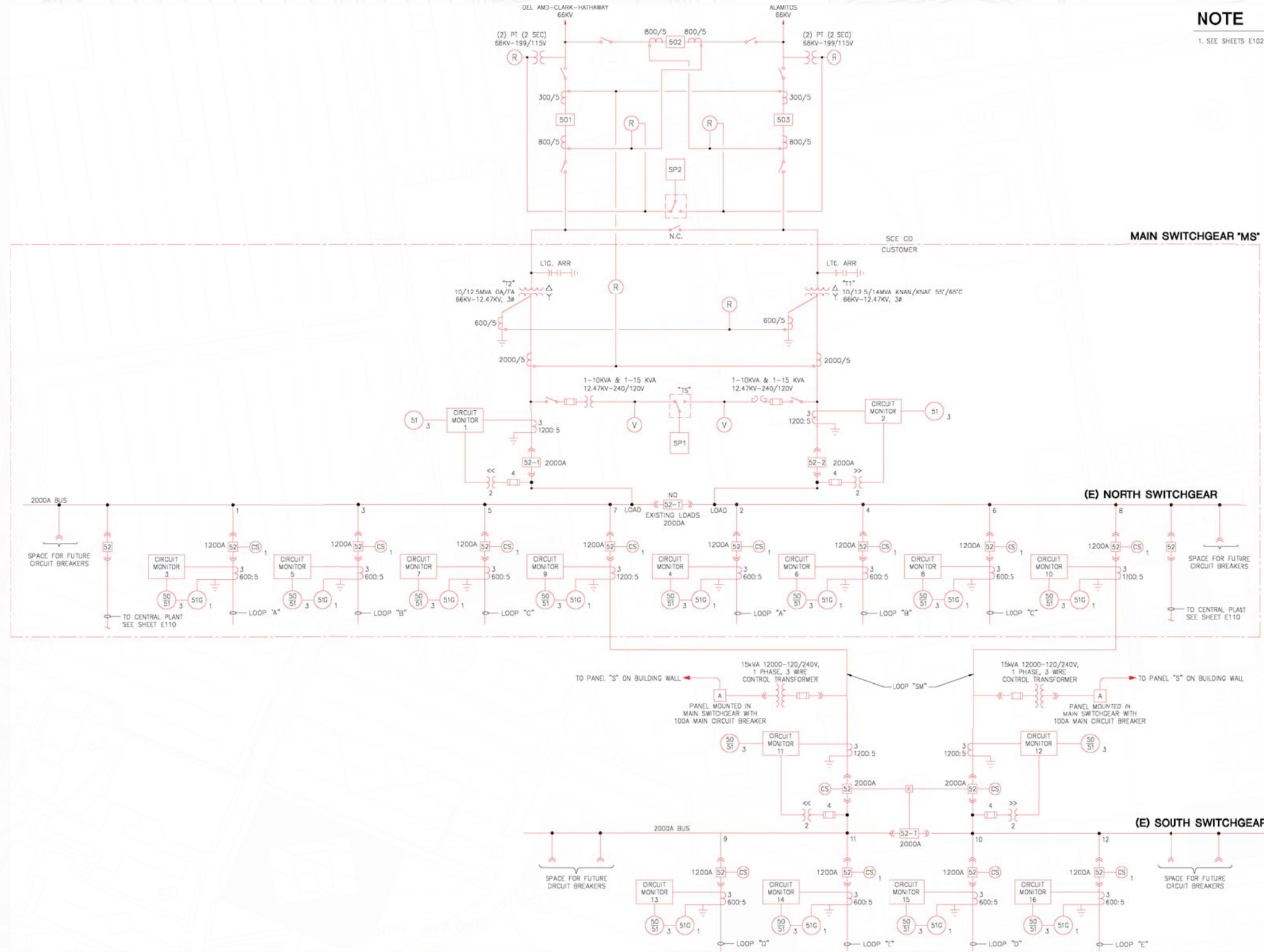


E11-C
PROPOSED ELECTRICAL PLAN-MDF C



NOTE

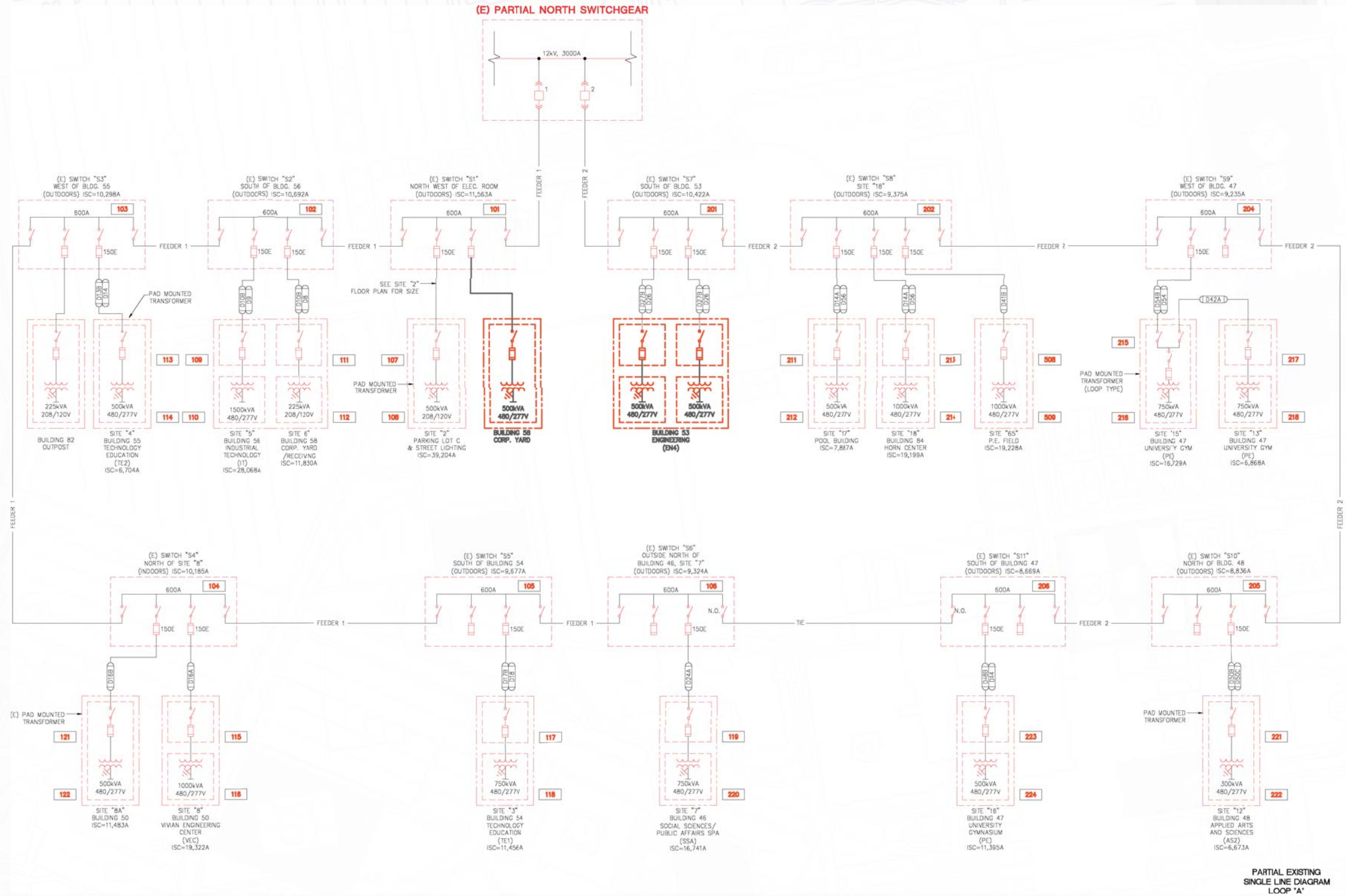
1. SEE SHEETS E102 THRU E106 FOR CONTINUATION OF SINGLE LINE DIAGRAMS.



EXISTING METERING AND RELAY PROTECTION SINGLE LINE DIAGRAM

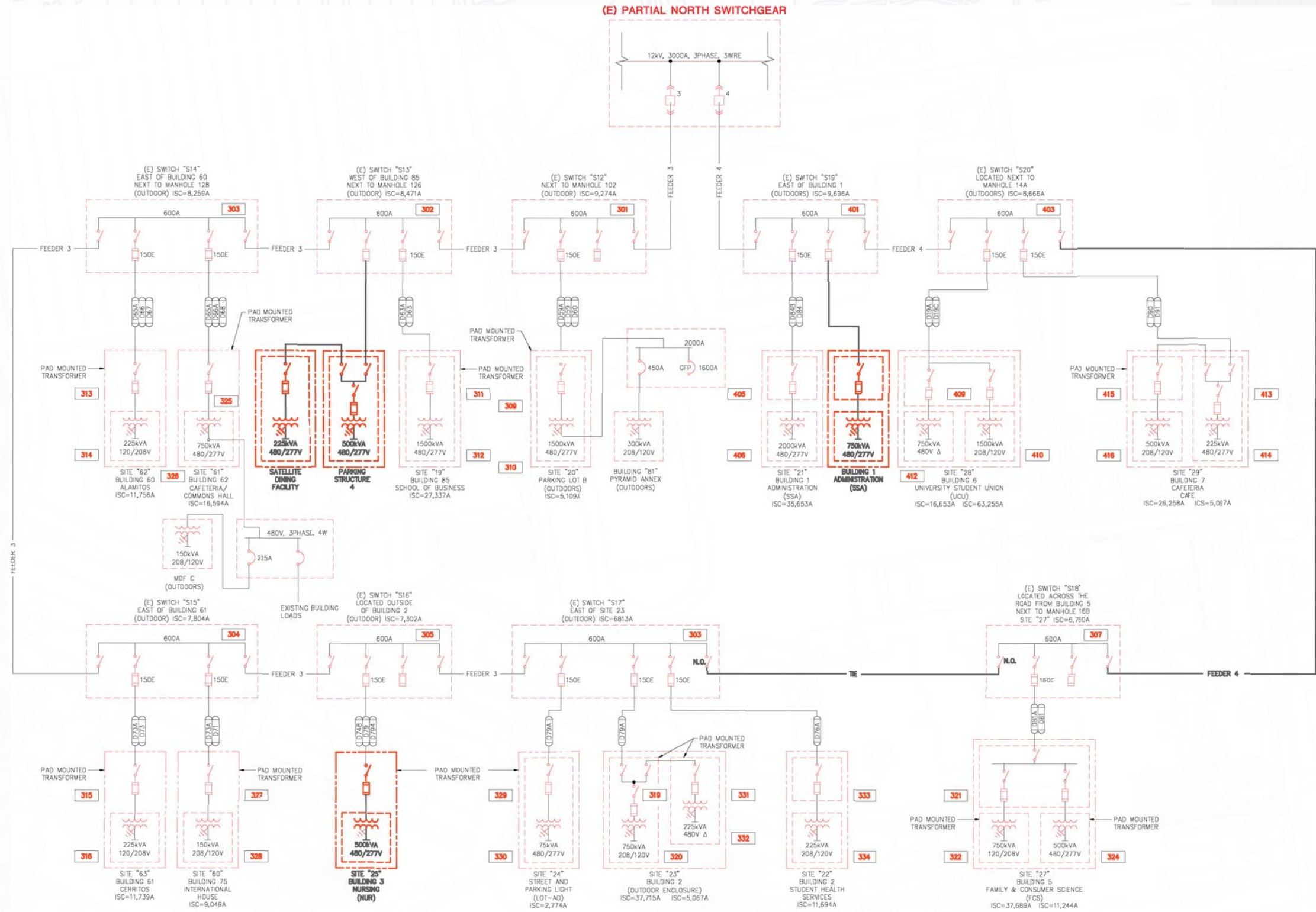
E101





E102

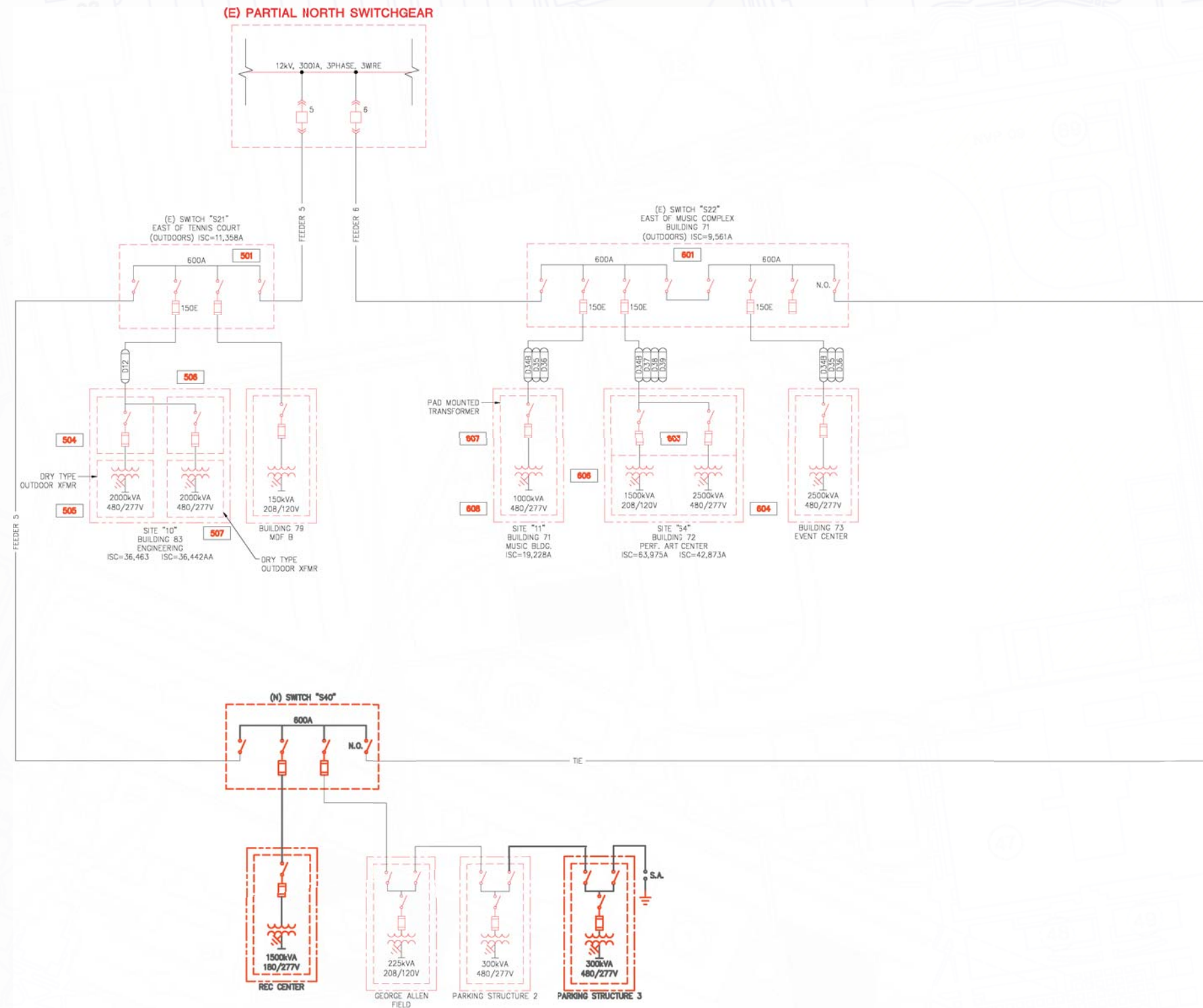




(E) PARTIAL NORTH SWITCHGEAR

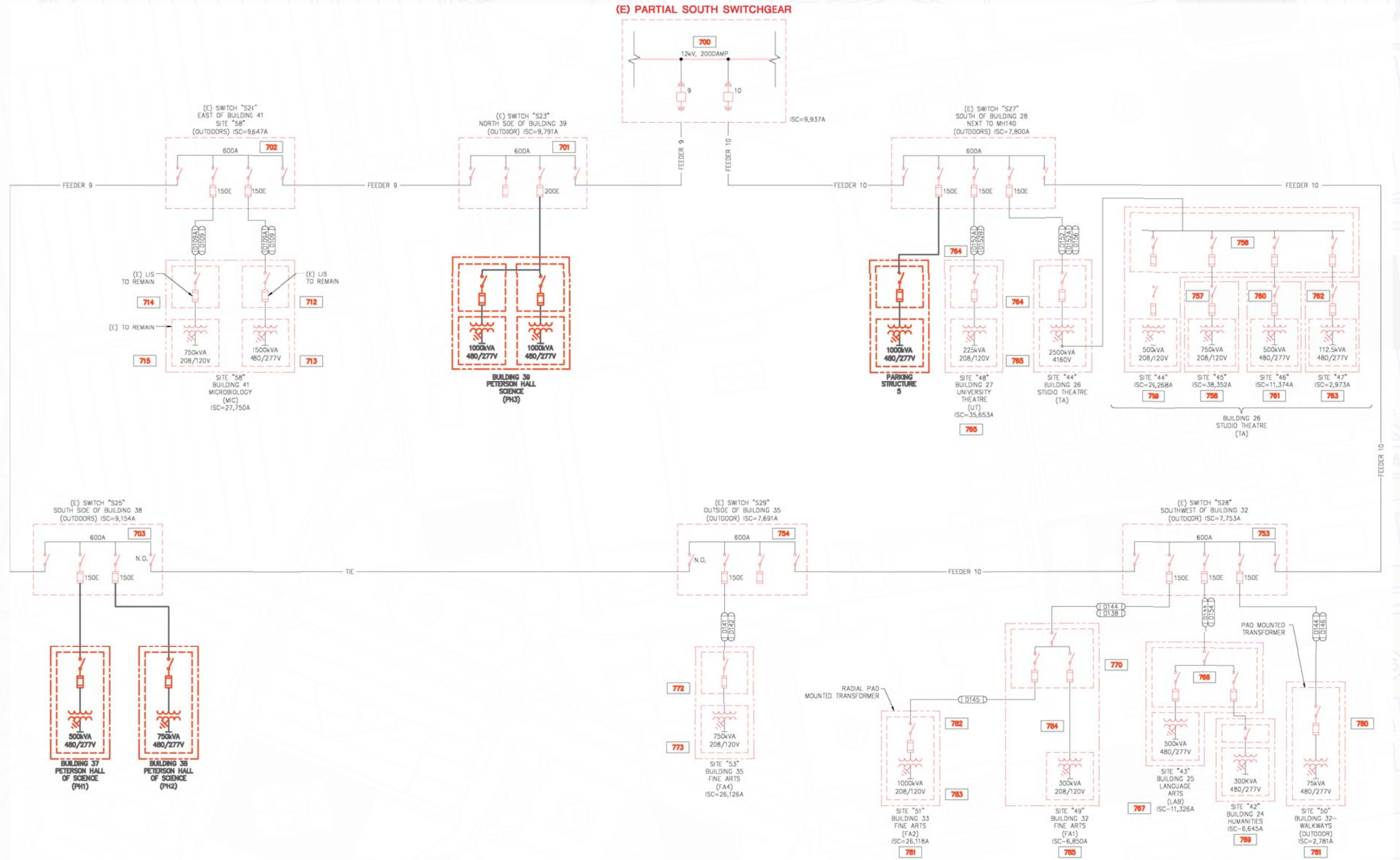
PARTIAL EXISTING SINGLE LINE DIAGRAM LOOP 'B' E103





PARTIAL EXISTING SINGLE LINE DIAGRAM LOOP 'C' E104

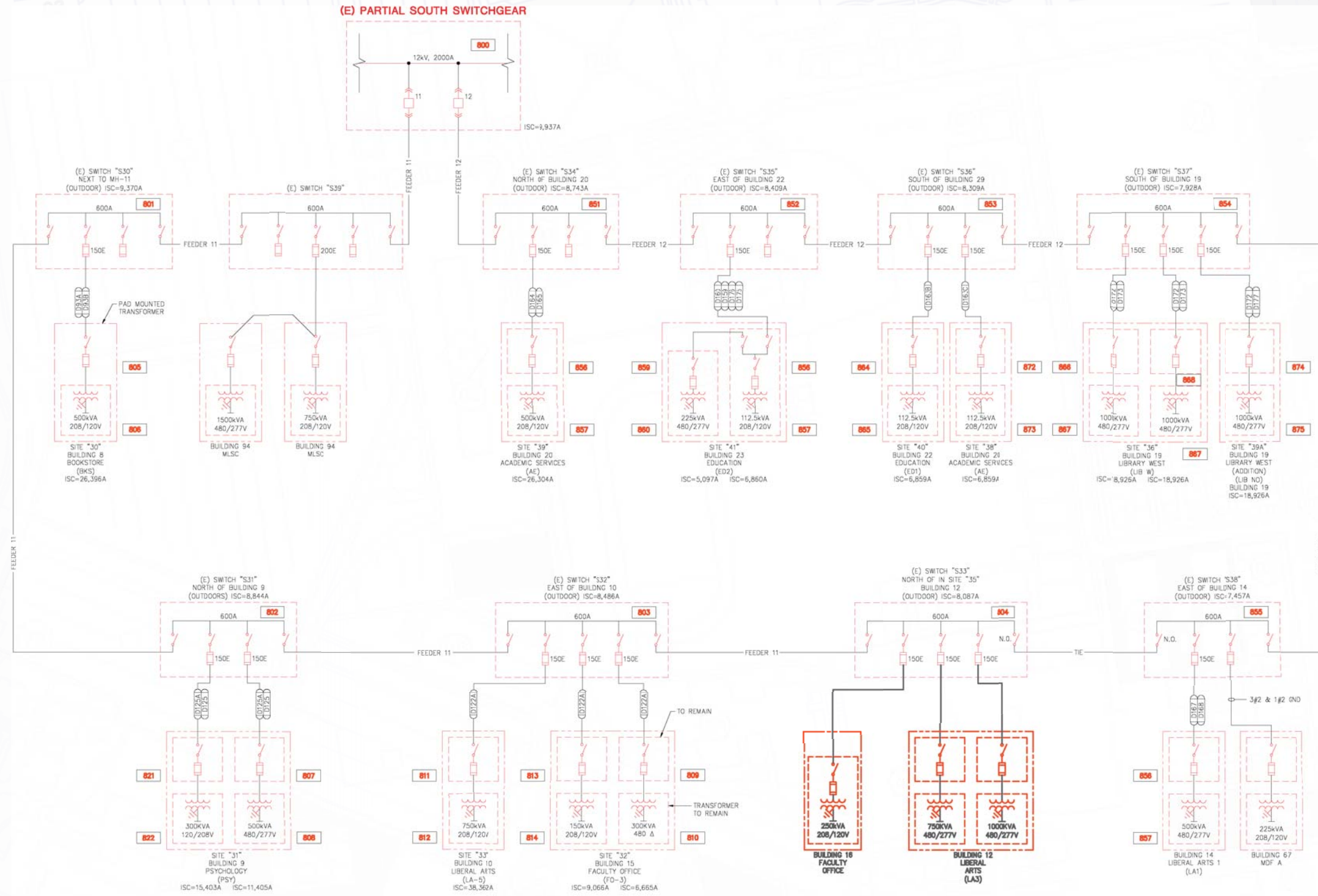




PARTIAL EXISTING SINGLE LINE DIAGRAM LOOP 'D'

E105





PARTIAL EXISTING SINGLE LINE DIAGRAM LOOP E

E106



Telecommunications

The following are our recommendations to accommodate each of the proposed buildings.

Project #1 – Peterson Hall III Replacement Building

Recommendation:

- Install (6) 4 inch underground conduits from existing manhole CMH#16 to the new building BDF. (See Exhibit EC11-A.)
- Install 600 pair copper building entrance cable from MDF A to the new building BDF in the existing ductbank on East Campus Drive. (See Exhibit EC12-A.)
- Relocate the fiber fusion splice from BDF in PH I to manhole CMH#14. This will require rearrangements of the cables serving building 41, Microbiology and building 45, FO5. It may require a small temporary fiber cable from manhole CMH#14 to building 37, PH I to maintain existing service until the building is replaced during project #2. (See Exhibit EC13-A.)
- Provide a new underground fiber optic cable with 36 singlemode/18 multimode optics from the existing 96/48 fiber cable in manhole CMH#14 to the new building. The new cable will be spliced into the new fusion splice described above. (See Exhibit EC13-A.)

Project #2 – Liberal Arts Building (Phases 1&2)

Recommendation:

- Extend (6) 4 inch underground conduits from the cutoff conduits and pull box CPB#14A. (See Exhibit EC11-A.)
- Install 600 pair copper building entrance cable from splice in manhole CMH#14 to the new building BDF. The existing 600 cable pairs removed from building 37, PH I will be reused to serve the new building. (See Exhibit EC12-A.)
- Provide a new underground fiber optic cable with 36 singlemode/18 multimode optics from the existing 96/48 fiber cable in manhole CMH#14 to the new building. The new cable will be spliced into the new fusion splice described in project #1. (See Exhibit EC13-A.)

Project #3 – Liberal Arts Complex

Recommendation for Serving New Building:

Re-use and extend (4) 4 inch conduits from the western site boundary to serve the new building. Provide fiber cable with 24 singlemode and 12 multimode optics from MDF A building to serve the new building. Provide 900 pair copper cable from MDF A.

Recommendation for Rerouting Ductbank and Cables:

Our recommendation is Option A: Avoid and Maintain Two Ductbanks Along North and South Site Boundaries And Relocate the Existing Ductbank Through Center Of Proposed Site. This plan provides for the following infrastructure upgrades:

- Extend (4) 4 inch underground conduits from the cutoff conduits serving building 16 to existing manhole CMH#6C in the quad. (See Exhibit EC11-A.)
- Install 1800 pair copper cable in the new ductbank from manhole CMH#54 to CMH#6C to re-route existing copper cable serving buildings 6, 15, and 94. (See Exhibit EC12-A.)
- Install fiber cable consisting of 48 singlemode and 24 multimode optics in the new ductbank from MDF A Building to manhole CMH#6C to re-route existing fiber cables serving buildings 6 and 15. (See Exhibit EC13-A.)

Project #4 – Parking Structure Lot 7

Recommendation:

Our recommendation is Option A: Avoid and Maintain The Ductbank Along North Boundary And Serve The Parking Structure From the Existing Manhole.

This plan requires no demolition and provides for the following infrastructure upgrades:

- Extend (2) 4 inch underground conduits from existing manhole CMH#5. (See Exhibit EC11-A.)
- Install 100 pair copper building entrance cable from splice in manhole CMH#5 to the new Parking Structure BDF. In manhole CMH#5, splice the new entrance cable to 100 spare cable pairs in the 1200 pair cable from MDF A. (See Exhibit EC12-A.)
- Install fiber cable consisting of 12 singlemode and 6 multimode optics in the existing and new ductbank from Building 27, University Theater. Serve the Parking Structure as an IDF from BDF in Building 27 in lieu of a new fiber cable back to MDF A. (See Exhibit EC13-A.)

Project #5 – Parking Structure 2 (Building #91)

Recommendation:

This project was under construction at the time of this report. All demolition and upgrade requirements were provided by the Parking Structure Project. (See Exhibits, EC11-B, EC12-B, and EC13-B for conduit, copper cable, and fiber cable plans that are being implemented.)



Project #6 – Parking Structure 3 (Building #92)

Recommendation:

We recommend Option C: Serve Parking Structure 3 From Parking Structure 2 For Data Service And With Direct Copper Pairs To MDF B For Voice Service.

This plan requires no demolition and provides for the following infrastructure upgrades:

- (2) 4 inch underground conduits from existing pull box CPB#28A serving Parking Structure 2. (See Exhibit EC11-B.)
- Install 50 pair copper building entrance cable from splice in manhole CMH#28 to the new Parking Structure 3 BDF room. In manhole CMH#28, splice the new entrance cable to 50 spare cable pairs in the 300 pair cable from MDF B. (See Exhibit EC12-B.)
- Install fiber cable consisting of 12 singlemode and 6 multimode optics in the existing and new ductbank from Building 91, Parking Structure 2. (See Exhibit EC13-B.)

Project #7 – Student Recreation Center (Building #93)

Recommendation:

- (4) 4 inch underground conduits from existing manhole CMH#25. (See Exhibit EC11-B.)
- Install 300 pair copper building entrance cable from MDF B. (See Exhibit EC12-B.)
- Install fiber cable consisting of 24 singlemode and 12 multimode optics in the existing and new ductbank from MDF B. (See Exhibit EC13-B.)

Project #8 – Engineering 3 and 4 Replacement Building

Recommendation:

- (4) 4 inch underground conduits from existing manhole CMH#26A. (See Exhibit EC11-B.)
- 300 pair copper building entrance cable from splice in manhole CMH#26A. Re-use the existing 300 cable pairs in the 1200 pair cable that will be available after the existing buildings are demolished. (See Exhibit EC12-B.)
- Install fiber cable consisting of 48 singlemode and 24 multimode optics in the existing and new ductbank from MDF B. (See Exhibit EC13-B.)

Project #9 – Outpost Replacement Building

Recommendation:

- (4) 4 inch underground conduits from existing manhole CMH#22A. (See Exhibit EC11-B.)
- 100 pair copper building entrance cable from splice in manhole CMH#22A. Reduce the number of copper cable pairs serving building 55, Human Services and Design, by 100. Re-use the 100 cable pairs in the existing 600 pair cable to serve the proposed building. (See Exhibit EC12-B.)
- Install fiber cable consisting of 24 singlemode and 12 multimode optics in the existing and new ductbank from MDF B. (See Exhibit EC13-B.)

Project #10 – Satellite Dining Facility

Recommendation:

- (4) 4 inch underground conduits from existing manhole CMH#61. (See Exhibit EC11-B.)
- 300 pair copper building entrance cable from MDF B. (See Exhibit EC12-B.)
- Install fiber cable consisting of 24 singlemode and 12 multimode optics in the existing and new ductbank from MDF B. (See Exhibit EC13-B.)

Project #11 – Student Services Complex

Recommendation:

Recommendation For Serving New Building:

Our recommendation is based on the assumptions that the new building is located adjacent and attached to the south-east side of Brotman Hall. The building can also be constructed over the existing ductbank.

The Student Services Complex will contain one or more telecommunications rooms that will be IDF rooms served from the BDF and Data Center in Brotman Hall. The pathways will be constructed inside the building in the space above the dropped ceilings on the first floor. The new IDF rooms will be connected to the BDF and Data Center in the new building with conduits, copper cables, and fiber cables.

Recommendation For Rerouting Ductbank and Cables In Conflict With Proposed Building Site:

Our recommendation is Option A, Avoid and Maintain The Existing Ductbank in the proposed building site. This plan eliminates the requirement to reroute the existing ductbank and cables.

Project #12 – Nursing Building Addition

Recommendation:

Our recommendation is Option A, Avoid And Maintain The Ductbank And Manhole Along Northwestern Boundary And Serve The Nursing School Building From The Existing Manhole.

This plan requires no demolition and provides for the following infrastructure upgrades:

- Extend (4) 4 inch underground conduits from existing manhole CMH#44. (See Exhibit EC11-C.)
- Install 300 pair copper building entrance cable from splice in manhole CMH#44 to the new building BDF. In manhole CMH#44, splice the new entrance cable to 300 spare cable pairs in the 1200 pair cable from MDF C. (See Exhibit EC12-C.)
- Install fiber cable with 24 singlemode optics and 12 multimode optics in the existing and new ductbank from MDF C. (See Exhibit EC13-C.)



Project #13 – Parking Structure Lot 14

Recommendation:

Our recommendation is Option A, Avoid And Maintain The Ductbank And Manhole Along The Southwestern Boundary And Serve The Parking Structure From The Existing Manhole.

This plan requires no demolition and provides for the following infrastructure upgrades:

- (2) 4 inch underground conduits from existing manhole CMH#41. (See Exhibit EC11-C.)
- Install 100 pair copper building entrance cable from MDF C building. In manhole CMH#41, splice the new entrance cable to 100 spare cable pairs in the 1200 pair cable from MDF C. (See Exhibit EC12-C.)
- Install fiber cable with 12 singlemode optics and 6 multimode optics in the existing and new ductbank from MDF C. (See Exhibit EC13-C.)



MATCH LINE SEE EC11-C FOR CONTINUATION





MATCH LINE SEE EC11-B FOR CONTINUATION

NO. BUILDING DESIGNATION	NO. BUILDING DESIGNATION
3 Nursing	26 Studio Theatre
4 Soroptomist House	27 University Theatre
5 Family & Consumer Sciences	28 University Telecommunications
6 University Student Union	29 Art Annex
7 Cafeteria	32 Fine Arts 1
8 University Bookstore	33 Fine Arts 2
9 Psychology	34 Fine Arts 3
10 Liberal Arts 5	35 Fine Arts 4
11 Liberal Arts 4	36 Faculty Office 4
12 Liberal Arts 3	37 Peterson Hall 1
13 Liberal Arts 2	38 Peterson Hall 2
14 Liberal Arts 1	39 Peterson Hall 3
15 Faculty Office 3	40 Science Lecture Hall
16 Faculty Office 2	41 Microbiology
17 Lecture Halls 150-151	42 Animal House
18 Faculty Office 1	43 Greenhouse 1&2
19 Library	45 Faculty Office 5
20 Academic Services	46 Social Sciences & Public Affairs
21 Multi-Media Center	65 Electrical Substation (South)
22 Education 1	67 Main Distribution Communication Facility MDF A
23 Education 2	75 International House
24 McIntosh Humanities Building	86 Central Plant
25 Language Arts Building	94 Molecular and Life Sciences Center

Building / Boundary Legend

-  EXISTING BUILDING
-  FUTURE PARKING STRUCTURE
-  POTENTIAL BUILDING SITE
-  FUTURE BUILDING
-  PLANNED BUILDING SITE

Legend

-  NOTES
-  NEW
-  EXISTING TO REMAIN
-  EXISTING TO BE REMOVED

PROJECT #3
LIBERAL ARTS COMPLEX

PROJECT #1
PETERSON HALL 3
REPLACEMENT BUILDING
(BLDG.#95)

PROJECT #2
LIBERAL ARTS BUILDING
(PHASE 1 & 2)

PROJECT #4
PARKING STRUCTURE
LOT 7



EC11-A
PROPOSED CONDUIT PLAN-MDF A







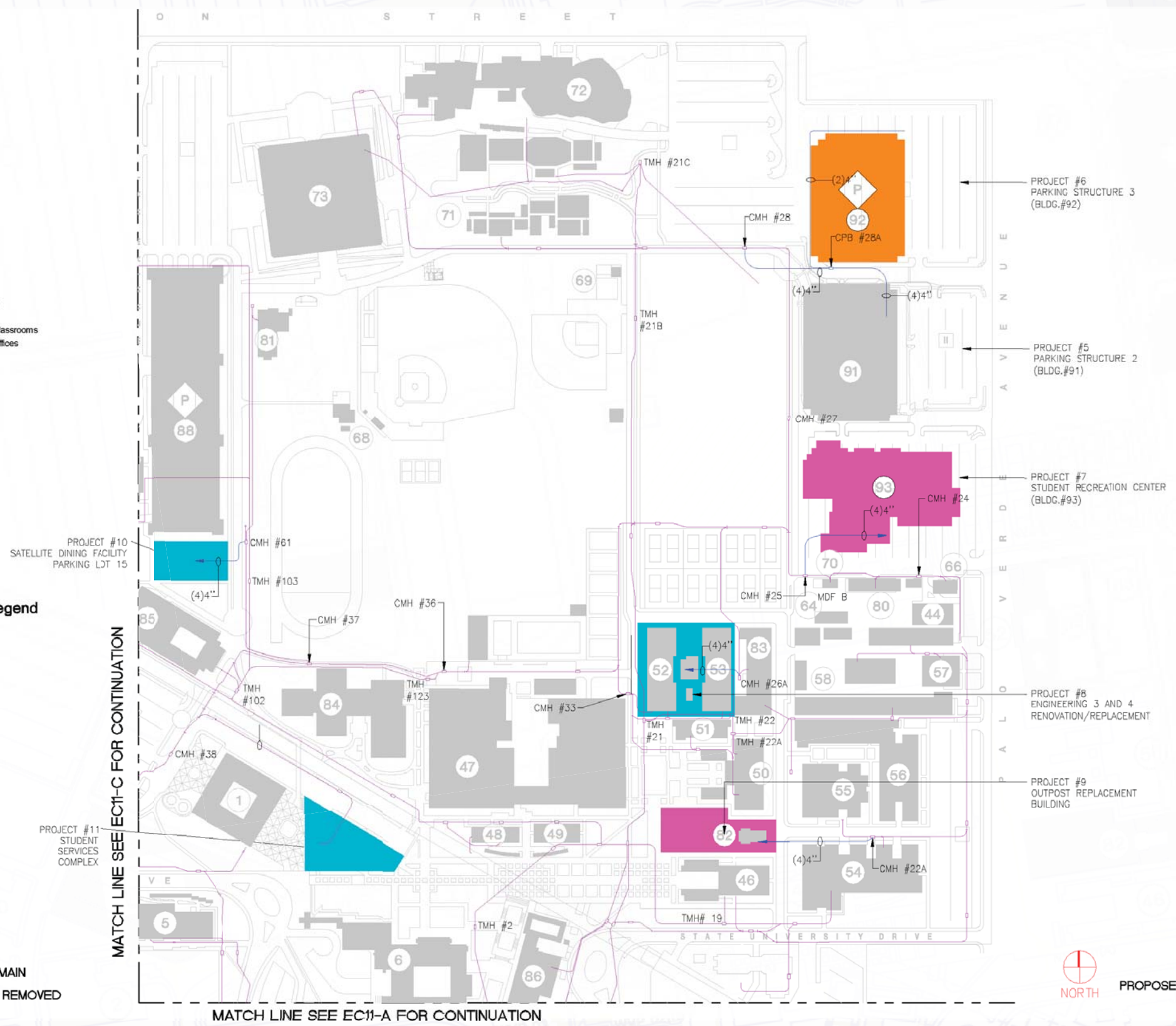
NO.	BUILDING DESIGNATION
1	Brotman Hall
6	University Student Union
44	Electrical Substation (North)
45	Faculty Office 5
46	Social Sciences & Pub Affairs
47	Physical Education/Gym
48	Health & Human Services 1 Classrooms
49	Health & Human Services 2 Offices
50	Vivian Engineering Center
51	Engineering 2
52	Engineering 3
53	Engineering 4
54	Design

Building / Boundary Legend

-  EXISTING BUILDING
-  FUTURE PARKING STRUCTURE
-  POTENTIAL BUILDING SITE
-  FUTURE BUILDING
-  PLANNED BUILDING SITE

Legend

-  NOTES
-  NEW
-  EXISTING TO REMAIN
-  EXISTING TO BE REMOVED



MATCH LINE SEE EC11-C FOR CONTINUATION

MATCH LINE SEE EC11-A FOR CONTINUATION






EC11-B
PROPOSED CONDUIT PLAN-MDF B







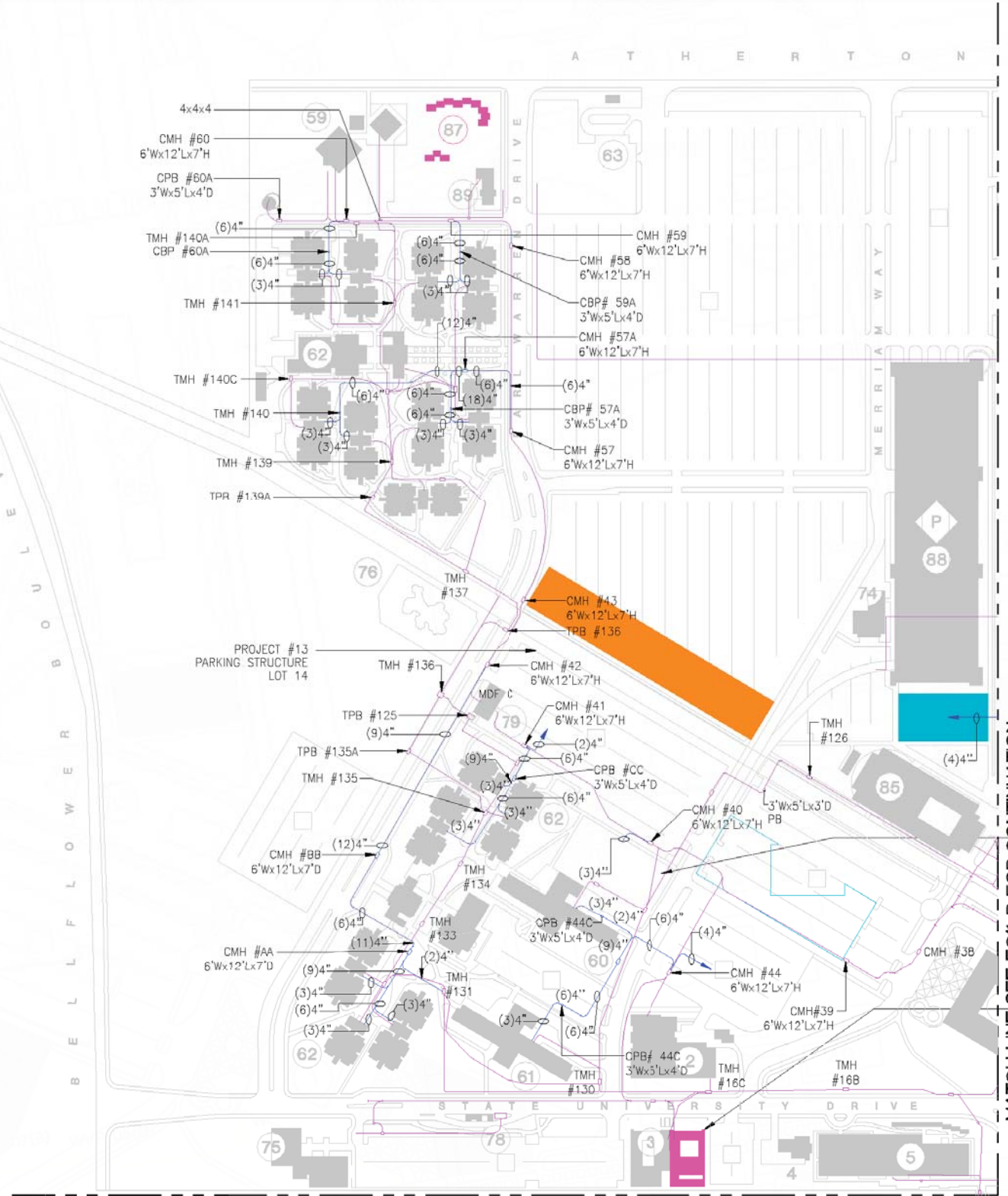
NO.	BUILDING DESIGNATION
2	Student Health Services
3	Nursing
4	Soroptomist House
5	Family & Consumer Sciences
59	Patterson Child Development Center
60	Los Alamos Hall
61	Los Cerritos Hall
62a	Residence Commons
62b	Parkside Commons
63	Recycling Center
74	Parking and Transportation Services
75	International House
76	Earl Burns Miller Japanese Garden
78	Visitor Information Center
79	Main Distribution Communications Facility MDF C
85	College of Business
88	Parking Structure No. 1
89	Housing & Residential Life

Building / Boundary Legend

-  EXISTING BUILDING
-  FUTURE PARKING STRUCTURE
-  POTENTIAL BUILDING SITE
-  FUTURE BUILDING
-  PLANNED BUILDING SITE

Legend

-  NOTES
-  NEW
-  EXISTING TO REMAIN
-  EXISTING TO BE REMOVED



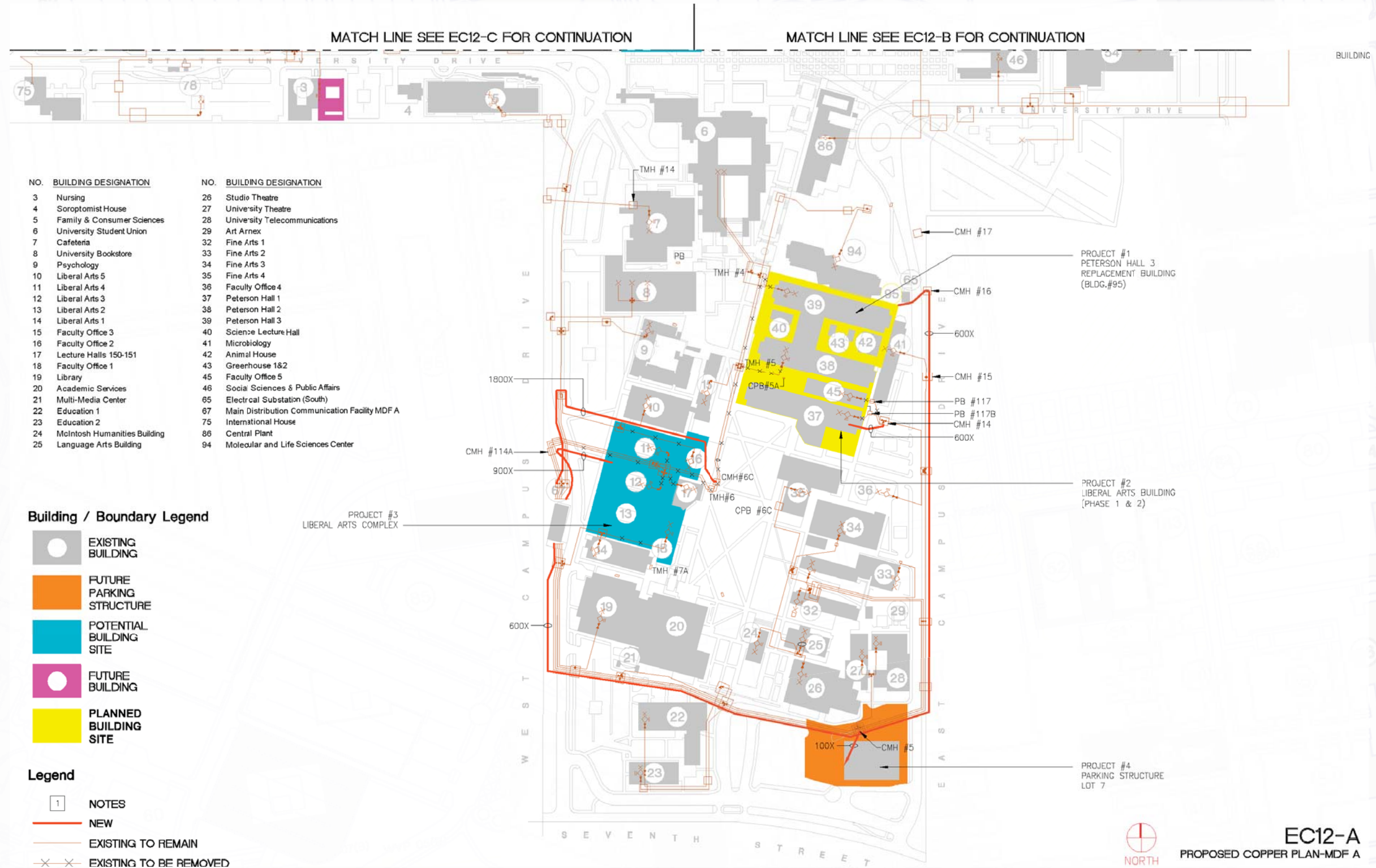
MATCH LINE SEE EC11-A FOR CONTINUATION

MATCH LINE SEE EC11-B FOR CONTINUATION












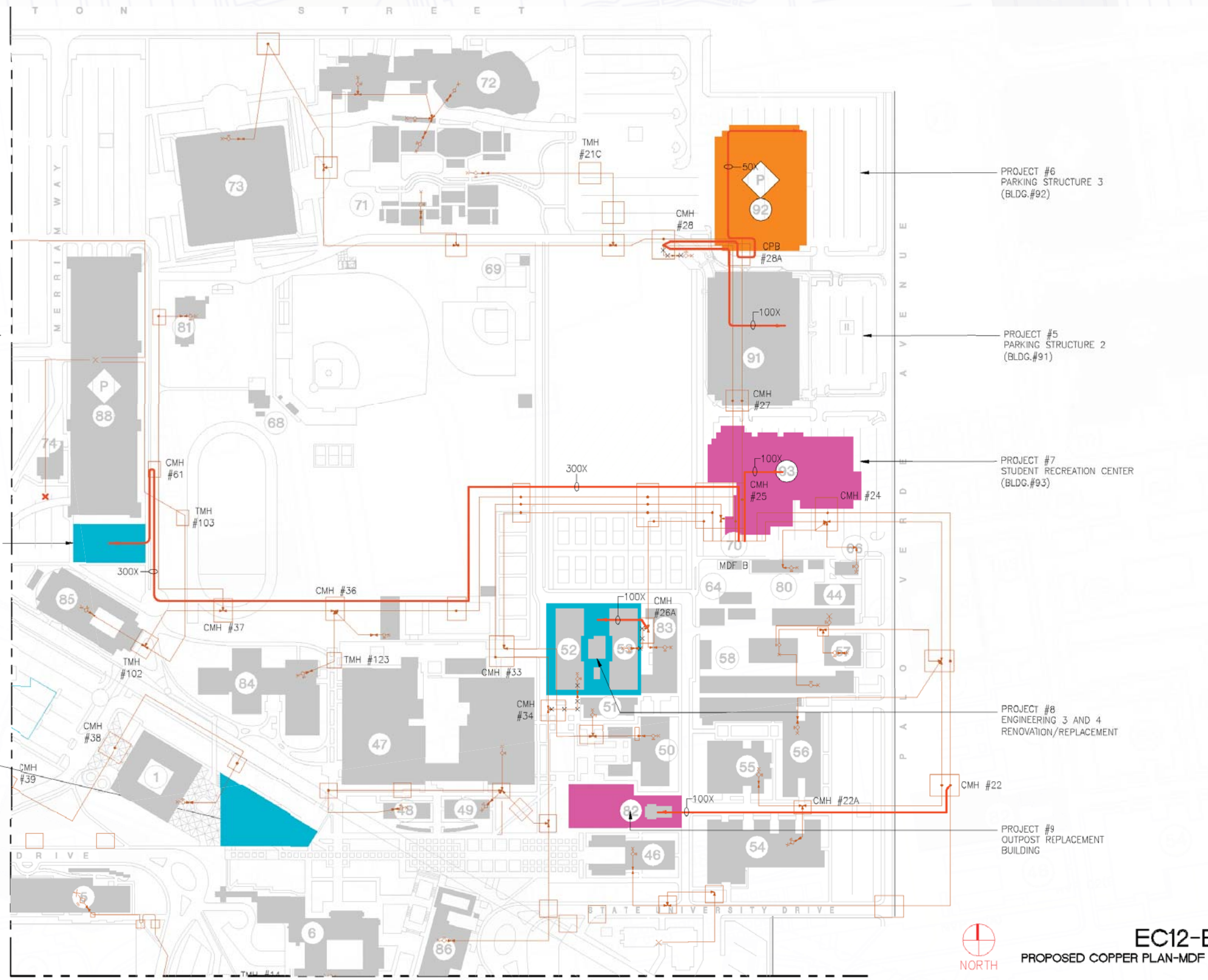
EC11-C
PROPOSED CONDUIT PLAN-MDF C





- NO. BUILDING DESIGNATION**
- 1 Brotman Hall
 - 5 Family & Consumer Sciences
 - 6 University Student Union
 - 44 Electrical Substation (North)
 - 46 Social Sciences & Public Affairs
 - 47 University Gymnasiums
 - 48 Health & Human Services Classrooms
 - 49 Health & Human Services Offices
 - 50 Vivian Engineering Center
 - 51 Engineering 2
 - 52 Engineering 3
 - 53 Engineering 4
 - 54 Design
 - 55 Human Services & Design
 - 56 Engineering Technology
 - 57 Facilities Management
 - 58 Corporation Yard
 - 64 Greenhouse 3
 - 66 Reprographics
 - 68 Restrooms/Storage
 - 69 Softball Field Restroom
 - 70 Main Distribution Communications Facility MDF B
 - 71 University Music Center
 - 72 Carpenter Performing Arts Center & Dance Center
 - 73 Mike and Arline Walter Pyramid
 - 80 University Police
 - 81 Parking Office Building
 - 82 Outpost Food Service
 - 83 Engineering / Computer Science
 - 84 Steve and Nini Hom Center
 - 85 College of Business
 - 86 Central Plant
 - 88 Parking Structure No. 1
 - 91 Parking Structure No. 2
 - 92 Parking Structure No. 3
 - 93 Student Recreation Center

- Building / Boundary Legend**
-  EXISTING BUILDING
 -  FUTURE PARKING STRUCTURE
 -  POTENTIAL BUILDING SITE
 -  FUTURE BUILDING
 -  PLANNED BUILDING SITE
- Legend**
-  NOTES
 -  NEW
 -  EXISTING TO REMAIN
 -  EXISTING TO BE REMOVED



 NORTH

EC12-B
PROPOSED COPPER PLAN-MDF B







NO.	BUILDING DESIGNATION
2	Student Health Services
3	Nursing
4	Soroptomist House
5	Family & Consumer Sciences
59	Patterson Child Development Center
60	Los Alamos Hall
61	Los Cerritos Hall
62a	Residence Commons
62b	Parkside Commons
63	Recycling Center
74	Parking and Transportation Services
75	International House
76	Earl Burns Miller Japanese Garden
78	Visitor Information Center
79	Main Distribution Communications Facility MDF C
85	College of Business
88	Parking Structure No. 1
89	Housing & Residential Life

Building / Boundary Legend

-  EXISTING BUILDING
-  FUTURE PARKING STRUCTURE
-  POTENTIAL BUILDING SITE
-  FUTURE BUILDING
-  PLANNED BUILDING SITE

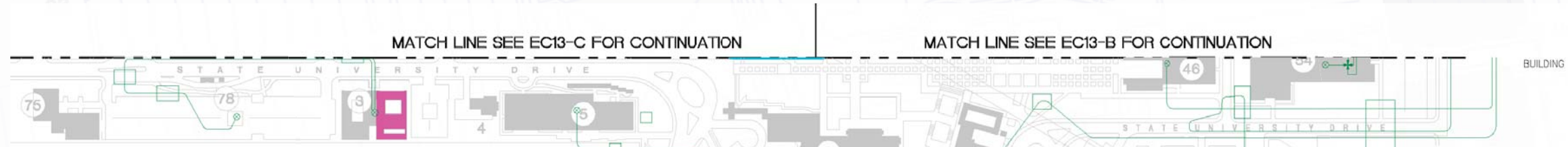
Legend

-  NOTES
-  NEW
-  EXISTING TO REMAIN
-  EXISTING TO BE REMOVED



EC12-C
PROPOSED COPPER PLAN-MDF C





NO.	BUILDING DESIGNATION	NO.	BUILDING DESIGNATION
3	Nursing	26	Studiv Theatre
4	Soroptimist House	27	University Theatre
5	Family & Consumer Sciences	28	University Telecommunications
6	University Student Union	29	Art Amex
7	Cafeteria	32	Fine Arts 1
8	University Bookstore	33	Fine Arts 2
9	Psychology	34	Fine Arts 3
10	Liberal Arts 5	35	Fine Arts 4
11	Liberal Arts 4	36	Faculty Office 4
12	Liberal Arts 3	37	Peterson Hall 1
13	Liberal Arts 2	38	Peterson Hall 2
14	Liberal Arts 1	39	Peterson Hall 3
15	Faculty Office 3	40	Science Lecture Hall
16	Faculty Office 2	41	Microbiology
17	Lecture Halls 150-151	42	Animal House
18	Faculty Office 1	43	Greenhouse 1&2
19	Library	45	Faculty Office 5
20	Academic Services	46	Social Sciences & Public Affairs
21	Multi-Media Center	65	Electrical Substation (South)
22	Education 1	67	Main Distribution Communication Facility MDF A
23	Education 2	75	International House
24	McIntosh Humanities Building	86	Central Plant
25	Language Arts Building	94	Molecular and Life Sciences Center

Building / Boundary Legend

- EXISTING BUILDING
- FUTURE PARKING STRUCTURE
- POTENTIAL BUILDING SITE
- FUTURE BUILDING
- PLANNED BUILDING SITE

Legend

- NOTES
- NEW
- EXISTING TO REMAIN
- EXISTING TO BE REMOVED

NOTES

1 MOVE SPLICE FROM PHI TO MANHOLE CMH #14 ON PROJECT #1. MAINTAIN TEMPORARY SERVICE TO BLDGS 37 AND 45 UNTIL PROJECT #2.








EC13-A
PROPOSED FIBER PLAN-MDF A







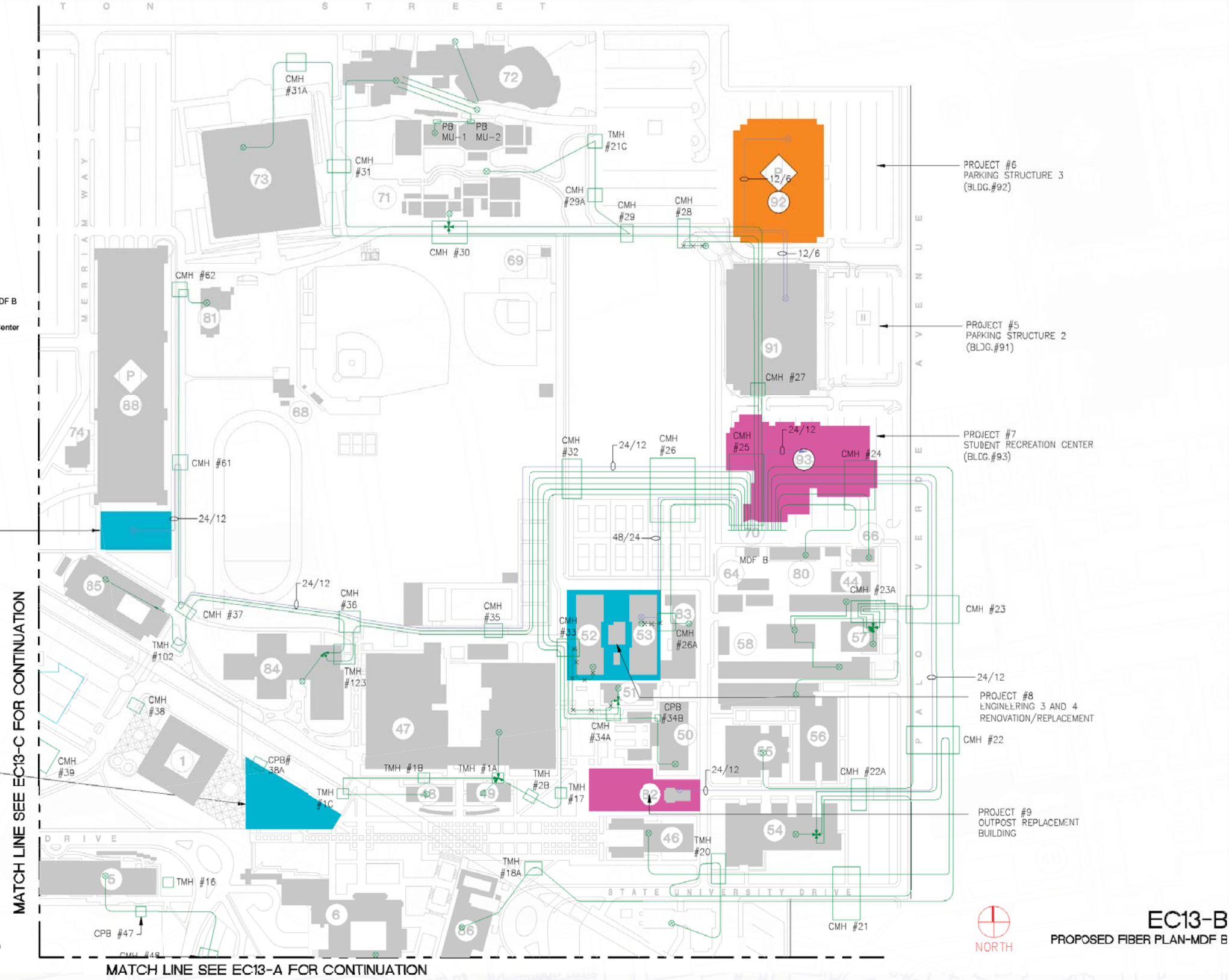
NO.	BUILDING DESIGNATION
1	Brotman Hall
5	Family & Consumer Sciences
6	University Student Union
44	Electrical Substation (North)
46	Social Sciences & Public Affairs
47	University Gymnasiums
48	Health & Human Services Classrooms
49	Health & Human Services Offices
50	Vivian Engineering Center
51	Engineering 2
52	Engineering 3
53	Engineering 4
54	Design
55	Human Services & Design
56	Engineering Technology
57	Facilities Management
58	Corporation Yard
64	Greenhouse 3
66	Reprographics
68	Restrooms/Storage
69	Softball Field Restroom
70	Main Distribution Communications Facility MDF B
71	University Music Center
72	Carpenter Performing Arts Center & Dance Center
73	Mike and Arline Walter Pyramid
80	University Police
81	Parking Office Building
82	Outpost Food Service
83	Engineering / Computer Science
84	Steve and Nini Horn Center
85	College of Business
86	Central Plant
88	Parking Structure No. 1
91	Parking Structure No. 2
92	Parking Structure No. 3
93	Student Recreation Center

Building / Boundary Legend

-  EXISTING BUILDING
-  FUTURE PARKING STRUCTURE
-  POTENTIAL BUILDING SITE
-  FUTURE BUILDING
-  PLANNED BUILDING SITE

Legend

-  NOTES
-  NEW
-  EXISTING TO REMAIN
-  EXISTING TO BE REMOVED



MATCH LINE SEE EC13-C FOR CONTINUATION

MATCH LINE SEE EC13-A FOR CONTINUATION



EC13-B
PROPOSED FIBER PLAN-MDF B







NO.	BUILDING DESIGNATION
2	Student Health Services
3	Nursing
4	Soroptomist House
5	Family & Consumer Sciences
59	Patterson Child Development Center
60	Los Alamitos Hall
61	Los Cerritos Hall
62a	Residence Commons
62b	Parkside Commons
63	Recycling Center
74	Parking and Transportation Services
75	International House
76	Earl Burns Miller Japanese Garden
78	Visitor Information Center
79	Main Distribution Communications Facility MDF C
85	College of Business
88	Parking Structure No. 1
89	Housing & Residential Life

Building / Boundary Legend

-  EXISTING BUILDING
-  FUTURE PARKING STRUCTURE
-  POTENTIAL BUILDING SITE
-  FUTURE BUILDING
-  PLANNED BUILDING SITE

Legend

-  NOTES
-  NEW
-  EXISTING TO REMAIN
-  EXISTING TO BE REMOVED



MATCH LINE SEE EC13-B FOR CONTINUATION

MATCH LINE SEE EC13-A FOR CONTINUATION



EC13-C
PROPOSED FIBER PLAN-MDF C

