Pre-Design Diligence Report
Benson Polytechnic High School
June 12, 2017

bassetti architects

PORTLAND PUBLIC SCHOOLS
Health, Safety and Modernization Bond
www.pps.net/bond2017

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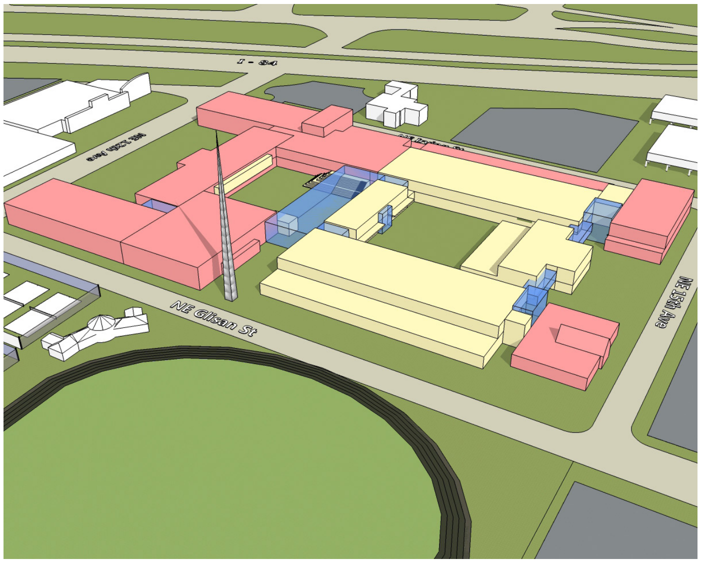
I. EXECUTIVE SUMMARY

TEAM ACKNOWLEDGMENT

Owner:	Portland Public School District
Architect:	Bassetti Architects
Cost:	Rider Levett Bucknall (Owner's Consultant)
Civil:	BHE Group
Landscape:	Mayer/Reed
Structural:	KPFF
Historic Architect:	Architectural Resources Group
Mechanical:	PAE Engineers
Electrical:	Reyes Engineering
Kitchen:	JBK
Theater:	PLA Designs
AV & Acoustics:	Greenbusch
Community Engagement:	Nancy Hamilton Consulting



Construction Budget
$122,000,000

Project Budget
$201,654,716

Project cost based on recommended construction schedule. Final project cost will be based on Board of Education-approved construction schedule.

Student Design Capacity
1,700

Proposed Building Area
+/- 368,000 SF

Area shown is the design target based on preliminary Benson Tech Focus Option Ed Spec program information. Final area to be determined with finalization of the Ed Spec from information being gathered from Benson Tech staff, administration, community, alumni, and equipment surveys through May 2017.

PROJECT INTENT

The main focus of the Benson Polytechnic pre-design diligence effort has been to build upon the work done in the Master Planning phase and develop greater detail about program needs, budget considerations, as well as exploring phasing scenarios of the developing schemes.

Key Project Challenges

+ Historic landmark
+ Constrained urban site
+ Extensive health and safety upgrades required, including seismic upgrade of unreinforced masonry (URM) buildings and providing universal access throughout campus
+ Phased construction with student occupancy

Master Plan Committee (MPC) Process

The Benson Tech MPC has met 12 times thus far as a part of the master planning effort. MPC input on design iterations, site design, programming and Ed Spec development has been crucial for finalization of the masterplan.

Due Diligence

During the pre-design diligence phase, the design team has reviewed the findings in the Master Plan report, conducted numerous site visits and reviewed existing documentation. For program development, the team has gathered input from staff of over 20 departments, including all Career Technical Education (CTE) department heads, alumni, and administration.

ARCHITECTURAL DESIGN

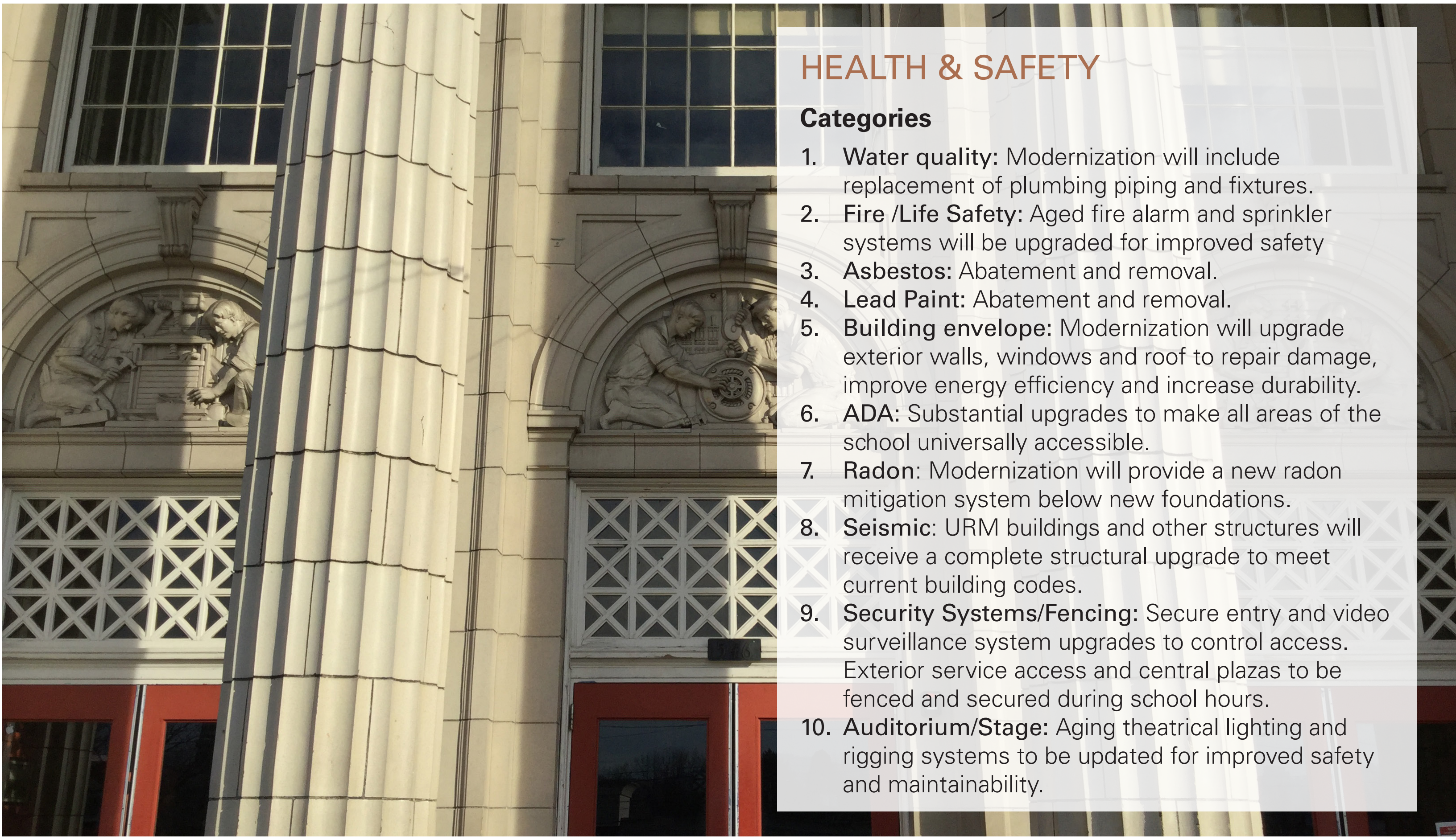
The modernization of Benson Polytechnic will restore the historic 1916 Main Classroom building, the 1927 Old Gymnasium and the 1930 Auditorium Building. Additionally, Scheme L.1 looks to restore the North Wing Shops and Foundry Building, both constructed in 1916. The South Wing Shops Building may or may not be restored depending on function and cost.

The masterplan approach places the Commons at the new heart of the school, serving multiple uses such as cafeteria, student and community gatherings, foyer for athletic events, informal studies and access to various exterior spaces.

Three exterior spaces are also being introduced and enhanced in the masterplan:

+ The existing historic west entry lawn
+ A new central social courtyard
+ A new east CTE work courtyard

Internal layouts of academic classrooms and CTE programs within the school restoration will provide an integration of academic, SPED, and CTE programs. The design also looks to maximize opportunities for natural daylighting into all learning spaces, and a flexibility in building systems that will allow for accommodation of evolving educational programs. The design approach seeks to integrate all of these considerations in a manner that will propel Benson Polytechnic High School into the 21st Century as a national model for career learning educational institutions.



HEALTH & SAFETY

Categories

1. **Water quality:** Modernization will include replacement of plumbing piping and fixtures.
2. **Fire /Life Safety:** Aged fire alarm and sprinkler systems will be upgraded for improved safety
3. **Asbestos:** Abatement and removal.
4. **Lead Paint:** Abatement and removal.
5. **Building envelope:** Modernization will upgrade exterior walls, windows and roof to repair damage, improve energy efficiency and increase durability.
6. **ADA:** Substantial upgrades to make all areas of the school universally accessible.
7. **Radon**: Modernization will provide a new radon mitigation system below new foundations.
8. **Seismic**: URM buildings and other structures will receive a complete structural upgrade to meet current building codes.
9. **Security Systems/Fencing:** Secure entry and video surveillance system upgrades to control access. Exterior service access and central plazas to be fenced and secured during school hours.
10. **Auditorium/Stage:** Aging theatrical lighting and rigging systems to be updated for improved safety and maintainability.

APPROACH

The design team has done a thorough investigation of the existing conditions based on the following:

+ Review of as-built documents provided by PPS
+ Conducted an initial site visit on November 4, 2016 with all consultants
+ Follow-up site visits to review specific items such as exterior envelope, mechanical systems, acoustical treatment, theater, equipment surveys, etc.
+ Review of draft Phase 1 Environmental Site Assessment
+ Detailed equipment survey
+ Acoustical testing

The information gathered from these investigations was incorporated into the cost analysis overview that was provided to the district's cost estimator, RLB, to define the construction budget for the project. Areas were identified for renovation based on existing conditions in the following categories:

+ Heavy Remodel – Hazmat abatement, extensive interior demolition, seismic and structural upgrades, envelope upgrades, interiors reconfiguration, new finishes, new technology, new mechanical, electrical, plumbing and fire/life safety systems.
+ Medium Remodel – Hazmat abatement, modest interior demolition, seismic and structural upgrades, minimal envelope repairs, interiors upgraded with some layout remaining, new finishes, new technology, modifications to mechanical, electrical, plumbing and fire/life safety systems.
+ Light Remodel – Hazmat abatement, minimal demolition, minimal interior renovations, new finishes, new technology, integration of mechanical , electrical, plumbing and fire/life safety with new systems
+ Demolition – full abatement and removal of buildings to be removed based on the final masterplan.

The majority of the building is in the Heavy and Medium categories, or new construction.

Investigation of existing conditions will continue throughout the design process to aid with fully understanding the building parameters for construction. Further analysis will include work such as:

+ Building survey and photo documentation
+ Creating a BIM model of existing conditions
+ Geotechnical soils investigation
+ Phase 2 Environmental Site Report
+ Testing (structural, acoustic, etc.)

SCHEME DEVELOPMENT

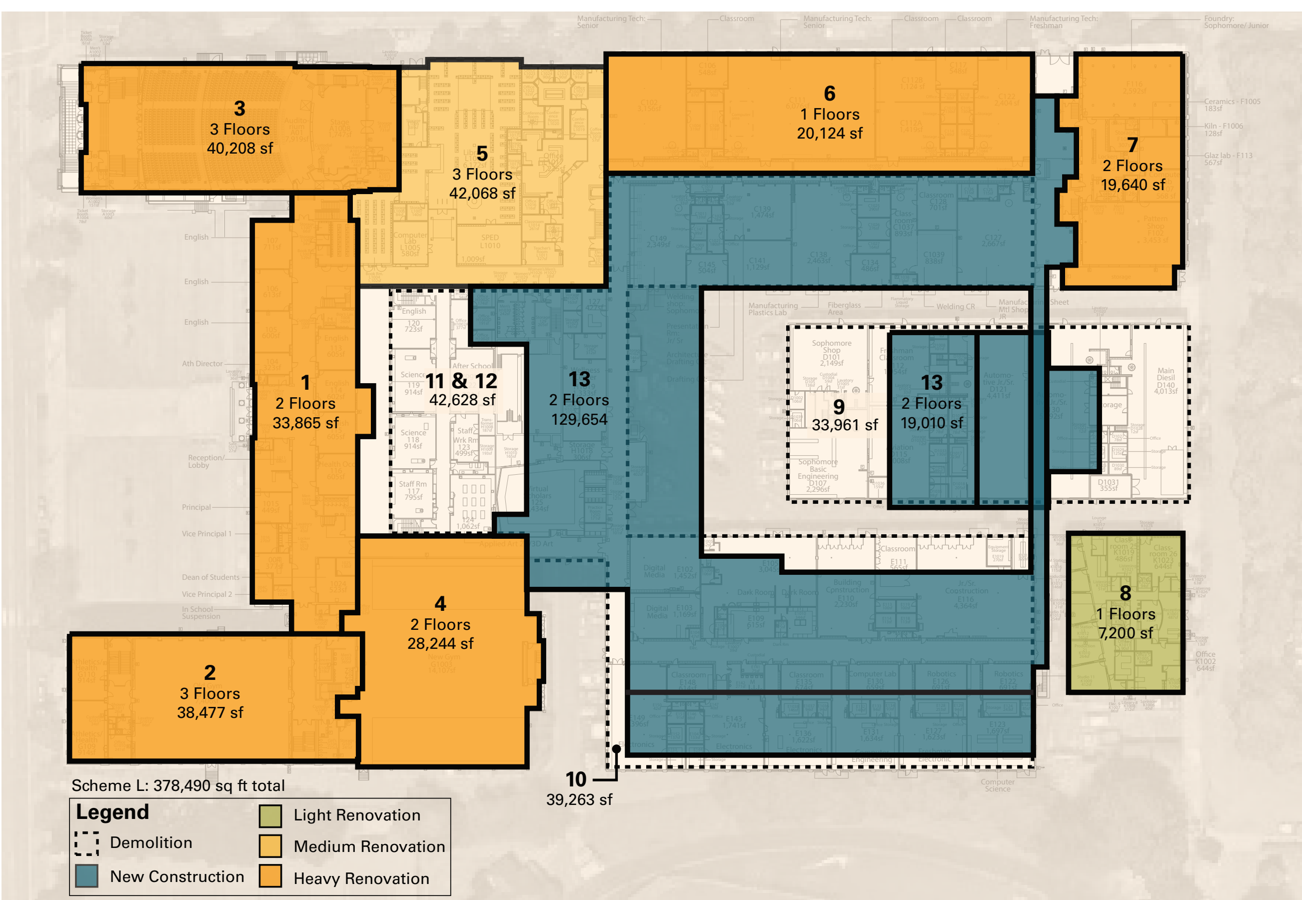
The preferred Scheme L.1 incorporates input received from the MPC based on review of Schemes A-D in the Master Plan Report and a more recent iteration of the design in Schemes E-L, reviewed with the MPC from January to March.

Key themes incorporated into the design schemes include:
+ Maintaining and modernizing historic buildings to the west and north and the KBPS building (located in the southeast corner of the site).
+ Providing a protected courtyard at the center and a shared work courtyard to the east.
+ Addressing service and delivery access from the east and south.
+ Integrating academic classrooms and CTE shops within the school for better collaboration.
+ Enhancing daylighting, transparency, and natural ventilation.
+ Providing flexible and adaptable spaces that will meet the needs of Benson Tech now and in the future.
+ Balancing program, budget and phasing considerations.

PHASING ASSUMPTIONS

Due to the fact that Benson Tech is a focus option school and attracts students district-wide, finding viable off-site swing site(s) for Benson Tech programs would prove extremely difficult. Initial phasing studies are being tested on both design schemes to understand variables that should be taken into consideration for on-site phasing with students occupying the campus throughout construction.

The following is a starting list of phasing assumptions:
+ Assume all Benson Tech programs will remain on-site during construction.
+ If off-site options are presented or available before the start of construction, reductions in swing costs or durations may be achieved.
+ No increase to student capacity prior to or during construction.
+ Non-Benson programs will be relocated off-site before the start of construction.
+ Utilize adjacent PPS parking site for swing or contractor space, if possible.
+ Maximize efficiency in programs to minimize swing space needs.
+ Main gym and theater will each be unavailable for one school year.
+ Swing of Main Gym and Auxiliary Gym will allow P.E. programs to continue to operate on-site.



II. DESIGN APPROACH

This section includes design approach narratives for the following scopes of work:

A. Civil
B. Landscape
C. Historic Architecture
D. Architecture
E. Structural
F. Mechanical
G. Electrical
H. Kitchen Design
I. Theater
J. AV & Acoustics

Existing conditions assessments were completed for the Master Plan Report by DOWA-IBI Group Architects, Inc. Relevant information from this report has been referenced where pertinent.

A. CIVIL

Site Vehicular Access and Circulation:

- Vehicle Parking: There is a total of approximately 52 parking spaces onsite, and 154 parking spaces located in a nearby parking lot to the southwest. Four of the on-site parking spaces are accessible, and two of the spaces in the nearby lot are accessible. Refer to the DOWA MPR for a detailed breakdown of the parking space distribution.

  Per the Draft Due Diligence Traffic Impact Analysis (TIA), dated February 2016, the project should maintain enough onsite parking to accommodate all faculty and staff (estimated at 80), so staff does not have to utilize on-street parking. The proposed design concept is expected to reconfigure the parking on the main school site, but will retain some parking spaces. The aggregate number of parking spaces at the main school site and the adjacent parking lot will be well in excess of 80 spaces.

  As noted in the Draft TIA, the site is well served by transit facilities and Portland Code implies there is no minimum onsite parking requirement. City staff have interpreted this code provision differently for recent projects, and it is expected that a detailed parking analysis will be required to demonstrate that adequate parking is available. Regardless, the Draft TIA indicates the existing parking facilities should be sufficient for the project.

- Existing Vehicular Site Access: There are five existing vehicle access points to the site:
  - Northeast / NE Irving Street: Access is provide through a driveway apron to NE Irving Street This access is used for a maintenance/loading area and is not open to public use.
  - East Parking Lot Exit / NE 15th Avenue: One-way exit to NE 15th Ave. from the internal parking and service courtyard.
  - East Parking Lot Access / NE 15th Avenue: One-way entrance from NE 15th Avenue into the onsite internal parking and service courtyard.
  - Southeast Storage Yard / NE 15th Avenue: Access is provided via a driveway apron to NE 15th Avenue. This apron provides access to a fenced storage area adjacent to the south side of the KBPS building.
  - Southeast / NE 15th Avenue: Access is provided via a driveway apron to the corner of NE 15th Avenue and NE Glisan Street. The apron aligns with the approximate centerline of NE Glisan Street. This apron provides access to several small parking areas along the south edge of the site.

- Existing Parking Lot Access:
  - NE Glisan Street: Access to the parking lot is provided through a two-way driveway apron located at the intersection of NE Glisan and NE 15th Avenue. There is another driveway apron located just to the west that is currently closed with chains blocking the access.
  - NE Flanders Street: The NE Flanders Street right-of-way extends a short distance to the west of NE 16th Avenue, and provides access to the parking lot. The roadway cross section transitions into the parking lot curbing, and there is no formal driveway apron.

- Proposed Vehicular Access and Circulation: The proposed concept will establish two onsite vehicle access / circulation routes. The first route will be a one-way loop entering and exiting the CTE courtyard, similar to the existing loop at this location. The second route will be a limited access drive along the south property line. This drive may accommodate limited parking south of the KPBS building, but will not accommodate through traffic to NE 12th Avenue, except for emergency vehicles. A turnaround may be necessary near the southwest corner of the KPBS building. Vehicles will utilize the south access drive to enter the auto shop. A new access connection to NE 12th Avenue may be provided to accommodate emergency vehicle ingress/egress. Access will be restricted with gates.

- Bus Drop Off: PPS does not utilize school busses for general student transportation; and instead relies on public transportation via Tri-Met. There are several public bus stops adjacent to the school on NE 12th Avenue. PPS does use several small busses and vans for transportation of special programs. Loading and unloading for these programs is subject to change, but the current activities are summarized as follows:
    - Benson Southeast Student: Utilizes a Type 10 vehicle (sedan). Vehicles unload within the site at the u-shaped driveway extending to/from NE 15th.
    - Clinton at Benson: Utilizes (3) small buses. Loading occurs along NE 15th Avenue, just south of Irving.
    - Pioneer Annex at Benson: Utilizes (2) small buses. Loading occurs along NE 15th Avenue, just south of Irving.

  There is currently signage in place demarking the unloading zone along NE 15th, just south of Irving. The typical PPS small bus is 24' long, with a lift apparatus near the rear of the bus. The lifts are capable of unloading students onto an elevated sidewalk surface.

  The Draft TIA recommends the project accommodate onsite loading/unloading for the special needs buses, with sufficient space to accommodate all buses simultaneously. Further coordination with the design team and the transportation engineer is needed to determine if onsite loading is appropriate. Retaining the on-street loading on NE 15th Avenue may be pursued due to onsite space constraints.

- Passenger Vehicle Drop Off: Passenger vehicle drop-off accounts for a relatively small percentage of arrivals. Some drop-off and pickup activity occurs along NE 12th Ave. and NE Irving St. Most arrivals are by public transit or from the parking lot to the southeast of the site. Refer to the preliminary Draft TIA for additional information on vehicle drop-off activity.

  Due to congestion on NE 12th Avenue, the Draft TIA recommends providing onsite passenger vehicle unloading or improving the on-street unloading zone at NE 12th Avenue. Due to limited space onsite and potential pedestrian vehicle conflicts, onsite passenger vehicle loading/unloading is not expected to be feasible. Improvements to NE 12th Avenue to accommodate loading/unloading should be anticipated. The northbound right turn lane on NE 12th Avenue begins near the midpoint of the front lawn area, in alignment with the main entrance to the school. It is anticipated that passenger vehicle loading/unloading improvements on NE 12th Avenue will occur south of the right turn lane.

- Service and Loading Areas: There are multiple loading areas throughout the existing site, including at-grade bay doors and exterior unloading zones. Based on discussions with staff during the assessment, the existing center service/parking courtyard and drive lanes provide ample space for loading and unloading activities. Kitchen deliveries are expected to be the most frequent loading/unloading activity, and a loading area is recommended in the vicinity of the kitchen. Deliveries for building materials are expected to be less frequent.

For the proposed concept, the primary service and solid waste collection (dumpster) area will be positioned in the southwest part of the interior CTE courtyard, adjacent to the kitchen.

The City of Portland stormwater standards generally require loading areas to be covered with a building roof. Portland BES has allowed PPS to opt out of the standard on past projects. However, this should be revisited as the project moves forward. Materials handled at the Benson site may represent a greater risk if leaks or spills occur.

- Materials Storage and Solid Waste Collection: Based on site observations, trash collection is located in the parking/service courtyard. The dumpsters are not currently housed in a trash enclosure. As part of the redevelopment project, the trash and recycle containers will need to be located within a covered trash enclosure with a drain to the sanitary sewer system. PPS does not utilize rolling dumpsters, so the trash enclosure should accommodate direct access by a front-loading garbage truck. If possible, it is recommended that the trash enclosure be in the vicinity of the kitchen.

  The City of Portland Source Control standards apply to exterior storage of materials. Storage of high risk materials that may result in leaching must be stored under a building roof. Low risk materials such as metals, sawdust, and scrap materials, must be stored under cover, but a temporary cover (sheeting) is allowed in lieu of a permanent roof.

- Pavement Condition: Some of the existing concrete and asphalt on the project site is in relatively good condition. However, it is anticipated that the majority of the pavement on the main school site will be removed and replaced to accommodate the proposed design. The southeast parking lot may be utilized for construction staging and may require mill and overlay rehabilitation, or full pavement replacement. Alternatives for salvaging or reclaiming existing pavements will be further reviewed following development of the design concept.

Right-of-Way Improvements:

- Context: The site abuts the following roadway rights-of-way:
  - NE 12th Avenue extends the full length of the west property line. NE 12th Avenue is City of Portland right-of-way.
  - NE Irving Street extends the full length of the north property line. NE Irving Street is City of Portland right-of-way.
  - NE 15th Avenue extends the full length of the east property line. NE 15th Avenue is City of Portland right-of-way.

- Frontage Improvements: Portland Zoning Code (Section 17.88.020.A) allows the City to condition right-of-way frontage improvements with conditional use approval, if the existing improvements do not meet current standards. Per the 6/8/16 Early Assistance Staff Report, PBOT will require the following frontage improvements:
  - NE 12th Avenue: Possible street tree additions.

- NE Irving Street: Curb cut/driveway closures and replacement of sidewalk. Frontage improvements not required unless building is demolished.
- NE 15th Avenue: Closure of unused driveway aprons.
- NE Glisan Street (Parking Lot Site): The City will require a 0.5' right-of-way dedication and reconstruction of sidewalk, furnishing zone, and street trees along western half of frontage. The eastern half of the frontage (in the vicinity of the existing mature trees) is acceptable as-is.
- NE 16th Avenue (Parking Lot Site): The City will require a 3' right-of-way dedication and reconstruction of the sidewalk, furnishing zone, and street trees along the northern half of this frontage. The southern half of the frontage (in the vicinity of the existing mature trees) is acceptable as-is.
- Corner Curb Ramps: The City will require improvements to the corner curb ramps. See below for further discussion.

There are additional deficiencies (noted below) that may require additional improvements within the right-of-way.

- Driveway Aprons: Based on field observations, there are ADA cross-slope deficiencies at nearly all of the existing driveway aprons for the main school site. It is anticipated that all of the driveway aprons at the main school site will be replaced with new ADA compliant driveway aprons, or replaced with sidewalk where the aprons will no longer be used. The unused driveway apron at NE Glisan Street will also require closure per PBOT requirements (see above).

  The project may propose a restricted access connection and driveway apron at NE 12th Avenue at the southwest corner of the site. The access connection would connect the southerly fire lane to NE 12th Avenue. PBOT has expressed concern about establishing this connection, and will require supporting information in the Traffic Impact Analysis if this connection pursued. Refer to 6/8/16 Early Assistance Staff Report for additional information.

- Public Curb Ramp Deficiencies:
  - Mid-Block Ramp at NE 12th Avenue: Recently constructed - replacement not expected.
  - Corner Ramp at NE 12th and NE Irving: Recently replaced – replacement not expected.
  - Corner Ramp at NE 15th and NE Irving: Non-compliant – replacement required.
  - Corner Ramp at NE 16th and NE Glisan: Non-compliant – replacement expected. Ramp is on parking lot site frontage.
  - Corner Ramp at NE 16th and NE Flanders: Non-compliant – replacement expected. Ramp is on parking lot site frontage.

- Public Sidewalk Cross Slope Deficiencies: Per Portland Code and Charter, Chapter 17.28, the property owner is responsible for maintaining sidewalks to comply with ADA standards. The City of Portland sidewalk repair division periodically repairs non-compliant sidewalks and bills property owners for the repairs. A significant percentage of the sidewalk surrounding the site has excessive (non-ADA compliant) cross slopes. Further review of topographic survey data is needed to fully assess the extents of non-compliant sidewalk. However for budgeting purposes, it should be assumed that 85% of the sidewalk at the school site frontage will be replaced.

- Public Sidewalk Change in Level Deficiencies: There are several areas along NE 15th and NE Irving where the existing sidewalks have changes in level (at panel joints) exceeding the ADA tolerances (which allow for up to ½" if beveled).

- Other Public Improvements: A Draft Traffic Impact Analysis (TIA) was prepared by DKS for the project. In addition to the proposed improvements described above, the Draft TIA recommends potential intersection and signage improvements. Refer to the Draft TIA for additional information.

- Public Works Permit: Improvements within the City of Portland right-of-way generally require a Public Works Permit (PWP). The PWP process requires preparation of a plan-profile drawing set (separate from the building permit process) to be reviewed/approved by the Public Works/Engineering Department for review and approval. The prescriptive review process requires plan submittals at 30%, 60%, 90%, and 100% phases. Depending on Public Works staff workload, the review process may take between 10 to 20 weeks.

Site Fire Protection

- Fire Apparatus Access and Coverage: The site is generally compliant with fire apparatus access requirements, with several tight pinch points that likely do not meet the minimum width or turn radius requirements of the Oregon Fire Code. Fire apparatus access requires further coordination with the Fire Bureau during site design. Portland Fire Code requires fire apparatus access roads to extend to within 250' of the most distant point of the building exterior. Apparatus access roads may extend up to 300' in a dead-end configuration. Access roads longer than 300' require a turn-around.

- Aerial apparatus access: Aerial apparatus access will be required where the height of the building exceeds 30'. Aerial access consists of a 26' wide roadway width, placed between 15'-30' away from the building. Locations and frequency of aerial apparatus access will need to be reviewed with the Fire Bureau. Aerial apparatus access may be waived if the building construction satisfies the requirements of Portland Fire Code D105.4.

- Site Fire Hydrant Coverage: There were no existing fire hydrants found onsite. There are existing public fire hydrants at the following locations:
  - Intersection of NE 12th and NE Glisan (southwest corner of site).
  - Intersection of NE 12th and NE Irving (northwest corner of site).
  - Mid-block on NE Irving between NE 12th and NE 15th (north of site).
  - Intersection of NE Irving and NE 15th (northeast corner of site).
  - Intersection of NE 15th and NE Glisan (southeast corner of site)

  Portland Fire Code requires hydrants be located within 600' of the most distant point of a building (400' for non-sprinklered buildings). This minimum coverage is satisfied with the existing fire hydrant locations, assuming the entirety of the buildings are sprinklered. Additional hydrants to meet the fire code requirements are not expected.

Site Water Systems

- Master Plan Report: The Master Plan Report (MPR) prepared by DOWA includes a brief summary of the existing domestic water and fire services for the site. The following information represents additional findings during the subsequent investigation and the anticipated scope of improvements.

- Site Fire Flow: Fire flow modeling from the Portland Water Bureau indicates the design static pressure at the site is 57 psi. Simulated fire flow at 20 psi residual pressure is approximately 2500 gpm. Refer to the plumbing systems narrative for discussion about fire pumping systems. The simulated fire flow is expected to be adequate per Oregon Fire Code Appendix B, provided all buildings are equipped with automatic sprinklers.

- Site Fire Sprinkler Supply: Fire protection water for the site is supplied through (3) services:
    - 6" fire service located at NE 12th Ave. with an existing 6" Backflow Prevention (BFP) device that meets Portland Water Bureau's (PWB) current standards. Refer to the DOWA MPR for additional information on this service.
    - 8" fire service located on NE 15th Ave. adjacent to the auto shop building with an existing 8" BFP that complies with PWB's current standards and a fire department connection. This service extends west to provide fire sprinkler supply to the "D" Wing, then south to serve the "E" Wing sprinkler system.
    - 6" at the corner of NE 15th Ave. and NE Glisan St. with an existing 6" BFP that complies with PWB's current standards and a fire department connection. This service extends north to serve the KBPS radio station building. Refer to the DOWA MPR for additional information on this service.

- Domestic Water Service: Per PWB's records, domestic water for the site is supplied through two parallel 2" domestic services located adjacent to the 6" fire service at NE 12th Ave. The meters are located under the sidewalk in a vault. The existing meters have been determined to be acceptable by PWB. Depending on the scope of building improvements, it may be acceptable for the existing water meters to remain as-is. Backflow prevention (BFP) retrofits should be anticipated. It may be necessary to install a new premise isolation reduced pressure principle BFP near the point of entrance to the site.

- Assessment / Scope of Improvements: Due to the age of the domestic water service, and evidence of poor drinking water quality in the buildings, it is anticipated that replacement of the on-site domestic water piping will be included in the project. All of the fire services are functioning per PWB's standards and are anticipated to remain.

Natural Gas:

- Master Plan Report: The Master Plan Report (MPR) prepared by DOWA includes a brief summary of the existing natural gas services for the site. The following information represents additional findings during the subsequent investigation and the anticipated scope of improvements.

- Per NW Natural records, there are four active natural gas services to the site.
    - 3" gas service from the 4" gas main in NE Irving St. to the north building wall just east of the Auditorium wing.
    - Gas service of unknown size from the 4" gas main in NE Irving St. to the "C" wing.
    - Gas service of unknown size from the 2" gas main in NE 15th Ave. to the "D" wing.

  - Gas service of unknown size from the 4½" gas main in NE 12th Ave. to the old gym wing.

- It is expected that the existing gas services will be adequate for the proposed redevelopment of this site.

Stormwater:

- Master Plan Report: The Master Plan Report (MPR) prepared by DOWA includes a brief summary of the existing stormwater management systems for the site. The following information represents additional findings during the subsequent investigation and the anticipated scope of improvements.

- Existing System: Based on as-built record information provided by PPS, stormwater from the majority of the site is collected and discharged to the public combined sewer system at the discharge points described under the Wastewater / Combined Sewer section below. There are no known underground injection control (UIC) systems located on the main school site. However record drawings show three drywell UICs located in the adjacent parking lot to the southeast; approximately 16' deep. A search of the Oregon Department of Environmental Quality (DEQ) UIC Database indicates there is one registered UIC for the facility. It is unknown if this UIC is one of those located in the parking lot.

  For scoping, it should be assumed that some of the existing drywells do not comply with current DEQ pretreatment standards, and will need to be upgraded and retrofitted with the redevelopment project.

- Evaluation / Assessment of Existing Systems: Although much of the existing storm drain pipe is over 80 years old, the pipes may still be in good condition. In order to fully assess the condition and performance of the existing system, pipe cleaning and in-line video inspection is recommended. Window well and stair well drains should be cleaned and video inspected to ensure positive drainage. If video inspection shows existing pipes to be in good condition, it is expected that a significant portion of the existing pipe can remain intact. TV inspections should be conducted with an electromagnetic locator probe, with locations marked on the ground surface and incorporated into the survey.

- Potential Drainage Issues: Custodial staff had no knowledge of existing drainage problems at the site. Further investigation will be required following review of topographic survey.

- Applicable Standards: Portland stormwater management standards will apply to all redevelopment areas on the site. Stormwater management standards may also be triggered for existing impervious surfaces depending on the degree of comingled drainage between redeveloped and existing areas. The stormwater management standards require onsite vegetated stormwater treatment and onsite surface infiltration facilities to the maximum extent feasible. If surface infiltration is infeasible, vegetated surface treatment with subsurface infiltration is required to the maximum extent feasible. If infiltration facilities are not feasible, onsite detention with discharge to the combined sewer is allowable. For the purpose of preliminary scoping, it should be assumed that all redeveloped vehicular areas will include vegetated surface treatment and onsite infiltration systems. Redeveloped roof and pedestrian plaza areas are generally exempt from vegetated treatment, and can be assumed to drain directly to underground infiltration or detention systems.

- Infiltration and Site Soils: Evaluation pending geotechnical investigation of the site. There are currently no records available of previous geotechnical study, and soil mapping for the area does not include information on infiltration rates or permeability. Based on Portland Bureau of Environmental Services sump capacity data, deeper soils (25' depth) are expected to have moderate infiltration rates. A geotechnical investigation, infiltration testing, and groundwater investigation will be necessary to evaluate the suitability of soils for infiltration.

  If onsite infiltration is determined to be feasible, it is expected that vegetated surface treatment with overflow to subsurface infiltration systems will be necessary due to space constraints.

- Underground Injection Control (UIC) Systems: In the context of this report, UICs are underground stormwater disposal systems such as drywells or soakage trenches. UIC's are subject to federal regulations and are permitted through Oregon DEQ. As noted above, 3 known drywell UICs are present onsite. Further coordination with DEQ and PPS will be necessary to understand the status and level of compliance of the existing UICs. PPS is in the process of gaining approval from DEQ for an area-wide WPCF UIC permit, to obtain permit coverage for UICs at all schools. Once approved, the WPCF permit will define monitoring, sampling, analysis, and associated reporting requirements for UICs on a district-wide basis.

- Columbia South Shore Wellfield Wellhead Protection Area: Project is outside of protection area.

- Flood Zone: Project is outside of flood zone.

- Assessment / Scope of Improvements:
  - General: It is assumed that existing piping within new building areas will be fully removed and replaced. Refer to the Plumbing assessment for piping within existing building areas. For non-building areas, it is assumed that the existing piping will remain intact to the maximum extent feasible, pending the outcome of cleaning and video inspections.
  - Roof Drainage: The majority of existing roof drainage is routed in-building to one of the discharge points to the combined sewer. It is assumed that the majority of existing building roof to remain will be routed in a similar manner, with piping replaced as needed. Roof drainage from new building areas will be routed to new onsite infiltration or detention facilities. For budgeting purposes, it should be assumed that approximately (10) 48" diameter, 30' deep drywells will be required for roof drainage.
  - Parking Lot, Plaza, and Landscape Areas: Based on the current concept plan, the project will redevelop the majority of the hardscape and softscape onsite. Drainage from redeveloped vehicular pavement is expected to receive treatment through new vegetated treatment facilities, such as vegetated infiltration swales, basins, or planters. Drainage from redeveloped landscape and pedestrian plaza areas is expected to drain directly to underground infiltration facilities, without undergoing vegetated treatment. For preliminary budgeting, it should be assumed that vegetated stormwater infiltration facilities will be placed at numerous locations around the site, with a total facility

footprint of approximately 5,100 square feet. It should be assumed that approximately 15 new drywells will be required to provide onsite infiltration for landscape, plaza, and parking areas. It should be assumed that the 3 existing drywells will be reused, with each drywell being cleaned and tested. If any of these drywells do not meet the infiltration requirements and can't be brought to compliance, they will be decommissioned by cleaning each drywell and then filling with concrete or controlled density fill.

Wastewater / Combined Sewer:

- Master Plan Report: The Master Plan Report (MPR) prepared by DOWA includes a brief summary of the existing wastewater services for the site. The following information represents additional findings during the subsequent investigation and the anticipated scope of improvements.

- Existing System: Based on as-built information and City records, there are four connections from the site to the public combined sewer system:
    - 8" combined sewer lateral from the Gymnasium Wing to the existing public 30" combined sewer in NE 12th Ave. This lateral collects wastewater, roof drainage, and window well drainage from the Gym Wing.
    - 12" combined sewer connection from the Auditorium Wing to the existing public 24" combined sewer in NE Irving St. to the north. This lateral collects wastewater, roof drainage, and window well drainage from the Auditorium Wing.
    - 12" combined sewer connection near the northeast corner of the Auditorium wing to the existing public 24" combined sewer in NE Irving St. This lateral collects wastewater, roof drainage, and surface drainage from the remainder of the site.
    - 6" combined sewer connection from the KBPS station building to the existing public 10" combined sewer in NE 15th Ave. This lateral collects wastewater and roof drainage from the KBPS building.

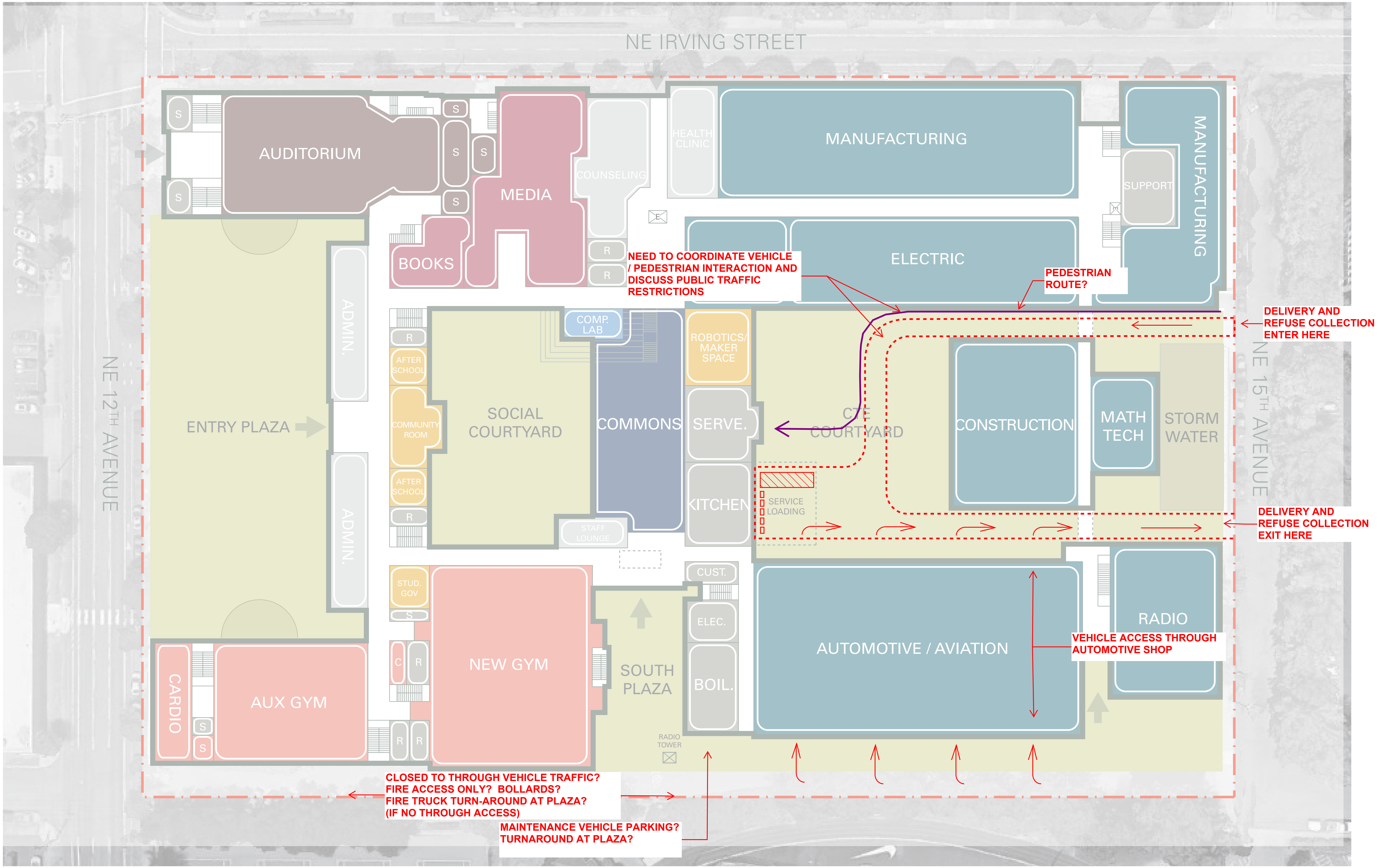
- Assessment / Scope of Improvements: The existing 24" and 30" public combined sewers are expected to have adequate capacity for the existing and proposed conditions. Redevelopment is expected to reduce wastewater flows through water efficient fixtures. The condition of the existing private sewer pipes is unknown. TV inspection is recommended prior to completing the design. Trenchless pipe rehabilitation can be used to extend the design life of the pipe. Based on the lack of trees on the site, root intrusion is expected to be minimal.

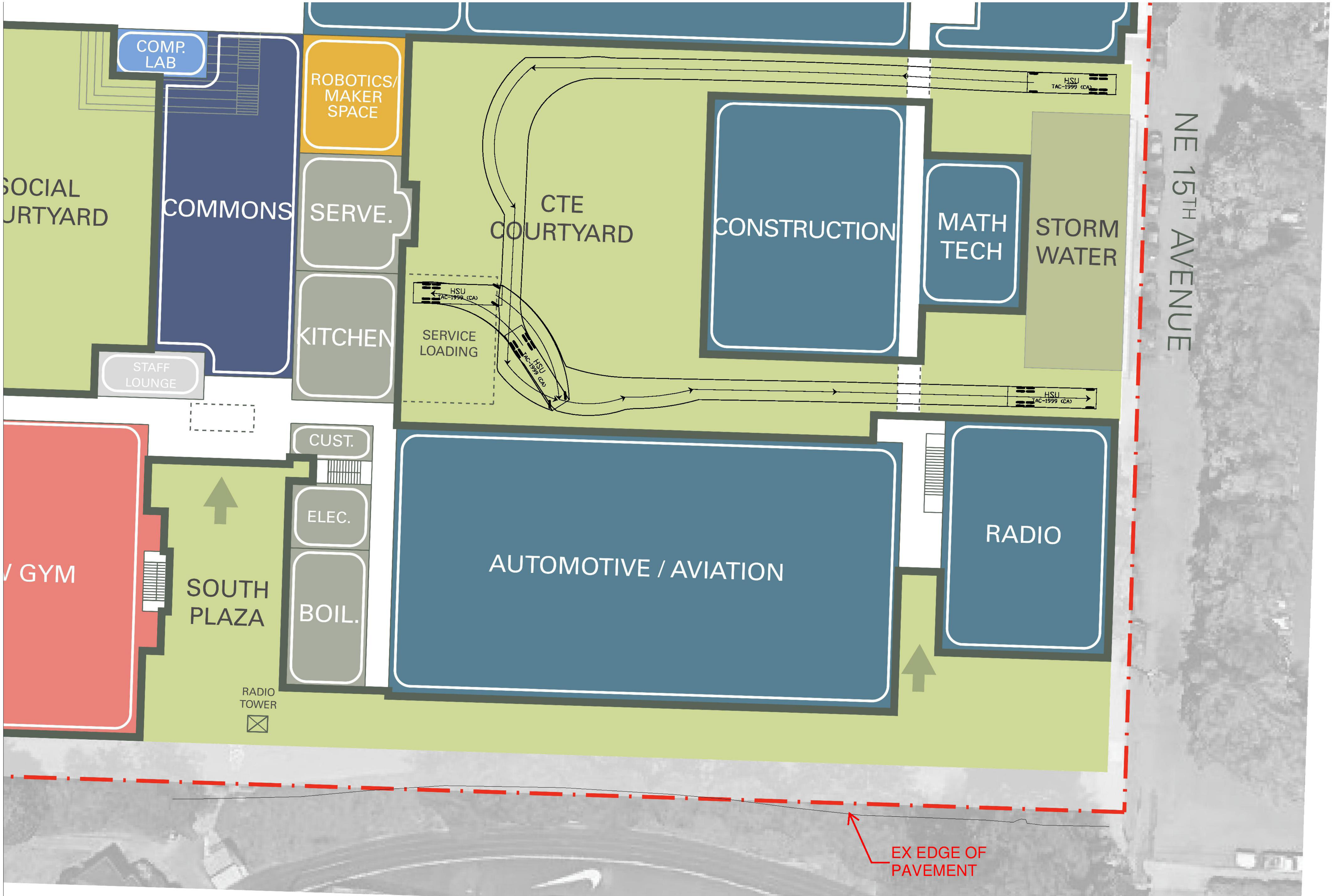
  It is assumed that the majority of wastewater piping will be routed in-building to the existing 12" lateral that currently serves most of the site. Replacement of any sewer piping within the central courtyard is expected.

Potential Environmental Issues:

- Record documents indicate the presence of two abandoned heating oil tanks on site, in the central parking lot. DEQ records indicated there was a leaking underground storage tank (LUST) reported during decommissioning. It is not known if this was related to either of these tanks;

but the status of the LUST record is “Closed”. It is recommended that PPS retain an environmental consultant to perform a Phase I Environmental Site Assessment (ESA).


NE IRVING STREET
NE 12TH AVENUE
NE 15TH AVENUE
AUDITORIUM
MEDIA
BOOKS
COUNSELING
HEALTH CLINIC
MANUFACTURING
MANUFACTURING
SUPPORT
ELECTRIC
ADMIN.
ADMIN.
ENTRY PLAZA
AFTER SCHOOL
COMMUNITY ROOM
AFTER SCHOOL
SOCIAL COURTYARD
COMP. LAB
COMMONS
ROBOTICS/ MAKER SPACE
SERVE.
KITCHEN
STAFF LOUNGE
CTE COURTYARD
SERVICE LOADING
CONSTRUCTION
MATH TECH
STORM WATER
RADIO
STUD. GOV
NEW GYM
SOUTH PLAZA
CUST.
ELEC.
BOIL.
AUTOMOTIVE / AVIATION
CARDIO
AUX GYM
RADIO TOWER
NEED TO COORDINATE VEHICLE / PEDESTRIAN INTERACTION AND DISCUSS PUBLIC TRAFFIC RESTRICTIONS
PEDESTRIAN ROUTE?
DELIVERY AND REFUSE COLLECTION ENTER HERE
DELIVERY AND REFUSE COLLECTION EXIT HERE
VEHICLE ACCESS THROUGH AUTOMOTIVE SHOP
CLOSED TO THROUGH VEHICLE TRAFFIC? FIRE ACCESS ONLY? BOLLARDS? FIRE TRUCK TURN-AROUND AT PLAZA? (IF NO THROUGH ACCESS)
MAINTENANCE VEHICLE PARKING? TURNAROUND AT PLAZA?



Scale: 1"= 40' 03/30/17

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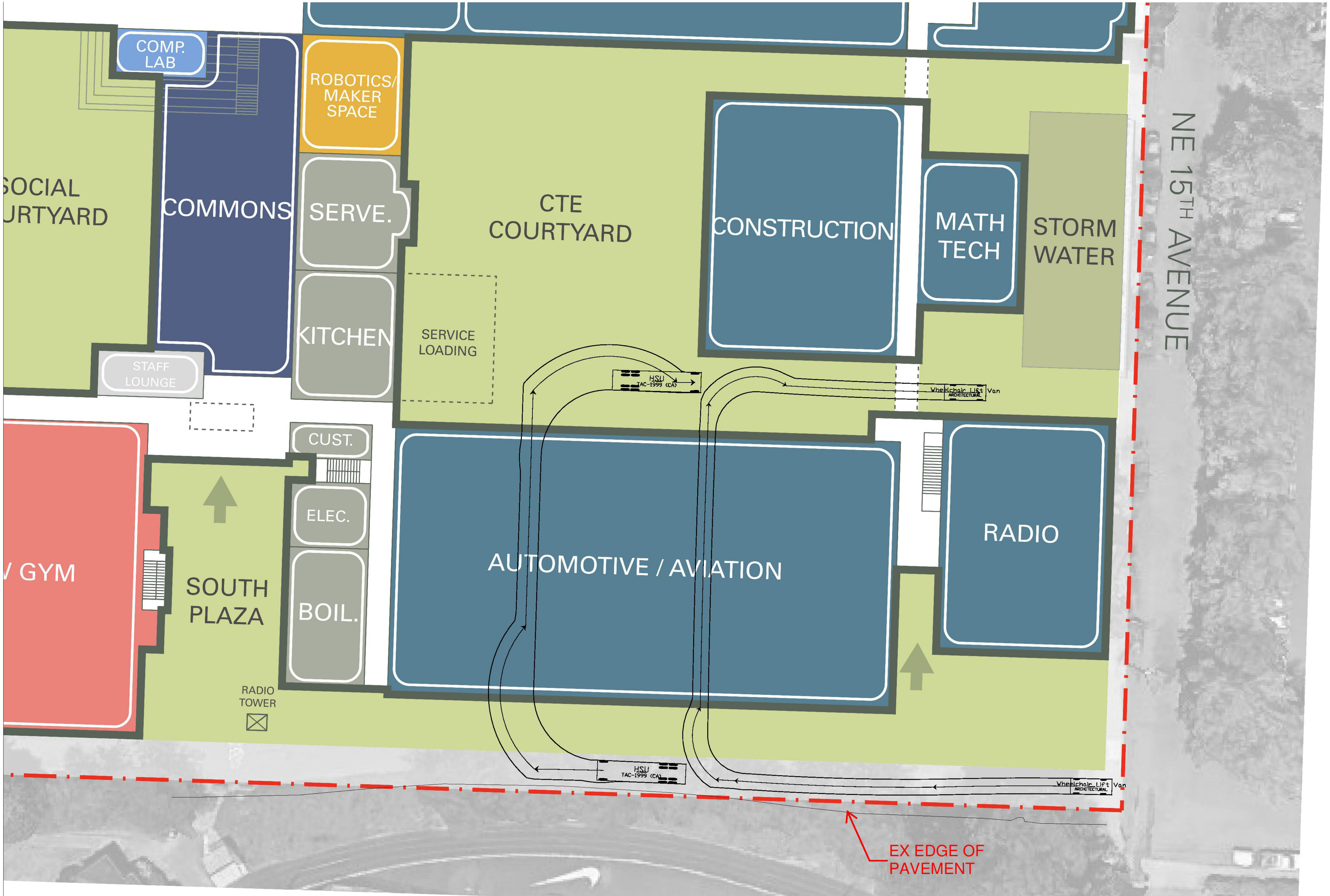
MILK DELIVERY TRUCK ACCESS TO LOADING AREA



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BENSON POLYTECHNIC HIGH SCHOOL

LARGE AND MEDIUM VEHICLES ACCESS TO AUTO SHOP BAYS

B. LANDSCAPE

Site Assessment

As is discussed in the 2016 Master Plan Draft Report, Benson's exterior spaces and facilities are limited in size and are primarily vehicular oriented. The western facing open sided forecourt is the largest outdoor area that is not accessible to vehicles. Due to the large elevation change, the front door of the school is also not accessible to those with disabilities. The space is underused and the circulation, above and beyond ADA, does not serve desirable connections. Other than a tiny pedestrian courtyard, the central exterior spaces and southern edge of the school are primarily drive aisle or parking lot, creating hazardous navigation for both vehicles and pedestrians. While the auditorium has a clear though not accessible entry, visitors have difficulty finding the entry to the gyms. There is one narrow non-ADA site connection between the school and Buckman Park, where all the outdoor athletic facilities are located. As the synthetic turf field is also the emergency gathering location, this substandard condition makes egress hazardous. Site bike parking is inadequate, consisting only of five racks in the tiny interior courtyard.

The site vegetation is limited to lawn, Rose Princess roses and over-large shrub species. An automatic irrigation system is not present on site. The lawn receives minimal maintenance and is mowed infrequently. Weeding and rose care is accomplished by volunteers. Due to safety concerns, PPS facilities staff periodically cuts the large shrubs almost to the ground. There are many large camellia specimens throughout the site which add Spring color though people have slipped on rotting petals. The sloped planted area between the school and the park is covered in English ivy, a nuisance plant. There are no trees on site though there are perimeter street and park trees.

Scoping Statement

West Forecourt

The west forecourt will be comprised of an entry sequence to the main school entry, secondary pedestrian connections, paved use spaces and daylighting for lower building levels. The entry sequence to the main entry of the building will be enhanced to provide ADA accessibility along main desire lines and will include improved plaza use spaces while maintaining its historic symmetry and grandeur. Secondary connections will improve circulation to other building entries with a focus on the athletics entry. The lower levels of the north and south wings will have adjacent sunken courtyards, improving natural illumination of the spaces within and creating contiguous outdoor areas for programs such as the daycare. The Rose Princess roses will be reinstalled along with the various memorials and student gifts.

Social Courtyard

The central courtyard will be dedicated to collaborative learning and socializing through a mixture of outdoor spaces. An extension of the adjacent very transparent interior Commons, this exterior space will be subdivided into various areas with porous connectivity from many directions. A larger plaza adjacent to the Commons will accommodate activities such as outdoor dining, group studying, presentations and larger class events such as exhibits or performances. A portion of this space may be covered allowing use throughout the year. Other smaller use spaces throughout the courtyard can be used for small group gathering, outdoor classrooms, gardening, studying and experimenting among others. Special consideration will be taken to address the varied microclimates inherent in an internal courtyard. Sustainable practices will be incorporated to the extent possible throughout this space to support experiential learning.

CTE and Service Courtyard

The CTE courtyard will be likewise multifunctional, geared towards outdoor work space, material delivery and building services such as waste pick-up and school supply and cafeteria deliveries. A small amount of short term parking may be located in this area. Most of the space will be paved to provide the greatest flexibility for the varied types and scopes of student projects. Additionally, the paved area will accommodate the varied vehicle traffic including access in and out of the automotive/aviation wing on the south. Stormwater facilities will be incorporated in key locations. The courtyard will be secured by fencing and gates at the two western openings between the buildings.

South Edge

The south edge of the site will serve the dual function of fire lane and pedestrian promenade. Limited and controlled vehicular access will be allowed to the automotive/aviation wing and is proposed, pending PBOT review, to connect through to 12th Avenue. Otherwise the promenade will be gated to control vehicular access thereby reducing vehicular/pedestrian conflicts. This space will be augmented with plantings and upgraded paving. Additionally, an entry plaza adjacent to the main gym and Commons will aid with wayfinding and will promote an improved connection to between the school and the Buckman Field Park.

Parking Lot and Pedestrian Connections to Buckman Park

As is mentioned in the original Masterplan report, the parking lot to the SE of the school is currently not code compliant, with limited tree and shrub planting and no stormwater mitigation. It is likely, due to the space constraints on the main campus, that this will be where the Contractor mobilizes and as such will need to be rebuilt at the end of construction in a code compliant manner.

The hillside and its connections between the school and Buckman Park, a majority of which is located on Portland Parks and Recreation property, is currently not included in the modernization project. The PPS portion of the hill will likely be impacted by fire lane construction. As has been mentioned in the existing conditions report, the pedestrian connection to Buckman Park for both emergency egress and daily use is inadequate and not ADA compliant. Due to the importance of this area in daily use and in emergencies, PPS should consider working with PP&R to improve it in the near future. Improvements should include widened pedestrian connections from multiple locations, including ADA connections from both the school and the parking lot.

C. HISTORIC ARCHITECTURE

Architectural Resources Group

Architecture
Planning
Conservation

Historic Resource Assessment

Benson Polytechnic High School

Prepared for

Portland Public Schools and Bassetti Architects, P.S.

Prepared by

Architectural Resources Group, Inc.
Portland, Oregon

Revised, April 2017

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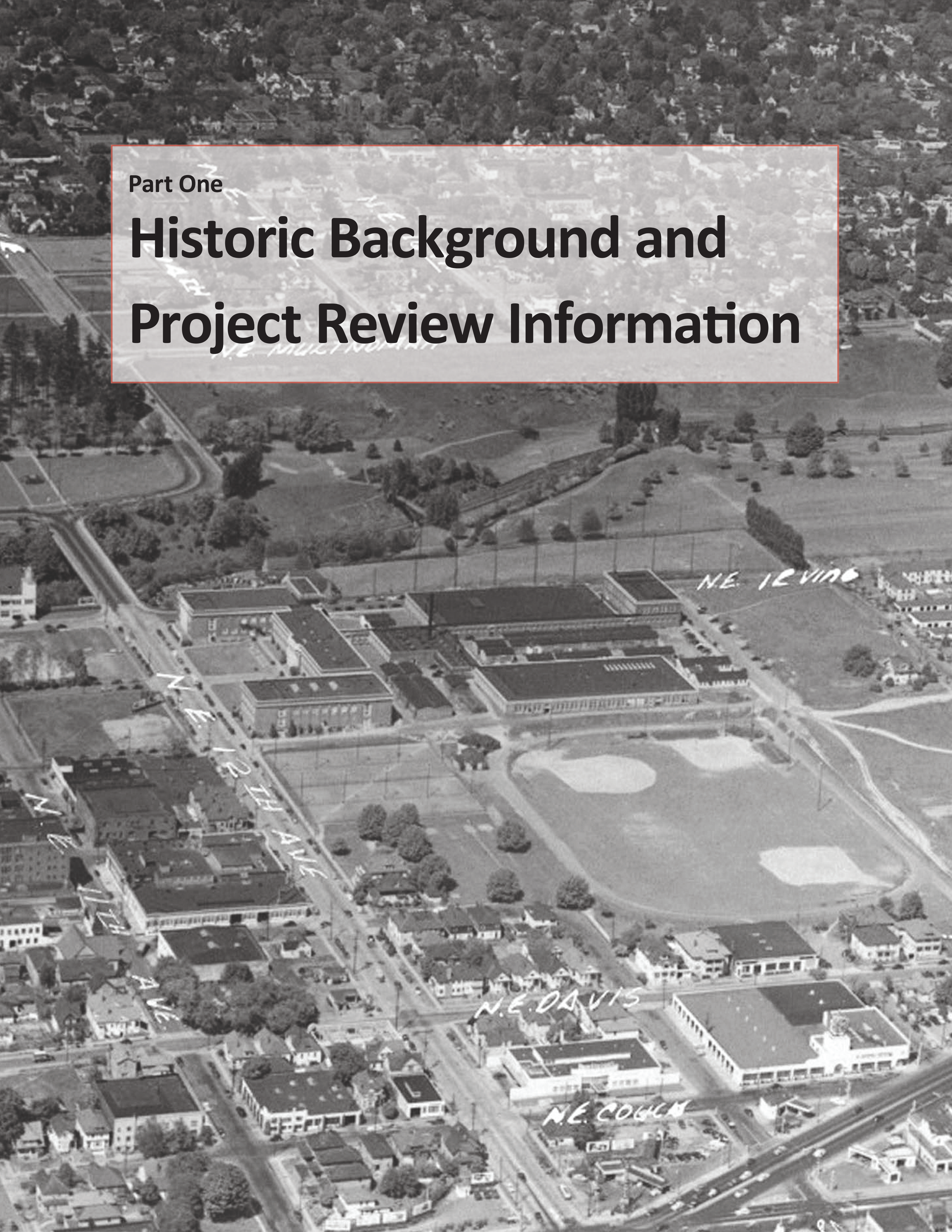
Historic Background and Project Review Information

PART II

Conditions Assessment and Repair Recommendations

Part One

Historic Background and Project Review Information



1.1 Introduction

At the request of Bassetti Architects, Architectural Resources Group (ARG) has prepared this Historic Resource Assessment (HRA) for Benson Polytechnic High School (BPHS) in Portland, Oregon. The HRA is intended to serve as a baseline reference regarding significance and condition of Benson Polytechnic High School's historic features, as well as a "preview" of anticipated historic review processes.

Part 1 of the HRA includes: (1) a summary of the school's historic significance; (2) a summary of alterations made to the school; (3) a description of the school's character-defining features; (4) a description of the anticipated historic review processes with the City of Portland and the State Historic Preservation Office (SHPO); and (5) a discussion of which aspects of the existing facility will likely be the primary focus of the historic review.

Part 2 of the HRA consists of a conditions assessment of the school's historic features. This assessment includes descriptions and photos of typical deteriorated conditions, repair and maintenance recommendations, and general quantities, which can be used to calculate a rough estimate of the cost and skilled labor needed to address identified deficiencies.

To complete this report, ARG conducted (1) one site visit of BPHS in November 2016 to note and photograph interior and exterior architectural features, site features and visible alterations. ARG also reviewed existing information regarding the historic significance and condition of the school, with special focus on three documents:

- DOWA – IBI Group Architects, Benson Polytechnic High School Master Plan Report, Sept 2016.
- Entrix, Benson Polytechnic High School Oregon Historic Site Form, June 2009.
- F. A. Naramore, Benson Polytechnic School (original architectural drawings), 1916-1930.

1.2 Summary of Significance

BPHS is located in the Kerns neighborhood of northeast Portland at 546 NE 12th Avenue. The school consists of multiple, connected buildings. The oldest buildings date from 1917-1929 and were designed in the Classical Revival style by Floyd Archibald Naramore, who served as architect and superintendent of school properties for PPS from 1912 to 1919.[1] The construction of BPHS was part of a larger building program undertaken by PPS in response to the city's growing population and to changing approaches to education. In 1915, retired logging magnate Simon Benson donated $100,000 to the City for the creation of an industrial arts school. Construction began the following year.

During his tenure as architect and superintendent of schools for PPS, F. A. Naramore designed 16 schools for the district, including the Kennedy School. Naramore went on to develop several schools in the Seattle area before establishing a series of private architectural partnerships in Seattle. In 1943, Naramore co-founded the firm of Naramore, Bain, Brady & Johanson which, as NBBJ, would grow into one of the largest architecture firms in the world in the second half of the twentieth century.

[1] The gymnasium (1925) and auditorium (1929), which were included in Naramore's architectural plans for the site, were actually completed. under the guidance of Matthew O'Dell, Naramore's successor at PPS.

Entrix completed an Oregon Historic Site Form for BPHS in 2009, as part of a district-wide historic building assessment project completed for PPS. According to this form, BPHS appears to be eligible for listing in the National Register of Historic Places (NRHP) under Criterion A (Events/Pattern of Events) for its association with the development of east Portland and with the expansion of higher education, especially industrial arts education in the 1910s. The school also appears significant and under Criterion C (Architecture/Design) as the work of a master architect and a significant example of the extensible school building type.[2] ARG concurs that BPHS appears NRHP-eligible under Criteria A and C, and adds that the Naramore/O'Dell buildings also appear significant under Criterion C as representative examples of public buildings designed in the Classical Revival style.

The Oregon Historic Site Form that Entrix completed for BPHS in 2009 does not identify a period of significance for BPHS. Based, however, on the school's significance (summarized above in Section 1.2), ARG has concluded that BPHS's period of significance extends from 1917 to 1929, corresponding to the years during which architect F.A. Naramore's plan for the school was implemented. Later construction, beginning with Buildings E1 and H in 1953, adhered neither to Naramore's plan nor to the Classical Revival style of the original campus.

Entrix divided BPHS's component buildings into three categories based on significance:

Contributing High Significance

- Building A (1917)
- Building B (1929)
- Building C (1925)

Contributing Moderate Significance

- Building G (1917)
- Building J (1918)
- Building K (1917)

Non-Contributing

- Building D (1991)
- Building E (1917/1953/1991)
- Building F (1964)
- Building H (1953)
- Building L (1991)

[2] Entrix, Benson Polytechnic High School Oregon Historic Site Form, June 2009, 3-4. Entrix noted that BPHS may also be eligible under Criterion B (Persons) for its association with the philanthropy of Simon Benson, a contention that was beyond the scope of the current effort to substantiate.

ARG concurs with these significance classifications, with the single caveat that the hallway along the eastern wall of Building E2, which dates to 1917 (north half)/1918 (south half) should be included in the “Contributing Moderate Significance” category. ARG does not agree, however, with the classification in DOWA's Master Plan of buildings F and H as “Contributing Low Significance.” They were built outside BPHS’s period of significance and should be considered non-contributing. (Entrix found the buildings non-contributing in its 2009 survey.) These significance classifications are summarized on the following site map.

1.3 Summary of Major Alterations

Timeline of Major Building Construction

1916	Administration Building (Bldg A) & Boiler Room (Bldg E2) constructed
1917	North Shop Wings (Bldg G & K) constructed
1918	South Shop Wing (Bldg J) constructed
1925	Old Gymnasium (Bldg C) constructed
1929	Auditorium/Cafeteria (Bldg B) constructed
1938	New Field and Track constructed
1950	Steel Radio Tower (RT) constructed
1953	Library Science Addition (Bldg E1) constructed
1953	Aeronautics/Automotive Shops (Bldg H) constructed
1964	New Gymnasium (Bldg F) constructed
1991	New Library (Bldg D) constructed
1991	Music Room (Bldg E2) constructed
1991	KBPS (Bldg L) constructed
1991	Covered Walkway constructed

Major Alterations by Building

All Buildings

1985	Exterior doors replaced / frames modified
1991	Fire safety system incorporated (sprinklers, fire-walls, etc)

Building A

1917	Construction of Administration Building completed
1953	Wood windows replaced with steel windows at courtyard as part of Library Science Addition
1986	Classroom doors replaced
1987	Roof replaced
1991	Corridor and lobby floor finishes replaced
1991	Administration offices layout altered
1997	Structural upgrades: clay tile walls and load-bearing walls reinforced
2002	Structural upgrades: roof and parapet reinforced and portico column strengthened

Building B

1929	Construction of Auditorium completed
1992	Cafeteria remodeled

Building C

1925	Construction of Old Gymnasium completed
1985	Classroom floor tile replaced
1985	Skylights replaced

Building D	
1991	Construction of New Library and Classrooms completed
Building E1 (West)	
1953	Construction of Library Science Addition completed
1991	Interior layout altered from library into classrooms
Building E2 (East)	
1917	Construction of Boiler Room completed
1975	East façade entry doors replaced
1991	Construction of Music Room completed
1991	Restrooms built
2004	Boiler and fuel system upgraded
Building F	
1964	Construction of New Gymnasium completed
Building G	
1917	Construction of North Shop Wing completed
1958	North Shop Wing layout altered
1958	Original wood columns replaced with steel pipe columns
1994	Roof replaced
1997	Structural upgrades: roof diaphragm added to wall ties
Building H	
1953	Construction of Aeronautics/Automotive Shops completed
Building J	
1918	Construction of South Shop Wing completed
1958	Original wood columns replaced with steel pipe columns
1960	South Shop Wing layout altered
1991	Journalism room altered
1997	Structural upgrades: roof diaphragm added to wall ties
Building K	
1917	Construction of North Shop Wing completed
1977	Interiors remodeled
1990	Roof replaced
1991	Covered walkway added
Building L	
1950	Construction of Steel Radio Tower completed
1991	Construction of the KBPS building completed
Fields	
1938	Construction of the Stadium and Track completed

1.4 Character-Defining Features

A *character-defining feature* is an aspect of a building's design, construction, or detail that is representative of the building's function, type, or architectural style.[3] Generally, character-defining features include specific building systems, architectural ornament, construction details, massing, materials, craftsmanship, site characteristics and landscaping within the period of significance. An understanding of a building's character-defining features is a crucial step in developing a rehabilitation plan that is consistent with the S*ecretary of the Interior's Standards for the Treatment of Historic Properties* by incorporating an appropriate level of restoration, rehabilitation, maintenance, and protection. To meet the Secretary's Standards, care needs to be taken to, wherever possible, preserve character-defining features, to repair instead of replace deteriorated features, and to replace-in-kind features that are too severely deteriorated to repair. (See Section 1.5.2 for specification of the *Secretary of the Interior's Standards for Rehabilitation.*)

Based on its 1917-1929 period of significance, BPHS possesses the following character-defining features. These features are based on discussion in the 2016 Master Plan and ARG site reconnaissance. Primary character-defining features should be the main focus of historic material retention efforts. Secondary character-defining features may be less central to the building's historic significance, but their retention where feasible can further underscore a building's historic character.

Building A – Main Building (1917)

Master Plan Status: Contributing High Significance

Exterior, Primary

- Two-story height
- Orientation towards NE 12th Avenue
- Brick cladding in running bond
- Symmetric façade
- Centrally located two-story entry bay:
    - Terra cotta portico with fluted Doric columns and frieze with four panels that depict an open book, a cog and two torches
    - Terra cotta *bas reliefs* depicting industrial arts activities
    - Panel above dentiled cornice with incised lettering
    - Three pairs of double-door openings with multi-light transom
    - Three eighteen-over-eighteen wood windows
- Paired twelve-over-twelve wood windows divided by two-story pilasters with terra cotta capitals
- Terra cotta cornice with dentils

Interior, Primary

- Primary entrance vestibule:
    - Paired stained wood Doric pilasters and paneled wainscoting
    - Three built-in display cases
    - Interior door openings with wood pediments (doors themselves are not original)
    - Three double-door openings on the west wall with multi-light transoms (doors themselves are not original)
    - Ceiling with stained wood dentil molding and box beams

[3] *Nelson, Lee H.* Architectural Character: Identifying the Visual Aspects of Historic Buildings as an Aid to Preserving Their Character. *Washington, D.C: Technical Preservation Services, National Park Service, U.S. Dept. of the Interior, 1988, 1.*

- First-floor corridors:
    - o Overall size and volume
    - o Walls with wood bases and wood panel trim
    - o Wood doors and openings with wood cases
    - o Wood display cases (along west wall of first floor corridor and in east-west hallways by the historic stairs on the first floor)
    - o Cast iron radiators
- Second-floor corridors:
    - o Wood-paneled opening to original library
    - o Five multi-light skylights with dentil molding
    - o Cast iron Radiators
- Two half-turn stairs:
    - o Overall size and volume
    - o Wood bases, handrails, wood trim, and curving, continuous wood half-wall caps with curtail details

Interior, Secondary

- Classrooms:
    - o Wood bases and wood built-in casework
    - o Original wood panel trim
    - o Built-in blackboards with wood and metal chalk rails
    - o Multi-light wood clerestory windows on the east corridor walls
    - o Horizontal five-light wood windows (in classrooms along the east façade)
    - o Twelve-over-twelve wood windows (in classrooms along the west façade)
- Partially glazed wood doors (at several classrooms)

Building B – Auditorium (1929)

Master Plan Status: Contributing High Significance

Exterior, Primary

- Two-story height with day-lit basement
- Rectangular plan
- Brick cladding in running bond.
- Two-story entry bay at west façade:
    - o Three sets of paired door openings with wood transom
    - o Terra cotta quoins, pilasters and details
    - o Three twelve-over-twelve wood windows
    - o Double-return concrete staircase with terra cotta balustrade
- At north and south façades, arched, multi-light steel windows (divided by two-story pilasters with terra cotta capitals) with terra cotta keystone details at the second level and square multi-light steel windows at the first level
- Large, multi-light wood windows on the north and south facades corresponding to the stairwell west of the auditorium space

- Pair of paneled doors along north façade with divided-light sidelights and transom
- Terra cotta cornice with dentils

Interior, Primary

- Auditorium:
    - Inclined concrete floor
    - Fixed wood theater chairs with aisles at center and along north and south walls
    - U-shaped second-level balcony
    - Stage at east end with arched apron and squared, paneled proscenium
    - Coffered ceiling with ornamental plaster cornice and beams, pendant light fixtures and painted metal grills
    - Wood wall bases and trim
    - Concrete pilasters
    - Multi-paneled wood and metal doors
    - Enclosed projection booth at west end of balcony
- Auditorium Lobby:
    - Terrazzo floor, bases and full-width steps to vestibule
    - Two ticket booths
    - Stained wood wainscoting
    - Stained wood Doric pilasters at corners of lobby landing
    - Three recessed double-door openings with multipaneled wood doors and wainscoting at the west wall of the auditorium
    - Detailed plaster cornice at ceiling
- Stairs:
    - Concrete bases, wood handrails, wood trim and half-wall wood caps
    - Large, fixed multi-light wood window at landing
    - Second-floor lobby
    - Concrete wall bases
    - Plaster wainscot with wood trim
    - Two sets of recessed, paired, paneled wood doors and two single paneled wood doors

Interior, Secondary

- Second-floor rooms:
    - Concrete floors with wood bases
    - Interior wood storm windows
    - Stained wood multi-paneled cabinets in the north wall of the north office

Building C – Old Gymnasium (1925)

Master Plan Status: Contributing High Significance

Exterior, Primary

- Two-story height and rectangular plan
- Brick cladding in running bond
- Window bays divided by brick pilasters with terra cotta capitals
- At the west wall, twelve-over-twelve wood windows with wood sills
- At the north and south walls, steel arched, multi-light windows with keystone details and awning sashes at the second story
- Terra cotta cornice with dentils

Interior, Primary

- Gymnasium:
    - Central open gymnasium space
    - Exposed brick walls
    - Banked athletic track at mezzanine with metal railing and recessed, arched door openings
    - Exposed metal roof truss supported by double-height pilasters
    - Three central gable roof skylights

Interior, Secondary

- Classrooms:
    - Wood or concrete wall bases
    - Wood panel trim and built-in casework
    - Built-in blackboards with wood chalk rails
    - Multi-light wood and metal doors
- Stairs:
    - Concrete bases, wood handrails, wood trim and and curving wood half-wall caps with curtail details
    - Large fixed multi-light wood window at landing

Building E2 (1917/1991)

Master Plan Status: East corridor – Contributing Moderate Significance; Remainder of building – Non-contributing/ Non-historic

Interior, Secondary

- East corridor with exposed brick wall, rowlock course cornice and fixed and hopper fan wood windows

Building G – North Shop Wing (1917)

Master Plan Status: Contributing Moderate Significance

Exterior, Primary

- One-story height and rectangular plan
- Brick cladding in running bond
- Terra cotta cornice
- Terra cotta-capped parapet
- At north elevation, twelve-over-twelve wood windows divided by pilasters with terra cotta capitals
- Multi-light wood transom and original hopper fanlights at south elevation

Building J – South Shop Wing (1918)

Master Plan Status: Exterior – Contributing Low Significance; Interior – Non-contributing/Non-historic

Exterior, Primary

- One-story height and rectangular plan
- Brick cladding in running bond
- Terra cotta cornice
- Wood hopper fanlights along north elevation

Building K – North Shop Wing (1917)

Master Plan Status: Contributing Moderate Significance

Exterior, Primary

- Two-story height and rectangular plan
- Brick cladding in running bond
- Terra cotta cornice
- Terra cotta-capped parapet
- Twelve-over-twelve wood windows divided by pilasters with terra cotta capitals at north elevation, east elevations and second story of south elevation
- Multi-light wood transom and original hopper fanlights at south elevation

1.5 Historic Review Process

1.5.1 City of Portland

BPHS is a designated local landmark, future projects at the school would be subject to historic review by the City of Portland's Bureau of Development Services (BDS). Specifically, the project would undergo a Type III Historic Resource Review, which would include review before the Historic Landmarks Commission (HLC). In seeking project approval, the Applicant must demonstrate compliance with the ten approval criteria specified in Section 33.846.060.G ("other approval criteria") of the Portland Planning and Zoning Code:

1. Historic character. The historic character of the property will be retained and preserved. Removal of historic materials or alteration of features and spaces that contribute to the property's historic significance will be avoided;
2. Record of its time. The historic resource will remain a physical record of its time, place, and use. Changes that create a false sense of historic development, such as adding conjectural features or architectural elements from other buildings will be avoided;
3. Historic changes. Most properties change over time. Those changes that have acquired historic significance will be preserved;
4. Historic features. Generally, deteriorated historic features will be repaired rather than replaced. Where the severity of deterioration requires replacement, the new feature will match the old in design, color, texture, and other visual qualities and, where practical, in materials. Replacement of missing features must be substantiated by documentary, physical, or pictorial evidence;
5. Historic materials. Historic materials will be protected. Chemical or physical treatments, such as sandblasting, that cause damage to historic materials will not be used;
6. Archaeological resources. Significant archaeological resources affected by a proposal will be protected and preserved to the extent practical. When such resources are disturbed, mitigation measures will be undertaken;
7. Differentiate new from old. New additions, exterior alterations, or related new construction will not destroy historic materials that characterize a property. New work will be differentiated from the old;
8. Architectural compatibility. New additions, exterior alterations, or related new construction will be compatible with the resource's massing, size, scale, and architectural features. When retrofitting buildings or sites to improve accessibility for persons with disabilities, design solutions will not compromise the architectural integrity of the historic resource;
9. Preserve the form and integrity of historic resources. New additions and adjacent or related new construction will be undertaken in such a manner that if removed in the future, the essential form and integrity of the historic resource and its environment would be unimpaired; and
10. Hierarchy of compatibility. Exterior alterations and additions will be designed to be compatible primarily with the original resource, secondarily with adjacent properties, and finally, if located within a Historic or Conservation District, with the rest of the district. Where practical, compatibility will be pursued on all three levels.

Design Advice Request (DAR)

ARG recommends that PPS plan to submit a Design Advice Request (DAR) to the Bureau of Development Services near the end of the Schematic Design (SD) phase. This will provide an opportunity to solicit project feedback from the Historic Landmarks Commission prior to submitting a Type III Historic Design Review. DARs are typically heard by the Commission at a public hearing a few weeks following submittal. (Commissioners do note vote on the project as part of a DAR.) A second DAR is allowed, without additional fees, within six months of the first hearing date. Design Advice Requests may be made for a project prior to or after a pre-application conference, but do not substitute for a required pre-application conference.

1.5.2 State Historic Preservation Office (SHPO)

Because BPHS has been found eligible for the NRHP, future projects at the school would require consultation with the State Historic Preservation Office (SHPO). Oregon Revised Statute (ORS) 358.653 obligates state agencies and all "political subdivisions" of the state—including counties, cities, universities, school districts, and local taxing districts—to consult with SHPO to avoid inadvertent impacts to historic properties for which they are responsible. Any property listed in the NRHP or eligible for listing in the National Register qualifies for consideration under this statute. As a practical matter, SHPO tracks compliance with this statute through a "lite" version of the process for a similar federal law, Section 106 of the National Historic Preservation Act.

Consultation with the SHPO is typically initiated during the pre-design phase and is closely coordinated with Portland's Historic Resource Review process. Coordination meetings occur at project initiation, at the end of major design phases, and typically terminate at the end of the Design Development phase at which time PPS submits Oregon Section 106 compliance paper work. Proposed work is not "approved" or "denied" through the consultation process with the SHPO. However, should the proposed new work pose potential adverse impacts to historic features, stipulations for mitigation may be placed on the project. Such mitigation would typically be memorialized through a Memorandum of Agreement (MOA) between PPS and SHPO identifying further communication and documentation during the mitigation process.

As stated on the Oregon SHPO website:

> Mitigation cannot, and is not intended to, fully compensate for damage to or the loss of irreplaceable historic buildings and places. Instead, mitigation is an opportunity for a federal agency to preserve and document the past for the public's education and appreciation....Good mitigation is project-specific, taking into account the current and future impact(s) of the project, and the needs of the local community.[4]

The Oregon SHPO website also describes types of mitigation that are often used to offset impacts to historic resources, including:

- Formal property documentation on SHPO forms, if not already completed
- Formal property documentation to standards of federal Historic American Building Survey (HABS), Historic American Engineering Record (HAER), or Historic American Landscape Survey (HALS)
- Completion of National Register nomination for subject property or related property
- Development of historical brochures, displays, interpretive panels or websites
- Development of management plan for continued use and maintenance of the historic resource

[4] Oregon State Historic Preservation Office website, "Example Mitigation for Adverse Effects," http://www.oregon.gov/oprd/HCD/SHPO/Pages/preservation_106_examplemitigation.aspx, accessed July 26, 2016.

In coming to conclusions regarding necessary mitigation, SHPO looks at the project as a whole to assess the overall level of change posed by the project. SHPO typically does not assign specific mitigation measures to specific project components.

Secretary of the Interior's Standards for Rehabilitation

Note that no mitigation would be necessary for any project that SHPO finds to be in conformance with the *Secretary of the Interior's Standards for Rehabilitation*, which are:

1. A property shall be used for its historic purpose or be placed in a new use that requires minimal change to the defining characteristics of the building and its site and environment.
2. The historic character of a property shall be retained and preserved. The removal of historic materials or alteration of features and spaces that characterize a property shall be avoided.
3. Each property shall be recognized as a physical record of its time, place, and use. Changes that create a false sense of historical development, such as adding conjectural features or architectural elements from other buildings, shall not be undertaken.
4. Most properties change over time; those changes that have acquired historic significance in their own right shall be retained and preserved.
5. Distinctive features, finishes, and construction techniques or examples of craftsmanship that characterize a property shall be preserved.
6. Deteriorated historic features shall be repaired rather than replaced. Where the severity of deterioration requires replacement of a distinctive feature, the new feature shall match the old in design, color, texture, and other visual qualities and, where possible, materials. Replacement of missing features shall be substantiated by documentary, physical, or pictorial evidence.
7. Chemical or physical treatments, such as sandblasting, that cause damage to historic materials shall not be used. The surface cleaning of structures, if appropriate, shall be undertaken using the gentlest means possible.
8. Significant archeological resources affected by a project shall be protected and preserved. If such resources must be disturbed, mitigation measures shall be undertaken.
9. New additions, exterior alterations, or related new construction shall not destroy historic materials that characterize the property. The new work shall be differentiated from the old and shall be compatible with the massing, size, scale, and architectural features to protect the historic integrity of the property and its environment.
10. New additions and adjacent or related new construction shall be undertaken in such a manner that if removed in the future, the essential form and integrity of the historic property and its environment would be unimpaired.

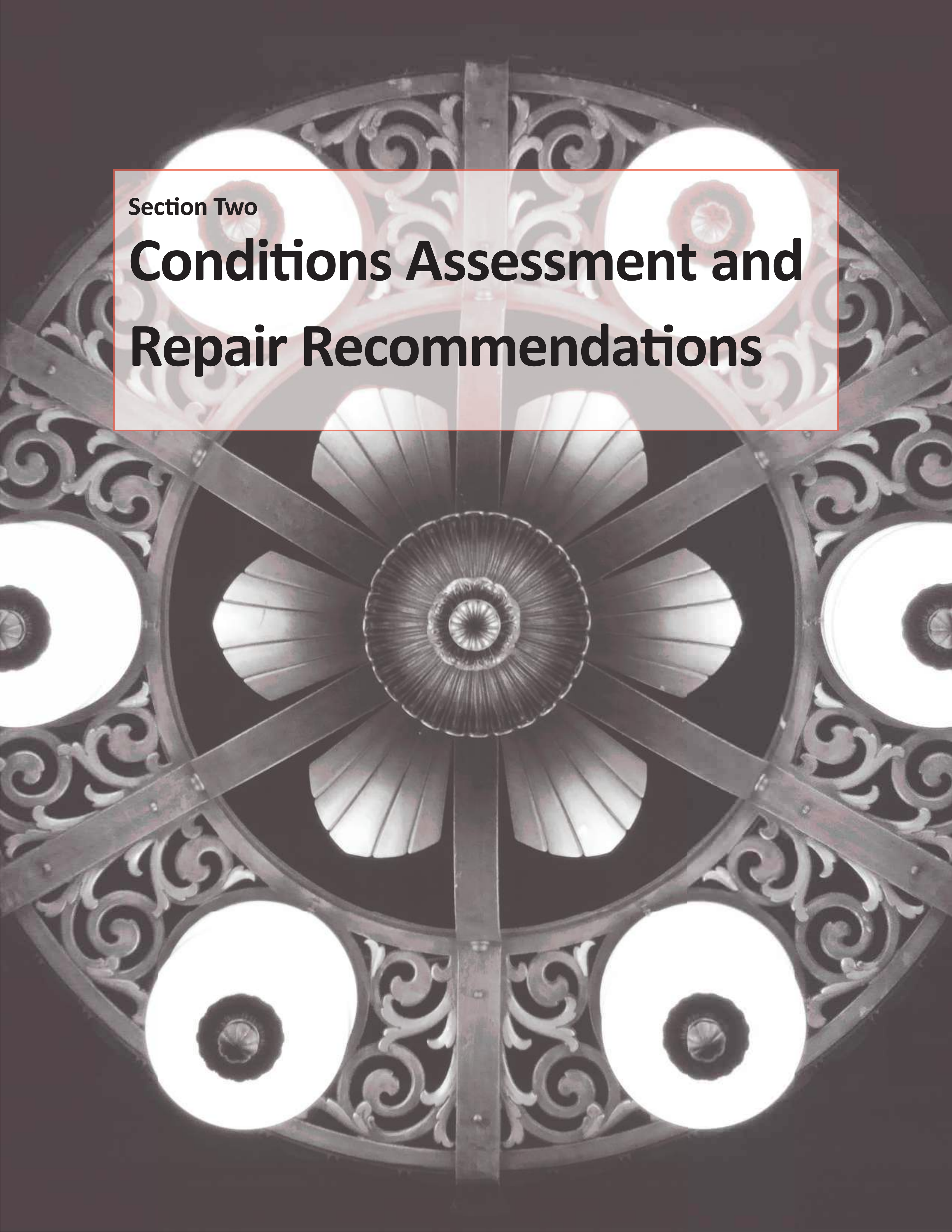
1.5.3 Recommendations Regarding the Future Renovation

The scope of the renovation of BPHS has not yet been finalized. Accordingly, we lay out below some general guidelines intended to simplify the historic review processes with the City of Portland and SHPO. Once a full renovation scope is developed, more specificity can be added to this discussion.

- Buildings A, B and C, especially their north-, west- and south-facing façades, should be preserved as the "face" of the historic school.
- Proactive maintenance and repair of the exterior of Buildings A, B and C is encouraged, and would be considered to be "mitigation" for purposes of the SHPO review. A robust conservation effort could partially or completely offset the need for additional mitigation. Similarly, replacing the historically inappropriate transom and sidelights at select locations of Buildings B and C could also be considered important mitigation.
- Preservation, or sensitive rehabilitation, of the school's most significant interior spaces – including the Building A lobby and corridors, the old gymnasium, the auditorium, and the auditorium lobby – is encouraged.
- Preserving the exterior façades of Buildings G, J and K, along with the east façade of Building E, is recommended. These buildings were constructed at the same time as Building A and share the main building's Classical Revival design. The interiors of these buildings have generally been modified over time and it is expected that additional alteration could be pursued without complicating the historic review process.
- Rooftop additions to Buildings G, J and K should be set back from the existing buildings' street-facing walls (as shown in Master Plan Concepts A, B and C). Rooftop additions should also be designed in a manner that they are compatible with the features and finishes of the historic buildings without directly copying them.

Section Two

Conditions Assessment and Repair Recommendations



2.1 Executive Summary

On November 10, 2016, Architectural Resources Group conducted an exterior and partial interior survey of the historic buildings on the Benson Polytechnic High School (BPHS) campus. The survey was limited to those buildings identified as “Contributing High Significance” (Buildings A, B and C) or “Contributing Moderate Significance” (Buildings G, J and K) in the 2009 historic assessment of the property completed by Entrix. The exterior survey was conducted from ground level, accessible building roofs, and other available vantage points. High-powered binoculars and telephoto equipment were used to assess upper stories. The goal of the exterior survey was to understand the nature and condition of architectural elements, and to develop preliminary repair and maintenance recommendations with approximate quantities in order to calculate a rough estimate of the cost and skilled labor needed to address identified deficiencies. The goal of the partial interior survey (Buildings A, B and C) was to understand the nature and condition of architectural elements and provide general preservation guidance.

The principle façades of most buildings on the BPHS campus are brick masonry with terra cotta ornament and a concrete foundation finished with a concrete parge coat. The exterior materials are generally in good condition with some localized damage including cracking, spalling and missing mortar. At the west elevation of the Main Building (Building A), five cornice units are cracked, one of which appear to be slightly displaced. Due to the location near the building entrance and above a sidewalk, the condition of these units should be considered hazardous and measures should be taken to inspect and stabilize or remove loose pieces. In addition the buildings should be cleaned of general soiling and biological growth.

Historic wood and steel windows are in good to poor condition, depending on their location. Original wood windows on the west façade of Building A and many of the original wood and steel windows at Buildings B and C are still intact and operable but in poor condition.

The roofs are past their useful life and should be replaced as recommended in DOWA's Master Plan. Most of the skylights are new, in good condition and can be retained. Building E2 retains ten (10) historic steel skylights with most of the historic wired glass intact, but they are in poor condition. Restoration would be costly so ARG recommends replacing them with new skylights to match the other new ones.

The interiors of Buildings A, B and C are mostly intact with modifications limited to new hardware, lighting and interior finishes. Interior condition issues are mostly due to general day-to-day wear. While it is understood that these interior spaces will undergo significant modification to accommodate necessary structural and MEP improvements, effort will be made to retain interior historic features where feasible.

2.2 Exterior Wall Materials Condition Survey

2.2.1 Methodology

An exterior survey of extant historic buildings on the Benson Polytechnic High School (BPHS) property was conducted on November 10, 2016. Buildings in the survey include the following:

Building A – Constructed 1917

Building B – Constructed 1929

Building C – Constructed 1925

Building G – Constructed 1917

Building J – Constructed 1918

Building K – Constructed 1917

The survey was conducted from ground level, available building roofs, and other accessible vantage points. High-powered binoculars and telephoto equipment were utilized for upper stories. On the day of the survey the weather changed from overcast to sunny, with a mean temperature of 57 degrees Fahrenheit.

Conditions were notated by hand on printed copies of original construction drawings and recorded with digital photographs. See Appendix A for elevation drawings related to exterior visual survey.

The goal of the survey was to understand the nature and condition of exterior architectural elements, and to develop preliminary repair and maintenance recommendations with approximate quantities in order to calculate a rough estimate of the cost and skilled labor needed to address these deficiencies.

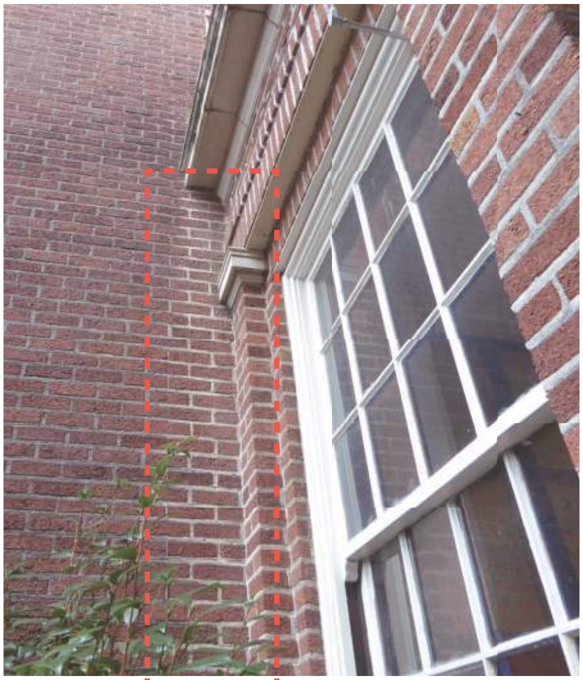
This report includes photos that illustrate typical deterioration conditions, repair treatment recommendations, and quantities for cost estimation purposes.

2.2.2 Description of Materials

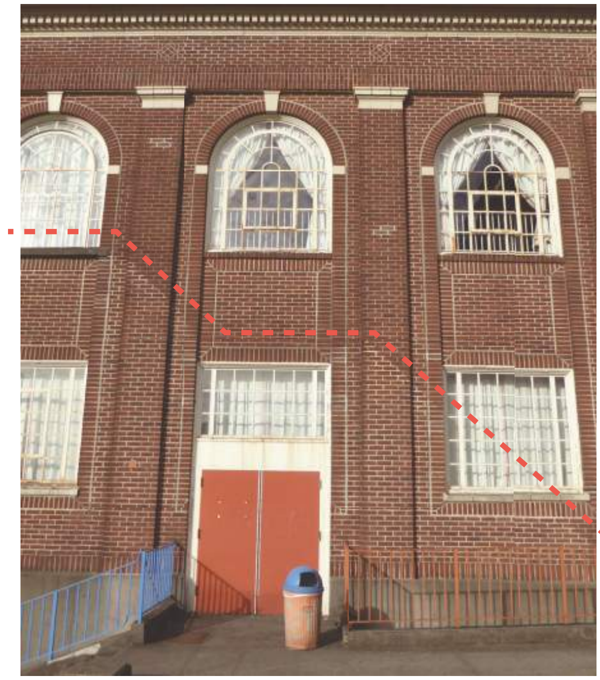
The principle facades of most buildings on the BPHS campus are brick masonry with terra cotta ornament. Terra cotta is used throughout for ornamental details including parapet copings, projecting cornices, pilaster capitals, keystones and window sills. It is used to clad and highlight prominent entrances on the west elevation, including the entrance portico of the Main Building ("A" Building), and the entrance façade and approach stairs to the Auditorium ("B" Building). It is also used for other ornamental features, such as the pediments over entrances to the Shop Wings ("G" and "J" Buildings). The base of the building is concrete finished with a concrete parge coat.

Brick & Mortar

Each of the six buildings surveyed shares a common architectural language, with material continuity in the brick-and-mortar construction. The same brick type was used between all six buildings, with some variation in bond. Bricks are rough-textured with visible aggregate inclusions. Pointing mortar originally exhibited a creamy white finish that most likely matched the coloring of the terra cotta ornament and window finishes; the creamy tone of the mortar is still apparent at protected areas such as directly below cornices (2.2.2/1) and where fire escape staircases were previously attached to Building B (2.2.2/2). Joints are wide, about finger-width, and slightly recessed.



2.2.2/1 Area of protected masonry that shows clean mortar joints.



2.2.2/2 Location where fire escape was removed at south elevation of Building B, showing clean mortar joints.

Concrete

All exterior stairs and walkways in the study area are poured-in-place concrete. Most staircases appear to be original. All buildings in the study area are constructed over concrete foundations; at some locations, such as along the downslope of Buildings B, C, and G, the concrete foundation sits above grade (2.2.2/3).

Parge Coat

A smooth gray parge coat is applied over exterior concrete walls and sills at several buildings in the study area, most extensively at Building B. Original drawings show that the foundation and lower register of ground-level exterior walls at Building B were clad with a layer of "Cement Plaster on Concrete." Later parge coatings have been applied on the exterior of infilled basement walls where windows have been removed (2.2.2/4).

Terra Cotta

Despite the varied construction dates of the buildings, the terra cotta appears to be the same or near the same color throughout. The glaze is off-white or cream in color (similar to limestone) with darker specks interspersed through (can be seen upon close inspection). The construction varies slightly from building to building, but in general the terra cotta units are installed over brick or hollow clay tile backup masonry. They are laid up with mortar, and most likely have metal anchors at the top and bottom of the units in order to tie them to the backup wall (a standard terra cotta construction method). Cornices are comprised of two separate units, including the upper larger unit which has a sloped top surface and projects approximately two feet out from the face of the wall; and the lower smaller unit which has egg-and-dart molding and dentil blocks. The larger projecting units are fastened back to the wall using small steel channels and anchor rods. Window bay openings are framed by brick pilasters with terra cotta capitals, and the masonry above the window is carried by steel lintels. Columns are comprised of fluted segmented units, anchored to a central structural core (most likely a steel column encased in concrete). The condition of all concealed fasteners and anchors is unknown at this time.

Photo 2.2.2/3 Above-grade foundation wall.

Photo 2.2.2/4 Window infill area.

2.2.3 Summary of Existing Conditions

Brick & Mortar

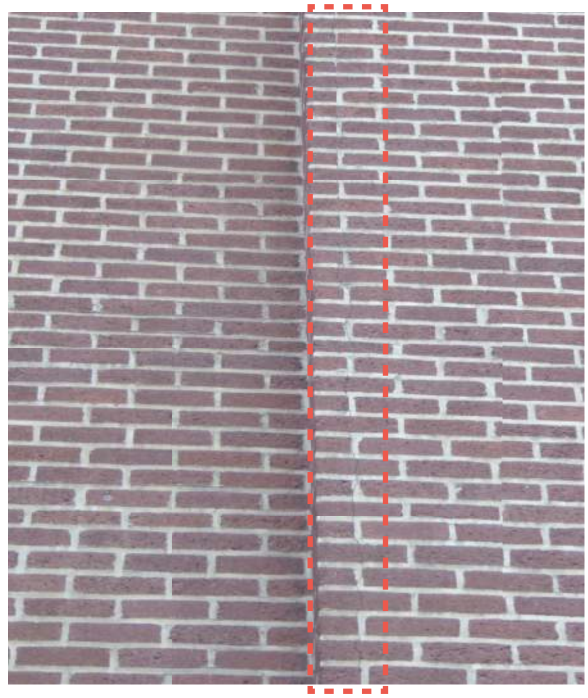
In general the historic brick and mortar at BPHS is in good condition. Soiling is ubiquitous and imparts a darker, grayer tone, particularly to the mortar joints. At areas where brick is more vulnerable to weathering, surfaces are rougher and aggregate more exposed. Biological growth is commonly seen along sills, the upper edge of soldier courses (2.2.3/1), in corners, and in larger surface areas where water is directed onto the face of the building, such as along the north elevation of Building G (2.2.3/2). Modifications to openings over the years have necessitated the use of non-original brick and mortar types for infill but in general these changes are compatible with the original materials (2.2.3/3), with a few exceptions. One structural crack was observed at the north elevation of Building B; the crack runs right through the brick coursing (2.2.3/4). Joint cracking was not widely seen but documented where observed for future investigation (2.2.3/5). While not seen much during the survey, graffiti appears to be a periodic issue as several "overcleaned" areas were observed, which is indicative of graffiti removal (2.2.3/6). A chalky white film was noted at some locations (particularly around windows on the east elevation of Building K and outside the upper passageway doors at the north side of Building C), which is most likely residue from chalkboard erasers being cleaned by banging them against the building (2.2.3/7).

Mortar joints are generally in good condition with isolated areas of loss, most commonly seen at locations where a soldier course abuts projecting sills and foundation walls (2.2.3/8); some of these horizontal joints have been filled with sealant. Sealant was also noted along the steel bracing at the upstairs passageway between Buildings A and C (2.2.3/9). Efflorescence is a common condition issue with brick construction but it is seen in only a few areas at BPHS. At one location, at the west facade of the passageway between Buildings A and C, heavy efflorescence salts are visible at mortar joints, along with extensive mortar loss and patching—combined, these conditions are suggestive of a systemic deficiency such as ongoing water saturation (2.2.3/10). A few non-historic penetrations such as wall ties and plumbing were noted throughout the survey area (2.2.3/11); conversely, several escutcheons are in place where light fixtures have been removed (2.2.3/12). The removal of several fire escapes at Building B has revealed unweathered masonry that for years was protected by the stair assembly (2.2.2/2).

2.2.3/1 Light biogrowth at soldier course.

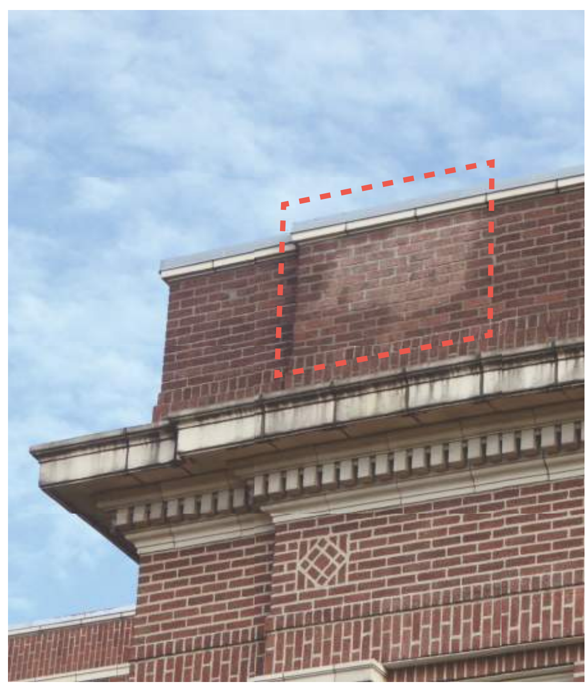
2.2.3/2 Heavy biogrowth where water is directed down the face of the building from a downspout above.

2.2.3/3 Area of brick infill, relatively compatible with existing.



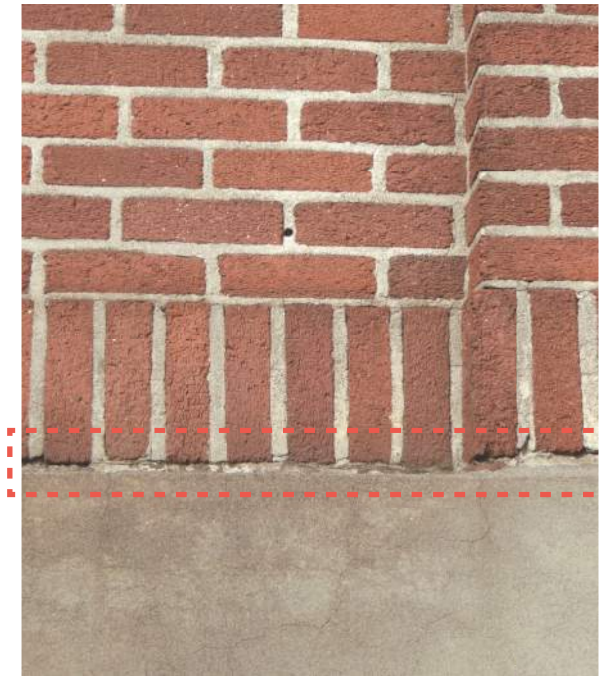
2.2.3/4 Long structural crack at north elevation of Building B.

2.2.3/5 Vertical crack at mortar joint.



2.2.3/6 "Overcleaned" graffiti.

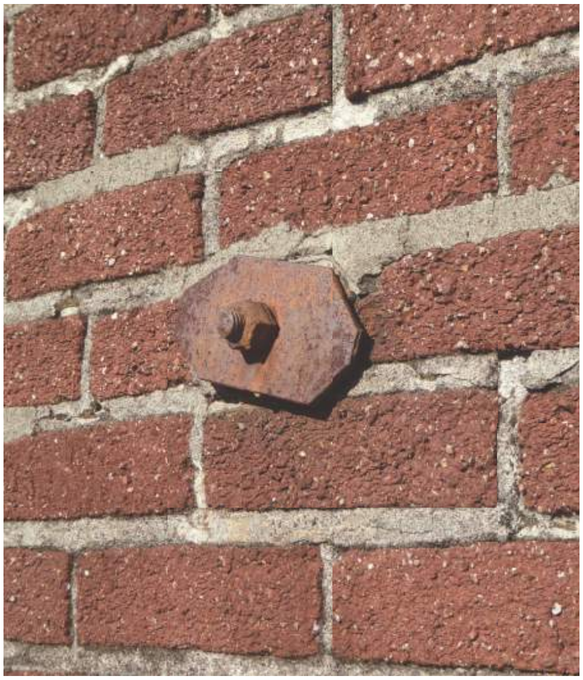
2.2.3/7 Chalk residue



2.2.3/8 Deteriorated mortar joint.

2.2.3/9 Dry/cracked sealant joint.

2.2.3/10 Area showing heavy efflorescence at mortar joints.



2.2.3/11 Steel wall tie at parapet of Building A.

2.2.3/12 Escutcheon cover where light fixture was removed.

Concrete

Many cracks at concrete steps and pavers were noted, which is unsurprising given the age of the material and site location in an area of high rainfall and heavy foot traffic (2.2.3/13 and 2.2.3/14). Some evidence of prior patching was noted, but many of these repairs have failed (2.2.3/15). At the west elevation of Building B, cracks in the foundation at the staircase show active water intrusion and may indicate structural deficiencies that warrant further investigation. Some cracks are more significant and may indicate structural issues, such as at the northwest corner of Building A (2.2.3/16) and in the foundation wall on the north elevation of Building B (2.2.3/17). A number of concrete spalls were also noted, with the highest occurrences at stair treads and sill edges. Cracks in building foundations are also present, but the full extent is not known due to the presence of a parge coat at many elevations. Exposed concrete displays a moderate level of atmospheric soiling; moss, lichens, and other biological growth are present at interfaces where concrete sills intersect with brick walls, at cracks, and at stair risers. Ferrous staining was observed along the sill of Building A's west elevation below leaking downspouts.

Parge Coat

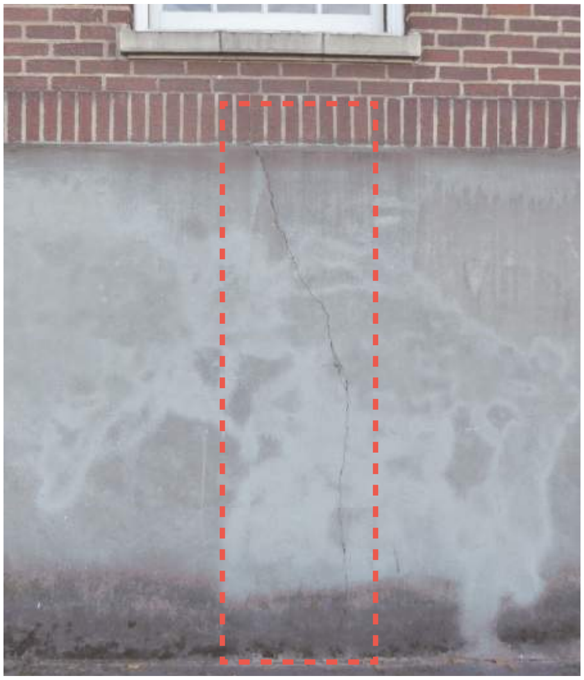
At building foundations and sills where a parge coat is present, older plaster is generally in poor condition, exhibiting networks of cracks (2.2.3/18 and 2.2.3/19). This is likely caused by a weakening of the bond between the parge and concrete substrate through building movement and moisture intrusion. Efflorescence is present at some crack locations (2.2.3/20); since crack repair should take place prior to exterior pressurized water cleaning, efflorescence should be rinsed away prior to crack injection repair. Cracks in the parge coat that are more substantial may be mirroring cracks in the concrete foundation which may be indicative of a larger structural issue. Cracking is also ubiquitous where windows have been removed from foundation walls and infilled (2.2.3/21).

2.2.3/13 Concrete spalls and cracking.

2.2.3/14 Cracks and biogrowth seen at walkway pavers.

2.2.3/15 Failed concrete patch at exterior stairs.

2.2.3/16 Structural crack in foundation at the NW corner of Building A.



2.2.3/17 Structural crack in foundation at the north side of Building B.

2.2.3/18 Superficial parge coat cracks.

2.2.3/19 Crack in concrete sill.

2.2.3/20 Cracks and efflorescence at parge coat.

2.2.3/21 Crack in parge coat following outline of window infill.

2.2.3/22: Heavy soiling, stains and biological growth at terra cotta cornice, Building C - north elevation.

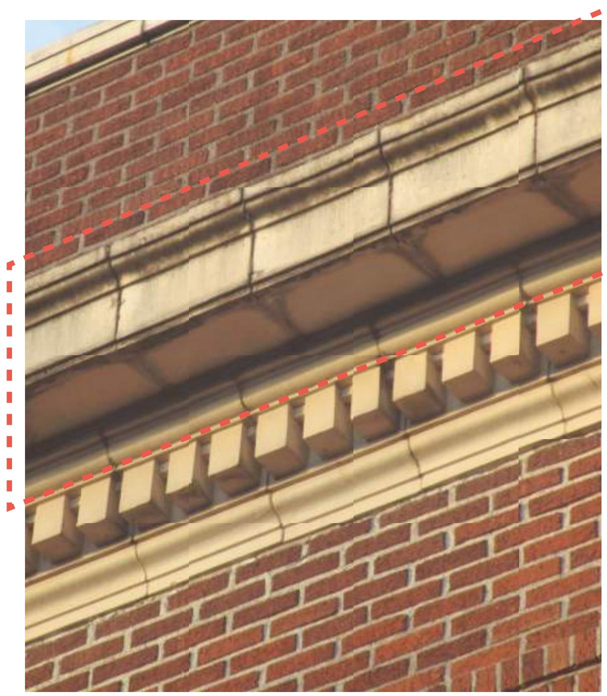
Terra Cotta

General Terra Cotta Conditions

In general, terra cotta surfaces are soiled throughout; this has resulted in an overall dulling of the color and gloss. Cornice units, and other specific areas such as the Auditorium entrance stairs, typically have much heavier accumulations of soiling, as well as stains and biological growth (2.2.3/22). Crazing of the glaze was observed at many terra cotta units (2.2.3/23). This was noted throughout all the buildings, but appears to be more predominant at the first floor level, in particular the window sill units.

Mortar joints are in fair to good condition overall, depending on the location. The mortar is relatively hard, cohesive, and most likely portland cement-based. It is typically more deteriorated and eroded at upward-facing joints, such as at copings, cornices and window sills. Mortar joints at the vertical face and underside of the cornice units are also eroded, most often with staining and glaze spalls at the unit faces to either side of the joints. At areas where water has migrated through deteriorated joints and infiltrated cornice units, there is typically an area of staining, glaze spalls and surface deterioration at the face of the terra cotta below (2.2.3/24-26).

2.2.3/23: Crazing at first floor window sill units, Building A - west elevation.



2.2.3/24: Eroded mortar and associated staining and glaze spalls at terra cotta cornice, Building C - north elevation.

2.2.3/25: Detail of eroded mortar and associated staining and glaze spalls at terra cotta pediment, Building E - east elevation.

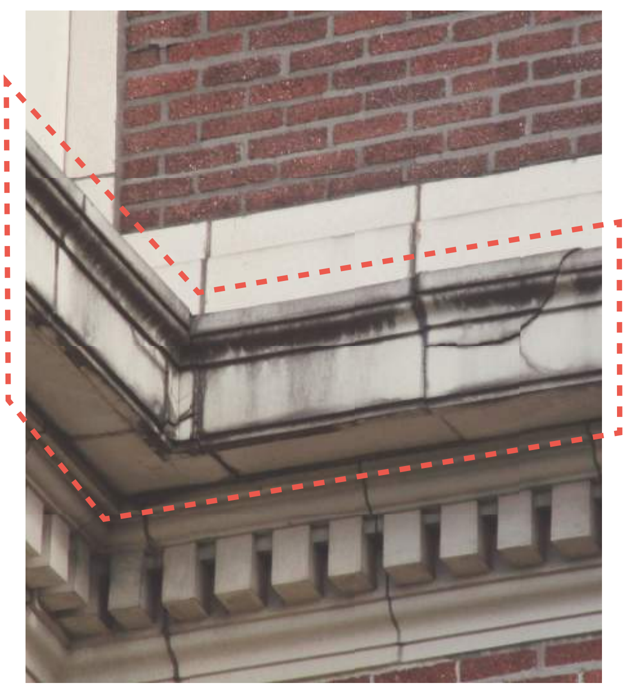
2.2.3/26: Detail of loose/spalling mortar at terra cotta stair wall, Building B - west elevation.

Localized Terra Cotta Conditions

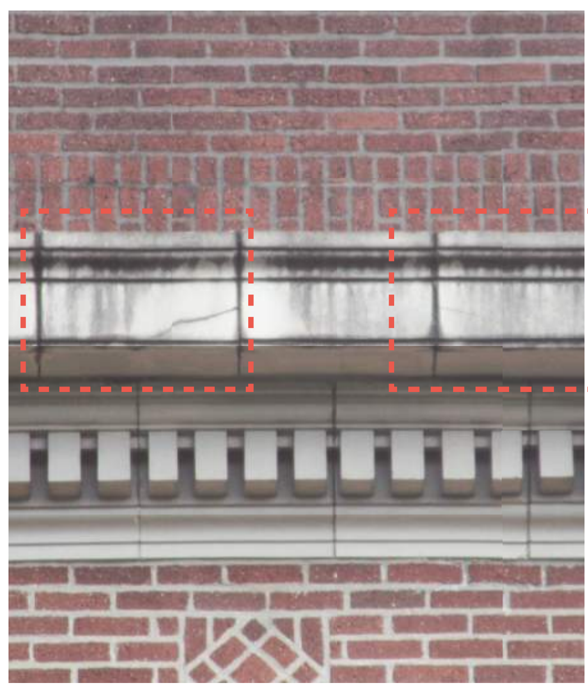
Several cracked terra cotta units were observed in localized areas. At the west elevation of the Main Building (Building A), five cornice units are cracked, one of which appear to be slightly displaced (2.2.3/27-28). Due to the location near the building entrance and above a sidewalk, these units should be considered hazardous and measures should be taken to inspect and stabilize or remove loose pieces. Additional cracked units were observed at the fluted column units (2.2.3/29), and at the attic portion of the porticoes of both the Main Building and Auditorium (Building B) (2.2.3/30).

Glaze spalls, chips and unit spalls were observed in many locations (2.2.3/31). These range from small nicked and chipped edges, to small losses of the glaze layer at the face, to larger losses some several inches deep into the terra cotta bisque. Much of this damage is located at ground floor level, near entrances and windows, and are often associated with damage from vandalism, use or modifications over time. In other cases, it is associated with water infiltration and thermal stresses (see Discussion section below for more information). Graffiti stains were noted in several locations around the campus. These tend to be at ground floor locations or near windows at upper levels.

The terra cotta damage is much more pronounced at the entrance steps to the Auditorium (Building B) at the west elevation (2.2.3/33-36). Many balustrade and wall units are cracked. There are chips and glaze spalls throughout, and some larger spalls at railing units. Soiling and biological growth is heavier here than in other areas, along with some graffiti. The concrete base and steps are cracked, with efflorescence noted. And the lower terra cotta wall units near the concrete base are crazed.



2.2.3/27: Three cracked cornice units at Building A - west elevation. Note unit on right is slightly displaced and possibly hazardous.



2.2.3/28: Two cracked cornice units at Building A - west elevation.

2.2.3/29: Cracks at fluted column unit, Building A - west elevation.

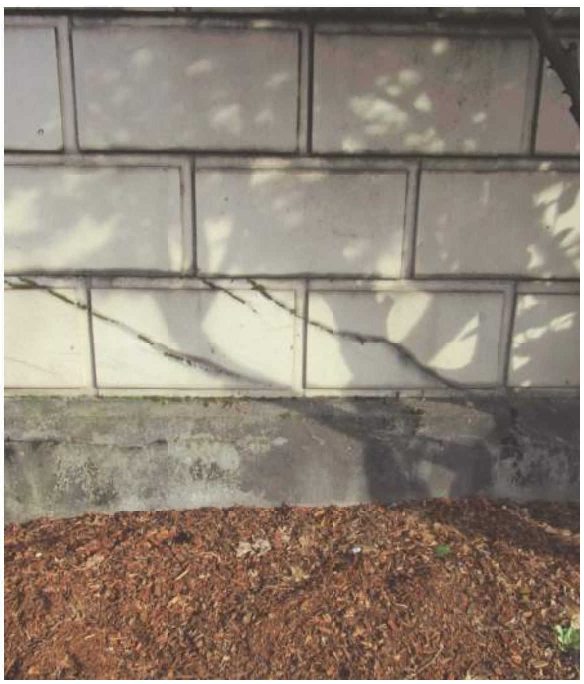
2.2.3/30: Two cracked cornice units at Building A - west elevation.

2.2.3/31: Chip losses and abraded edges at fluted column units, Building A - west elevation portico.

2.2.3/32: Large losses at terra cotta window sills, Building G - north elevation. Also note soiling and biological growth. Spall damage most likely related to vandalism.

2.2.3/33: Cracking, glaze spalls, heavy soiling and biological growth at stair balustrade, Building B - south elevation.

2.2.3/34: Large losses at terra cotta balustrade pier, Building B - west elevation.



2.2.3/35: Cracking, crazing, soiling and biological growth at stair wall, Building B - west elevation.

2.2.3/36: Glaze spalls at terra cotta stair wall, and cracking, water stains and efflorescence at concrete base, Building B - west elevation.

2.2.4 Maintenance & Repair Recommendations

The recommendations outlined in this section are intended to provide enough detail for general cost estimation. For actual work implementation, formal project specification documents should be developed and submitted with approved construction design packages. The "repair keys" included in this section are reiterated in the repair quantity spreadsheet found in the Appendix.

Systemic Brick and Concrete Repairs

A. *Cleaning:*

a. Pressurized Water

The buildup of atmospheric soiling on exterior architectural features suggests that the BPHS campus does not appear to have been cleaned for some time, if ever. It is therefore recommended that a comprehensive exterior cleaning take place as part of the proposed construction project. The reasons for this go beyond aesthetic improvements: soiling and other accumulations can conceal and even exacerbate material deterioration. By removing these buildups, the true condition of underlying building materials can be properly assessed. Hot pressurized water will have more cleaning impact than cold water, but is not necessary. Historic buildings must be cleaned with great care and lower water pressure, as their materials tend to be softer and more vulnerable.

Recommendations:

1. Select an area(s) for mockup and execute treatment for project team review following recommendations outlined in steps 2-4.
2. Set up drainage capture for water runoff.
3. Install temporary protections to protect landscaping and fragile materials.
4. Exterior Masonry (all levels/elevations): Hot or cold pressurized water wash at no more than 600 psi. Note: Open mortar and sealant joints should be repaired prior to cleaning to avoid driving pressurized water into wall cavities. Pressure should be lowered or cleaning avoided altogether if masonry surface is heavily deteriorated, cracked, or fragile and water pressure may exacerbate the condition. Prior to cleaning, perform a visual survey of exterior elevations to identify these areas ahead of time, and protect them as appropriate. *(Repair Key: Cl)*
5. Concrete Stairs and walkways: Hot or cold pressurized water wash at no more than 600 psi. Note: Open mortar and sealant joints should be repaired prior to cleaning to avoid driving pressurized water into pavers and stair assemblies. *(Repair Key: Cl)*

b. Architectural Biocide

In wet climates such as the Pacific Northwest, it is common for accumulations of moss, lichens, and other biological growths to colonize architectural elements and proliferate through the wet winter months. In addition to altering the appearance of a building, these growths can have a deleterious effect on building materials by slowly eroding the surface grains of stone, brick, concrete, and mortar. Spongier growths will saturate and hold moisture for long periods of time, and larger plant growths with strong root systems can lead to cracking and displacement of building materials. Therefore it is important to eradicate these colonizations as much as possible, and there are a number of products on the market designed for use on older buildings that are sensitive to historic materials. While an exterior cleaning with hot pressurized water will be effective at removing much of the biological plant matter, application of post-cleaning topical biocides will ensure that bacterial residue is effectively culled. Recolonization is inevitable, so a regular schedule of inspection and maintenance should be established.

Recommendations:
1. Select an area(s) for mockup and execute treatment for project team review following recommendations outlined in steps 2-3.
2. At surfaces where biogrowth is thinner, such as below downspouts along the north elevation of Building G: Cleaning with overall biocide treatment followed by low-pressure cold water rinse. *(Repair Key: B_Cl)*
3. At surfaces where biogrowth tends to be spongier and thick or is actively growing out of cracks in concrete, such as along the west staircase at Building B: Remove plant material with nylon brushes and/or plastic scrapers before hot pressurized water cleaning treatment is carried out. Water and/or biocide may aid in bio-growth removal. *(Repair Key: B_Cl)*

Localized Brick and Concrete Repairs

A. *Localized Brick Repair:*

By far the most common deterioration type for brick at BPHS is surface weathering. Fortunately this is a natural condition that does not generally impact the material performance. Isolated locations of brick cracking, spalls, and incorrect reinstallation were noted and should be repaired. Areas where brick is cracking should be inspected for structural soundness; this is because general settling tension is typically absorbed by the mortar joint. If a crack extends through multiple courses of brick, there could be an underlying structural problem that should be addressed holistically. It is important to repair brick spalls because the fireskin (outer layer of brick) is a protective membrane. If exposed, the substrate material is more susceptible to weathering and erosion.[5] If bricks remain onsite from prior demolitions and they match existing brick units, these should be used for any replacement work. In some cases, the replacement work will comprise removing and reinstalling the same brick, as the work will focus on installing a more compatible pointing mortar (2.2.4/1).

Recommendations:
1. Cracks: For a crack extending through multiple courses of brick, consult structural engineer. If no structural repairs are deemed necessary, repair in conjunction with mortar crack repair at same location. Inject appropriate flowable injection grout into crack. Color should match brick as much as possible. Fill to surface, ensuring material does not drip across masonry face. *(Repair Key: B_CR)*
2. Spalls: If more than 40% of brick is missing, consider replacing in kind. Spalls smaller than ½-inch square should be left alone. For spalls larger than ½-inch square, brush out loose material, or apply compressed air. If spall is at edge of a brick unit, install a wood screed in the mortar joint. Provide a mechanical key for patching materials by drilling ½-inch diameter holes spaced two inches apart and minimum 1-inch deep. Wet area to be patched. Patch with an appropriate patching material, such as Jahn M 100, and apply according to manufacturer's specifications. Remove wood screed after patch is firm. *(Repair Key: B_PR)*
3. Replacement: At locations where bricks have been removed and reset with inappropriate/sloppy pointing mortar, carefully remove unit by hand using chisel and mallet. Support and protect masonry surrounding removal area. Clean area to be repointed, removing traces of incompatible mortar. If possible, remove incompatible mortar from face of brick to be reinstalled. Alternatively, use a compatible replacement unit or turn the existing brick around so that the opposite face is presented. Lay brick into filled bed, buttering ends with sufficient mortar to fill head joints and shove into place. Maintain joint width to match existing. Repoint new joints in repaired area to comply with requirements for repointing existing masonry. *(Repair Key: B_Rpl)*

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[5] This is why sandblasting is so harmful—it removes the fireskin, which will lead to the rapid deterioration of remaining material.

2.2.4/1 Brick unit needing to be removed and reinstalled with new mortar.

2.2.4/2 Mortar deterioration at parapet terra cotta unit joints.

B. *Localized Mortar Joint Repair*

It is important to maintain masonry joints in order to keep the building envelope free from moisture intrusion beyond the intended water vapor transmission performance. The mortar joints surveyed at BPHS are generally in very good condition, but some isolated areas of cracking and deterioration were noted. Cracks should be filled with a flowable cementitious grout (such as Jahn M 40 or M 30 Injection Grout) that is compatible with existing mortar. Broken and open mortar joints should be cleaned out and repointed with a compatible mortar mix that is pigmented to match existing historic joints and executed with the same joint profile. The repointing mortar should be appropriate for use with historic masonry; too often, masonry joints are repointed with hard mortars with high Portland cement content. Over time, this will lead to deterioration of the brick because moisture is not able to move through the cementitious joints and instead works its way out through the softer and more vulnerable brick. Type N mortar is recommended.[6] Note: Because the survey was conducted from ground level, the parapet masonry was not visible due to the projecting terra cotta cornice. A close view of the south parapet of Building A was observed from the roof of Building F (2.2.4/2), which showed a higher percentage of mortar deterioration, biogrowth, soiling, and repair than the mortar joints at the first and second levels. Therefore the repair quantity for above-cornice mortar joints is expected to represent a higher volume per square foot than elsewhere on the project site.

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[6] National Park Service, U.S. Department of the Interior, Technical Preservation Services, Preservation Brief 2: Repointing Mortar Joints in Historic Masonry Buildings, Published October 1998. Link: https://www.nps.gov/tps/how-to-preserve/briefs/2-repoint-mortar-joints.htm

Recommendations:

1. Broken and open mortar joints at vertical surfaces: Remove loose material and clean recess with compressed air and water. Repoint mortar joints with custom-mixed Type N mortar, match color and profile to historic appearance. *(Repair Key: JR)*
2. Cracked mortar joints at vertical and horizontal surfaces: Inject flowable cementitious grout into crack. Color should match cleaned mortar as much as possible. Fill to surface, ensuring material does not drip across masonry face. For mortar cracks larger than hairline in width, joint should be repointed. *(Repair Key: M_CR)*
3. Broken and open mortar joints at horizontal surfaces (such as concrete stairs and pavers): Repointing of mortar joints with custom-mixed Type N mortar, match color to adjacent concrete. (Repair Key: JR)
4. Sealant repair: Replace sealant joints at all areas of failure, except at locations where joints should be repointed with mortar. *(Repair Key: Slnt)*

C. Localized Concrete Repair

a. Stairs and Walkways

Pedestrian pathways and stairs can present trip/fall hazards if not properly maintained. Cracks and spalls should be filled and patched, and plants and other types of biological growth should be removed. If more than 25% of the unit is broken or missing, consider replacing in kind. All repairs should be monitored and maintained.

Recommendations:

1. Cracks: Cracks narrower than ¼-inch wide should be carefully cut to a depth of ¾-inch and a width of ¼-inch using a hand-held grinder. Clean crack with compressed air and wet with water. Mix patching mortar according to manufacturer's specifications. Color should match cleaned concrete as much as possible. Fill crack with mortar; if crack is deeper than ¾-inch, build up mortar in layers. The repaired crack should be flush with face of adjacent concrete. *(Repair Key: C_CR)*
2. Spalls: Remove loose concrete. If more than 40% of paver is missing or if paver is severely cracked and out of the plane, consider replacing in kind. Concrete spalls should be patched with a compatible cementitious mortar. To prepare for patch, cut back spall to create square edges with a slight undercut. Roughen surface of patch area for a better bond. Remove loose material and wet surface. Mix and apply patching mortar according to manufacturer's specifications. If patch is larger than 24 square inches, install stainless steel anchors into concrete and set with epoxy before filling with patching mortar. Patch should be flush with face of adjacent concrete. *(Repair Key: C_PR, C_PR_AR, C_Rpl)*
3. Biogrowth: If surface of concrete exhibits moss or other biogrowth, or if biogrowth has colonized in cracks and spalls, remove using an architectural biocide before repairing concrete. Refer to the Architectural Biocide information in the Cleaning section, above, for further information. *(Repair Key: B_Cl)*

b. Foundation Walls

Cracks in foundation walls that extend deeper than the parge coat should be reviewed by a structural engineer. For parge coat cracks, refer to the parge coat repair section, below. *(Repair Key: F_CR, P_PR)*

D. Localized Parge Coat Repair

All parge coat locations should be inspected prior to exterior cleaning so that loose material and cracks can be repaired. Inspection should include sounding the surface of the coating to identify loose and debonded areas. For cracks that may be telegraphing through the parge coat from the concrete foundation wall, it will be important to inspect the condition of the concrete once the parge crack has been widened in preparation for repair. Many existing patches have failed and should be removed and replaced.

Recommendations:

1. Hairline cracks: If parge coat is cracked but still securely in place, cracks should be filled with grout. Inject flowable cementitious grout into crack. Color should match cleaned parge coat as much as possible. Fill to surface, ensuring material does not drip across masonry face. At areas where cracking aligns with former window outlines, inspect infill material to ensure it is securely in place before proceeding. If parge coat is cracked and coating is debonded from surface of substrate, carefully remove loose section and patch as appropriate per recommendations below. *(Repair Key: P_CF)*
2. Larger cracks: Cracks narrower than ¼-inch wide should be carefully cut to a width of ¼-inch using a hand-held grinder, down to the concrete substrate. Inspect concrete foundation substrate; if crack extends into concrete, consult a structural engineer before proceeding. If crack is limited to parge coat only, clean crack with compressed air and wet with water. Mix patching mortar according to manufacturer's specifications. Color should match cleaned parge coat as much as possible. Fill crack with mortar; if crack is deeper than ¾-inch, build up mortar in layers. The repaired crack should be flush with face of adjacent surface. *(Repair Key: P_CR)*
3. Spalls: Parge coat spalls should be patched with a compatible cementitious mortar. To prepare for patch, remove loose parge material until edges of sound material are reached. Cut edges of existing material so they are perpendicular to the vertical substrate surface. Roughen surface of patch area for a better bond. Remove loose material and wet surface. Mix and apply patching mortar according to manufacturer's specifications. If patch is larger than 24 square inches, install stainless steel anchors into concrete and set with epoxy before filling with patching mortar. Patch should be flush with face of adjacent concrete and textured to match. *(Repair Key: P_SP, P_SP_AR)*
4. Incipient spall repair: It may be possible to reattach loose and debonded sections of parge coat using pins or countersunk fasteners. If identified, these sections should be inspected by an architectural conservator to determine the most appropriate repair for individual conditions. *(Repair Key: PA)*
5. Patch repair: Carefully remove failed patch so as to not damage or detach surrounding parge coat plaster. Inspect concrete foundation substrate and consult a structural engineer if deficiencies are noted. To patch, follow procedure in Item 3, above. *(Repair Key: P_PR)*

Localized Terra Cotta Repair

Recommendations:

1. Remove localized deeper soiling, stains and graffiti with light-duty chemical cleaners. (Cleaning mockups will be required.) *(Repair Key: L_TC_Cl)*
2. At identified hollow/un-sound units (from further up-close inspection), stabilize units and re-anchor to backup masonry with stainless steel anchors (e.g. helical anchors). Install anchors through the face of the terra cotta to a minimum depth to engage the backup wall, inset a minimum ½-inch and patch anchor holes. Prior to work, test for adequate pull-out strength. *(Repair Key: TC_AR)*

3. At cracked units to remain, stabilize sections of unit to backup masonry with anchors as noted above, and repair crack with flowable crack filler or grout. Visually blend crack repair with custom color-matched surface treatments (see below). *(Repair Key: TC_AR, TC_CR)*
4. At superficial chips and glaze spalls (less than ¼-inch deep), apply latex-modified re-profiling mortar (e.g. Edison Coatings Thin Fill 55 or similar). Mortar to be custom color-matched to the existing terra cotta glaze. Hand-apply paints as required to recreate the stippled texture. *(Repair Key: TC_GR)*
5. At larger unit spalls (more than ¼-inch deep but less than 16 inches square in size), prepare surfaces and patch with a latex-modified patching mortar (e.g. Edison Coatings Custom System 45). Mortar to be custom color-matched to the existing terra cotta glaze. Hand-apply paints as required to recreate the stippled texture. Prior to patching, cut back damaged area of terra cotta units as required to provide key and good bond surface for the mortar repair. (Note: In general, larger spalls at overhead public locations to be replaced with new units rather than patch repairs, due to potential for future fall hazards should the patch fail over time.) *(Repair Key: TC_PR, TC_GR)*
6. Remove and replace selected terra cotta units that are cracked, spalled, or otherwise damaged, and cannot be stabilized using the repairs noted above. Replace units in kind with new terra cotta units to match the existing in size, form, color, and finish. Prior to reinstallation, repair and/or parge backup masonry as required. Repair, prime and paint or replace as required any metal anchors or underlying steel supports. Install new units with galvanized or stainless steel anchors. New matching terra cotta units are available from two suppliers within the United States: Gladding McBean Terra Cotta and Boston Valley Terra Cotta. *(Repair Key: TC_Rpl)*

Localized Cleaning Treatments (for all exterior brick, concrete, and terra cotta materials)

A. Ferrous Staining (No Repair)

Ferrous stains noted during the exterior survey of BPHS appear to be limited to the concrete sill along ground level at the west elevation at Building A. All stains are caused by active or formerly active faucet leaks, whereupon iron-rich water from inactive pipes drips onto the flat sill, leaving a stain. At least one of the faucets is still dripping and should be adjusted or turned off completely. The spigot is wrapped in blue tape with "N.I.U." written in pen, presumably to mean "Not in Use" (2.2.4/3). Pressurized water cleaning may eradicate some of the iron, but a poultice or oxalic acid treatment may be needed to effectively remove the staining. The iron won't harm the sill and runoff is unlikely to negatively impact adjacent vegetation, so the goal for cleaning would be for aesthetic reasons only; given that the sill is not a prominent visual element to the building's architectural character, and cleaning may require the use of toxic substances, removing the ferrous staining is a low-priority item.

Recommendations:

1. Shut off any valves with active drips.
2. Cleaning is not recommended except as part of overall exterior treatment.

B. Efflorescence (Repair Key: L_Cl)

Efflorescence comprises residue from soluble salt migration through water vapor transmission activity that deposits salts on masonry surfaces as water evaporates. Efflorescence at the surface is not inherently harmful, but repeated wetting and drying cycles reintroduce the salts to the masonry body, which can be harmful over time by eroding masonry and mortar materials. In climates where freeze-thaw cycles occur, these salt accumulations can cause significant damage to masonry materials through crystalline expansion, which may cause material displacement through cracking and breakage. Efflorescence was noted in only a few locations at BPHS, with a notable concentration above the doorway at the exterior of the passageway between Buildings A and C. At this location, the salt deposits are likely emerging from a repair mortar, as indicated by deposit patterns along joint lines (other condition issues at this location may indicate a more systemic issue and should be investigated). Efflorescence can typically be rinsed away with water and gentle scrubbing, but it may reappear because a water rinse will not typically address the source of the problem. A poultice may be applied to the masonry surface to pull soluble salts out of the mortar body, but this should be tested in a small location before undertaking over a larger area.

Recommendations:
1. Ensure joints are in good condition. If not, repair as needed before proceeding.
2. Rinse surface of masonry with clean potable water. No pressure is needed. Scrub effloresced joints with a natural bristle brush (do NOT use metal or plastic bristles) and rinse.
3. Monitor for efflorescence on a regular maintenance schedule. Efflorescence should diminish over time as long as the surface salts are removed and not reintroduced to the substrate through repeated wetting and drying cycles.

C. *Chalk Residue (Repair Key: L_Cl)*

Cleaning chalkboard erasers by hitting them against a hard surface is a method evidently still in practice at BPHS. Chalk residue was noted at a number of locations on campus, primarily on brickwork around the perimeter of windows. The chalk is harmless and will likely disappear when saturated with pressurized water during overall exterior cleaning.

Recommendations:
1. Rinse with water and gentle scrubbing with natural bristle brushes (do NOT use metal or plastic bristles). If an exterior cleaning campaign is undertaken, this should take care of the chalk residue and no additional work will be necessary.

D. *Graffiti/Graffiti Overpaint (Repair Key: L_Cl)*

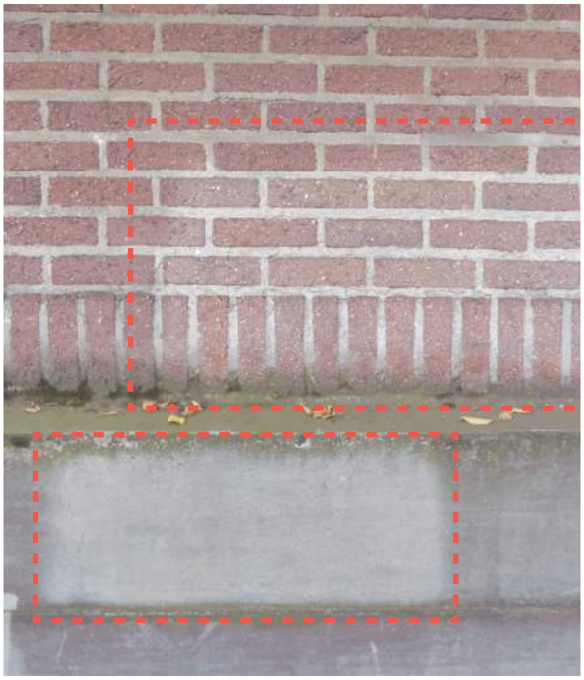
Graffiti was noted in only a few areas along the ground level of Building B at the north side, however evidence of prior graffiti remediation efforts is abundant. These are noticeable in two ways: areas that have been overcleaned (2.2.4/4-5), and areas that have been painted over (2.2.4/6). The recommended approach is to remove the graffiti rather than paint over it, but by using methods that do not adversely impact the substrate.

Recommendations:

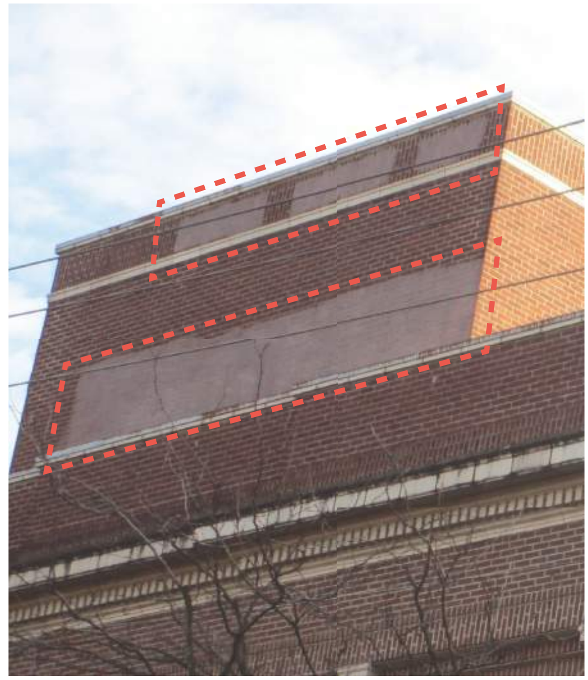
1. For new/existing graffiti: perform cleaning tests to determine the most effective solvent for removing the paint. Note that different paints respond to different cleaning agents, so what works on one may not work on another. The focus should be on protecting the substrate. Once an appropriate solvent has been identified, remove paint carefully using hand tools and clear the surface with water, capturing runoff so that it doesn't reach the municipal drainage system. Some strippers may require the application of a neutralizing agent after cleaning; refer to manufacturer's instructions.
2. For graffiti that has been overpainted, such as at the rooftop bulkhead at Building B: perform cleaning tests to determine the most effective paint removal product starting with the gentlest/least-caustic product. A poultice or "peel away" system may work best on brick. Once an appropriate solvent has been identified, remove paint and clear the surface with water, capturing runoff so that it doesn't reach the municipal drainage system. Some strippers may require the application of a neutralizing agent after cleaning; refer to manufacturer's instructions.
3. For overcleaned areas where graffiti has been removed: allow to soil and weather over time, which will soften the visual contrast. These areas should be inspected to ensure the substrate has not been adversely affected by the cleaning agents used, aside from the visible blanching noted during the survey.

2.2.4/3 Dripping faucet.

2.2.4/4 Overcleaned graffiti area.



2.2.4/5 Overcleaned graffiti area.



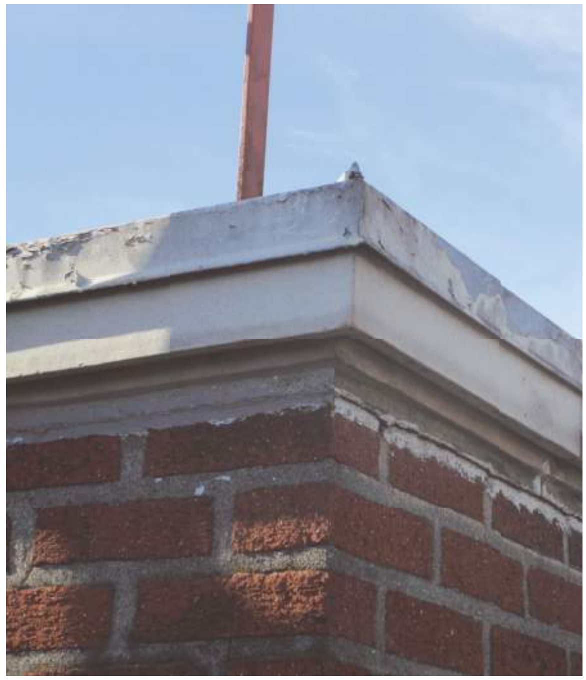
2.2.4/6 Painted over graffiti area at Building B - north elevation.

Terra Cotta Repairs & Modifications

At projecting cornices, the upward-facing joints between units have typically been covered over with a black roofing mastic product, most likely in an effort to stop water infiltration. The mastic is unevenly applied and deteriorated, it stains the terra cotta, and in most locations no longer serves it purpose. Sealant (caulking) has also been applied in some areas, perhaps also as a stop-gap measure for water infiltration. The sealants are generally deteriorated and ineffective, and in some cases may prevent natural moisture evaporation from masonry and mortar materials. For example, we observed sealant installed over the horizontal mortar joint between the terra cotta copings and the brick masonry parapet wall (2.2.4/7-8).

Most parapet walls and copings have been covered with sheet metal flashing. Depending on location, the flashing varies from copper to galvanized metal to painted metal. It is unclear at this time how the sheet metal flashings were installed and if damage was done to the terra cotta units when installing anchors, etc. The condition of the coping units is unknown at this time. At locations where they remain exposed, such as the one-story connection between the Main Building (“A” Building) and the Old Gymnasium (“C” Building), the coping units are heavily soiled and the joints are eroded. It can be assumed that the remainder of the coping units are in similar condition, and that the sheet metal flashing was installed in an effort to prevent water infiltration into the parapet walls. At the South Shop Wing (“J” Building), the sheet metal flashing encloses the entire parapet wall, not just the copings and roof-side. The sheet metal flashing is in fair condition overall, with some dents, bends and open seams observed. Paint films are weathered, chalked and peeling in many areas. The exposed sheet metal has areas of surface corrosion; galvanized sheet metal flashings also have surface corrosion throughout. In some cases, the corrosion products have stained the terra cotta masonry below (2.2.4/9-14).

2.2.4/7: Deteriorated roofing mastic applied over upward-facing joints at terra cotta copings, Building A - south elevation.



2.2.4/8: Painted sheet metal cap flashing installed over terra cotta copings at Building C. Note deteriorated coping joints and horizontal sealant joint between coping and brick parapet wall.

2.2.4/9: Section of original terra cotta coping at connection bridge between Buildings A & C. At most other locations, copings have been covered with sheet metal flashing.

2.2.4/10: Copper sheet metal flashing installed at wall and parapet, Building A - east elevation.

2.2.4/11: Painted galvanized sheet metal flashing covering entire parapet wall and coping; also cap flashing at cornice, Building J - north elevation. Note peeling paint throughout.

2.2.4/12: Damaged seams and peeling paint at galvanized sheet metal flashing, Building C - north elevation.

2.2.4/13: Damaged cap flashing at parapet, and rust stains at terra cotta copings, Building B - south elevation.

2.2.4/14: Galvanized sheet metal flashing installed at parapet coping, Building A - east elevation. Note open seams at corners covered with sealant.

Other previous repairs to terra cotta units are localized patch repairs at damage areas. These are typically mortar-based products, and some are more successful than others. For example, at the west elevation of the Main Building ("A" Building), several window sill units were patched with an unknown cementitious mortar-based product. The patches continue across joint lines with no breaks, and the patches are much darker than the surrounding terra cotta; there was no effort made to match the color of the glaze. They appear to be stable and bonded to the terra cotta substrate but are not well-executed. Other modifications are related to building changes or changes of use. For example, at locations where exterior fire escape stairs and landings were removed, the window sill was formed with cast concrete rather than installing terra cotta units to match the remainder of the windows (2.2.4/15-16).

2.2.4/15: Previous cementitious patch repairs at terra cotta window sills, Building A - west elevation.

2.2.4/16: Cast concrete window sill at location of removed fire escape stair landing, Building B - south elevation.

Recommendations for Further Study / Areas of Concern

A. Mortar analysis to determine color/composition/materials. Collect samples of presumed original mortar materials for laboratory testing. Perform gravimetric acid digestion of mortar samples to determine original mortar constituents and proportions for matching purposes.

B. Vertical crack at Building B, north elevation (through numerous courses of brick)

C. Parapet investigation to evaluate condition of underlying materials.

D. Exterior passageway investigation between Buildings A and C (open joints/broken mortar, efflorescence, biogrowth, steel bracing, penetrations).

E. Exterior staircase structural investigation at Building B (west elevation).

F. Foundation cracking at several locations.

G. Perform an up-close survey of selected areas of the terra cotta masonry to further identify areas requiring repair. Use manual sounding techniques to detect loose or unstable units. At a minimum, survey the west elevation of the Main Building (Building A) and entrance stairs/balustrades of Auditorium (Building B). Inspection at Building A will require aerial lift access.

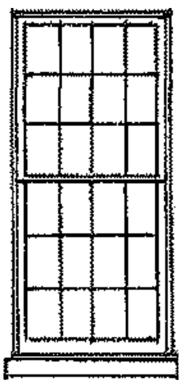
H. At terra cotta, selectively remove damaged materials or make small openings at select locations in order to inspect concealed areas and gather more detailed information relative to the construction and material conditions, in particular concealed metal anchors. Inspection openings can occur simultaneously with removal of potentially hazardous terra cotta units.

2.3 Historic Steel and Wood Windows

2.3.1 Historic Windows by Building

Building A

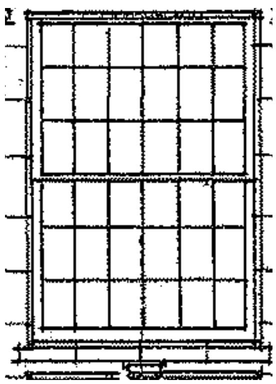
The wood windows in this 1917 building are restricted to the west elevation (window types 1, 2 and 4). The west elevation is one of the most prominent facades of any high school in the city and the windows make up its most dominant defining historic feature. Fifty-six of the windows are 12/12 double-hungs with three 18/18 double-hungs over the main entrance doors. The windows are machine-made, large institutional sash typical of this era of public school construction. Some of the defining features are a beveled meeting rail, lugs, weight pockets, and unpainted pulley tracks. A large percentage of the bottom sash remain in operating condition and the evidence present suggests that these windows are still used for ventilation purposes. The sash are 1 ¾” thick and counter-balanced with bronze sash chain with flat-bottomed pulleys. Existing conditions of the weights could not be determined with this limited assessment; the species of wood was also unidentifiable. A more detailed assessment is recommended to address these lingering questions. The east elevation windows originally matched the west elevation but were replaced in 1953 with steel windows of three different sizes that feature mid-century-style horizontal glazing units (window types 3a–c).



TYPE 1

58 Units

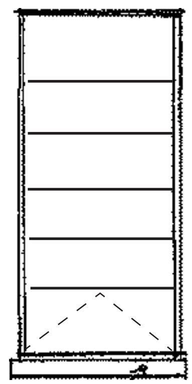
5’ X 10’



TYPE 2

3 Units

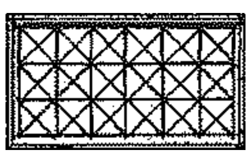
7’ X 10’



TYPE 3a

42 Units

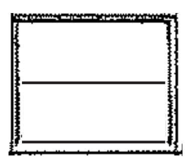
5’ X 10’



TYPE 4

3 Units

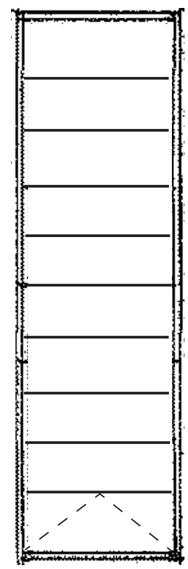
7’ X 4’



TYPE 3c

2 Units

5’ X 3’



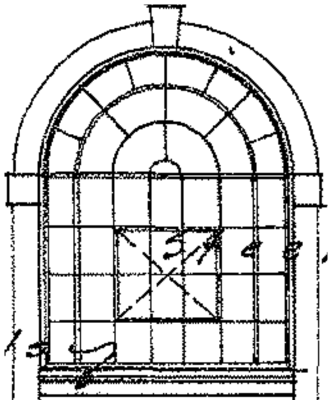
TYPE 3b

4 Units

5’ X 15’

Building B

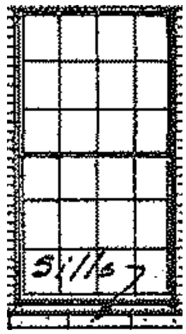
This 1929 building houses the auditorium, cafeteria, and a few office/classroom spaces. Unlike Building A, these windows are predominantly steel sash. There are a few wood windows at the lobby and lobby stairwells to the west of the auditorium entrance and at the lower-level cafeteria. The steel windows on the second level comprise 28-light bottom sections including a six-light center pivot operable sash and a 16-light fan at top; there are 10 windows of this configuration (window types 5 and 6). Two (2) of the 10 have a larger operating casement at the mid-section that was used as a fire escape. The steel windows at the first level are 35-light including a nine-light center pivot operable sash; there are 12 of these (window type 7). The below-grade cafeteria is daylit with nine (9) wood-mullioned casements with two sashes per opening with 24 lights each (window type 8). The west elevation features seven (7) wood 12/12 double-hungs (window type 9), four (4) wood 6/6 double-hungs (window type 11), and five (5) 9/9 wood double-hungs (window type 10). It is unclear at this stage whether or not these west-elevation windows are original. There are also two (2) large staircase ensembles at the north and south elevations; these comprise seven (7) sash mullioned together (window type 13). The larger top 2 are in a double-hung configuration.



TYPE 5

8 Units

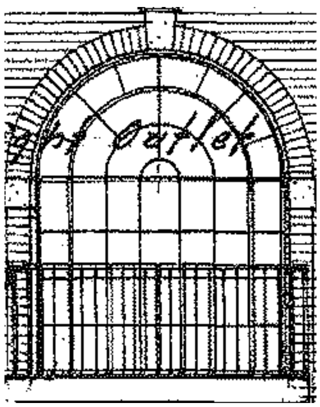
7' X 9'



TYPE 9

7 Units

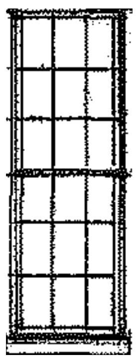
4' X 7'



TYPE 6

2 Units

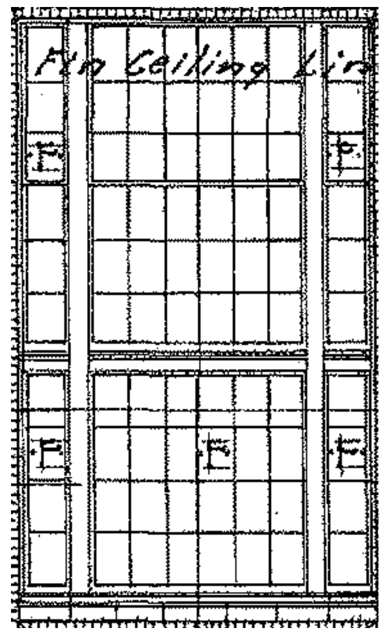
7' X 9'



TYPE 10

5 Units

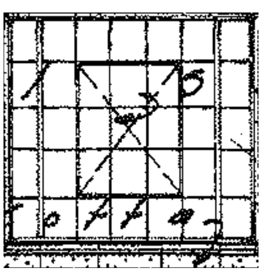
3' X 9'



TYPE 13

2 Units

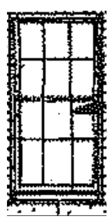
9' X 12'



TYPE 7

12 Units

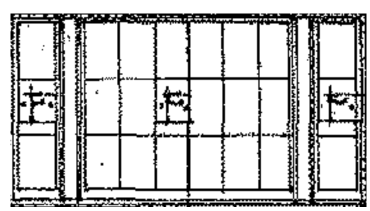
7' X 6'



TYPE 11

4 Units

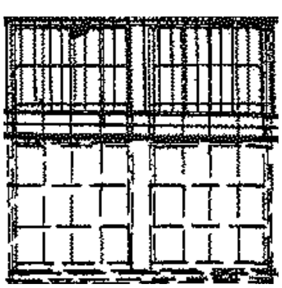
3'X 4'



TYPE 14

4 Units

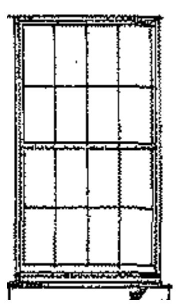
9' X 4'



TYPE 8

9 Units

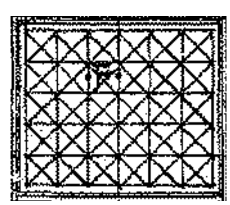
7' X 6'



TYPE 12

1 Units

4'X 6'



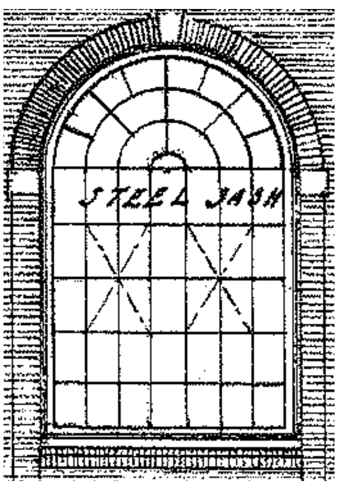
TYPE 16

3 Units

5' X 4'

Building C

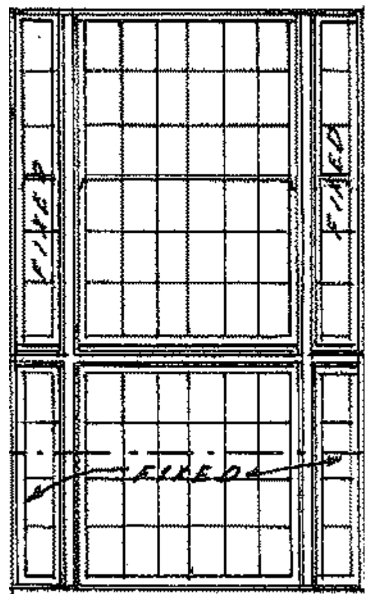
Building C was constructed in 1925 and houses the historic gymnasium. Like the auditorium building, Building C contains a mix of steel and wood windows. Fourteen 50-light, fan-topped steel-sash windows with two (2) center-pivot operable units (window type 16) comprise the majority of the windows and are all located on the second level. The west elevation features 22 12/12 double-hung windows with sashes that match those at Building A (window type 1). The lower-level window openings have been filled in and repurposed for ventilation needs. As with Building B, the staircase windows comprise seven (7) sash mullioned together with the larger top as a double-hung (window type 18).



TYPE 16

14 Units

7' X 9'



TYPE 18

2 Units

9' X 12'

TYPE 17

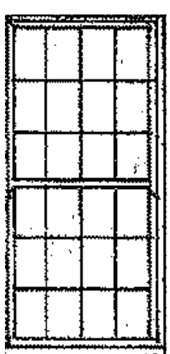
4 Units

2' X 3'

TYPE 19

2 Units

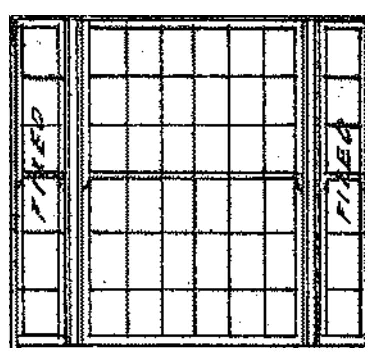
6' X 3'



TYPE 1

22 Units

5' X 10'



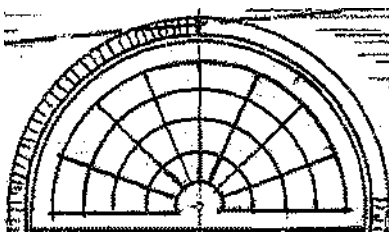
TYPE 20

2 Units

9' X 9'

Building E2

The east elevation of Building E2 contains a series of historically significant wood windows. There are 11 fan windows, two of which are larger in size. The smaller 18-light fans are configured as inswing hoppers and do not appear to operate (window type 22). The two larger 32-light fans are located above historic doorways; these fans do not operate (window type 21).



TYPE 21

2 Units

9' X 4'-5"

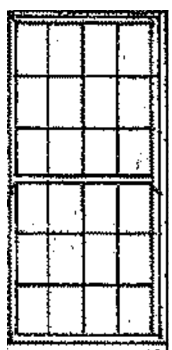
TYPE 22

9 Units

6' X 3'

Building G

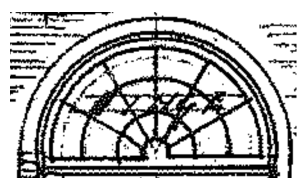
Building G was constucted in 1917 and contains numerous classrooms and workshop rooms. Several of the rooms house industrial trades instruction and therefore the interior condition of the windows is fair to poor due to the volume of atmospheric soiling, organic material, and oily substances. Fifty-one (51) wood double-hung windows line the north and east elevations. The south elevation features 22 18-light fan windows configured as inswing hoppers. Three (3) of the fans are located above non-historic doorways. In three instances a small section of the historic doorway was reused as a transom over the new non-historic doors.



TYPE 1

51 Units

5' X 10'



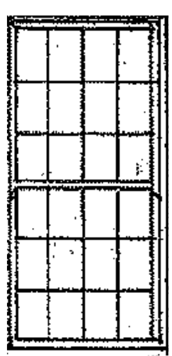
TYPE 22

22 Units

6' X 3'

Building K

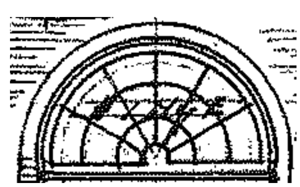
The lower level of Building K houses a foundry and other industrial arts classrooms and the windows here are in similar condition to those at Building G. Eighty-six (86) 12/12 wood double-hung windows (window type 1) are located in this building between both levels. Ten (10) 18-light fan inswing hoppers (window type 22) are located on the lower level of the south elevation. Two (two) of the fans are over a non-historic doorway.



TYPE 1

86 Units

5' X 10'



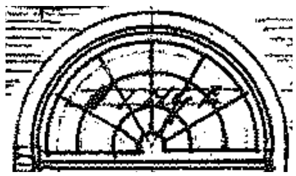
TYPE 22

10 Units

6' X 3'

Building J

Three elevations at Building J have lost their historic wood windows; replacements comprise 60 simple, non-historic two-light aluminum windows. The north elevation differs, featuring 22 18-light fan windows (window type 22); three of the fans are above non-historic doorways.



TYPE 22

22 Units

6' X 3'

2.3.2 Window Repair Categories (see Appendix A for Window Survey Elevations)

Fair: Green

These windows have minimal damage and the majority of the wood is sound and in good condition.

- Deteriorated coatings;
- Organic material and debris build up from activities taking place in classrooms and workshops;
- And minimal deterioration of glazing putty (0-30%).

Recommended repair procedures:

- Remove all deteriorated glazing putty.
- Assess glazing points for condition. If points are missing replace with in-kind product.
- Clean off each pane of glazing.
- Prime the glazing rabbet with approved product.
- Apply approved knife-grade glazing putty to areas that are missing.
- Prime the new glazing putty after a skin has formed, following manufacturer's recommended timeline for curing. The paint should lap up over the glazing onto the glass at least 1/16".
- Prime any areas of the sash that are bare.
- Check all sash joinery for deterioration.
- Apply final coatings after preservation architect approval.

Poor: Orange

These windows are in various stages of deterioration. Lack of maintenance and coatings have contributed to this condition.

- Decay at one or two areas on the sash;
- Deteriorated or absent coatings on sills and large areas of the sash;
- Inappropriate products used in previous maintenance work;
- And glazing putty deterioration at 30-50% of the sash.

Recommended repair procedures:

- Thoroughly dry any wet windows before beginning repairs.
- Apply a product to kill any decay-causing fungus before applying epoxy.
- Coat decayed fibers with an approved consolidating liquid epoxy.
- After cure time apply approved paste epoxy to decay areas.
- Sand and prep epoxied areas after they have cured.
- Prime epoxied areas with approved primer.
- Remove all deteriorated glazing putty.
- Assess glazing points for condition. If points are missing replace with in-kind product.
- Clean off each pane of glazing.
- Prime the glazing rabbet with approved product.
- Apply approved knife-grade glazing putty to areas that are missing.
- Prime the new glazing putty after a skin has formed, following manufacturer's recommended timeline for curing. The paint should lap up over the glazing onto the glass at least 1/16".
- Prime any areas of the sash that are bare.
- Check all sash joinery for deterioration.
- Apply final coatings after preservation architect approval.

Critical: Red

These windows are in the worst condition and are typically located on the west and south elevations, which are exposed to greater weathering influences. A general lack of regular maintenance over the decades has contributed to the severe conditions.

Primary condition issues include:

- Active water infiltration;
- Visible rust/spalling and decay present, especially at the sill locations;
- Compromised sash joinery and missing components;
- Deteriorated or absent coatings;
- And glazing putty deterioration at 50%-100% of the sash.

Recommended repair procedures:

- Remove sash from opening and transport to offsite facility.
- Assess sash once removed from opening and adhere to this criteria:
    - If decay area is greater than 50% of the component (bottom rail for example), replacement with in-kind material is recommended.
    - If decay area is less than 50% of component, an infill repair is recommended.
    - If decay area is 1”x1”x1” or smaller, an epoxy repair is recommended. Adhere to the procedure in Repair Category Poor (Orange) for epoxy application.
    - All decay repairs to be inspected by preservation architect.
- Remove of all deteriorated glazing putty.
- Assess glazing points for condition. If points are missing replace with in-kind product.
- Clean off each pane of glazing.
- Prime the glazing rabbet with approved product.
- Apply approved knife-grade glazing putty to areas that are missing.
- Prime the new glazing putty after a skin has formed, following manufacturer’s recommended timeline for curing. The paint should lap up over the glazing onto the glass at least 1/16”.
- Prime any areas of the sash that are bare.
- Check all sash joinery for deterioration.
- Apply final coatings after preservation architect approval.

2.3.4 Wood Window Openings

- Assess overall condition of casings (interior and exterior), jambs, and sills.
- Assess sealant at frame/brick interface. If found lacking, apply approved sealant product.
- If decay areas are found, adhere to this criteria:
    - If decay area is greater than 50% of the component (bottom rail for example), replacement with in-kind material is recommended.
    - If decay area is less than 50% of component, an infill repair is recommended.
    - If decay area is 1”x1”x1” or smaller, an epoxy repair is recommended. Adhere to the procedure in Repair Category Poor (Orange) for epoxy application.
    - All decay repairs to be inspected by preservation architect.
- Prime entire frame with approved primer.
- Apply final coatings after preservation architect approval.

2.3.5 Steel Window Repair Categories and Procedures (see Appendix A for Window Survey Elevations)

Repair Category –Fair (Green)

These windows have minimal damage and sound metal with missing or cracked glazing putty being the overall problem and spots of missing coatings with slight rusting.

- Clean all steel elements, including the removal of corrosion and corrosion buildup.
- Remove all deteriorated glazing putty.
- Replace broken glazing to match existing.
- Apply approved glazing sealant/putty.
- Clean and lubricate existing hardware where required.
- Prime all exposed metal areas with approved product.
- Apply final coatings after preservation architect approval.

Repair Category- Poor (Orange)

These windows in addition to failing glazing putty have cracked joints and minimal corrosion beginning.

- Clean all steel elements, including the removal of corrosion and corrosion buildup.
- Repair steel window frames, sash, and mullions, including the straightening of sash and frames as required.
- Remove all deteriorated glazing putty.
- Replace broken glazing to match existing.
- Apply approved glazing sealant/putty.
- Clean and lubricate existing hardware where required.
- Prime all exposed metal areas with approved product.
- Apply final coatings after preservation architect approval.

Repair Category- Critical (Red)

These windows are in the worst condition. In addition to the problems noted in the above categories, these windows may have severe corrosion areas with structural implications. Active water infiltration to interior of building may be present.

- Remove steel sash from opening.
- Clean all steel elements, including the removal of corrosion and corrosion buildup.
- Assess condition of steel at corrosion areas. Inspection by a specialist is recommended for guidance with repairs.
- If components are structurally compromised, replacement with in-kind material is recommended.
- Repair steel window frames, sash, and mullions, including the straightening of sash and frames as required.
- Remove all deteriorated glazing putty.
- Replace broken glazing to match existing.
- Apply approved glazing sealant/putty.
- Clean and lubricate existing hardware where required.
- Prime all exposed metal areas with approved product.
- Return sash to opening and secure to frame.
- Apply final coatings after preservation architect approval.

2.3.6 Steel Window Openings

Assess overall condition of casings (interior, and exterior), jambs, and sills.

Assess sealant at frame/ brick interface. If found lacking, apply approved sealant product.

If decay areas are found, adhere to this criteria:

- If decay area is greater than 50% of the component (bottom rail for example), replacement with in-kind material is recommended.
- If decay area is less than 50% of component, an infill repair is recommended.
- If decay area is 1”x1”x1” or smaller, an epoxy repair is recommended. Adhere to the procedure in Repair Category Poor (Orange) for epoxy application.
- All decay repairs to be inspected by preservation architect.

- Prime entire frame with approved primer.
- Apply final coatings after preservation architect approval.

2.4 Roofs Condition Survey

2.4.1 Summary of Existing Conditions

The historic buildings have the following roof types:

- Building A – Low sloped built-up roof membrane with skylights.
- Building B – Low-slope built-up roof membrane.
- Building C – Low-slope built-up roof membrane with skylights.
- Building E2 – Low-slope built-up roof membrane with skylights.
- Building G – Medium-slope (barrel-shaped) built-up roof membrane.
- Building K – Low-slope built-up roof membrane.
- Building J – Low-slope built-up roof membrane.

Based on the Benson Polytechnic Master Plan, it is assumed that these roofs most likely consist of "...a recover roof system installed over the original roof system. Both systems are believed to consist of layered glass fiber ply sheets, some adhered over a roof level insulation assembly (most likely foam core panels), and others installed directly over wood roof decks. The system layers were assembled using either hot asphalt adhesive or were torch applied. All roof areas have been coated with an aluminum emulsion." No cores have been taken to confirm these assumptions.

The Master Plan also states that the majority of the roof surfaces (73%) are considered to be in poor condition, requiring replacement within 1-3 years from 2016, with 15% in fair condition requiring replacement in 5 years, and only 12% in good condition with a life span of 8 years or more.

Skylights were surveyed on buildings A, C, and E2. Skylights were either in good condition of newer construction (blue), older skylights with the historic glazing and frame (orange), or completely covered decomissioned skylights (green), as shown in the following roof diagram.


K
G
J
E2
Potential ARG Roof scope (dependent on design for buildings G, J, and K)
E6 E5 E4 E3 E2 E1
E7
E8
E9 E10 E11 E12 E13 E14 E15
A
A5 A4 A3 A2 A1
A6
B
ARG Roof scope
C1
C2
C3
C

2.4.2 Roof Recommendations

The roof assemblies at buildings A, B, C, and E2 should be replaced. The existing roof overburden should be demolished down to the substrate and a completly new roof assembly should be installed. New metal copings at the parapets and necessary flashing would be installed at this time to create a complete water-tight assembly. The exact roof assembly type would need to be further researched with PPS involvement, taking into consideration maintenance, longevity, and thermal performance. There is also the potential for adding an eco-roof to some or all of the roofs which would need to be further studied to determine the feasibility of this option, taking into consideration the impacts on the existing structures.

The scope of work for the roofs at buildings G, J, and K is dependent on the final design for the project. Any options that re-use these buildings will most likely require a new roof assembly and potentially a new roof structure. If the exterior enclosure of Building J is retained, it is recommended to restore and expose the terra cotta coping that is currently covered with a metal flashing.

2.4.3 Skylight Recommendations

Building A

Skylights A1-A5 are in good condition and do not require any repair work. Sealant joints should be reviewed when the project is closer to completion to determine if they should be replaced as part of the overall project.

Skylight A6 is no longer functional (2.4.3/1). It originally illuminated the historic library below. This space has gone through interior renovations that have split the room into two classrooms, resulting in the skylight being decommissioned. Ideally, this space can be restored as one large room allowing for the skylight to be restored in conjuction.

Building C

Skylights C1-C3 are in good condition and do not require any repair work. Sealant joints should be reviewed when the project is closer to completion to determine if they should be replaced as part of the overall project.

Building E2

Skylights E14 and E15 are in good condition and do not require any repair work. Sealant joints should be reviewed when the project is closer to completion to determine if they should be replaced as part of the overall project.

Skylights E1, E7, and E8 are covered and no longer functional. Whether or not it makes sense to restore these skylights will be dependent on the program below. Currently they are located above storage rooms.

The remaining ten (10) skylights are the historic skylights that are in poor condition (2.4.3/2-3). Understanding that it would be very costly to restore the skylights in their current condition, it is recommended to replace these skylights with the same aluminum system utilized at skylights E14 and E15 (2.4.3/4).

2.4.3/1 Skylight A6: Originally illuminated historic library no longer in function.

2.4.3/2 Skylight E11: Typical existing biogrowth, corroded metal components and deteriorated sealant on historic skylights.

2.4.3/3 Skylight E13: Typical corroded metal flashing, biogrowth, and peeling paint on historic skylights.

2.4.3/4 Skylights E14 and E15: Aluminum system skylight replacements.

2.5 Historic Doors

2.5.1 Survey Methodology

A survey of extant historic doors on the BPHS property was conducted on November 10, 2016, when classes were not in session. Buildings included in the survey are as follows:

- Building A – Constructed 1917
- Building B – Constructed 1929
- Building C – Constructed 1925
- Building G – Constructed 1917 – no historic doors remaining
- Building J – Constructed 1918 – no historic doors remaining
- Building K – Constructed 1917 – no historic doors remaining

The survey was conducted from the exterior at ground level and from the interior at basement, first, and second level. A small amount of doors were not accessible and could not be viewed. Doors not highlighted on the survey notes were either not historic or inaccessible.

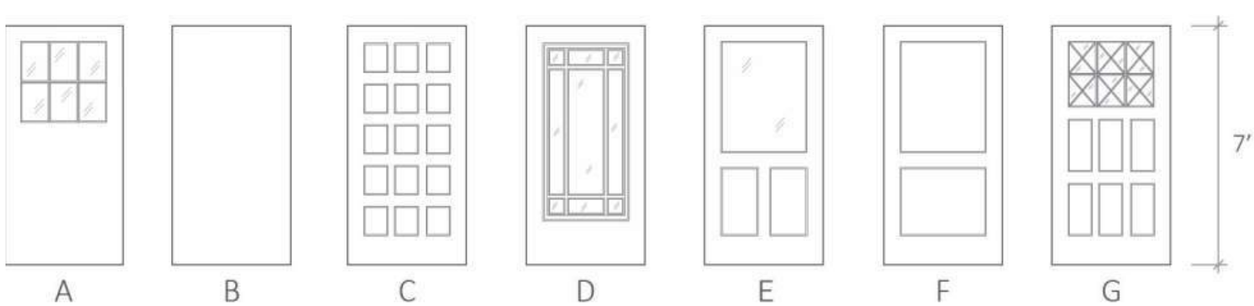
Conditions were noted by hand on printed copies of original construction drawings and recorded with digital photographs. See Appendix B for floor plan drawings related to the historic door survey.

The goal of the survey was to understand the nature and condition of the remaining historic doors, as well as their current location. Preliminary repair and maintenance recommendations with approximate quantities are also given in Appendix B in order to calculate a rough estimate of the cost and skilled labor needed to address these deficiencies.

2.5.2 Description of Doors

There area seven (7) remaining types of historic doors at BPHS campus. The majority are wood, 1-¾" thick and 7'0" in height. In some cases the doors are clad with sheet metal (kalamein doors) (2.5.2/1). Widths vary by door type. Buildings A, B, and C contain the only remaining historic doors on campus. The auditorium building (Building B) has the only exterior historic doors remaining. All other remaining historic doors are interior doors.

Door Types:



2.5.2/1 Two doors at the second-level lobby of Building B. The left one is wood and the right door is clad with sheet metal.

2.5.3 Summary of Existing Conditions

In general, the remaining historic doors at BPHS are in good condition. The most common deterioration consists of wood cracks and split wood (2.5.3/1). The majority of these cracks are small and do not generally impact the door performance. The few sheet-metal-covered doors are interior doors and seem to only have minor dents and cracking paint. The coating of one of the metal doors at the second-level Auditorium Lobby has been severely abraded (2.5.3/2). Besides that, metal doors are in good condition.

Door light glass panes are also in good condition and many of the original panes remain. Some of the wood trim at the lights are cracked, broken, or missing. In some cases door lights have been painted over (2.5.3/4). Historic transom and relight windows have similar conditions as the wood doors where most of the original glass panes are still intact, including most of the wired glass panes at the staircases in Building C (2.5.3/3). These also have minor wood cracks and splits.

Most of the original historic hardware has been replaced except for several doors at Building B (2.5.3/5) and one door at Building C (2.5.3/4). Most replacements consist of door knobs and a few off-the-shelf levers. Some doors are fixed shut and their handles have been removed.

Some of the doors used mostly at restrooms and at closets have metal or wood grille vents. The metal grilles seem to be in good condition, while some of the wood grilles have various broken slats that will need replacement (2.5.3/6). There are also several cases of doors connecting classrooms at Building A that feature chalk boards at the top half of the door (2.5.3/7). These have wood frames and are also in good condition.

2.5.3/1 Typical door wood crack and split wood condition.

2.5.3/2 Dented and scratched kalamein door. Coating is severely abraded.

2.5.3/3 Wired glass panes at the staircase historic transom relight windows in Building C.

2.5.3/4 Painted-over door lights at Building C mezzanine. Also note historic hardware.

2.5.3/5 Historic pushbar hardware at Building B cafeteria doors.

2.5.3/6 Typical broken slats at wood door grilles.

2.5.3/7 Typical door chalk board.

2.6 Interior Historic Materials

The survey of BPHS's interior spaces was conducted on November 23, 2016. The goal was to assess general conditions of character-defining features within historic interior spaces. Although the study area comprises six buildings and the façade of a seventh, only three buildings—Buildings A, B, and C—retain original interior materials and configurations and were therefore the focus of the survey. This section is intended to provide a sufficient overview of existing conditions to inform the project team of general concerns and priorities, but a more detailed survey should be undertaken if there is a desire to gain a more thorough understanding of existing conditions and repair quantities for cost estimating or bidding purposes.

2.6.1 Building A – Main Building (1917)

Primary Entrance Vestibule

Given the location in a high-traffic area, the wood paneling, doorways, and cabinets in the entry vestibule of Building A are in remarkably good shape. The primary condition issue is superficial scuffing, with secondary condition issues comprising checks and cracks in the wood, uneven finish weathering and patina, graffiti (mostly pencil and pen marks), and a few areas where wood is chipped and missing. The stained wood dentil molding and box beam ceiling appears to be in very good condition as assessed from the vestibule area. The horizontal trim piece between the pilaster capitals and dentil molding, into which the sprinkler heads are set, appears to be a replacement piece as it exhibits a different, matte finish. The configuration, however, appears to be original.

2.6.1/1 Interior door with wood pediment flanked by paired stained wood Doric pilasters and paneled wainscot.

2.6.1/2 Multi-light transoms over main entry doors. Also note ceiling wood molding detailing.

A. Paired stained wood Doric pilasters and paneled wainscoting (2.6.1/1-4)

At the pilasters, column bases and vertical edges display scuffs and finish wear. At the paneled wainscoting and baseboard molding, scuffs and finish wear are notable throughout the entry vestibule surfaces up to approximately three feet in height. In general the condition issues are minor. Non-historic penetrations for fire alarms and electrical outlets were observed at panels and baseboards. Wainscoting at the east wall and sections of wainscoting at the north and south walls are concealed behind historic display cases and non-historic display wall fixtures and were not assessed. Two large plaques commemorating the school's namesake and its first principal are affixed to pilasters at the east wall and presumably the screws securing them in place are drilled into the wood. If the plaques are removed, the holes should be carefully patched and painted.

B. Built-in display cases (2.6.1/4)

Two freestanding display cases are located at the east wall of the entry vestibule and flank an original recessed display cabinet that houses a large school seal behind glass. Eight additional display cases lines the west wall of the hallways to the north and south, with several more in the circulation spaces near stairwells. Except for the original recessed case, the cases look similar to each other but differ in subtle details; a plaque on one made from figured plywood indicates that it was made by students, and is presumably true of some of the other cases as well (the cases at the east wall of the entry vestibule show a bit more refinement and may have served as the design basis for the student-built cases). The recessed display case appears to retain most of its original materials—the inset panel at the top right side appears to be a replacement—but does exhibit some significant wear patterns, particularly along the sill below the display window. A portrait of Simon Benson hangs above the display case, concealing the original domed pediment behind it. As with the other wood elements at the entry vestibule, condition issues of the display cases primarily comprise superficial scuffs and finish wear that is generally limited to the lower four feet of height. Hardware and operability were not evaluated as part of this survey.

C. Interior door openings with wood pediments (2.6.1/1)

The wood pediments above doors at the entry vestibule are in good condition. The recessed central triangle could provide an excellent source for matching the finish of adjacent wood elements during repair and maintenance work, if an approximation of the original/historic appearance is desired. Some wear and patina are noted on the corbels at both doorways. The door frames show heavy wear and scrapes with complete loss of stain at lower areas where people and objects frequently brush up against and bump into them, with some deeper gouges noted at the baseboard trim.

D. Multi-light transoms (2.6.1/2-3)

The three transom windows over the main entry doors appear to be in good condition and fully intact. Some overpaint was noted on glazing. A closer inspection should be undertaken to verify that all mullion joints are tight and glazing is securely in place.

E. Ceiling with stained wood dentil molding and box beams (2.6.1/1-4)

The stained wood dentil molding and box beam ceiling appears to be in very good condition as assessed from the vestibule area. The horizontal trim piece between the pilaster capitals and dentil molding, into which the sprinkler heads are set, appears to be a replacement piece as it exhibits a different, matte finish. The configuration, however, appears to be original.

Notes

The appearance of the wood paneling in the entrance lobby area, which currently exhibits numerous scuffs and other abrasions, can be greatly improved with a sensitive restoration. The goal is not to make the materials look 'new' by aggressively refinishing the wood paneling, columns, door frames, trim, and display cases, but to restore the luster and richness of the finish while preserving the inherent patina and wear patterns. A comprehensive approach would incorporate all of the recommendations listed below, applied where applicable, followed by an overall application of stain selected to match the historic appearance.

- Superficial scuffs can be improved with careful inpainting by a trained conservator, which will conceal the exposed wood substrate by painting the surface with stain or dilute paint to match the stained wood. At locations where deep gouges are noted, such as the baseboard at the two interior doorways, these conditions represent the history of use of the building and should be preserved rather than repaired or filled (unless the damage presents a safety hazard).
- If scuffed areas are inpainted, the surface gloss will likely differ than adjacent surfaces when viewed in raking light. If the selected repair/restoration approach calls for an overall application of stain, any surface gloss irregularities from inpainting work will be successfully diminished. If repairs are undertaken in phases, a bit of paste wax or wood conditioner applied to the surface after inpainted areas are dry will unify the finish in that area.
- Crevices and recessed areas, such as above the pilaster capitals, on top of display cases, along upper wall molding ledges, and in dentil molding bands, should be cleaned and dusted periodically.
- A periodic application of wood conditioner or dilute stain will help wood retain a rich luster and prevent wood from becoming too dry and brittle (which leads to checking). A small test area in an inconspicuous location will aid in determining whether this approach is viable.
- A small sample of wood collected from a discreet location can be used to confirm the identity of the wood species. If needed repairs include dutchman (infill) patching where wood loss is noted, a species match is critical to performing a successful repair.

First-floor Corridors

A. Overall size and volume (2.6.1/5)

The corridors appear to retain their original widths. Furnishings —cabinets, in particular,— have been added over the years but do not impact the original massing and spatial profile.

B. Walls with wood bases and wood panel trim (2.6.1/5)

Painted baseboard molding runs the length of both wings of Building A on both sides of the hallway, with interruptions at all door openings. Mid-wall trim also runs the length of both wings on both sides of the hallway, with interruptions at each classroom transom window frame. Baseboard and mid-wall moldings are connected at wall corners by vertical trim boards, and both trim elements continue up to the second floor along stairways. All trim pieces are painted a dusky orange color and appear to be in good condition. Some pieces may have been replaced over the years, but could not be confirmed by visual inspection. Original trim colors and verification of historic provenance can be determined through cratering and cross section samples viewed microscopically.

Wall plaster is generally in good condition at first-floor corridors. Plaster located below the mid-wall trim is in fair condition, with general scuffs and soiling and a few deeper gouges, obsolete fasteners, and pinholes. Wall plaster above the mid-wall trim is generally in good condition, although a significant vertical crack was noted in the plaster above the doorway to room 002. This should be looked at more thoroughly.

A. Wood doors and openings with wood cases (2.6.1/5-6)

Many of the classroom doors at Building A are original and in their original locations, as confirmed by the stamped numbers on the inside edges of the doors and door frames . In general these original doors are in good condition and fully operational, with expected wear patterns and scuffs. Non-historic kick plates presumably are protecting the doors from wear at the interior lower register. Doors with divided lights generally retain their original mullion and glazing materials, with some missing and damaged elements noted. All door hardware has been replaced. Historic door frames also appear to be in good condition, though multiple coats of paint conceal various repairs and replacement pieces. Doors and door frames are painted with the same dusky orange finish as baseboard and mid-wall trim, except for the door edges, which remain unpainted.

B. Wood display cases (along west wall of first-floor corridor) (2.6.1/5)

As noted in the Entry Vestibule section, many of the freestanding wood display cabinets appear to have been built by students at the school, as noted by a plaque on one display cabinet. The cabinets differ slightly with respect to materials, patterns, and quality, but generally match in size and overall appearance. The display cabinets exhibit scuffs and scrapes commensurate with their location along a busy corridor over the course of many decades, but in general are in good condition. Hardware and operability were not evaluated as part of this survey.

Notes

- Radiators appear to be original.

2.6.1/3 Detail of multi-light transoms over main entry doors.

2.6.1/4 Wood display cases across from main entry doors. Also note box beams.

2.6.1/5 Ground level main hallway. Note classroom wood doors with large transom lights and freestanding wood display cases.

2.6.1/6 Original door number stamp on door and corresponding frame.

Second-floor Corridors

A. Overall size and volume (2.6.1/7)

The corridors appear to retain their original widths. Hallway lockers have been added/changed over the years but do not impact the original massing and spatial impact.

B. Walls with wood bases and wood panel trim (2.6.1/7)

Painted baseboard molding runs the length of both wings of Building A on both sides of the hallway, with interruptions at all door openings. Mid-wall trim also runs the length of both wings on both sides of the hallway, with interruptions at each classroom door frame and at the stairway transom windows. (Unlike the first floor, the second floor classrooms do not have hallway transom windows.) Baseboard and mid-wall moldings are connected at wall corners by vertical trim boards. All trim pieces are painted a dusky orange color and appear to be in good condition. Some pieces may have been replaced but could not be confirmed from a visual inspection. Original trim colors and verification of historic provenance can be determined through cratering and cross section samples viewed microscopically.

Wall plaster is generally in good condition at second-floor corridors. Plaster located below the mid-wall trim is in fair condition, with general scuffs and soiling and a few deeper gouges, obsolete fasteners, and pinholes. Wall plaster above the mid-wall trim is in good condition. As with the trim, original colors can be determined through cratering and cross section samples.

C. Wood-paneled opening to original library

The wood paneling at the former library entrance is original. The doors are no longer in place, but traces of the hardware into which the double doors were secured are visible in the center of the trim piece in the overhead panel. The paneling is painted the same dusky orange as other trim pieces in Building A.

D. Five multi-light skylights with dentil molding (2.6.1/7-8)

The five corridor skylights appear to be in good condition. A closer inspection can confirm that mullions are tight and glazing is secure in place. The frame from a sixth skylight in the former library is extant and could potentially be restored with replacement glazing and a reconfiguration of the spaces below and at the roof.

Notes

- Radiators appear to be original.

2.6.1/7 View looking South at Second-floor Corridor.

2.6.1/8 One of five multi-light skylights.

Two half-turn stairs (2.6.1/9-10)

A. Overall size and volume

The two stairway configurations at Building A are highly intact, with a high percentage of original materials.

B. Wood bases, handrails, wood trim, and wood half-wall caps

Wood baseboards and trim at the stairs have been painted to match baseboards, trim, and doors elsewhere in Building A. These appear to be in good condition. Handrails are all original and unpainted, but show significant wear, patina, and heavy soiling, particularly at the continuous, curving center rail. Some pieces are damaged or missing. The half-wall caps are in good condition.

C. Walls at stair landings

Plaster walls at the second-floor story landings are in fair condition, with significant condition issues at the top of the north stairs where opening in the coatings expose earlier paint finishes and the plaster substrate and have not been repaired. The damage appears to be intentionally created, and not the result of a material performance deficiency. Otherwise, typical scuffs and scrapes were noted but not a significant concern.

Classrooms (2.6.1/11-12)

A. Wood bases, trim, and wood built-in casework

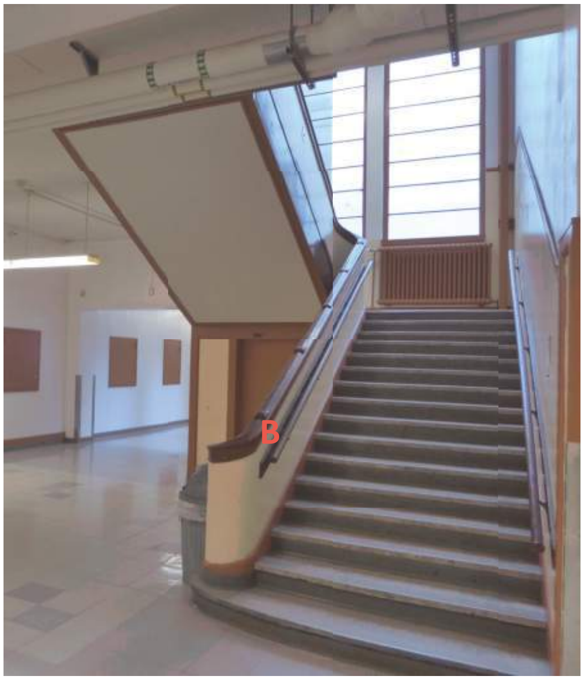
All original classrooms at Building A retain a high percentage of original wood bases and built-in furniture. The built-ins are still in use as storage, and have been painted different colors over time. The current classroom trim color at the ground floor is dusky orange. At the second floor some of the classroom trim color is blue (although some classrooms are orange). Primary condition issues comprise impact damage from classroom chairs; chair heights do not appear to have changed over the past 100 years, so the weathering pattern of chair contact with walls and built-ins around classroom perimeters is substantial yet localized. Most hardware at built-in classroom cabinets is original, except where locking hardware has been installed or pieces have been replaced.

B. Built-in blackboards with wood and metal chalk rails

The majority of historic blackboards are extant. The original configuration appears to have included chalkboards on all three interior walls. Some classrooms continue to utilize all of the boards, whereas other have covered over the non-primary chalkboards with posters, photographs, drawings, and other paper-based items. Some chalkboards appear to have been painted, or removed and replaced with bulletin boards. In a few locations, white boards have been mounted over the chalkboards. Original chalk trays are generally intact, and typically share the same painted finish as trim and built-ins. A newer metal lip has been added to some. The extant chalkboards and trays that are not concealed are in good condition.

Notes

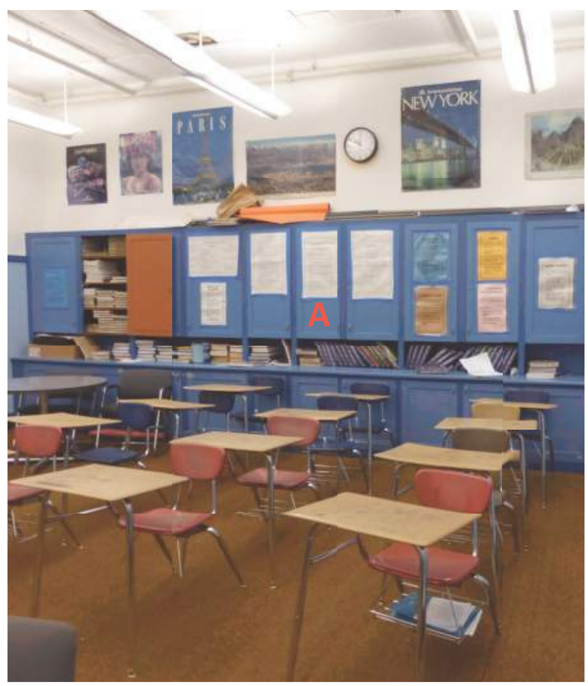
- Some classrooms have interior doors that lead to other classrooms and/or storage areas. These openings and doors appear to be original. At least one classroom (115) also has a small hinged panel and trim next to the interior door that appears to be original.
- Some classrooms have a cubby in the wall at ground level, near the door. The function of these cubbies is unknown.
- Original lath and plaster walls are still in place, as seen in classroom 115 where damage to the lower plaster panel has exposed the substrate and wood lath. The plaster walls are a valuable resource for identifying historic paint colors.



2.6.1/9 Northern staircase, view from first floor.

2.6.1/10 Northern staircase, view from landing.

2.6.1/11 Classroom interior.



2.6.1/12 Classroom interior.

2.6.2 Building B – Auditorium (1929)

Auditorium (2.6.2/1-2)

A. Inclined concrete floor

The circulation path around seating sections at the auditorium's ground floor is a stained and polished concrete. It is weathered and soiled and cracked, as befits its age and wear. Where seating sections are located, the concrete floor is gray and unadorned except for circular vents beneath many of the seats. The concrete floor at seating areas is also weathered and soiled and cracked. These areas may have been carpeted previously. The cracks do not pose a condition concern as they appear to be stable, but should be monitored for any changes to avoid the emergence of any trip/fall hazards. A more thorough assessment of the concrete floor should be performed to ensure that no hazards currently exist.

B. Fixed wood theater chairs with aisles at center and along north and south walls

The majority of the chairs in the auditorium are original or date from soon after the building's construction. A grouping of chairs at the front lower section are newer. The older chairs display typical wear patterns for their function and use. Ongoing regular maintenance should ensure they will continue to perform for years to come.

C. U-shaped second-level balcony

The balcony retains its original configuration and materials, including the brass railing and wooden ledge. Non-historic acoustical tiles have been affixed to the outward-facing vertical surface, between the wooden ledge and lower edge. The historic drawings show that this area was originally plastered. In order to determine whether the original finish can be restored, an exploratory removal of one or two tiles is recommended. This process will identify appropriate methods for careful tile removal and reveal the existing conditions at the plaster surface.

D. Stage at east end with arched apron and squared, paneled proscenium

The stage appears to be in its original configuration, including hidden hinged panels along the front edge that conceal electric lights. Two staircases at stage right and left are also original. These elements appear to be in good condition. It is unknown whether the concealed lighting is still operational.

E. Coffered ceiling with ornamental plaster cornice and beams, pendant light fixtures and painted metal grills

The auditorium ceiling appears to retain its original configuration and original materials, except for the soundproofing tiles and sprinkler system. The lights are all operational and appear to be well maintained.

F. Wood wall bases and trim

The baseboard molding is painted gray and the wall trim around the perimeter of the auditorium is painted orange. Both are presumed to be original based on historic drawing details. A thorough assessment was not performed but the bases and trim appear to be in good condition with an expected amount of scuffs and scrapes. The original trim may have been stained wood; verification of original trim color(s) can be determined through cratering the surface with a scalpel and/or collecting cross sections to view microscopically.

G. Concrete pilasters

The concrete pilasters at the second-level balcony appear to be in good condition. They are painted the same dusky orange as other trim in the auditorium and in Building A. A closer inspection should be conducted to verify that all pilasters are in sound structural condition.

2.6.2/1 View of the auditorium from stage.

2.6.2/2 View of the auditorium from the balcony level.

Auditorium Lobby (2.6.2/3-4)

A. Terrazzo floor, bases and full-width steps to vestibule

Differing aggregate between the vestibule steps and entryway and vestibule floors indicate that some changes have been made to the terrazzo floor. The steps are original and show significant wear in areas, including spalls and chips at stair noses, heavy soiling and wear patterns at risers, a large crack at the north end, and patching where a central handrail was removed. The vestibule and lobby floor terrazzo may not be original, but it is not of recent vintage. Cracks and soiling are the primary condition issues but overall the floors are in good condition.

B. Ticket booths

The ticket booths appear to retain their original materials and configurations, including the hinged access doors, metal grills, and "corkboard bulletin board" panels, although they no longer appear to be used for issuing tickets. The interior space of the booth on the north side of the vestibule is used for storage and is not furnished except for a built-in counter top and wood drawer; the counter may be the original wood piece but is currently laminated. The south booth was not accessed. The west wall inside the north ticket booth displays several significant cracks, which should be assessed by a structural engineer.

C. Stained wood wainscoting and Doric pilasters at lobby steps

The wood wainscoting features a similar pattern as seen in the main entryway at Building A, with a darker stain and trim panels that change in size by height. The wainscoting is well intact but displays many scrapes and dings that have abraded the finish coating in areas. With some attention, they could be restored beautifully. The pilasters at the top of the entry staircase are in very good condition. Two wood handrails affixed to the wainscoting and pilasters have replaced the original bronze rails.

D. Three recessed double-door openings with multi-paneled wood doors and wainscoting

The wainscoting at the east lobby wall where doors enter into the auditorium space is in fairly good original condition with significant wear patterns at the recessed door alcoves. A stained plywood panel conceals some of the wainscoting where a drinking fountain (now out of order) was installed between the center and north doorways. Some corner edges have been chipped away. Doors appear to be original but the stain differs slightly from adjacent wood paneling, showing a lighter, redder tone.

E. Detailed plaster cornice at ceiling

The plaster cornice at the lobby ceiling is in very good condition, with a few superficial stains noted. Two sprinkler heads are installed along the crown molding at the east wall. Several non-original ceiling tiles are missing at the lobby and vestibule ceilings.

Stairs (2.6.2/5-6)

A. Concrete bases, wood handrails, wood trim and half-wall wood caps

Stairs at the north and south ends of the lobby that connect the basement to the third floor are in their original configurations and retain their original materials, although non-original handrails were noted at the walls along the stairway to the basement/cafeteria level. Damage at adjacent plaster walls where radiators are located and water-stained ceiling tiles suggest that water intrusion and temperature fluctuations are an issue at the stairways but this has not impacted their condition in any significant way. Handrails and wall trim are in good condition; the handrails show typical wear patterns and soiling appropriate for their use and age. Concrete bases and stairs show chips and soiling but are in general in good condition.

2.6.2/3 Auditorium lobby.

2.6.2/4 Auditorium lobby.

2.6.2/5 SW auditorium staircase from second floor.

2.6.2/6 NW auditorium staircase from first floor.

Second Floor Lobby

The concrete floor is concealed by a thick layer of polish over linoleum; some damage is evident but overall the floos is in good condition. Concrete bases are scuffed and chalky and exhibit cracks. Wood doors appear to be original but feature non-historic hardware. Some have metal cladding. Doors are scuffed, particularly at interior faces of metal doors. Mid-wall molding is in good condition.

Second Floor Rooms

A. *Concrete floors with wood bases*

The second-floor rooms are in use as office space and are currently carpeted.

B. *Interior wood storm windows*

Several interior storm windows remain in place and are operable, and appear to be in good condition with general scuffs and soiling, UV damage, and wear from use.

C. *Stained wood multi-paneled cabinets in the north wall of the north office*

The built-in cabinets at the north wall of the office space are in good condition and appear to still be in use.

Cafeteria (2.6.2/7)

A. Overall size, volume and openness of the space.

2.6.2/7 Cafeteria.

2.6.3 Building C – Old Gymnasium (1925)

Gymnasium (2.6.3/1-3)

A. *Central open gymnasium space*

The historic gymnasium generally retains its original configuration with an expansive basketball court, steel trusses and skylights, and a rounded track and railings at the second level supported by wood beams. Doorways at both ends of the basketball court and upper track retain their arched brick openings and original doors, although some are not in use.

B. *Exposed brick walls*

Brick walls appear to be unchanged except for the insertion of steel ties along the north elevation, however there are some significant condition issues at several locations that should be more carefully assessed. Water intrusion at the northeast and southeast corners has been excessive, as evidenced by large swaths of staining and efflorescence and deteriorated mortar joints. The presence of a large trash can to collect water at the northeast corner suggests that leaks are still active. Some of the acoustical tile at the ceiling has been broken away, exposing an open channel for water to enter. Several obsolete penetrations are located in the south and east walls at the southeast corner of the second level, near a spray-painted number "4." Pointing mortar is deteriorated in the vicinity of some windows at the second level, leaving open channels for air and moisture to enter.

C. *Banked athletic track at mezzanine with metal railing and wood ledges*

Non-original fiberboard clads the banked track and is in fair condition, with some gaps noted between panels and corners peeling up from the substrate. The original track may still be in place beneath the existing track surface but this has not been confirmed. Metal railings are original and in good condition, currently painted blue. Wood ledges are in fair condition, with significant scuffs and scrapes and a worn finish patina at the tongue-and-groove boards.

D. *Exposed metal roof truss supported by double-height pilasters*

The roof trusses and pilasters retain their original configurations and appear to be in good condition.

Stairs (2.6.3/4)

A. *Concrete bases, wood handrails, wood trim, and wood half-wall caps*

Concrete stairs, hallways, and base trim at Building C appear to be a continuous-pour installation. Vinyl or asbestos tiles were installed throughout the circulation spaces to the east and west sides of the gymnasium but have been removed at some stairwell areas, exposing a series of cracks in the concrete (particularly at the east end). Where tiles are still extant, they are in fair condition, exhibiting cracks and broken pieces. Water intrusion may be a contributing factor to the condition of the concrete and plaster at stair landings at Building C. Stairways at the west end of Building C are in better condition than those at the east end, but active water intrusion, cracked concrete, and mastic residue are also factors here. Handrails are original and in good condition, with general wear and soiling noted.

Classrooms (2.6.3/5)

A. Wood or concrete wall bases, trim, and built-in casework

As with Building A, classrooms at Building C retain a majority of original materials and configurations, including baseboard and mid-wall trim, chalkboards and chalk trays, and wood built-ins. The classrooms at the west end are primarily used for dance and other athletic programming, whereas the classrooms at the east end—upstairs only—are configured for more traditional classroom use. In general the materials are in good condition. Trim and built-ins are painted the same dusky orange color as elsewhere on campus. Built-ins are still in use with original hardware with updated locking hardware.

B. Built-in blackboards with wood chalk rails

Most chalkboards are in good condition and remain exposed and in use, although some have been painted over (or replaced with different materials) or covered with posters and photographs. Chalk rails are in good condition, with newer aluminum rails at the lip.

2.6.3/1 Old Gymnasium from mezzanine level.

2.6.3/2 Banked athletic track at mezzanine.

2.6.3/3 Gymnasium north elevation from ground level.

2.6.3/4 Old Gymnasium stairs.

2.6.3/5 Old Gymnasium typical classroom.

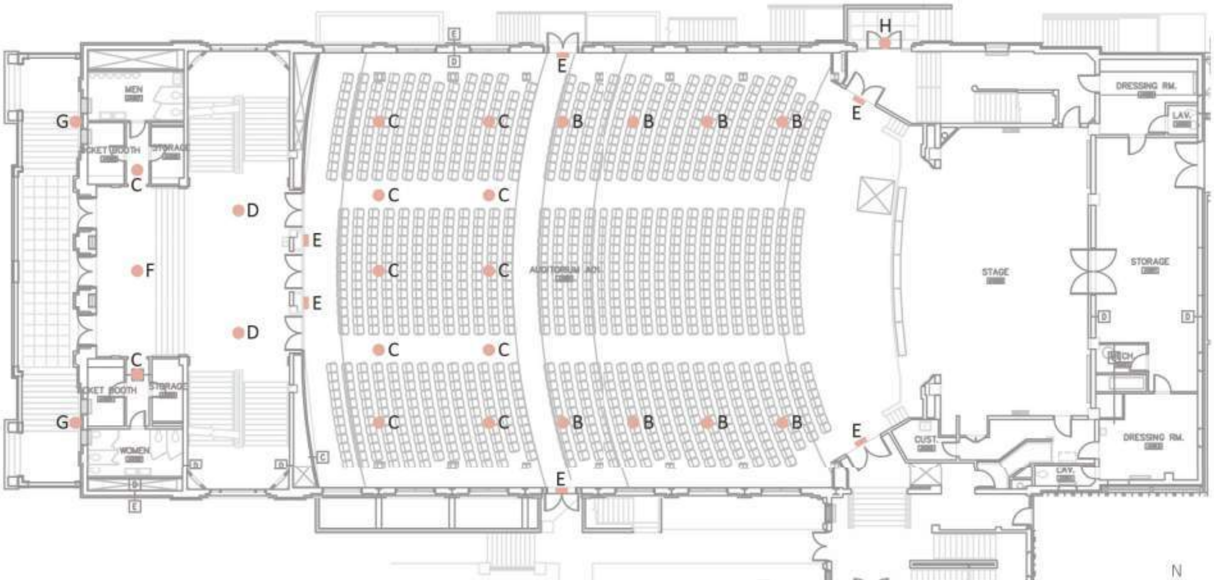
2.7 Historic Light Fixtures

2.7.1 Description of Light Fixtures

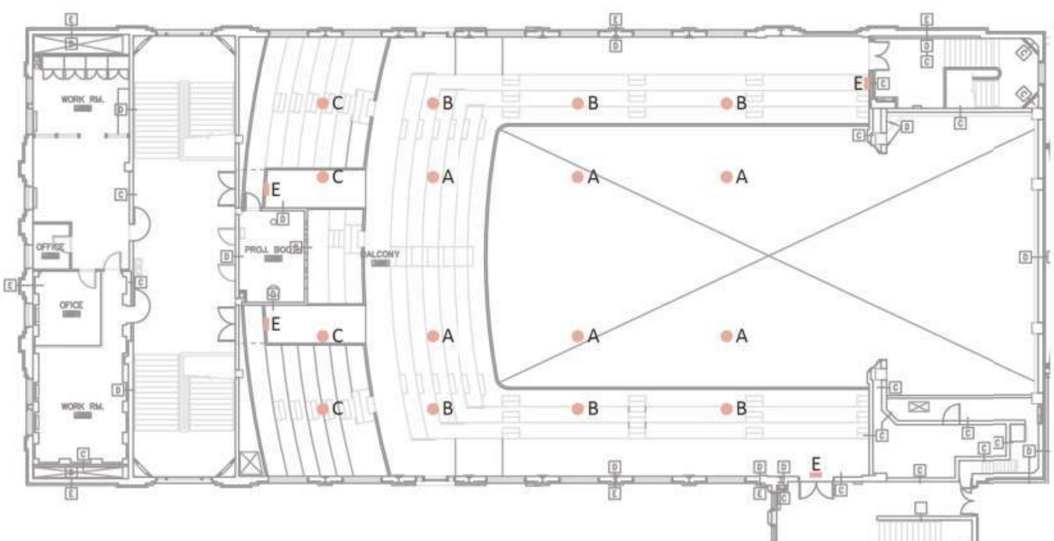
Remaining historic light fixtures are located at the auditorium building (Building B), and are recognizable for their Art Deco-style characteristics. The interior light fixtures consist of 16 bronze ceiling surface-mounted fixtures (Plan Key: C) (2.7.1/3), six bronze pan light fixtures (Plan Key: A) (2.7.1/1), and three kinds of bronze pendant light fixtures that add up to a total of 17 pendants (Plan Key: B, D, F) (2.7.1/2, 4, 6). There are also 10 original illuminated exit signs (Plan Key: E) (2.7.1/5). The exterior light fixtures consist of two large copper sconces (Plan Key: G) (2.7.1/7) flanking the auditorium's main entrance and a smaller metal sconce (Plan Key: H) (2.7.1/8) located above one of the building's northern exits.

2.7.2 Summary of Existing Conditions

The historic light fixtures will require basic refurbishment and maintenance. Several of the pendant and pan light fixtures have canopies that need to be readjusted back into place. Besides that, the light fixtures are generally in good condition.



BUILDING B- GROUND LEVEL



BUILDING B- SECOND LEVEL

2.7.1/1 Fixture A: bronze pan light fixture.

2.7.1/2 Fixture B: bronze pendant.

2.7.1/3 Fixture C: bronze ceiling surface-mounted light fixture.

2.7.1/4 Fixture D: bronze pendant.

2.7.1/5 Fixture E: illuminated exit sign.

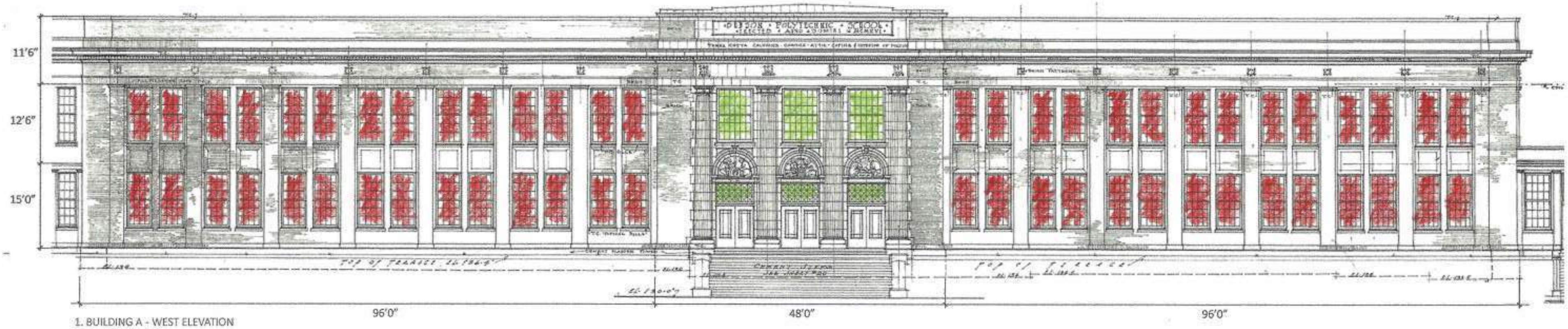
2.7.1/6 Fixture F: bronze pendant.

2.7.1/7 Fixture G: exterior copper sconce.

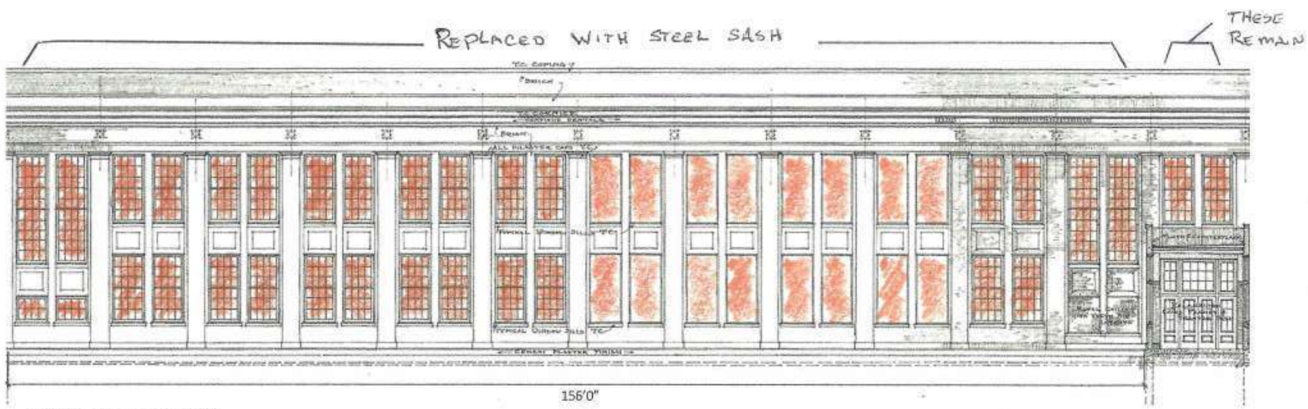
2.7.1/8 Fixture H: exterior metal sconce.

Appendix A

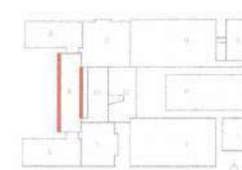
Window Survey Elevations

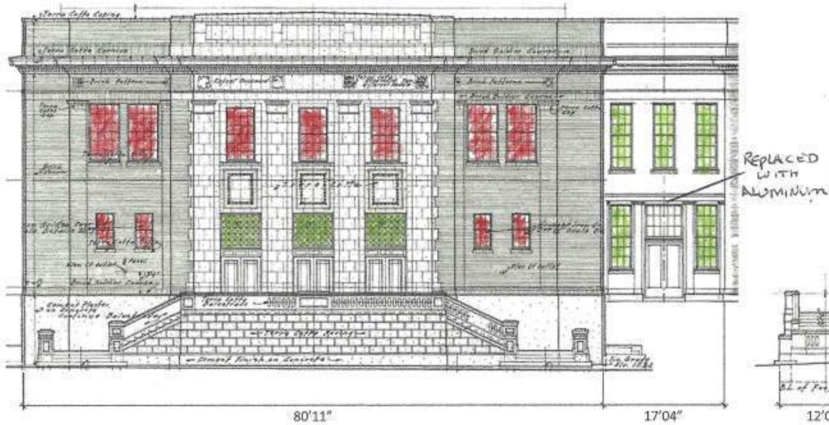


1. BUILDING A - WEST ELEVATION
Scale: 1/16" = 1'0"

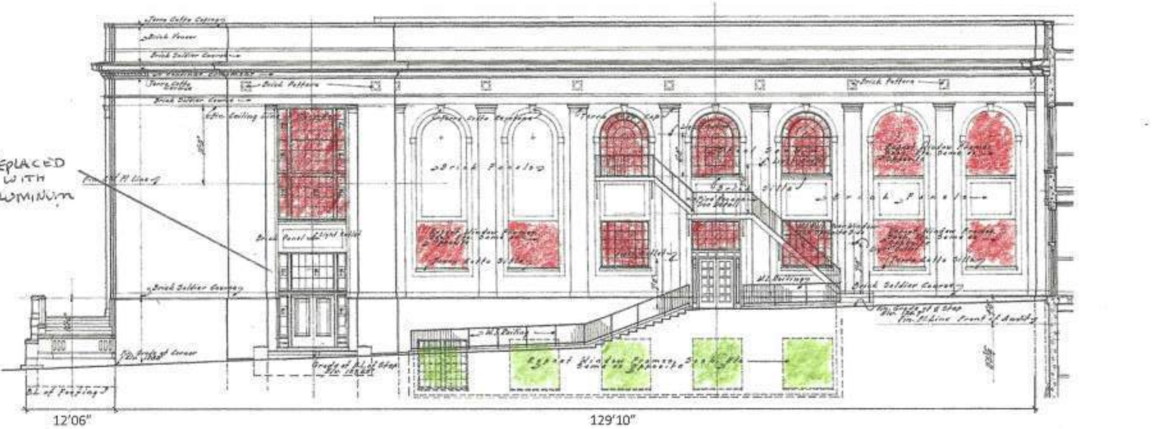


2. BUILDING A - EAST ELEVATION
Scale: 1/16" = 1'0"

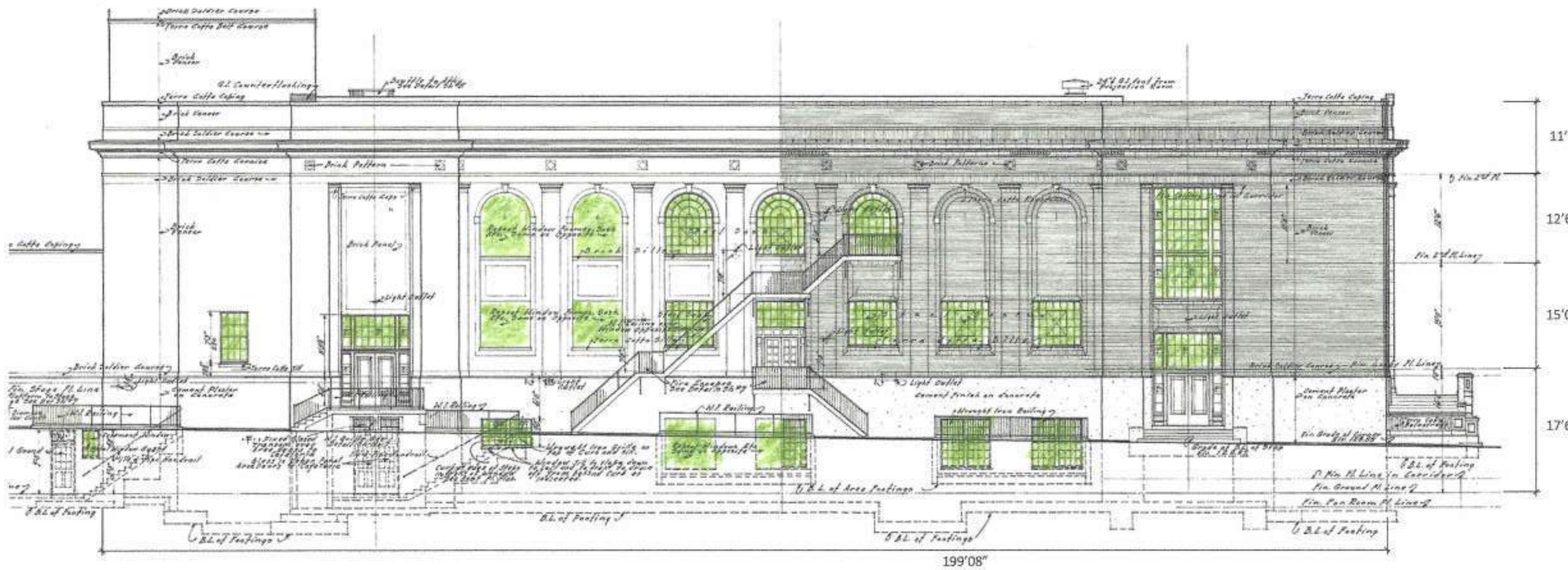




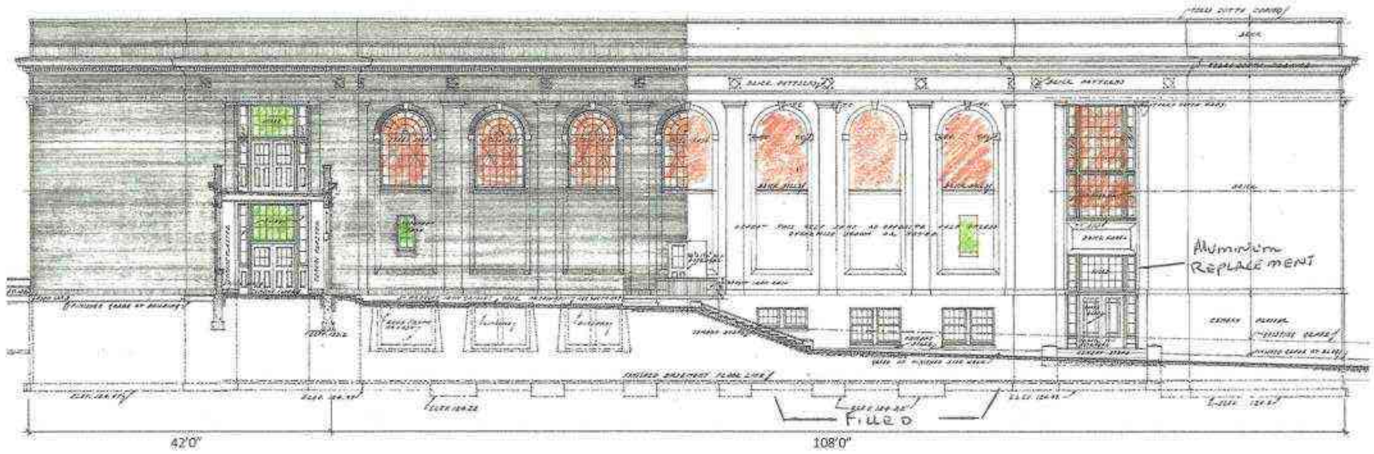
3. BUILDING B - WEST ELEVATION
Scale: 1/16" = 1'0"



4. BUILDING B - SOUTH ELEVATION
Scale: 1/16" = 1'0"



5. BUILDING B - NORTH ELEVATION
Scale: 1/16" = 1'0"



6. BUILDING C - NORTH ELEVATION
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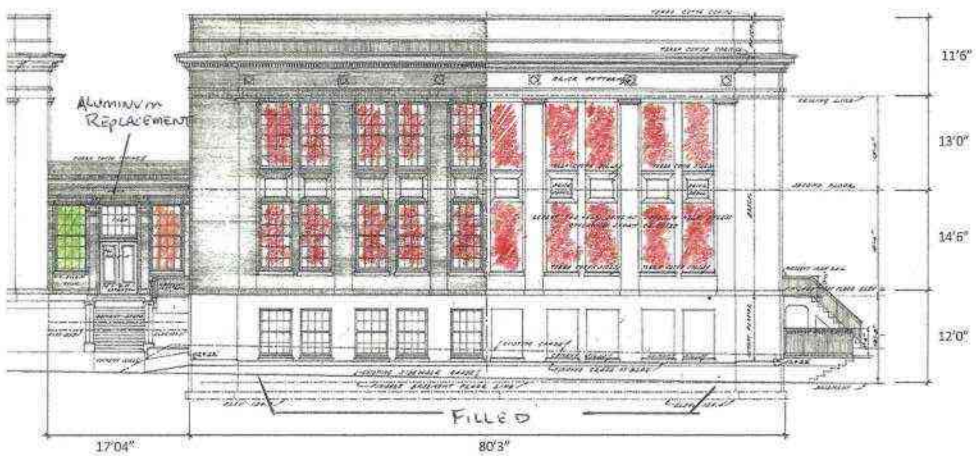
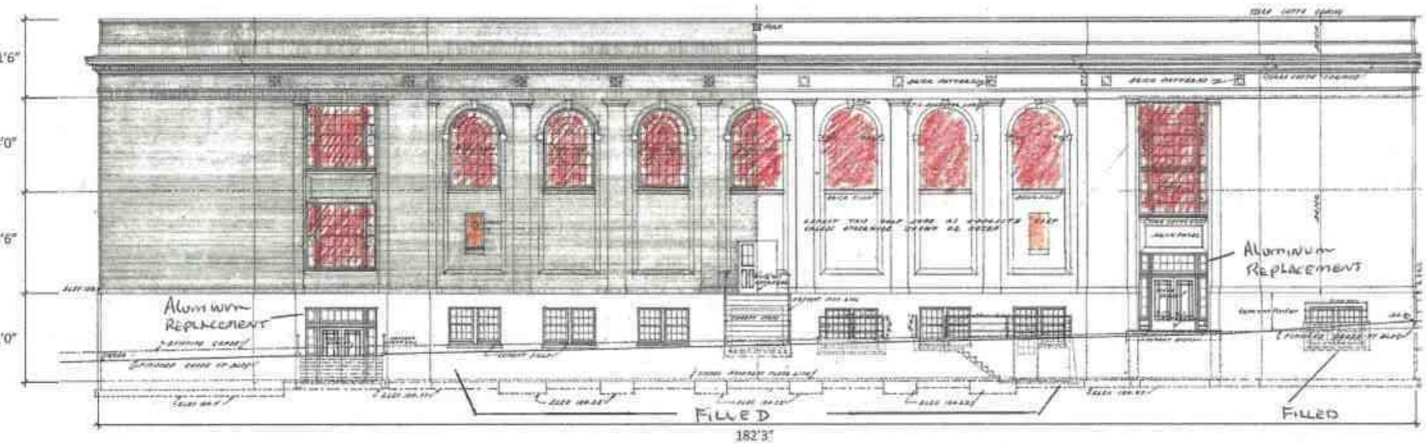
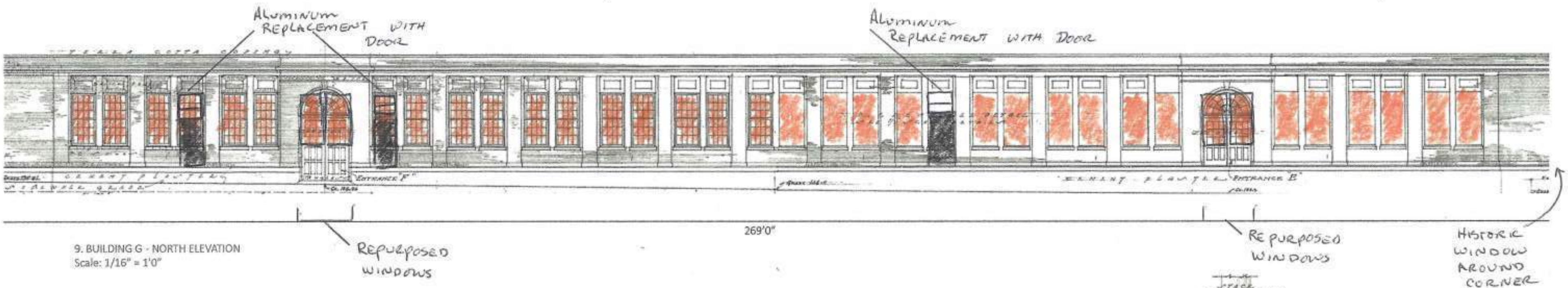


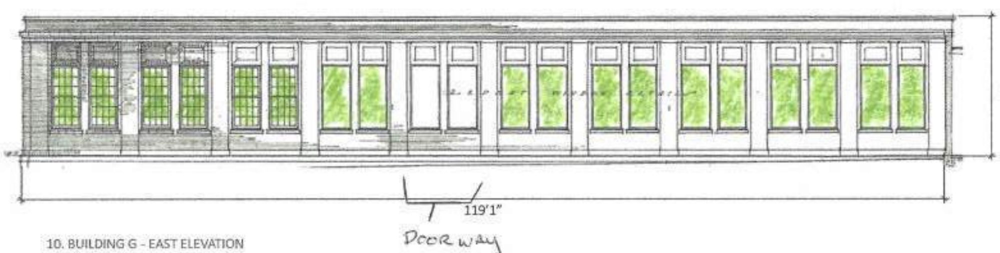
7. BUILDING C - WEST ELEVATION
Scale: 1/16" = 1'0"



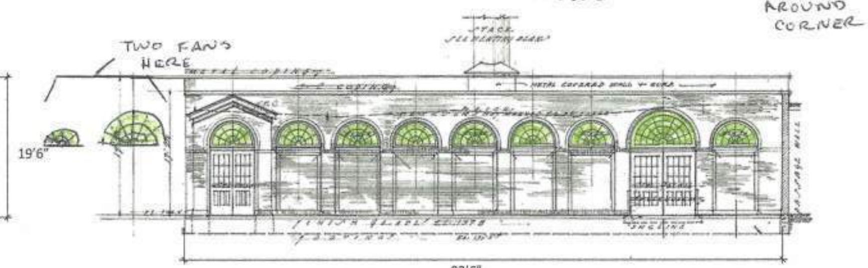
8. BUILDING C - SOUTH ELEVATION
Scale: 1/16" = 1'0"



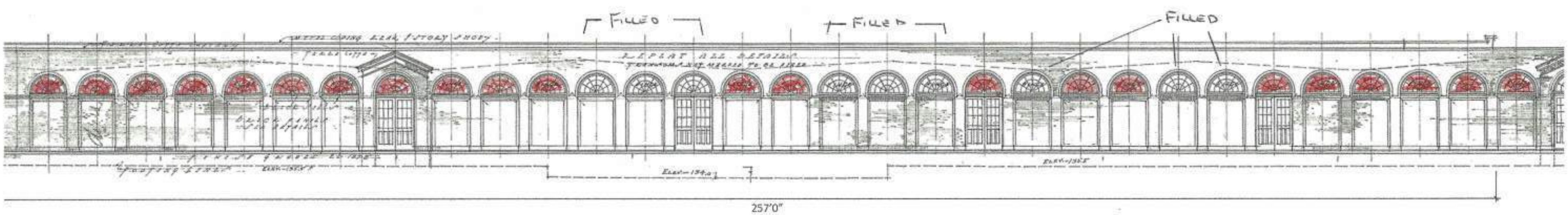
9. BUILDING G - NORTH ELEVATION
Scale: 1/16" = 1'0"



10. BUILDING G - EAST ELEVATION
Scale: 1/16" = 1'0"

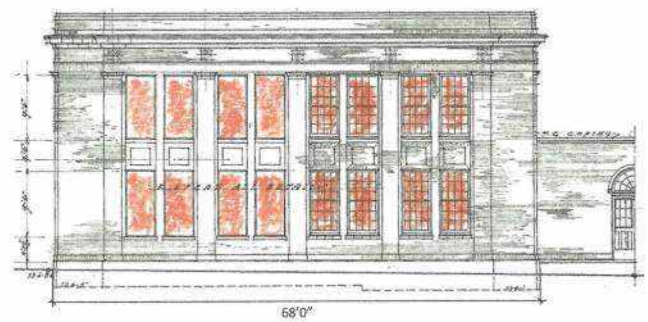


11. BUILDING E - EAST ELEVATION (HISTORIC PORTION ONLY)
Scale: 1/16" = 1'0"

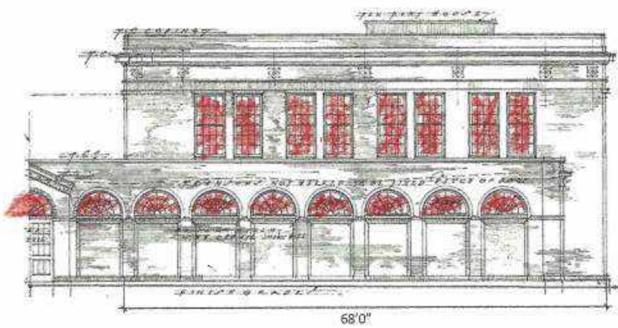


12. BUILDING G - SOUTH ELEVATION
Scale: 1/16" = 1'0"

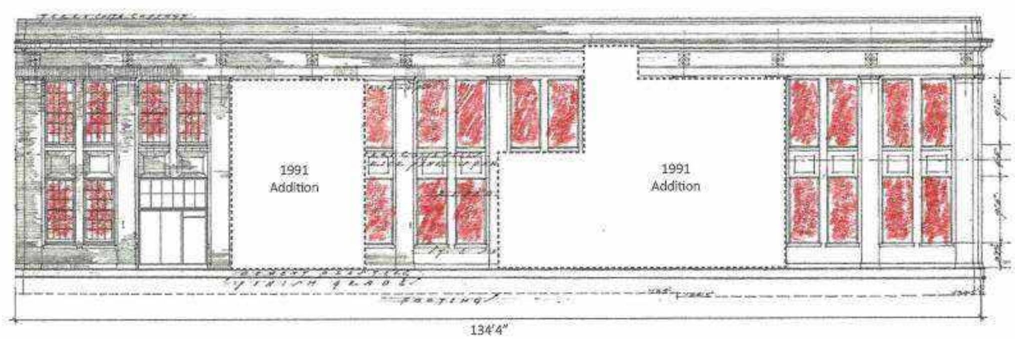
17. BUILDING K - EAST ELEVATION
Scale: 1/16" = 1'0"



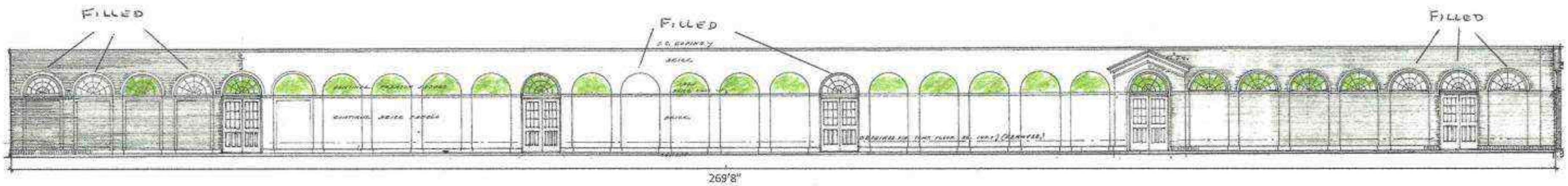
18. BUILDING K - NORTH ELEVATION
Scale: 1/16" = 1'0"



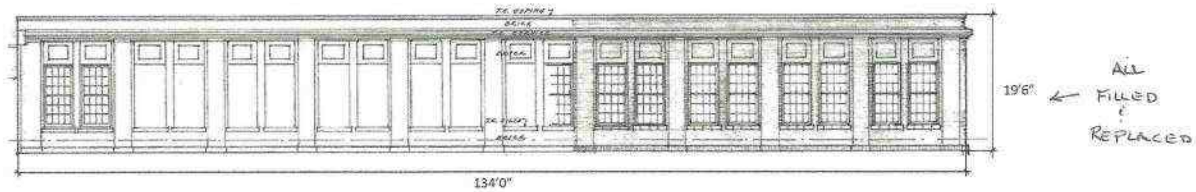
19. BUILDING K - SOUTH ELEVATION
Scale: 1/16" = 1'0"



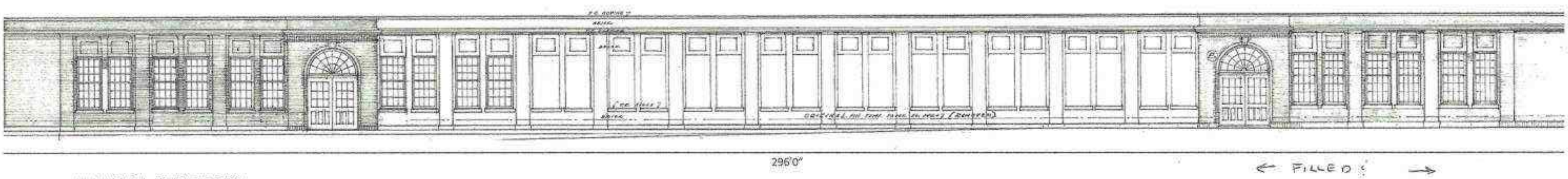
20. BUILDING K - WEST ELEVATION
Scale: 1/16" = 1'0"



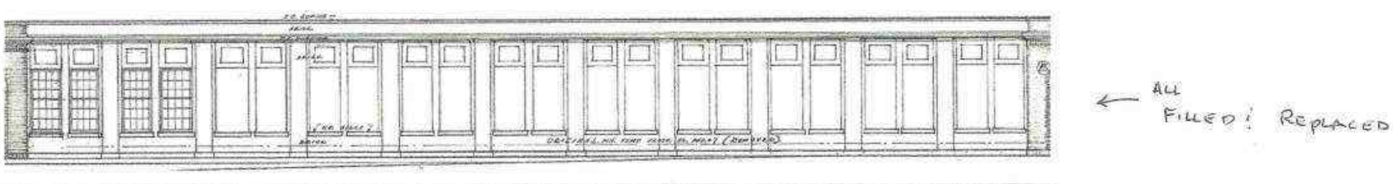
13. BUILDING J - NORTH ELEVATION
Scale: 1/16" = 1'0"



14. BUILDING J - EAST ELEVATION
Scale: 1/16" = 1'0"



15. BUILDING J - SOUTH ELEVATION
Scale: 1/16" = 1'0"



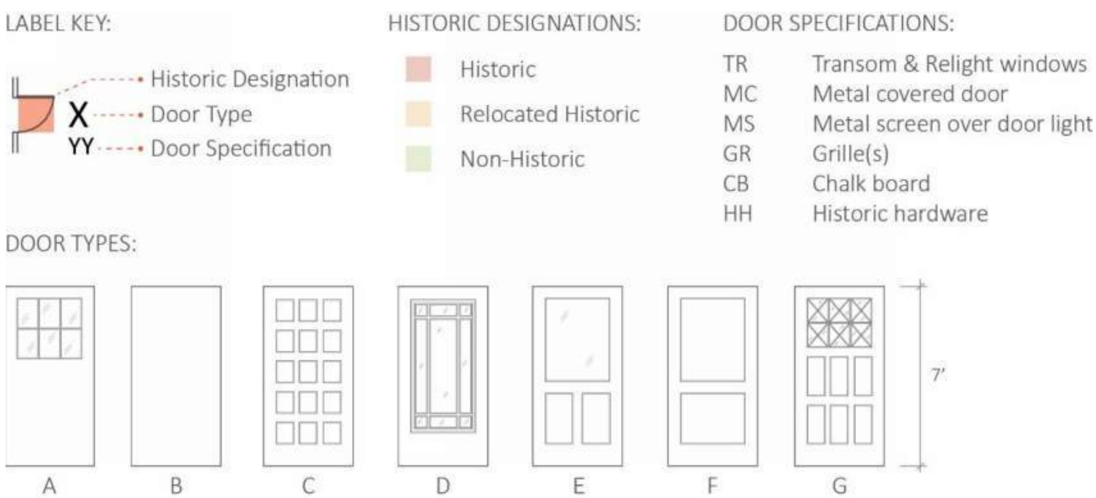
16. BUILDING J - WEST ELEVATION
Scale: 1/16" = 1'0"

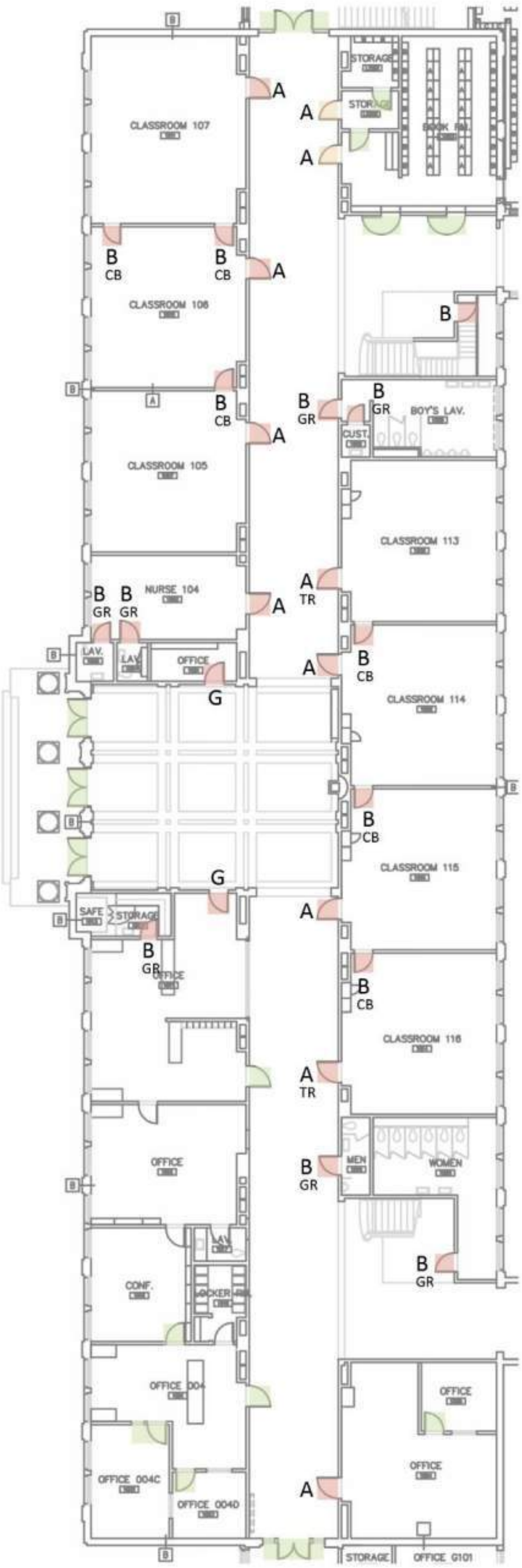
Appendix B

Historic Door Types and Locations

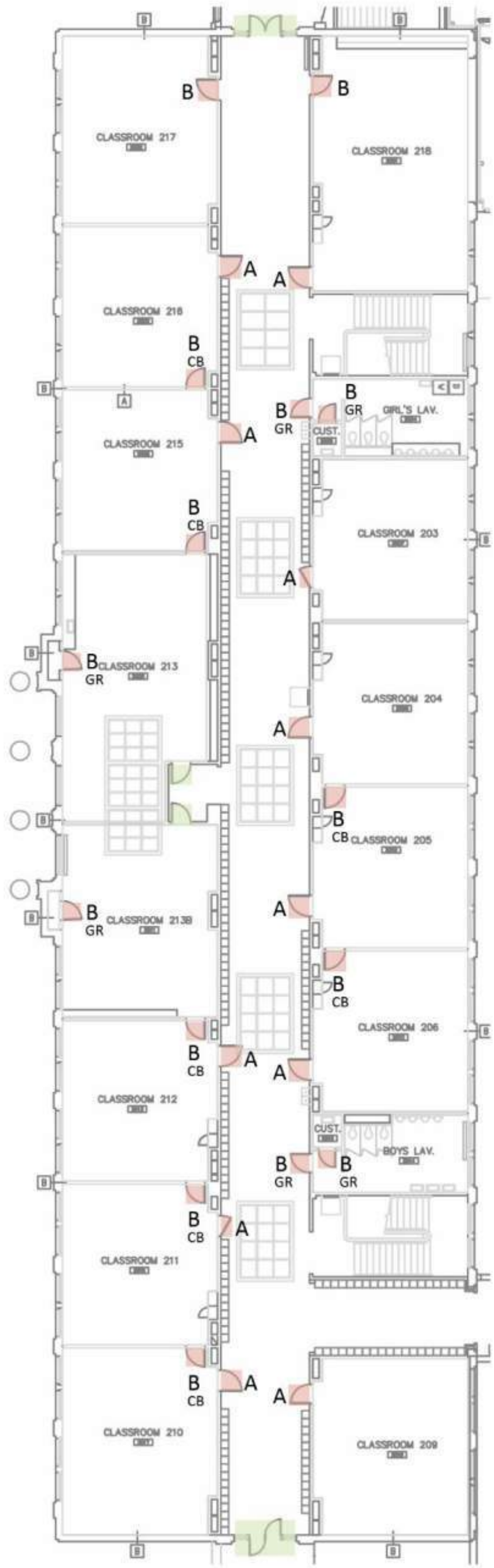
Architectural Resources Group

APPENDIX B - Historic Door Types and Locations



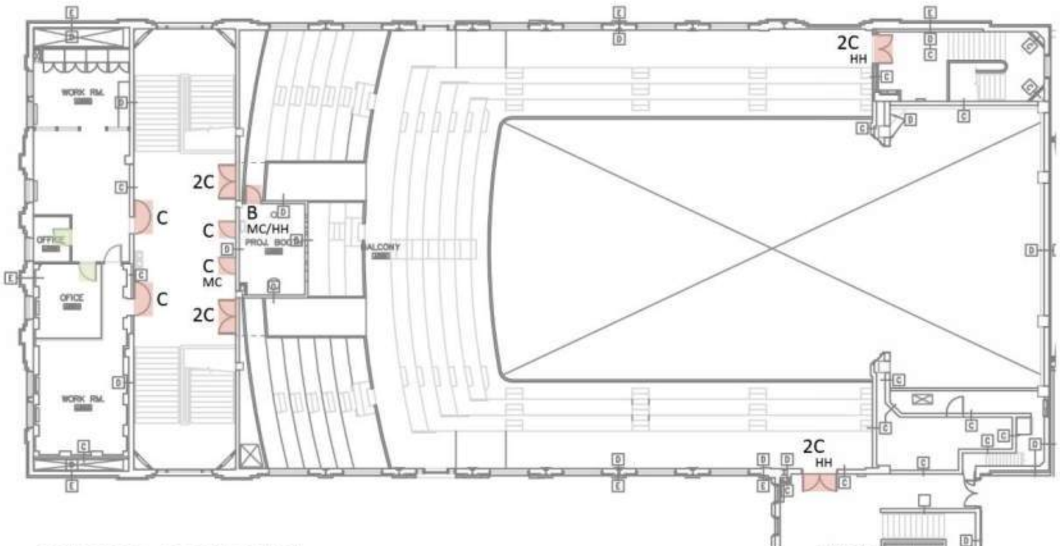


BUILDING A- GROUND LEVEL

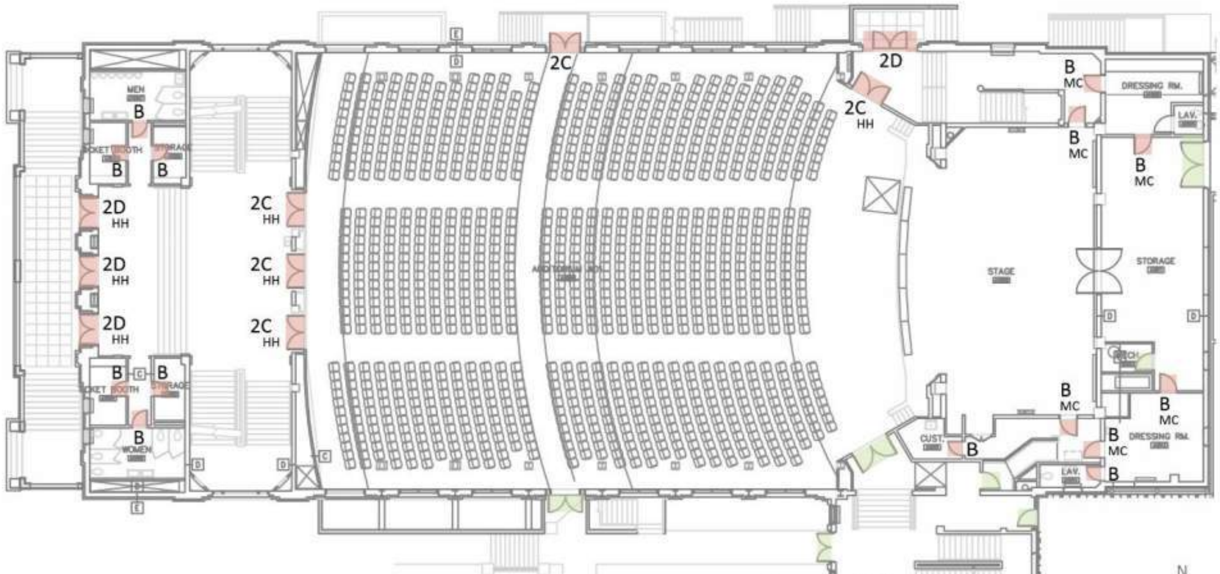


BUILDING A- SECOND LEVEL

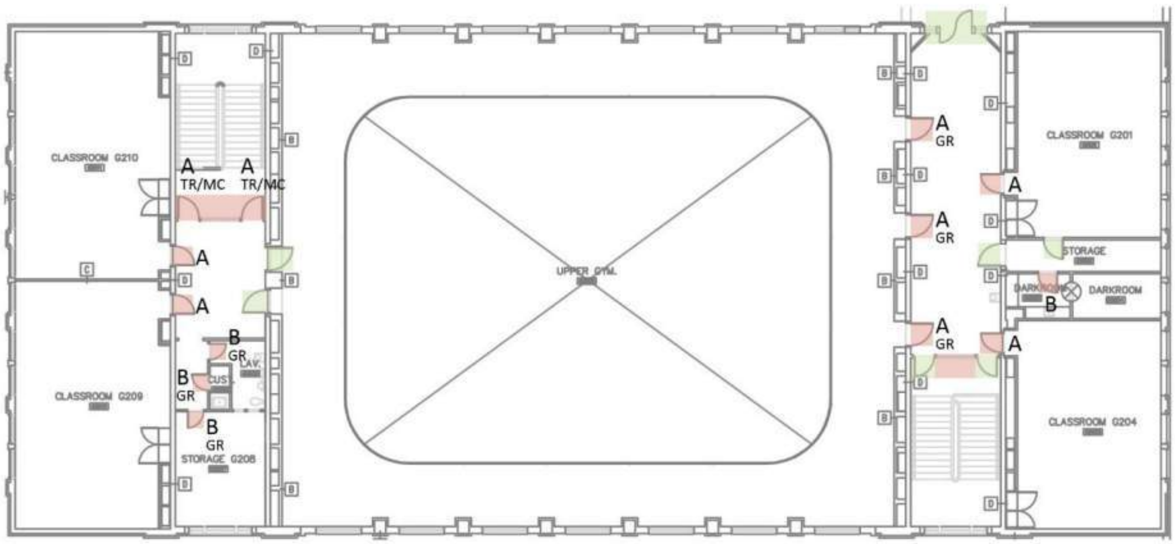
N



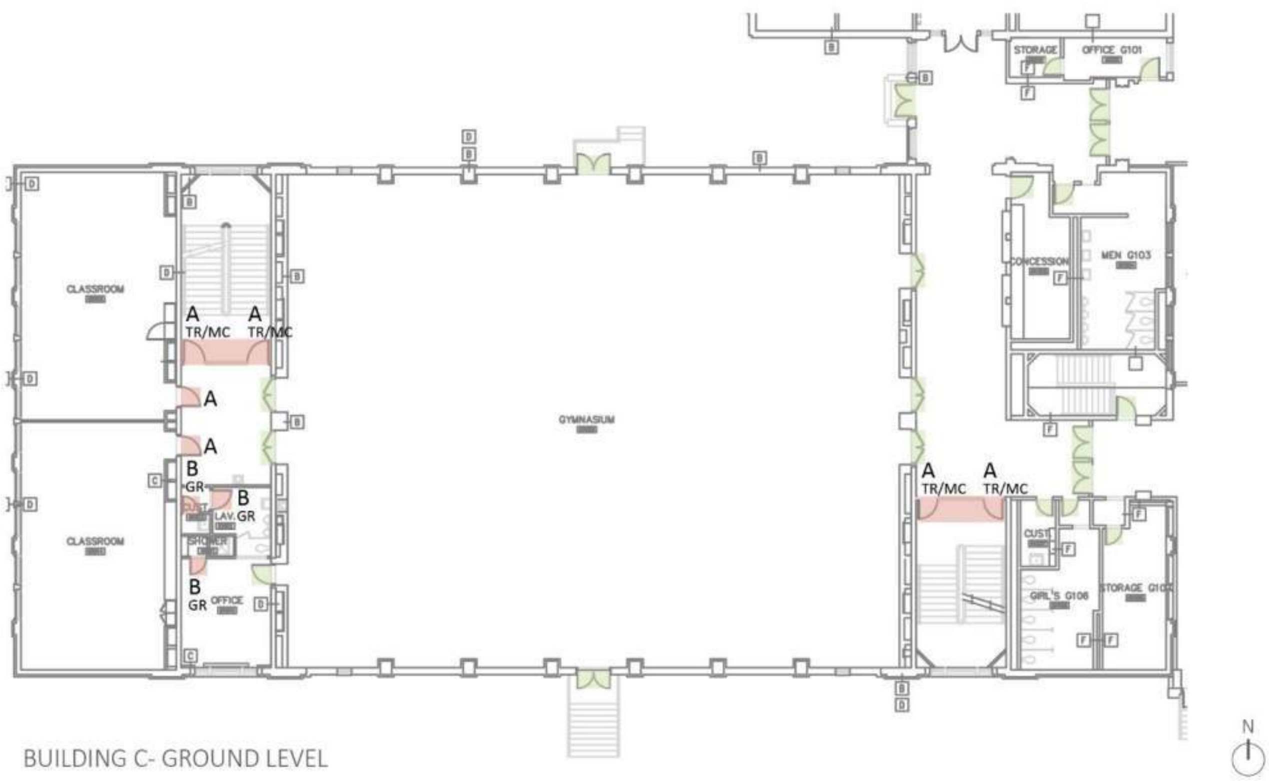
BUILDING B- SECOND LEVEL



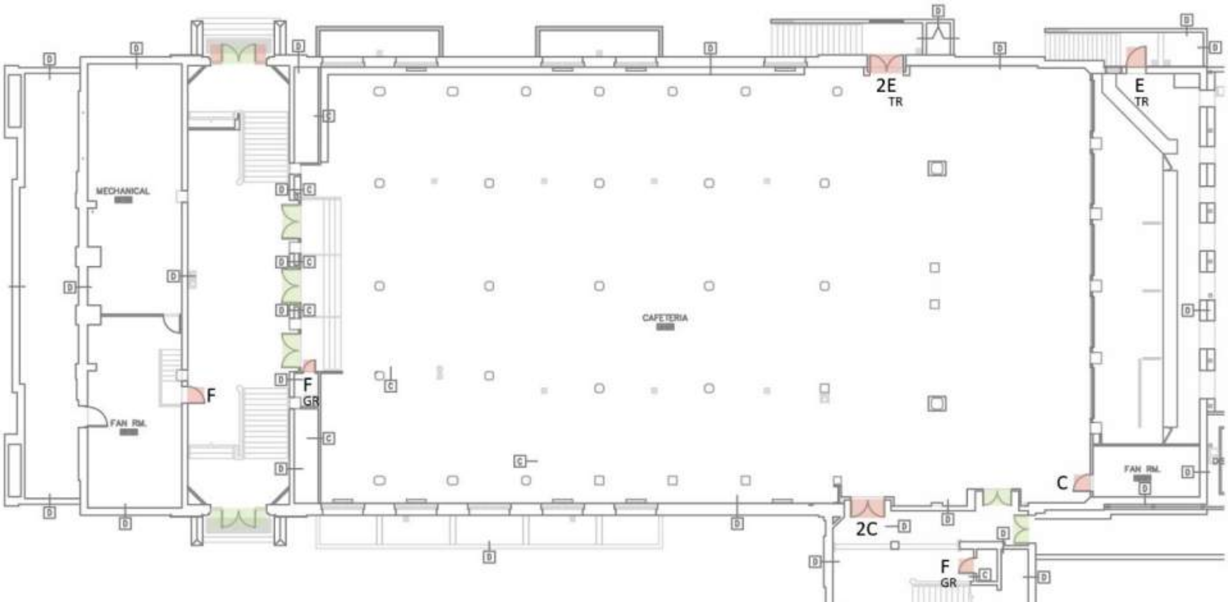
BUILDING B- GROUND LEVEL



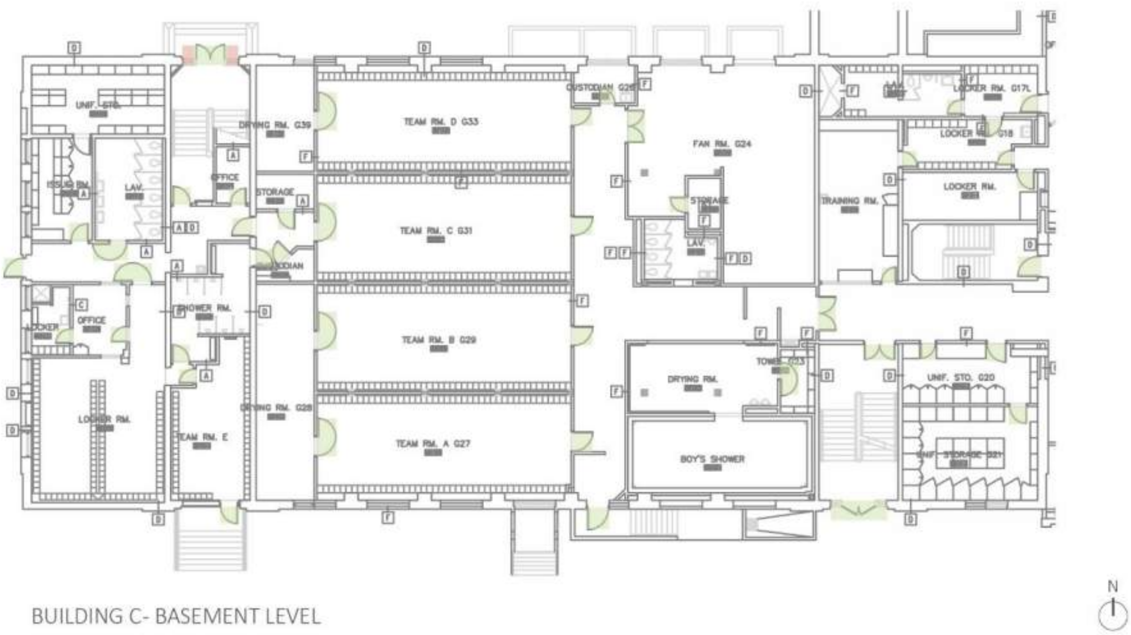
BUILDING C- SECOND LEVEL



BUILDING C- GROUND LEVEL



BUILDING B- BASEMENT LEVEL



BUILDING C- BASEMENT LEVEL

Architectural Resources Group

Benson Polytechnic High Schoool (Project #16193)

Historic Door Schedule

Nov/Dec 2016

Door Type	Door Quantities				Door Lights	Nr. of Historic Transom and Relight (TR) windows	Nr. of Mtl Covered (MC) Doors	Nr. of Doors w/ Historic Hardware (HH)	No. of Doors w/ Grille Vent (GR)	No. of Doors w/ Chalk Board (CB)
	Building A	Building B	Building C	Total						
A	22	0	15	37	2X2, 2X3, 3X3	32	6	1	0	0
B	29	12	7	48	N/A	0	7	1	18	13
C	0	25	0	25	N/A	0	1	18	0	0
D	0	2	0	2	3X3	0	0	0	0	0
E	0	3	0	3	1X1	2	0	0	0	0
F	0	3	0	3	N/A	0	0	0	3	0
G	2	0	0	2	2X3	0	0	0	0	0
TOTALS	51	45	22	118	N/A	34	14	20	21	13
SUMMARY OF EXISTING CONDITIONS	Buildings A, B, and C are the only buildings at Benson Polytechnic with remaining historic doors. Building B has the only historic exterior doors remaining. All other remaining historic doors are interior doors. In general the remaining historic doors are in good condition. All interior historic doors are 1 3/4" thick wood and 7'0" in height. Widths vary from door to door.				Door light glass panes are in good condition. Some of the wood trim at the lights is cracked, broken, or missing. The Old Gym door lights have been painted over.	Historic transom and relight windows are in really good condition. Most of the original glass panes are still intact, including most of the wired glass panes at the staircases in Building C.	Sheet metal door coverings have minor dents and paint cracking. Besides that, metal is in good condition. All remaining historic metal covered doors are interior doors.	Most of the original historic hardware has been replaced except by several doors at Building B and one door at Building C. Most replacements consist of door knobs and a few off-the-shelf levers. Some doors are fixed shut and their handles have been removed.	Most grille vents are metal with a few cases of wood grilles. Metal grilles are in good conditions. Wood grilles have several broken slats.	Chalk boards have a wood frame and cover the top half of the door. These are located in Building A.
GENERAL REPAIR NOTES	Assume 25% of doors will require minor wood crack and split repairs. Assume 100% varnish refinishing or repainting.				Assume less than 5% glass pane replacement.	Assume 10% wood repairs needed on historic transom and relight windows. Assume 100% repainting.	Assume 100% repainting as part of door repaint scope.	Assume 15% of historic hardware will need minor maintenance and some missing part replacements (door stoppers, door hooks, etc). All doors will need to have ADA compliant hardware and some doors will therefore need hardware replacement. Doors that have been fixed shut will also require new hardware if operability is wanted.	Assume 10% of doors with grille vents will need broken wood slat replacement.	Chalk boards are in good condition. 100% of frames should be repainted as part of door repaint scope.

Appendix C

Repair Quantity Spreadsheet

Architectural Resources Group

Benson Polytechnic High Schoool (Project #16193)

Summary of Exterior Repair Quantities

January 2017

Repair Treatment	Repair Key	Material/Feature	Main Building A	Auditorium Building B	Old Gym Building C	Building E	North Shop Building G	South Shop Building J	Foundry Building K	Walkways	Totals	Unit	20% contingency
Brick and Concrete Repair Quantities													
General Surface Cleaning (25%)	Cl	Brick	10000	10000	10000	5000	5000	5000	5000		50000	SF	60000
Localized Cleaning: Biogrowth Removal	B_Cl	Brick	5%	5%	5%	5%	15%	5%	5%	5%	8%	SF	10%
Localized Cleaning: Graffiti/Stain Removal	L_Cl	Brick	3	12	12	4	0	6	20	0	57	SF	68.4
Repoint Mortar Joints**	JR	Brick	10	20	25	12	5	10	15	0	97	LF	116.4
Mortar Crack Repair**	M_CR	Brick	40	35	30	18	25	20	20	0	188	LF	225.6
Unit Crack Repair**	B_CR	Brick	2	12	2	0	0.5	5	5	0	26.5	LF	31.8
Unit Patch Repair**	B_PR	Brick	3	0	0	0	1	0	0	0	4	Each	4.8
Unit Replacement/Reinstallation**	B_Rpl	Brick	3	1	1	0	0	15	0	0	20	Each	24
Repoint Wall Intersection Joints	SInt	Concrete	0	40	65	0	200	100	100	0	505	LF	606
Foundation Wall Crack Repair****	F_CR	Concrete	4	60	22	0	24	0	4	0	114	LF	136.8
Horizontal Surface Crack Repair	C_CR	Concrete	0	20	35	0	0	0	0	400	455	LF	546
Concrete Patch Repair	C_PR	Concrete	0	6	9	0	0	0	0	100	115	SF	138
Large Concrete Patch Repair (with anchors)	C_PR_AR	Concrete	0	0	6	0	0	0	0	0	6	SF	7.2
Concrete Paver Replacement	C_Rpl	Concrete	0	2	0	0	0	0	0	10	12	Each	14.4
Parge Spall Patch	P_SP	Parge Coat	0	12	4	0	2	2	2	1	23	SF	27.6
Large Parge Spall Patch (with anchors)	P_SP_AR	Parge Coat	0	0	0	0	0	0	0	0	0	SF	0
Parge Patch Repair	P_PR	Parge Coat	0	10	8	0	21	0	1	0	40	SF	48
Parge Crack Fill	P_CF	Parge Coat	4	130	110	0	55	0	30	0	329	LF	394.8
Parge Crack Repair	P_CR	Parge Coat	4	60	22	0	25	0	20	30	161	LF	193.2
Parge Reattachment	PA	Parge Coat	0	0	0	0	0	0	0	0	0	SF	0
Sheet Metal Repair Quantities													
Replace Parapet Flashing (Option 1)	RF	Sheet Metal	775	760	900		1265	2500	580		6780	LF	8136
Terra Cotta Repair Quantities Repair Cost													
General Surface Cleaning (100%)	TC_Cl	Terra Cotta	5500	4500	3000	215	1400	3600	2000		20215	SF	24258
Localized Cleaning/ Stain Removal	L_TC_Cl	Terra Cotta	10	20	0	0	0	0	5		35	SF	42
Install Lead T-Caps @ Sky-Facing Joints (Option 1)	TCp	Terra Cotta	235	70	90		120	150	120		785	LF	942
Install Lead T-Caps @ Sky-Facing Joints	TCp	Terra Cotta				15	15	165			195	LF	234
Repoint Joints	TC_JR	Terra Cotta	200	870	120	25	265	165	0		1645	LF	1974
Repoint Vertical Joints @ Coping (Option 1)	TC_JR	Terra Cotta	235	70	90		120	150	120		785	LF	942
Unit Crack Repair	TC_CR	Terra Cotta	10	10	5	5	5	5	5		45	LF	54
Unit Glaze Repair	TC_GR	Terra Cotta	75	90	85	10	10	5	55		330	SF	396
Unit Patch Repair	TC_PR	Terra Cotta	30	20	5	8	30	5	45		143	Each	171.6
Unit Replacement	TC_Rpl	Terra Cotta	4	30	0	0	0	0	0		34	Each	40.8
Unit Stabilization w/ Helical Anchors	TC_AR	Terra Cotta	8	0	0	0	0	0	0		8	Each	9.6
Wood Window Repair Cost													
Repair Type Red		Wood Windows	56	13	23		22		39		153	Unit	153
Repair Type Orange		Wood Windows	46		4		33		16		99	Unit	99
Repair Type Green		Wood Windows	6	19	5	11	18	22	40		121	Unit	121
			108	32	32	11	73		95				
Steel Window Repair Cost													
Repair Type Red		Steel Windows		11	7						18	Unit	18
Repair Type Orange		Steel Windows			7						7	Unit	7
Repair Type Green		Steel Windows		11							11	Unit	11

* Provide lump sum amount for very minor sheet metal repair (re-solder open/broken seams, straighten bent sections, etc.)

** Condition of brick and mortar above terra cotta cornice is not known due to inaccessibility, but they are expected to exhibit a higher rate of deterioration due to greater exposure

*** Unit replacement at Building J is for nonhistoric infill bricks that are broken or missing

**** Quantities are assumed based on severity of crack(s) in parge coat overlay

D. ARCHITECTURE

In addition to the approach outlined for Historic Architecture in Section C, the approach to new buildings and major renovations will evolve in Schematic Design. Technical standards will generally align with PPS Design Standards, and programming will follow the Benson Polytechnic Focus Option Educational Specification.

E. STRUCTURAL

Benson Polytechnic High School — Portland Public Schools

Conceptual Structural Narrative

April 26, 2017

GENERAL

The Benson High School renovation project will consist of a complete renovation and modernization of Benson High School located at 546 NE 12th Ave in Portland, Oregon. The project will consist of renovations of existing structures and construction of new buildings/additions as discussed below. Reference the associated conceptual structural sketches for additional information regarding the structural scope of the project.

New construction will conform to the 2014 Oregon Structural Specialty Code based on the 2012 International Building Code.

Seismic renovations of existing buildings will conform to the standard ASCE 41-13 “Seismic Evaluation and Retrofit of Existing Buildings.” All existing buildings on the campus will be seismically upgraded to the Basic Performance Objective Equivalent to New Building Standards (BPON) for a Risk Category III Building, with the exception of the KBPS Building, which will not receive structural modifications. The 1964 “New Gym” building will be seismically upgraded to BPON for a Risk Category IV Building.

There are currently twelve (12) unique buildings on the Benson High School campus, as located in figure 1:

1. 1916 Main Building (A Wing)
2. 1916 North Shops (C Wing)
3. 1916 Foundry (F Wing)
4. 1916/1930/1991 Boiler House, Stock Room, Music Room (H Wing East)
5. 1918 South Shops (E Wing)
6. 1923 Old Gym (G Wing West)
7. 1930 Auditorium (B Wing)
8. 1953 Automotive & Aeronautics Building (D Wing)
9. 1953 Library & Science (H Wing South)
10. 1964 New Gym (G Wing East)
11. 1991 KBPS (K Wing)
12. 1991 Library, Health Sciences, Kitchen Addition (H Wing North)

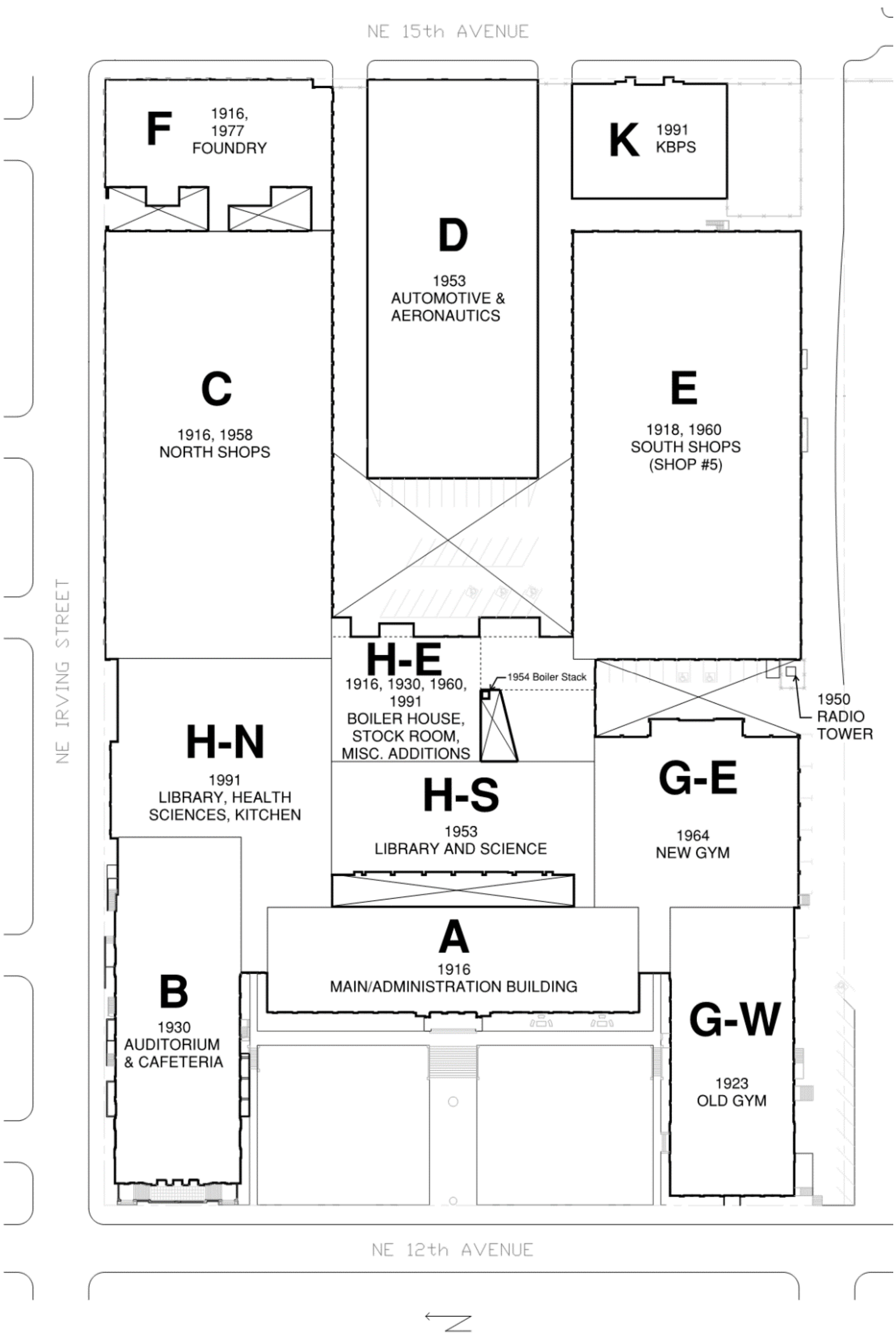


Figure 1: Existing Benson High School site plan with wing designations and approximate years built/modified.

In general, the structural scope of the project will consist of the following:

- Demolish the 1916/1930/1991 Boiler House/Stock Room/Music Room (H Wing East), the 1953 Library & Science Building (H Wing South), and the 1953 Automotive & Aeronautics Building (D Wing).
- Demolish the majority of the 1918 South One-Story Shops (E Wing), potentially preserving the north façade and salvaging heavy timber girders for reuse elsewhere.
- Construct a new two-story building near the current location of the H Wing East, between the C and E Wings and connecting to the H Wing North and G Wing East. Construct a new two-story building in roughly the same location as the current E Wing. Construct a new two-story building in a portion of the current D Wing footprint. Infill the space between the existing C Wing and F Wing with a new two-story structure.
- Demolish a significant portion of the North Shops (C Wing) and construct a new two-story addition in its place, heavily renovating the remaining historic portion.
- Renovate the 1916 Main Building (A Wing), 1916 Foundry (F Wing), 1923 Old Gym (G Wing West), 1930 Auditorium (B Wing), 1964 New Gym (G Wing East), and 1991 Library/Health Sciences/Kitchen Addition (H Wing North).
- No structural modifications (including seismic evaluation and retrofit) are proposed for the 1991 KBPS Building (K Wing).

EXISTING BUILDING DESCRIPTIONS

For the buildings that are to remain and receive renovations, the following existing building descriptions are meant to assist in understanding the nature of the renovation work and how it will relate to the existing structural systems.

1916 Main Building (A Wing) – Existing Building Description:

The 1916 Main/Administration Building (A Wing) measures approximately 240 feet by 67 feet in plan. There are 2 stories above grade with a partial basement near the northeast corner and a below-grade plenum chamber running most of the length of the building along the center corridor. Previous structural modifications include minor seismic improvements in 1997 and 2002. The following table summarizes the primary structural components of the building.

Component	Description
Foundations	Conventional concrete spread and strip footings.
Basement Floor	4” concrete slab on grade (reinforced).
First Floor Slab	4” concrete slab on grade/on bearing walls and concrete beams over the basement and plenum.
Second Floor	Wood joists spaced at 16” spanning to bearing walls.

Roof	Wood rafters spaced at 16" with ½" plywood sheathing over 1x decking; roof joists also support suspended ceiling framing to form the attic space.
Exterior Bearing Walls	9"-17" thick unreinforced masonry walls. A steel frame was added along the exterior walls in 1997 with the intent to prevent floor collapse in the event of wall failures, but lacks footings and may be undersized. North and south end walls are hollow clay tile supported by metal stud framing added in 1997.
Interior Bearing Walls	The concrete basement walls act as bearing walls to support parts of the first floor, along with hollow clay tile partitions in the air plenum that may support the corridor slab. The north/south walls along the corridor are bearing walls that support the second floor and roof framing.
Trusses	Wood trusses with steel rods support the second floor and roof at large openings in the north/south bearing walls, over the lobby and at the stairs.
Columns	Wood posts at trusses and beams where there are gaps in the north/south bearing walls.
Entry Portico Columns	Clay tile column cores, with tensioned steel rods anchored to the footings and a reinforced concrete wall behind the entablature added in 2002.
Lateral (Seismic) System	Lateral forces would be resisted primarily by the perimeter URM walls acting as shear walls. The 2002 seismic improvements braced the parapets, added a roof diaphragm, attached the roof to the exterior bearing walls, and extended the east/west cross walls to the roof to improve seismic behavior; however, the building still requires the addition of a lateral system designed specifically for seismic forces.

1916 North Shops (C Wing) – Existing Building Description:

The 1916 North One-Story Shops (C Wing) measure approximately 266 feet by 145 feet in plan. The building underwent significant structural renovations in 1958 and the current roof was built over the original saw-tooth roof structure in 1997. There are original connection passageways to the Foundry (F Wing) and Boiler House (H Wing East); an additional passageway to the Foundry was added in 1991 and the 1991 Library Addition (H Wing North) is attached to the entire west side of the building. The following table summarizes the primary structural components of the building.

Component	Description
Foundations	Conventional concrete spread footings.
First Floor Slab	4" concrete slab on grade (partially replaced in 1958).

Roof	Wood joists with plywood sheathing built over original heavy timber girders and saw-tooth trusses with 1-¾" T&G sheathing in 1997.
Columns	Steel pipe and wide flange columns (replaced original wood columns in 1958).
Interior Bearing Walls	Some of the interior CMU walls added in 1958 are attached to the original roof structure. Wood stud bearing walls built over the original wood beams support the new roof structure added in 1997.
Exterior Bearing Walls	9" unreinforced masonry along the south façade, 17" unreinforced masonry on the other three sides of the building.
Lateral (Seismic) System	Lateral forces would be resisted primarily by shear wall behavior of the URM walls. A roof diaphragm was added with the new roof and tied to the perimeter walls in 1997. The current lateral system is not adequate to resist seismic loads prescribed by modern building codes.

1916 Foundry (F Wing) – Existing Building Description:

The 1916 Foundry (F Wing, also referred to as the "Two Story Shops") measures approximately 135 feet by 68 feet in plan. There are 2 stories above grade with an original one-story passageway connecting to the North Shops (C Wing) on the south side. The building underwent significant renovations in 1977 including the addition of two CMU stair towers on the west side; an additional open-air passageway to the North Shops (C Wing) was added along with an elevator tower in 1991. The following table summarizes the primary structural components of the building.

Component	Description
Foundations	Conventional concrete spread footings.
First Floor Slab	Concrete slab on grade. Portions were replaced in 1977.
Second Floor (South)	Glulam beams added in 1977 are bolted to original heavy timber beams spaced at 13'. Sheathed with 2x4 laminated decking with ½" plywood sheathing in some rooms.
Second Floor (North, original foundry)	Original concrete mezzanine supported by concrete beams and columns. Second floor infilled with concrete on metal deck supported by glulam beams and columns over new concrete footings.
Low Roof (Passageway)	1-3/4" planking over wood beams.
Roof	Original heavy timber beams with glulams bolted on in 1977 support 3" T & G decking. Original saw-tooth trusses on the west end were removed in 1977.

Columns	Wood columns throughout, except for original reinforced concrete columns in the north foundry area. Wood columns added in 1977 near the perimeter bearing walls support the floor and roof framing in the south portion.
Exterior Bearing Walls	Most of the structure bears on the columns added in 1977; however, 13” – 17” URM walls are attached to the primary structure and take some load.
Stair Towers	Steel stairs inside reinforced 8” CMU bearing walls with concrete footings and slab on grade and T&G roof deck.
1991 Elevator Tower & Passageway	8” CMU walls with reinforced concrete footings and steel beams supporting metal deck roof.
Lateral (Seismic) System	Lateral forces would be resisted primarily by shear wall behavior of the URM walls, though they were not specifically designed to resist lateral loads. The current lateral system is not adequate to resist seismic loads prescribed by modern building codes.

1916 Boiler House with 1930, 1991 Additions (H Wing East) – Existing Building Description:

The original 1916 Boiler House has received numerous additions over the years, now collectively designated the “H Wing East” and measuring approximately 172 feet by 96 feet in plan. The original Boiler House and 1930 Stock Room Addition include one story below grade and one story above grade; the other additions are one story above grade. Several one-story storage rooms have been added outside the east wall. There is an open courtyard adjacent to the boiler stack near the center of this area, adjacent to the 1991 music room addition. The building is attached to the 1916 North Shops (C Wing), 1918 South Shops (E Wing), 1953 Library and Science Building (H Wing South), 1964 New Gym (G Wing East), and 1991 Library Addition (H Wing North), as well as being a collection of additions attached to the original Boiler House over time. The entirety of this building is proposed to be demolished including the portion of the 1916 URM passage that is under the upper level of the 1991 H Wing North Addition.

1918 South Shops (E Wing) – Existing Building Description:

The 1918 South One-Story Shops (E Wing) measure approximately 266 feet by 148 feet in plan. The building underwent significant renovations in 1960. There are connections to the 1930 Stock Room Addition and the 1991 Music Room/Passageway Addition in the H Wing East. The entirety of the existing building is proposed to be demolished with the possible exception of the north façade, which is described below.

Component	Description
Foundations	Conventional concrete spread footings.
Exterior Bearing Walls	9” unreinforced masonry along the north façade.
Lateral (Seismic) System	A new structural frame would need to be provided to support any portion of the façade that is retained.

1923 Old Gym (G Wing West) – Existing Building Description:

The 1923 Old Gym (G Wing West) measures approximately 182 feet by 80 feet in plan. There is a basement that is mostly below grade and a single tall story at the court area, with a second above-grade story at the east and west ends. A running track is suspended over the main court area from the roof trusses. The building has an original connection to the 1916 Main Building (A Wing) and the entire east side is attached to the 1964 New Gym (G Wing East). The following table summarizes the primary structural components of the building.

Component	Description
Foundations	Conventional concrete spread and strip footings.
Basement Floor	4" concrete slab on grade.
Retaining Walls	14-22" reinforced concrete retaining walls at the perimeter (with original window openings on 3 sides mostly infilled with CMU).
Interior Bearing Walls	Four 13" (9" in some locations) interior reinforced concrete bearing walls run north/south from the basement to the 2nd floor ceiling (2) and roof parapet (2) at the east and west ends.
Interior Columns	Reinforced concrete columns support the main gym floor.
Exterior Walls and Columns	Reinforced concrete columns support the roof trusses over the main gym area, with unreinforced masonry infill walls between the columns and at the parapet.
First Floor Framing	3-1/2" and 4" reinforced concrete slab over reinforced concrete beams at the main gym area. Concrete pan joists spanning to concrete walls at the east and west ends.
Second Floor Framing	Concrete pan joists spanning to bearing walls (east and west ends only).
Running Track	3x6" T & G planking over wood beams spanning to concrete columns, URM infill walls, and steel hanger rods (at the inner side) hung from the roof trusses.
Roof Trusses	Steel trusses with wood beams bolted to the top chord span the width of the building north/south over the main gym area; revised design dated 1924 (original 1923 drawings show wood trusses with steel tension rods).
Roof	2" T&G planking over 2x wood joists over bearing walls and roof trusses.
Lateral (Seismic) System	Lateral forces would be resisted primarily by shear behavior of the concrete walls and URM infill walls, although they were not specifically designed to resist lateral loads. The current lateral system is not adequate to resist seismic loads prescribed by modern building codes.

1953 Automotive & Aeronautics (D Wing) – Existing Building Description:

The 1953 Automotive & Aeronautics Building (D Wing) measures approximately 250 feet by 110 feet in plan. It is one story with three partial mezzanines and it is a freestanding structure without connections to other buildings. The entire building is proposed to be demolished.

1953 Library & Science Building (H Wing South) – Existing Building Description:

The 1953 Library & Science Building (H Wing South) measures approximately 170 feet by 67 feet in plan. There are 2 stories above grade with fan room penthouses at the northwest and southwest corners. There is an original two-story connection passageway to the Main Building, which the 1964 New Gym is entirely attached to on the south side, and the first floor is attached to the original 1916 passageway between the Main Building (A Wing) and the Boiler House, as well as the Boiler House itself (H Wing East). The 1991 Library Addition is attached to the second floor at the north end and the 1991 music room addition is attached to the east side of the building. The entire building is proposed to be demolished, including the south wall that is shared (structurally) with the 1964 New Gym (G Wing East) and the north wall that is shared (non-structurally) with the 1991 Library Addition (H Wing North).

1964 New Gym (G Wing East) – Existing Building Description:

The 1964 New Gym (G Wing East) measures approximately 133 feet by 118 feet in plan. There is one story below grade, which includes a tunnel under the south drive, and one tall story above grade with two mechanical penthouses. The building is entirely connected to the Old Gym (G Wing West) and Main Building (A Wing) on the west and to the Library and Science Building (H Wing South) on the north. The following table summarizes the primary structural components of the building.

Component	Description
Foundations	Conventional concrete spread footings.
Basement Floor	5” concrete slab on grade with minimal reinforcing. 6” tunnel slab along north and west ends is tied into existing (1953 and 1916) footings.
Columns & Basement Walls	Concrete columns and 8” interior concrete walls supporting first floor; 12” concrete retaining walls; steel columns supporting roof girders on west side.
First Floor Framing	Reinforced concrete tees (at longer spans) and pan joists.
Exterior Walls (1964)	6” Tilt-up concrete wall panels with 16”x20” columns spaced at 17’-24’ and 16”x21” beams at the parapet.
Connections (N Side)	8” concrete walls (with extensive original openings filled with CMU) of 1953 Library & Science building are shared and support roof structure; 1964 extensions above some existing walls at lower parapets.

1930 Auditorium (B Wing) – Existing Building Description:

The 1930 Auditorium (B Wing) measures approximately 200 feet by 81 feet in plan. There is one level below grade, the west end includes two above-grade stories, a balcony surrounds three sides of the main seating area on the second level, and a third-level penthouse is located over the stage at the fly loft. There is an original connection to the Main Building (A Wing) and the 1991 Library, Health Sciences, and Kitchen Addition (H Wing North) is attached to most of the east end of the building from the basement through the second level. The following table summarizes the primary structural components of the building.

Component	Description
Foundations	Conventional concrete spread and strip footings.
Basement Floor	4” reinforced concrete slab-on-grade.
Exterior Walls	Reinforced concrete walls extend from the basement (retaining) to the roof on all sides with integral columns supporting steel framing.
Interior Bearing Walls	Two reinforced concrete walls run north-south in the west end of the building at the lobby.
Columns	Reinforced concrete columns support the main auditorium floor. Reinforced concrete columns with steel cores support the balcony and roof trusses.
First Floor Framing	Reinforced concrete one-way slab over concrete beams and girders at the seating area and stage. Concrete pan-joist system at the lobby and the back of house area at the east and west ends.
Balcony (Back)	Two large steel built-up trusses clear span the auditorium in the north/south direction. A series of additional steel trusses cantilever off of the main truss in the east/west direction.
Balcony (Sides)	Steel trusses cantilever out from two reinforced concrete column lines (one in the exterior wall) with steel cores.
Balcony Level Slabs	The balcony floor consists of a folded concrete slab with integral beams that spans between the cantilevered trusses, with 8-9” concrete walls over the trusses supporting the slabs.
Roof Trusses	Built-up steel trusses span the width of the building north/south.
Roof Framing	3” concrete slab spanning to steel purlins over steel trusses; 3” concrete slab spanning to concrete beams and bearing walls.
Gridiron and Penthouse Roof	Steel beams and grating at the gridiron, 4” concrete slab over steel beams at penthouse roof.
Lateral (Seismic) System	Lateral forces would be resisted primarily by the reinforced concrete walls, although they were not specifically designed for lateral forces. The current lateral system is not adequate to resist seismic loads prescribed by modern building codes.

Connections (W Side)	Unreinforced masonry walls of 1923 Gym and 1916 Main Building support the edge of the roof deck. A CMU wall is located near the URM wall for part of this space and may provide additional support but appears to be intended as non-structural.
Roof Framing	26 ga. steel deck over steel open-web joists and steel beams spanning to built-up (6’ deep) steel girders, south wall of 1953 building (8” concrete), and tilt-up wall.
Penthouses	Steel framing with cross braces on each side.
Lateral (Seismic) System	Lateral forces would be resisted primarily by shear action of the perimeter tilt-up, concrete (1953), and unreinforced masonry (1916/1923) walls, although they were not specifically designed to resist lateral forces. The current lateral system is not adequate to resist seismic loads prescribed by modern building codes.

1991 Library, Health Sciences, and Kitchen (H Wing North) – Existing Building Description:

The 1991 Library, Health Sciences, and Kitchen Addition (H Wing North) measures approximately 130 feet by 130 feet in plan. There is one partial story below grade that is attached to the Auditorium (B Wing) on the west and continues east along the south side of the first floor footprint. The first floor above grade fills the entire space between the Auditorium (B Wing), the North Shops (C Wing), the Boiler House (H Wing East), the Library and Science Wing (H Wing South), and the Main Building (A Wing), and attaches to each of these buildings. There is a partial second story above grade running the length of the first floor east-west with a significant setback on the north side. The following table summarizes the primary structural components of the building.

Component	Description
Foundations	Conventional concrete spread footings.
Basement Slab	4” reinforced concrete slab on grade.
Basement Walls	10” reinforced concrete retaining walls.
First Floor Framing	Slab on metal deck over steel beams over basement; 4” slab on grade elsewhere.
Second Floor Framing	Metal deck (with concrete at interior two-story areas) over steel beams.
Roof Framing	Metal deck over steel beams.
Columns	Square tube steel columns.

Connection to A and B Wings	1991 Footings along the A and B Wings are generally doweled into and poured against the original 1916 footings. New steel framing along the original walls supports the floors in most cases with expansion joints; however, the original structure supports some decks without expansion joints. Portions of the 1991 structure are built over the existing structure and supported by added steel columns and enlarged footings within the older structures. Note that part of the 1930 façade was replaced in 1991 to make a portion of the original auditorium structure appear to be part of the 1991 addition.
Connection to C Wing	1991 basement walls and footings underpinned the original west wall of the C wing, with the 1916 unreinforced masonry wall retained, some original window openings infilled with CMU, an additional CMU parapet added, and metal stud veneer wall enclosing the space to the 1991 roof. The 1991 structure is generally but not entirely supported with its own framing for gravity loads.
Connection to H-S and H-E Wings	1991 steel columns are supported by grade beams from the original 1916 passage between the Main Building (A Wing) and Boiler House (H Wing East) on the west side. 1991 steel columns are over footings added in 1991 that underpin and dowel into the original 1916 Boiler House footings on the east side. Original 1916 URM passage walls are present along both sides of the corridor on the first floor, but generally do not bear significant gravity loads. Second floor and roof framing is fully supported by the 1991 structure with small expansion joints at the 1953 Library & Science building and the 1916 Boiler House.
Lateral (Seismic) System	Two steel braced frames are provided in each direction between the first floor and the high roof; however, one frame in each direction has geometry that is not allowed by current standards and the frames were likely designed for significantly lower seismic forces than current code requirements.

1991 KBPS Building (K Wing) – Existing Building Description:

The 1991 KBPS Building (K Wing) is a freestanding structure measuring approximately 100 feet by 72 feet in plan. There is one story above grade with an additional penthouse storage space in the center. The following table summarizes the primary structural components of the building.

Component	Description
Foundations	Reinforced concrete spread footings at columns and strip footings at walls.
First Floor Slab	4” reinforced concrete slab on grade.
Mezzanine Framing	12” TJI joists spaced at 16”.
Roof Framing	14-16” TJI joists spaced at 24” spanning to glulam beams and bearing walls.
Bearing Walls	Interior and exterior wood stud bearing walls.
Columns	Steel HSS columns supporting glulam beams.
Lateral (Seismic) System	Plywood shear walls with holdowns and plywood roof diaphragm.

Proposed Scope of Work

For each of the existing buildings to receive structural renovations and new buildings described above, the proposed structural scope of work is as follows.

Note that each existing building will be evaluated primarily as a standalone structure, with certain lateral elements supporting multiple adjacent buildings. Where joints exist between adjacent structures, they will generally be rigidly tied together, except at the existing K Wing and the new D Wing, so that all of the attached buildings function as a single unit with respect to seismic forces. If fire separation joints are deemed necessary at additional locations, seismic joints will also be required, requiring additional seismic provisions beyond what is described below.

A Wing – 1916 Administration/Main Building

The existing A Wing Main Building will be evaluated primarily as a standalone structure, with some of its proposed shear walls being shared with the attached G Wing East and H Wing North. The seismic renovation scope will include the following:

- Four to five new cast-in-place concrete shear walls distributed throughout the building in both directions (eight to ten total). The shear walls will extend from the foundation level to the underside of the roof. See the attached plan markup for approximate potential locations, which will be coordinated to minimize impacts to interior and exterior historic features.
- New cast-in-place concrete foundations will be required at each new shear wall. It should be anticipated that some amount of shoring and/or underpinning will be required for the installation of the new foundations as well as removal and replacement of the existing slabs

on grade. The new foundations will be doweled into the existing foundation elements where they intersect. Any shear walls located near the below-grade plenum chamber will require additional considerations for the placement of footings relative to the chamber.

- New collector elements (drag struts) at the underside of the first floor (except at slab on grade), second floor, and roof. The collector elements will connect the existing floor and roof slabs to the new shear walls to provide a complete load path. Typically, the collectors will consist of a steel HSS bolted to the underside of the existing floor joists and bolted to the sides of the new shear walls.
- The second floor will be sheathed with plywood to create a diaphragm. The diaphragm will be continuous through all interior walls; it is anticipated that this will be accomplished by installing sheet metal over the bottom plate around studs at the bearing walls and by removing all of the east/west partition walls to sheath the floor before constructing new partitions in different locations. The sheathing will be applied directly over the T&G decking; all layers of existing flooring will be removed.
- Additional nailing will be provided at the existing plywood roof sheathing to strengthen the roof diaphragm.
- The URM walls will be connected to the diaphragms for support against out-of-plane forces.
- At the hollow clay tile partition walls within the below-grade plenum chamber, new metal stud bearing walls will be constructed along each wall to support the first floor slab.
- The entry portico columns will be investigated for seismic performance and may require strengthening.

Additional non-seismic structural modifications to the existing building include:

- Potential removal of portions of the existing interior wood stud bearing walls, to be replaced with posts and beams.

B Wing – 1930 Auditorium

The Auditorium Building will be evaluated as a standalone structure, with one of its proposed shear walls potentially being shared with the H Wing North. The seismic upgrade scope will include:

- Several new cast-in-place concrete shear walls distributed throughout the building in both directions. The shear walls will extend from the foundation level to the underside of the roof. See the attached plan markup for approximate potential locations.
- New cast-in-place concrete foundations will be required at each new shear wall. It should be anticipated that some amount of shoring and/or underpinning will be required for the installation of the new foundations as well as removal and replacement of the existing slabs on grade. The new foundations will be doweled into the existing foundation elements where they intersect.
- New collector elements (drag struts) at the underside of the first floor, balcony, second floor, and roof. The collector elements will connect the existing floor and roof slabs to the new shear walls to provide a complete load path. Typically, the collectors will consist of a

steel HSS bolted to the underside of the existing slabs and bolted to the sides of the new shear walls.

- Nearly all of the original interior partition walls are hollow clay tile. Due to the very poor seismic performance of hollow clay tile walls, all of these partition walls will need to be either braced or removed and replaced. Some of the walls were previously removed around the organ lofts and in the basement when the organ was removed and the connections to the H Wing North were made in 1991.
- Proposed shear wall locations may require architectural modifications to portions of the existing exterior façade.
- An additional seismic bracing system may be required at the fly loft penthouse.

C Wing – 1916 North Shops

The North Shops will be renovated in two distinct sections with different approaches. The northern-most three structural bays (approximately 66 feet wide) will be historically-preserved and restored, with seismic strengthening. The southern portion (approximately 80 feet wide) will be entirely demolished with the possible exception of the south façade, replaced with a new two-story addition within the existing footprint, and rigidly tied to the renovated portion along the length of the building.

The north portion of the structure will be renovated as follows:

- The 1997 roof diaphragm constructed over the original saw-tooth roof trusses will be removed, along with the wood bearing walls over the original roof framing that support it.
- The original saw-tooth roof trusses will be restored with skylights. The roof structure and heavy timber girders will be exposed to the interior spaces below. Two bays of saw-tooth trusses will likely be exposed along the length of the building, except at the end bays where they are not present.
- An open diaphragm will be created at the plane at the top of the heavy timber roof girders, at the base of the saw-tooth trusses. The diaphragm will consist of exposed steel cross bracing located horizontally between bays of the saw-tooth trusses. This diaphragm will transfer seismic loads to the braced frames at the historic north façade and the north line of the new two-story addition to the south, and align vertically with the new second floor diaphragm at the south portion of the wing.
- A new steel gravity support frame will be added along the interior face of the north façade to support the roof framing and brace the historic unreinforced masonry. Architecturally-exposed buckling-restrained braced frames (BRBs) will be added in several bays for lateral support. Several additional BRBs will be distributed throughout the building in the north/south direction. Frames will typically consist of new steel columns that replace the existing steel pipe columns and steel beams attaching to the existing wood roof structure.
- The URM walls will be connected to the diaphragm for support against out-of-plane forces.
- New cast-in-place concrete footings will be required at the frame along the URM façade and at each new BRB. It should be anticipated that some amount of shoring and/or underpinning will be required for the installation of the new footings as well as removal and

replacement of existing slabs on grade. The new foundations will be doweled into the existing foundation elements where they intersect.

- New collector elements (drag struts) at the underside of the roof diaphragm will connect the new BRBs with the new roof diaphragm to provide a complete load path. Typically, the collectors will consist of a steel HSS bolted to the underside of the existing framing and to the sides of the BRBs.
- All interior brick and CMU walls will be removed.
- The existing fan room penthouse will be removed and the surrounding saw-tooth roof framing will be replicated in this bay.
- The east and west bearing URM end walls in this portion of the existing structure will either remain and be braced or be replaced with new steel framing and footings to support the roof structure.

The south portion of the structure will include the following scope of work:

- Demolish the entire structure, including both levels of roof framing, interior columns, column and wall footings, interior walls, and slab on grade, with the possible exception of the perimeter URM walls. Preserve the existing line of structure at the transition between the north and south portions of the building (exact design of interface TBD). The original heavy timber girders will be salvaged for reuse elsewhere.
- Scope of demolition will include the interface with the H Wing North in this portion of the structure (basement to second floor roof) and a portion of the original 1916 passageway connecting to the F Wing. See scope for those wings for additional detail.
- Construct new two-story structure with concrete spread footings and slab on grade, steel beams and columns, and concrete slab on metal deck.
- New structure to contain BRBs along the north edge (at the interface with the historic structure) as well as at least one other location in the east/west direction and at several locations in the north-south direction.
- New structure will infill part of the space between the C Wing and F Wing on both levels, rigidly connecting to the F Wing.
- If the URM south façade is preserved, it will be tied to and braced by the new structure.

F Wing – 1916 Foundry

The Foundry building will be seismically strengthened with the following elements:

- New exposed BRBs will be added along each edge of the perimeter URM façade, aligning architecturally with the added braces in the adjacent C Wing. Each BRB will typically include new steel columns and new steel beams at the second floor and roof levels. Due to the existing framing layout, it is not anticipated that additional gravity framing will be required to supplement the URM bearing walls.
- New cast-in-place concrete footings will be required at each new BRB. It should be anticipated that some amount of shoring and/or underpinning will be required for the installation of the new footings as well as removal and replacement of existing slabs on grade. The new foundations will be doweled into the existing foundation elements where they intersect.

- Alternatively, new cast-in-place concrete shear walls could be provided on the interior of the building in lieu of the BRBs. These would also require new footings.
- New collector elements (drag struts) at the underside of the second floor and roof. The collector elements will connect the existing floor and roof slabs to the new BRBs to provide a complete load path. Typically, the collectors will consist of a steel HSS bolted to the underside of the existing slabs and joists and bolted to the sides of the new BRBs.
- Plywood sheathing will be added to the roof to create a diaphragm.
- Plywood sheathing will be added and/or augmented at the second floor to create a diaphragm. Plywood sheathing currently exists in some of the classrooms; to complete the diaphragm, this will need to be tied together through partition walls with sheet metal or the interior partitions will be removed, new sheathing installed, and new partitions constructed. New sheathing is only required in the southern portion of the building where the second floor structure is wood-framed.
- The URM walls will be connected to the diaphragms for support against out-of-plane forces.
- The URM parapets will be braced.

Additional structural work at the foundry includes:

- Removal of the 1977 and 1991 stair and elevator towers and the 1991 connection to the C Wing, along with portions of the URM perimeter wall in this area.
- Removal of part of the 1916 passageway connecting to the C Wing.
- New infill structure between the C Wing and F Wing as described in the C Wing Scope.
- New stairs and elevator attached to the F Wing near the current stair towers.

G Wing West – 1923 Old Gym

The Old Gym will be seismically strengthened with the following elements:

- Four new cast-in-place concrete shear walls will be added in the east/west direction, at the windowless end bays on the north and south facades at each end. Each will extend from the basement to the roof.
- Pending analysis, strengthening of existing concrete walls in the north/south direction may be required. The new concrete shear wall at the shared wall with the G Wing East New Gym will support both buildings and likely be located on the west side of the URM wall separating the buildings.
- New cast-in-place concrete foundations will be required at each new shear wall. It should be anticipated that some amount of shoring and/or underpinning will be required for the installation of the new foundations as well as removal and replacement of the existing slabs on grade. The new foundations will be doweled into the existing foundation elements where they intersect.
- New collector elements (drag struts) at the underside of the first floor, second floor, and roof. The collector elements will connect the existing floor and roof slabs to the new shear walls to provide a complete load path. Typically, the collectors will consist of a steel HSS bolted to the underside of the existing slabs and bolted to the sides of the new shear walls.
- Add plywood sheathing to the roof to create a diaphragm.
- Add plywood sheathing and steel straps to the running track.

- Most of the original interior partition walls that remain (primarily in the east and west ends) are hollow clay tile. Due to the very poor seismic performance of hollow clay tile walls, all of these partition walls will need to be either braced or removed and replaced.
- The URM parapets will be braced. Additional interior bracing of the URM walls above the concrete columns supporting the trusses in the gym area may be required, potentially tying the walls to the trusses with bracing above the window line for out-of-plane support.
- The URM walls will be connected to the diaphragms for support against out-of-plane forces.

G Wing East – 1964 New Gym

The New Gym will be seismically upgraded to BPON for a Risk Category IV Building, providing the immediate occupancy structural performance level at the BSE-1N hazard level and life safety structural performance at the BSE-2N hazard level as defined in ASCE 41-13. The seismic strengthening will include the following elements:

- New cast-in-place concrete shear walls extending from the basement to the roof will be added along the west edge of the building, along the original URM G Wing West and A Wing buildings. These walls will be designed to support both buildings at the shared interfaces.
- New cast-in-place concrete foundations will be required at each new shear wall. It should be anticipated that some amount of shoring and/or underpinning will be required for the installation of the new foundations as well as removal and replacement of the existing slabs on grade. The new foundations will be doweled into the existing foundation elements where they intersect.
- The south and east perimeter tilt-up concrete wall panels will be strengthened and the connections augmented to create shear walls. It is expected that this work will primarily be conducted on the exterior of the building and that below-grade modifications will be minimal. Concrete corbels may be required outside the top of the basement walls to support the thickened shear walls.
- New collector elements (drag struts) at the underside of the first floor and roof. The collector elements will connect the existing floor and roof slabs to the new shear walls to provide a complete load path. Typically, the collectors will consist of a steel HSS bolted to the underside of the existing slabs and bolted to the sides of the new shear walls.
- Construct a new steel frame with BRBs approximately 2 feet south of the current north wall of the building, which is shared with the 1953 H Wing South. The new frame will extend from the basement to the roof along the entire north edge, supporting the roof joists (which will be shortened slightly) and providing lateral resistance. The existing north wall (dating to 1953) will then be removed and the new wall will provide gravity and lateral support for the new passageway structure proposed just to the north of the current building. If no openings to the new structure and courtyard to the north are desired, the new frame could alternatively be a solid concrete wall instead of steel framing with BRBs.
- New cast-in-place concrete foundations will be required along the new structure supporting the north end of the building. These will likely be located under the current basement tunnel. It should be anticipated that some amount of shoring and/or underpinning will be required for the installation of the new foundations as well as removal and replacement of the level 1 slab and basement slab on grade. The new foundations will be doweled into the

existing foundation elements where they intersect, except at the 1953 H Wing South foundations, which will be removed with the demolition of that structure. The tunnel and first floor slab will also be reconfigured as necessary.
- Replace the metal roof decking over the entire building, with a heavier-gauge metal deck that can act as a diaphragm.
- Strengthening of the steel penthouse structures may be required pending further analysis.

Additional structural work at the G Wing East includes:
- Support for a new façade outside the augmented tilt-up walls on the south and east sides.
- A new two-story passageway addition will be connected to the north side of the building, along the new frame at the north end. The addition will consist of steel framing with slab on metal deck and BRBs, as described for other new construction.

H Wing North – 1991 Addition

While the 1991 Addition is among the newest construction at Benson High School, its interfaces with numerous previously-existing buildings, as well as the detailing of its lateral system present concerns relative to current code. The structural scope for modifications to this building includes:
- Two of the four existing braced frames have geometry that is not allowed by current code. It may be possible to reconfigure these frames by adding beams, columns, and or new braces to achieve the desired performance. Alternatively, they will be replaced with new BRB frames, in locations where the geometry of the framing better facilitates braced frames.
- One of the existing braced frames is located at the interface with the A Wing. A new cast-in-place concrete shear wall will replace this frame and provide lateral resistance for both buildings by rigidly tying the buildings together and to the shear wall.
- The final existing braced frame is located at an interface with the proposed new building near the current location of the H Wing East, where the new commons will be located. It is anticipated that this frame will need to be removed and replaced elsewhere for architectural reasons.
- Due to the issues with the existing braced frames and to resist current lateral loads, new buckling-restrained braced frames will likely be added in each direction, extending from the basement to the second floor roof. Each new BRB will typically require new columns and beams.
- New cast-in-place concrete foundations will be required at each new BRB and concrete shear wall. It should be anticipated that some amount of shoring and/or underpinning will be required for the installation of the new foundations as well as removal and replacement of the existing slabs on grade. The new foundations will be doweled into the existing foundation elements where they intersect.
- New collector elements (drag struts) at the underside of the first floor, second floor, and roof will connect the existing floor and roof slabs to the new BRBs and shear walls to provide a complete load path. Typically, the collectors will consist of a steel HSS bolted to the underside of the existing slabs and bolted to the sides of the new shear walls and BRBs.

- At the west edge of the building, the interface with the 1930 Auditorium (B Wing) will be augmented so that the buildings are rigidly tied together, replacing the small expansion joint that currently exists.
- The north half of the east edge of the building, at the interface with the portion of the existing C Wing structure to remain, the (low) roof deck will be rigidly tied to the C Wing structure, replacing the minimal existing expansion joint.
- At the southern 80 feet of the east edge of the building, the entire C Wing structure will be removed and replaced with a new two-story addition. The second story of the H Wing North façade will need to be removed in the process of removing this shared wall; however, the new building will connect here once it is complete. The new C Wing structure will be rigidly tied to the existing H Wing North structure in this area, which may require modifications to the existing framing and footings/basement walls at the interface.
- The south edge of the building currently shares walls with the 1953 Library & Science building (H Wing South) and the 1916 Boiler House and Passageway (H Wing East). Because both buildings are proposed to be demolished, the entire south edge of the H Wing North will be removed and replaced with a new façade. The unreinforced masonry wall encapsulated within the north wall of the current passageway here will also be removed. The H Wing North structure has a separate gravity framing system for the second floor; however, many of its columns are supported on grade beams dating to the 1916 passageway. Pending further investigation, it may be necessary to rework the footings here.

New Buildings (At site of current E Wing, H Wing East, D Wing)

A new two-story building will be built near the current locations of the H Wing East and E Wing and will rigidly connect to the renovated H Wing North, C Wing, and G Wing East. When completed, this building will help the A, B, H-N, C, F, E, H-E, G-E, and G-W Wings act as a single unit with respect to resisting lateral loads. There will be a seismic joint between the new E Wing and the K Wing, which will remain a standalone structure.

An additional, separate two-story building will be built over approximately half of the footprint of the current D Wing. This building will connect to the C Wing addition and the new E Wing on the second level with seismic joints, and will act as a standalone structure.

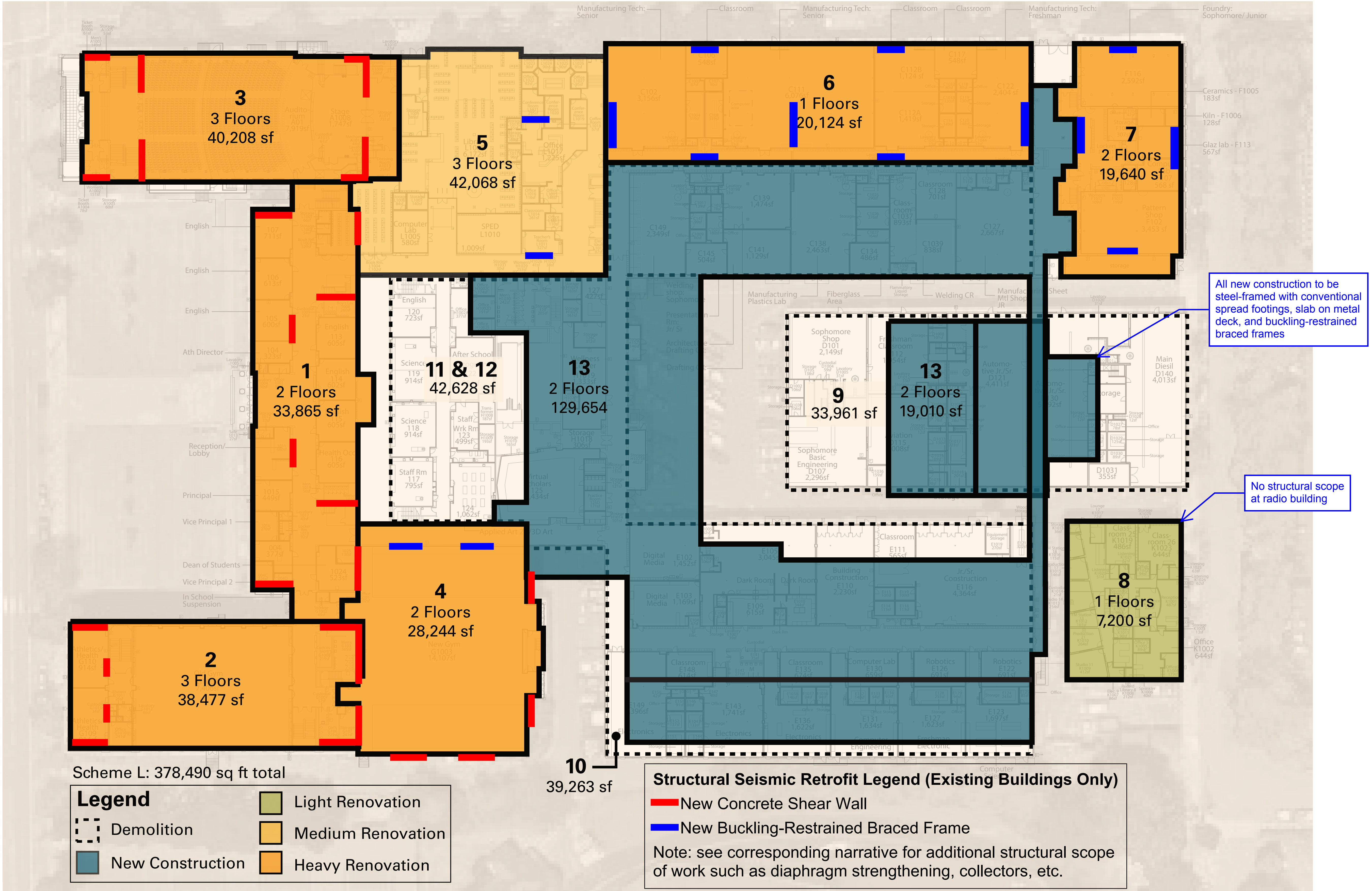
The ground floor of the new buildings will be concrete slab on grade. The elevated floors will be framed with steel columns, steel girders and beams, and a concrete slab on metal deck. The roof will be framed with steel columns, steel girders and beams, and a metal roof deck. Foundations will be conventional concrete spread footings. The lateral (seismic) system will likely consist of buckling-restrained braced frames.

The existing below-grade level of the H Wing East, along with the network of tunnels connected to the boiler room, will need to be excavated and backfilled before the new structure may be constructed. Where existing structures to be removed are located near the existing structures to remain (H Wing North, G Wing East, C Wing, F Wing, and K Wing), a system of excavation shoring and underpinning will be required.

Miscellaneous Items

This narrative only addresses the primary structural frame at this time. It is assumed that the majority of existing architectural and MEP elements will be removed and replaced with modern code-compliant systems. Appropriate allowances should be made to account for the preliminary nature of the design. Additional elements that should be considered include, but are not limited to:

- Stairs (bidder-designed exist stairs and feature stairs)
- Seismic bracing for any remaining hollow clay tile partition walls
- Elevator guide rail supports and separator beams
- Elevator overruns
- Mechanical screens
- Mechanical equipment support
- Curbs
- Additional slab thickness or concrete toppings to accommodate radiant floor heating
- Slab reinforcing steel for exposed finishes
- Parapets
- Roof tie-off systems
- Backup steel for cladding systems
- Fire water tanks
- Site structures (canopies, trellis structures, site retaining walls, elevated walkways, etc.)
- Excavation shoring (by others)
- Construction means and methods items (e.g. tower crane support, material hoist supports)



bassetti architects

F. MECHANICAL

PPS Benson High School Rebuild

Mechanical Scoping Narrative

April 26th, 2017

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Project Description

Benson Polytechnic High School is a focus option high school originally constructed in 1916. The modernization of the school is expected to occur in phases and include complete replacement of some buildings and varying degrees of renovation of the remainder of the campus. The mechanical and plumbing systems have been examined in this context to identify recommendations for reuse, renovation, and/or replacement.

Sustainability Considerations

All new schools and major renovations are required to be LEED Silver certified at a minimum. All replacement mechanical and plumbing systems will be designed in order to maximize energy and water savings while providing PPS with the most robust systems available.

Mechanical Systems

Heating Systems

Existing Conditions - Heating

The campus is heated by (3) 12,600 MBH dual fuel steam boilers housed in a basement boiler room in Building E. The boilers produce low pressure steam which is delivered to the buildings through a network of tunnels and trenches, and condensate is pumped back to the boilers. When in operation, the boilers also serve a steam hot water converter which provides domestic hot water. A small shell and tube heat exchanger produces heating water which is routed towards the east.

Recommendations

Discussions of replacing H Wing with a new cafeteria and student commons may require the relocation of the campus central heating plant. A possible new location is in the corner of the current south shop (E Wing) at grade level as shown in Appendix A.

Based on the low efficiency (~60%) and age of the boilers, it is proposed that the steam boilers be replaced with new natural gas high efficiency boilers. It is recommended that (6) 3,000 MBH condensing gas boilers be provided with (2) serving as redundant boilers in case of equipment failure. The gas boilers will provide heating water which will be distributed via a variable primary heating water loop serving variable zonal secondary loops. Heating water would be routed through the existing tunnel system where possible to the various buildings. Note that while the condensing boilers have an efficiency of up to 95%, they have a shorter life expectancy than the existing steam boilers.

Cooling Systems

Existing Conditions

The original buildings were not designed with mechanical cooling. There are a few spaces which have added window or portable air conditioners.

Recommendations

The school district has requested full cooling throughout the campus with a setpoint of 74°F. Additionally, the cooling systems are to be designed assuming a 12 month school year. In order to achieve full cooling, it is recommended that the campus install a central cooling plant alongside the heating plant. The plant would consist of (1) 300 ton water-cooled chiller with heat recovery, (1) 570 ton water-cooled chiller, and a cooling tower. Chilled water would be distributed via a variable primary loop serving variable zonal secondary loops. Chilled water would be routed through the existing tunnel system where possible to the various buildings.

Air Handling Systems

General Existing Conditions

Many of the original buildings have fan rooms delivering 100% outside air to the spaces and steam coils providing tempering and heating of the air. Newer buildings and renovations have a mix of equipment including multi-zone units and constant volume air handlers. The majority of the units have exceeded their lifespan.

General Recommendations

It is recommended that the existing air handling units be replaced. In the case of units serving classrooms, administration, and library spaces, dedicate outside air (DOAS) units with heat recovery are recommended in conjunction with local radiant heating and cooling. Radiant systems may include chilled beams, radiant sails, and/or perimeter finned tube radiators. In spaces where radiant systems cannot meet the cooling load or are not sufficiently robust for the environment, variable volume air handlers are instead recommended. This includes the two gym buildings, the auditorium, cafeteria, and kitchen. Shop spaces have exhaust requirements dictated by dust and fume producing equipment and will thus have a combination of special and general exhaust systems along with makeup air units. Special exhaust systems will also be required for several other spaces including science labs and the kitchen.

It is recommended that new air handling units be located in locations of existing fan rooms when possible to limit the impact to the buildings. This will aid in the reuse of shafts and possibly some ductwork. Access to these rooms will be tight and require AHUs that are assembled in sections on site. Demand control ventilation will be utilized in all densely occupied spaces to provide sufficient airflow to occupied spaces while also not overly ventilating the spaces.

Based on preliminary analysis, the campus will be served by 12 new air handling units. Table 1 provides initial sizing information for each of the units. Preliminary locations for each air handler are based on proposed floor plans and can be found in Appendix A. Note that Table 1 does not include makeup air units or packaged ventilators serving the kitchen or shop spaces.

Proposed Air Handling Units			
Equipment Name	Primary Service	Type	CFM
AHU-1	Main Bldg	DOAS	16,000
AHU-2	Old Gym	VAV	36,000
AHU-3	Auditorium	VAV	36,000
AHU-4	Auditorium – Basement Classrooms	DOAS	10,000
AHU-5	Main Gym	VAV	25,000
AHU-6	Main Gym Basement	VAV	25,000
AHU-7	Library Wing	DOAS	20,000
AHU-8	Foundry Bldg - Classrooms	DOAS	7,000
AHU-9	New Building - Classrooms	DOAS	16,000
AHU-10	New Building - Classrooms	DOAS	8,000
AHU-11	New Building - Classrooms	DOAS	4,000
AHU-12	New Building - Cafeteria/Kitchen	VAV	30,000

TABLE 1: AIR HANDLING SYSTEM SIZING

1. Main Building (M Wing)

The main building is served by a built up multi-zone air handler in the basement fan room. The unit provides 100% outside air which is tempered and heated by steam coils when needed. Pneumatic dampers for each zone control the mixing of air from hot and cool concrete plenums located underneath the main hallway. Distribution to the classrooms is via high sidewall supply with low exhaust. Exhaust ducts run up to the attic to relief vents.

It is recommended that the existing unit be replaced with a dedicated outside air handler with heat recovery and hot and chilled water coils served by the central plant. The new unit may be located in the existing fan room if sufficient access for the new unit can be created. Currently, access to the basement mechanical room is through a standard door and narrow stair. The new air handler will probably be assembled in sections on site. The use of two smaller DOAS units placed in the attic may be considered as another option. Structural and duct routing implications will need to be analyzed for feasibility. Demand control ventilation will be utilized in all densely occupied spaces such as classrooms to provide sufficient airflow to occupied spaces while also not overly ventilating the spaces. Radiant systems will provide local heating and cooling.

2. Old Gym Building (East G Wing)

The old gym building is served by a 1960s era constant volume multi-zone unit located in the basement. Air distribution is via high sidewall supply with low exhaust. Additional heating to select perimeter zones is provided by finned tube radiators.

It is recommended that the existing unit be replaced with a variable volume air handler with both hot water and chilled water coils served by the central plant. The new unit may be located in the existing fan room, which will aid in the reuse of shafts and possibly some ductwork. Access to this room will be tight and require the AHU to be assembled in sections on site.

3. Auditorium Building (A Wing)

The auditorium is served by a built up air handler located in the basement and is original to the construction. The unit provides heating only and is served by steam pipes running in a concrete trench under the building. Supply air to the auditorium is distributed overhead and exhaust air is routed through "mushroom" grilles under the seats. Steam radiators provide additional perimeter heating.

It is recommended that the existing unit be replaced with a variable volume air handler with both hot water and chilled water coils served by the central plant. Displacement ventilation will be considered as an option for air distribution – these systems are superior acoustically and provide good indoor air quality. This would involve converting the plenum underneath the floor to an airtight supply air plenum and the overhead supply would become the return. The new air handler may be located in the existing fan room, which will aid in the reuse of shafts and possibly some ductwork. Access to this room will be tight and require the AHU to be assembled in sections on site. The door to the mechanical room will need to be converted from a single to a double door for movement of equipment.

The cafeteria is located in the basement of A Wing. Similar to the auditorium, the cafeteria is served by a built up air handler in the basement fan room. Based on the master plan discussions, the cafeteria will be relocated. Assuming the space will instead be used for classrooms, it is recommended that the existing unit be replaced with a dedicated outside air handler with heat recovery and hot and chilled water coils served by the central plant. The new unit could be located in the existing mechanical room, though access is limited and will require the AHU to be assemble in sections on site. Demand control ventilation will be utilized in all densely occupied spaces such as classrooms to provide sufficient airflow to occupied spaces while also not overly ventilating the spaces. Radiant systems will provide local heating and cooling.

4. Main Gym Building (West G Wing)

The new gym building has two built up constant volume air handlers serving the gym and wrestling spaces along with two heating and ventilating units serving the locker rooms and basket room. The units are located in the two gym penthouses. General distribution strategy in the gym is overhead supply and low sidewall return.

It is recommended that the existing units be replaced with two variable volume air handlers with both hot water and chilled water coils served by the central plant. The new units may be able to be located in the existing penthouses assuming that existing structural conditions are adequate and access can be coordinated. This will aid in the reuse of shafts and possibly some ductwork.

5. Library Building (L Wing)

Currently the library building consists of the library, second floor health occupation classrooms, and a basement kitchen. A constant volume air handler and makeup air unit serve the basement kitchen, a variable air volume air handler serves the library, and a constant volume multi-zone unit serves the second floor classrooms.

The kitchen is likely be relocated to a new building. It is assumed that this space will instead be used for classrooms and admin spaces.

It is recommended that the existing units be replaced with a dedicated outside air handler with heat recovery and hot and chilled water coils served by the central plant. The new unit could be located in the existing mechanical room. Demand control ventilation will be utilized in all densely occupied spaces such as classrooms to provide sufficient airflow to occupied spaces while also not overly ventilating the spaces. Radiant systems will provide local heating and cooling.

6. North Shop (C Wing)

The north shop is served by seven (7) heating and ventilating units located in the attic above the corridor. Air is supplied via high sidewall grilles and return registers are located at the floor. Noise associated with the supply distribution is high. Exhaust fans serve specialized exhaust systems throughout the building.

Preliminary plans indicate that the north section of the building will be remodeled while the south side will be demoed and replaced with a two story building.

It is recommended that the existing mechanical equipment be completely replaced. Classroom spaces within the building will be served by a dedicated outside air unit with heat recovery and local radiant systems. Shop spaces will be provided with dedicated shaft space for exhaust and makeup air on a square foot basis to give the shop spaces the ability to accommodate future modifications as technology and needs of the students evolve. These spaces will be provided with new makeup air units and packaged ventilators dependent on the requirements and conditions of each shop space. Exhaust systems will be provided as necessary to serve dust and fume producing equipment. General shop exhaust will also be provided to ensure that shop spaces are negatively pressurized.

7. Foundry Building (F Wing)

The northeast shop is served by four (4) heating and ventilating units. Two of the units are located in the pattern shop and one is located in the foundry. Each provide 100% outside air. The fourth unit is located in an attic fan room serving the remainder of the building spaces via overhead supply and return. Exhaust systems serve both shops including a duct collection system in the pattern shop.

It is recommended that the existing mechanical equipment be completely replaced. Shop spaces will be provided with dedicated shaft space for exhaust and makeup air on a square foot basis to give the shop spaces the ability to accommodate future modifications as technology and needs of the students evolve. These spaces will be provided with new makeup air units and packaged ventilators dependent on the requirements and conditions of each shop space. Exhaust systems will be provided as necessary to serve dust and fume producing equipment. General shop exhaust will also be provided to ensure that shop spaces are negatively pressurized.

Classroom spaces within the shop building will be served by a dedicated outside air unit with heat recovery and local radiant systems.

8. KBPS Building

It is assumed that the Radio building will only have minor renovations, and the existing air source heat pump system will remain in place.

9. Automotive Building (D Wing)

Based on the master plan discussions, this building will be demoed to create a central open space for the campus.

10. South Shop (E Wing)

Based on master plan discussions, this building will be demoed.

11. Boiler House

Refer to the Heating Systems section above for a discussion of existing conditions. Based on preliminary plans, the boiler house will be demoed.

12. Science Building (H Wing)

Based on the master plan discussions, this building will be demoed and a new student commons and cafeteria will be constructed in its place. H Wing currently consists of classrooms, music rooms, a wellness center, and the central plant.

13. New Buildings

It is assumed that the new construction will include a mix of classroom space, shop areas, and a new cafeteria and commercial kitchen.

It is recommended that new classroom spaces be served by dedicated outside air units with heat recovery and hot and chilled water coils served by the central plant. Demand control ventilation will be utilized in all densely occupied spaces such as classrooms to provide sufficient airflow to occupied spaces while also not overly ventilating the spaces. Radiant systems will provide local heating and cooling.

New shop spaces will be provided with dedicated shaft space for exhaust and makeup air on a square foot basis to give the shop spaces the ability to accommodate future modifications as technology and needs of the students evolve. These spaces will be served by makeup air units and packaged ventilators dependent on the requirements and conditions of each shop space. Exhaust systems will be provided as necessary to serve dust and fume producing equipment. General shop exhaust will also be provided to ensure that shop spaces are negatively pressurized.

The new student cafeteria will be served by a variable volume air handler with hot and chilled water from the central plant. It is recommended that the design of the system be combined with the new kitchen and opportunities for transferring air from the cafeteria as make up air to the kitchen should be considered. Additionally, variable volume makeup air unit(s) and hood exhaust systems will be provided based on the cooking equipment requirements.

Controls

Existing Conditions

A majority of the existing systems seem to operate on pneumatic controls, with digital controls serving the more recent renovations.

Recommendations

It is recommended that the existing control system be replaced with complete digital controls utilizing the district standard Honeywell WEBs-AX platform.

Plumbing Systems

Domestic Cold Water

The school is served by a 4-inch potable water line routed along the south side of the auditorium building and connected to a 10” water main under 12th Ave. A 3” water meter is located in a vault in the front of the school.

Existing Conditions

The domestic cold water distribution system was replaced in 2002 with new copper pipe for the majority of the campus. Runout piping to fixtures and the fixtures themselves were left in place. Thus, the majority of the piping is copper with silver solder with the possibility of some copper pipe with lead solder.

Recommendations

Distribution piping can be reused in spaces where layout and remodeling does not necessitate demolition of the piping and sizing is adequate for new demands. It is recommended that all runout piping be replaced with new copper water supply and all fixtures be replaced with lead-free and low flow fixtures. Existing utility tunnels may be utilized where possible for distribution throughout the school. Based on initial water pressure estimates, a domestic water booster pump will also be required.

Domestic Hot Water

The domestic hot water system is a centralized system fed from the boiler room and provided by two different methods. When the steam boilers are operational, domestic hot water is generated using a steam-to-hot water converter located in the boiler room. When the steam system is off-line, two gas fired water heaters provide the domestic hot water for the school.

Existing Conditions

The domestic hot water distribution system was replaced in 2002 with new copper pipe for the majority of the campus. Runout piping to fixtures and the fixtures themselves were left in place. Thus the majority of the piping is copper with silver solder with the possibility of some copper pipe with lead solder. The gas fired water heaters in the boiler room appear to be in good condition.

Recommendations

Reuse of the existing domestic hot water system is unlikely given that the central plant will be relocated. It is recommended that a distributed hot water system be used in lieu of the existing centralized hot water system. Locations for new hot water heaters should be located close to restroom cores in a janitors’ closet or similar location.

The design team will consider re-using the existing gas fired water heater for locker room or kitchen loads.

Sewer and Storm Water

Existing Conditions

The majority of the school is served by a 10” combined storm and sewer line that connects to a 24” main under NE Irving St. Additionally, there is a combined storm and sewer line routed to NE 15th Ave serving the Radio building and another line serving the new gym and Wing G routed to NE 12th Ave.

Recommendations

Further analysis will be required to determine if any of the storm or waste piping can be reused.

Natural Gas

Existing Conditions

A 4” natural gas line from NE Irving St. and a 3” natural gas line from 15th Ave serve the campus.

Recommendations

Existing gas piping will be re-routed to the new locations (boiler, Kitchen, etc). Further analysis will be required to determine how much of the piping can be reused.

Fire Protection

Existing Conditions

The campus is served by a 6” fire line and backflow preventer routed along the south side of the auditorium which connects to a 10” water main under SE 12th Ave. Additionally, an 8” line is routed from NE 15th Ave with a 4” line routed to the Radio building and another 8” line from NE 15th Ave which serves the Automotive and south shops. The existing fire protection systems appears to serve the majority of the buildings and were installed at various times.

Recommendations

It is recommended that a new fire sprinkler system be installed providing complete coverage for all buildings designed to NFPA 13 and local applicable codes. A single fire service may be required along with a fire pump, though it is recommended that the fire protection strategy for the campus be discussed with local authorities as plans progress. Additionally, dependent on floor to floor height, standpipes may be required for any new buildings greater than two stories.

New Construction Considerations

Fats, Oils and Greases

With the relocation of the kitchen, the project will be required to provide Fats, Oils and Greases (FOG) Control to meet the Clean Water Act. A gravity grease interceptor will be required to be installed and should be easily accessible for maintenance. It is recommended that the grease interceptor be located as close to the kitchen as possible, while being located close to a paved area for easy drive up access for the grease maintenance vehicles.

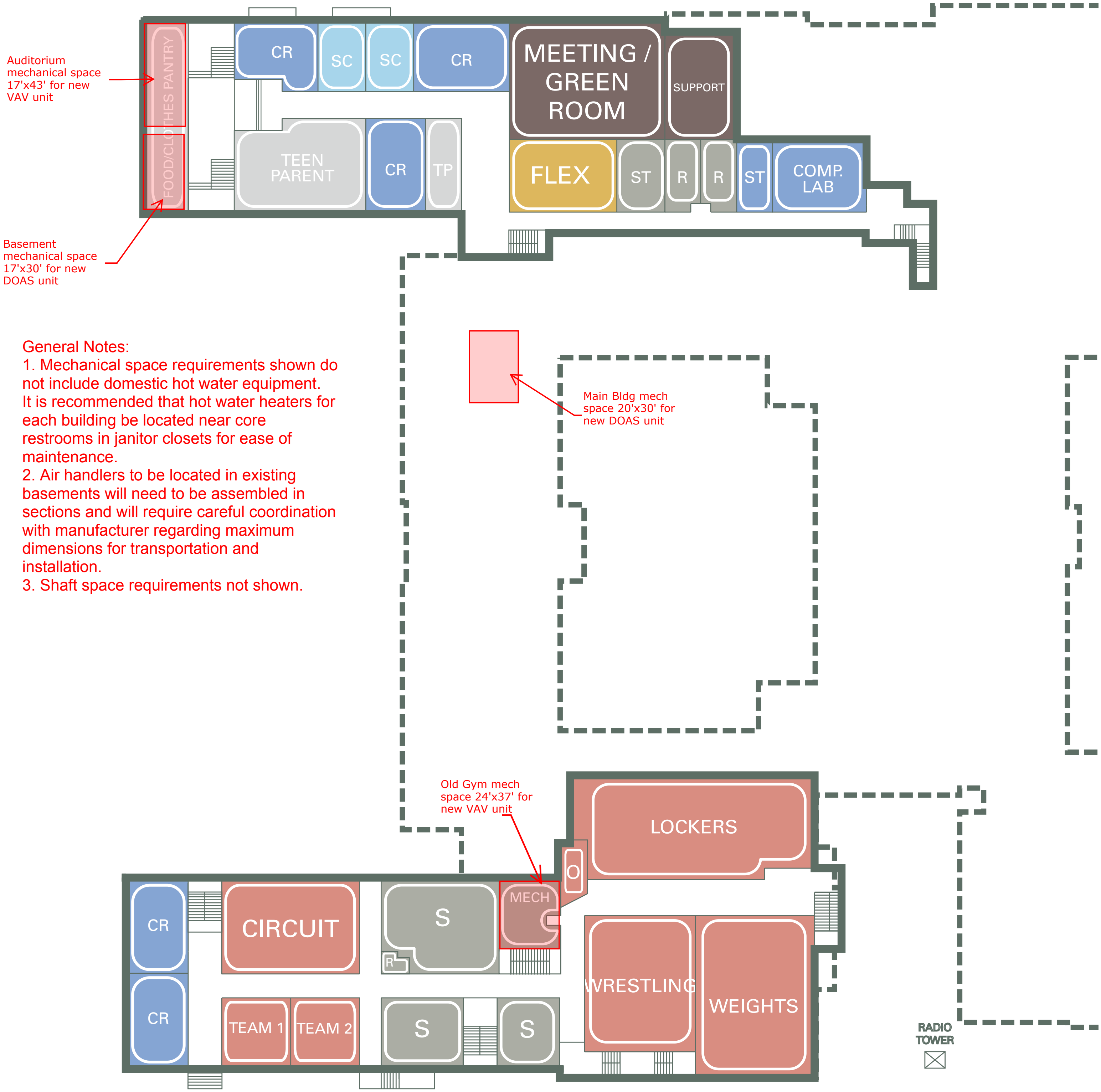
Acid Waste

New science labs and classrooms will require an acid waste system. This system will require sampling ports and may require an acid neutralization tank. This is to be determined after further investigation.

New Radon Mitigation System

With new construction being proposed in several locations, multiple radon mitigation systems will be required. Radon mitigation systems are not required to be retroactively added to existing buildings. A radon mitigation system consists of a centralized exhaust fan with distributed sub grade perforated pipe.

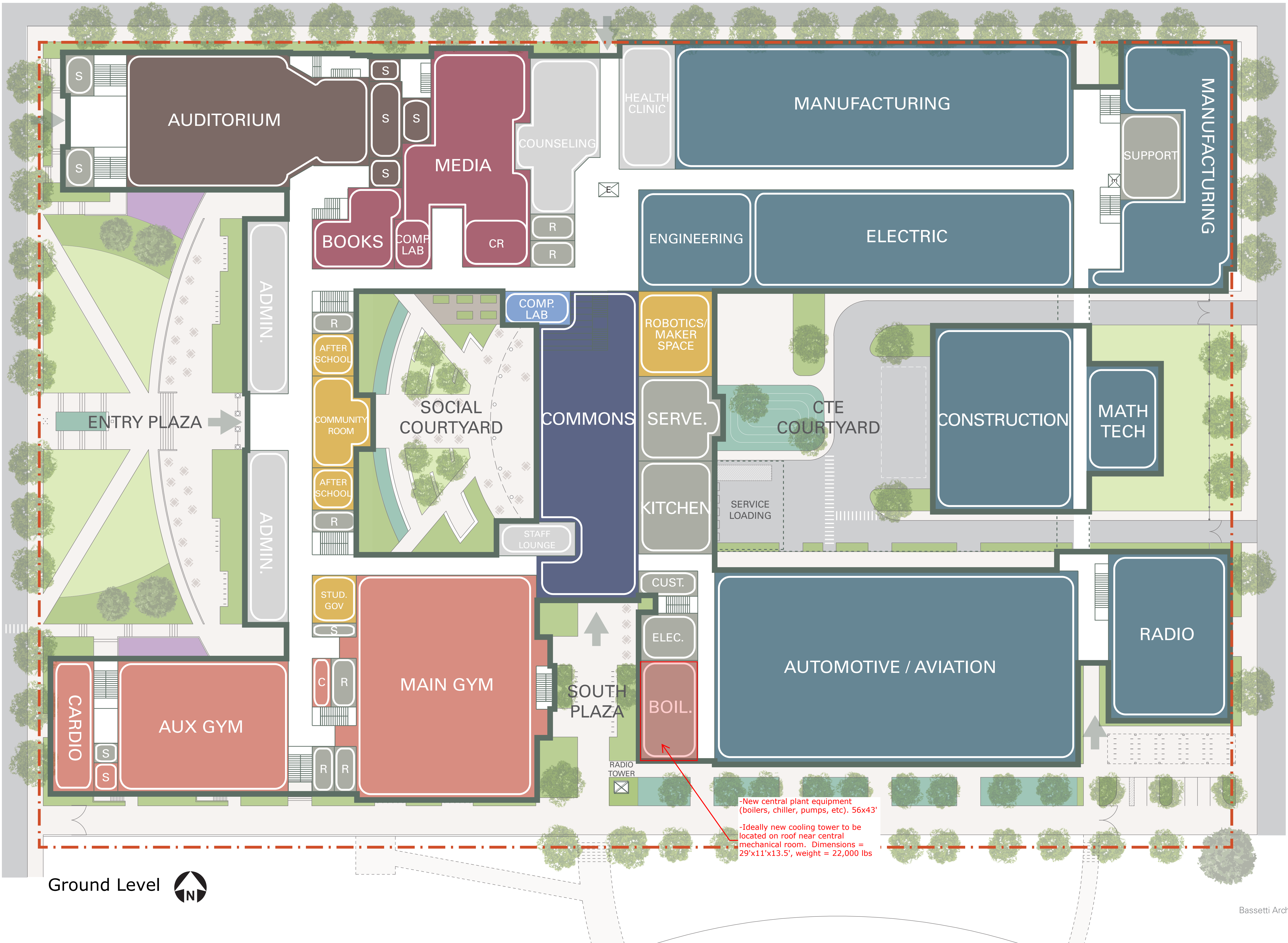
PAE



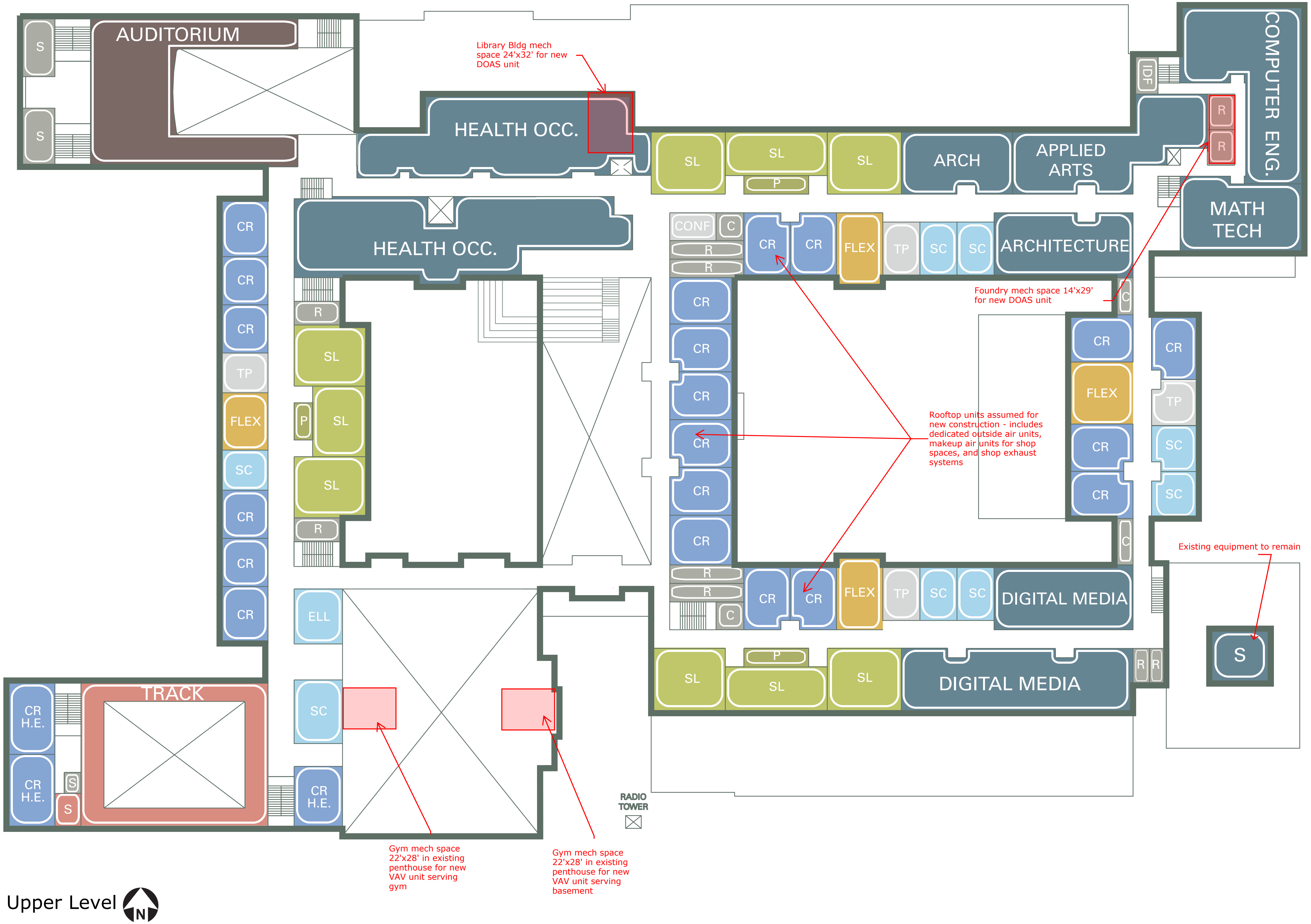
General Notes:

1. Mechanical space requirements shown do not include domestic hot water equipment. It is recommended that hot water heaters for each building be located near core restrooms in janitor closets for ease of maintenance.
2. Air handlers to be located in existing basements will need to be assembled in sections and will require careful coordination with manufacturer regarding maximum dimensions for transportation and installation.
3. Shaft space requirements not shown.

Lower Level



Ground Level


AUDITORIUM
S
S
HEALTH OCC.
HEALTH OCC.
Library Bldg mech space 24'x32' for new DOAS unit
SL
SL
SL
P
ARCH
APPLIED ARTS
IDF
R
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COMPUTER ENG.
MATH TECH
CR
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ARCHITECTURE
Foundry mech space 14'x29' for new DOAS unit
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Rooftop units assumed for new construction - includes dedicated outside air units, makeup air units for shop spaces, and shop exhaust systems
C
R
R
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FLEX
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SC
DIGITAL MEDIA
Existing equipment to remain
S
SL
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SL
SL
DIGITAL MEDIA
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R
ELL
SC
CR H.E.
TRACK
CR H.E.
CR H.E.
S
S
RADIO TOWER
Gym mech space 22'x28' in existing penthouse for new VAV unit serving gym
Gym mech space 22'x28' in existing penthouse for new VAV unit serving basement
N

Upper Level

G. ELECTRICAL

Benson Polytechnic High School Narrative, Electrical

April 26, 2017

Summary

The update of the facility to more effectively support the school's mission requires reconfiguration of the buildings. Retaining the totality of the existing buildings creates an obvious artificial limit on overall educational functionality. The need to redefine spaces to efficiently support education is an obvious crucial step.

The Creation of the social courtyard replaces the two story, 1960's classroom wing and small interior courtyard located to the East of the original main classroom building. This wing acted as the hub for the radial campus power distribution system. The campus communications and IT data access network also used this area as a critical radial distribution origin.

A new radial power and communication infrastructure is proposed to integrate with the sequential facility construction schedule. The Electrical power and Communications Main Distribution Frame (MDF) space are proposed to be West of the new Automotive / Aviation area on the South side of campus and East of the new South Plaza.

Communications

A New, communications entrance and Main Distribution Frame (MDF) space is proposed to be located in an 8 foot by 12 foot space near the new main electrical room on the south side of the building complex. This is West of the new Automotive / aviation area and East of the South plaza. This area is one of the early stages of phased project construction.

1. The new MDF area is expected to require cooling with an expected equipment heat rejection (unoccupied) of about 2200 Watts maximum.
2. The new MDF area will link to each of the new IDF spaces via project provided 24 strand, multimode fiber optic cable. A minimum of one 24 strand, multimode fiber optic cable will be provided to each IDF room from the MDF room.
3. The Fiber optic cables will have each strand terminated in 19 inch, equipment rack mounted, Fiber Distribution Units (FDU's). At least one FDU will be proved in each IDF Rack. Multiple FDU's will be provided in the MDF Racks as required to terminate the IDF fiber optic backbone cables.
4. The fiber optic cables will support the school Local Area Network (LAN) backbone, school Wi-Fi Wireless Access Points (WAP's) for handheld wireless device access.
5. The fiber optic cables will support the school telephone, Voice Over Internet Protocol (VOIP) access.
6. The school Video surveillance cameras will be digital cameras with digital multiplexed signal transmission and distribution utilizing the fiber optic backbone, video camera category 6 cabling will be extended from each IDF room.

7. Video surveillance camera, multiplexed real time signals will be distributed on the fiber optic cables and linked to the administrative security office from the nearby IDF.

The concept is to provide new Intermediate Distribution Frame (IDF) spaces on each floor of each of new project phase. Multiple IDF spaces on each floor are expected to be required in order to provide adequate signal levels for reliable communication

1. The new IDF rooms would be a minimum of 8 foot by 8 foot, and accessible from the corridor.
2. The new IDF rooms would be vertically stacked in multi-story buildings.
3. The IDF rooms will be located within 225 feet of the farthest IT station.
    a. The Category 6 station cable used to link the station jacks to the IDF digital signal switch are rated to provide adequate signal strength at cable length distances less than about 325 feet.
    b. The 225 foot radial length allows for reasonable cable routing pathway length.
4. On a long length building, two or more IDF rooms per floor can be expected with a separation of about 450 to 500 feet between IDF rooms.
5. The new IDF rooms would have ventilation to utilize building cooling air via exhaust fans to cool the rooms. The expected equipment heat rejection (unoccupied) is about 1000 Watts maximum.
6. Individual IT station cabling will be extended as two Category 6 cables minimum from the station device to rack mounted 48 and 96 port patch panels.
    a. The parch panels will be located in the 19 inch, floor anchored, equipment racks in each IDF room.
    b. School district provided digital signal switches will be mounted in the racks.
    c. Cable management fittings will be provided to allow orderly management of patch cables.
7. Door access controls and door locking power supplies will be located within the IDF Rooms.
8. The building Fire Alarm system will be an addressable system, with Voice Evacuation warning notification compliant with Portland Public Schools standards. The Fire Alarm System Notification Appliance Circuits (NAC's) and Satellite supervised audio amplifiers will be located within the IDF Rooms.

KBPS Radio Transmitter Impact

The existing KBPS Commercial Radio Station transmits a 1000 Watt, 1.45 Megahertz, Amplitude Modulated (AM) radio signal from the existing shunt signal feed, grounded, radio transmitting tower. The Tower is located at the South end of the new South plaza.

1. This is in close (with respect to transmitted signal wavelength) proximity of the new communications MDF space.
2. This is in close (with respect to transmitted signal wavelength) proximity of the new Electrical Power distribution equipment space.

3. This is in close (with respect to transmitted signal wavelength) proximity of the new Boiler room and the associated Direct Digital Control, (DDC) building energy management space.
4. The close proximity to the shunt signal feed, grounded, radio transmitting tower implies the school is subject to both radiated electromagnetic fields and non-radiating, conductor configured electric and magnetic, coupled fields.
5. The radio antenna ground array was originally configured as a radial, ¼ wavelength, array in an arc spanning from 90 degrees to 270 degrees (Project North) in about 15 degree increments. The absolute integrity of the ground array is not known, but surmised to be good based on the transmitter performance.
6. The existing radio antenna ground array will be maintained as fully functional with repairs as required.
7. The radio signal is of relatively medium frequency and reasonable field intensity.
8. The existing building Information Technology (IT), Direct Digital Control, (DDC), Security / Access Control and fire alarm system signal and communications cabling all utilize a balanced, non-grounded signal transmission protocol.
    a. These cables all typically utilize a balanced twisted pair as a signal transmission line medium.
    b. The radiated and close field effects chiefly manifest as a common mode offset signal to the balanced twisted pair transmission line.
    c. The relatively low frequency and acceptable signal strength is typically within the transmission line, Input - Output (IO) port common mode capabilities of handling.
    d. The modern computer IO ports for ethernet and similar applications often utilize optical isolation in their input port design. This further increases the common mode rejection capability.
    e. These existing systems within the school have had very low reported signal integrity issues attributed to KBPS.
9. The modern hand held communications devices, in use commercially and privately, are designed with significant Electromagnetic Interference (EMI) noise immunity.
10. The MDF space will be designed with a solid, high frequency reference ground plane below the area.
11. The MDF space will be designed with a 20 Megahertz bandwidth Faraday cage enclosing the MDF space within the walls and steel doors of the MDF space.
12. Low cost, hand held instructional instrumentation, (Volt Ohmmeters, etc.) with exposed, unshielded leads are expected to be affected by the KBPS electromagnetic fields.
13. EMI shielding of leads with proper local reference ground system implementation on instructional instrumentation designed for noise immunity are expected to allow accurate measurements to be taken.
14. The presence of a significant electromagnetic field is often present in industrial and real world environments. An exposure to the effects as a learning condition is not necessarily a bad thing.

Fire Alarm

The Buildings will be fully Fire Sprinkler Protected. The buildings will have a full evacuation warning coverage, fire alarm system installed.

1. The fire alarm system will have a full coverage, supervised, audible, voice evacuation warning speaker system.
2. The speakers will be located and spaced to provide good audible intelligibility within the buildings.
3. The building will have synchronized visual strobe lights to provide visual alerting to an evacuation warning condition.
4. The synchronized visual strobe lights will be located for the light pulses to be visible from all points within the buildings.
5. Building interior, fire rated, hallway and corridor doors, configured with magnetic hold open devices will be controlled from the fire alarm system. The doors will be released to allow closure on an alarm condition.
6. Manual pull stations with vandal resistant covers will be provided at the exterior exit doors.
7. Video surveillance cameras will be located to include the pull stations within their image field of view.
8. Fire Alarm System Smoke detectors will be provided at fire rated hallway and corridor doors, elevator lobbies, elevator hoist ways, elevator machine rooms, nurses stations, athletic trainers rooms and areas where student or staff may have difficulty in self evacuation.
9. The Portland Public Schools design standards request smoke detection in the path of egress in hallways and corridors or where egress is through an intervening space.
    a. These fire alarm smoke detectors are currently expected to be provided as part of the project work.
    b. These smoke detectors are currently installed above the code minimum requirements for fully fire sprinkler protected buildings.
    c. The review of the provision of this egress pathway, early warning smoke detection system is recommended to be considered by the school district.
10. The fire alarm system, voice evacuation warning speaker system can be utilized as a zoned paging system.
    a. The fire alarm system would have prescedence.
    b. A paging announcement would be interrupted by the fire alarm system to sound the alerting warning signal and evacuation instructions so long as the alarm state exists.
    c. This dual use reduces the need for a separate paging speaker system.

Security

The building exterior perimeter entry doors will be card access controlled. The exterior perimeter doors will be capable of being electronically locked by the administration. This allows a single command, perimeter lock down to be initiated.

The building interior corridor and hallway doors will be card access controlled. This will allow the building to be zoned for after-hours community use. The zoning is expected to be configured to limit after-hours access to specific areas.

Video surveillance cameras, both within the building and on the building exterior, will be provided. The locations of cameras and the image field of view will be coordinated with the school district. Video surveillance cameras will be digital. The camera digital image signal will be multiplexed and linked to the school LAN for display and storage.

A security camera video image display and recording station is expected to be provided within the administrative area. This station typically would be expected to provide privacy for viewing and evaluating security images.

The building perimeter access doors will be equipped with electric strikes and door release mechanisms. The building perimeter access doors will be configured to allow the administration to place the building into Lockdown. The Lockdown controls will function through the communication and security systems. The intent is to allow an administrator to be active within the building assessing the situation. From his location in the building, the administrator can initiate a Lockdown state via a wireless signal.

Power

The existing 120/208 volt power distribution system for Benson Polytechnic High School will be lost with the demolition for the new commons and social courtyard.

A new 277/480 Volt, three phase power distribution for the facility is proposed to be set in place as part of one of the early phases (prior to demolition for the new commons and social courtyard).

1. A new PGE 7200/12470 Volt primary power line would be extended from NE 15th Avenue, down the access road to set a new PGE, 1000 kVA, oil filled pad transformer near the existing KBPS Radio Transmitter Tower.
2. 277/480 Volt, three phase power will be extended from the PGE oil filled Transformer to a new campus electrical power distribution room. This room is approximately 24 feet by 16 feet. Two separate doors at opposite ends of the 24 foot dimension are required.
3. Underground 277/480 Volt, three phase power will be fed from the electric room to the electric rooms in the various, separate construction phase buildings from the campus electrical power distribution room.
4. The 277/480 Volt, three phase power will directly feed power to the mechanical equipment and lighting circuits in the various, separate construction phase buildings.
5. The 480 Volt, three phase power will energize 480 Volt Three phase to 120/208 Volt power transformers in each of the various, separate construction phase building electrical rooms
6. The 120/208 Volt power transformers generally provides power to the 120 Volt and 208 Volt loads.

7. The electrical rooms in the separate construction phase buildings will vary in size depending on the amount of load in the building. In general, the electrical rooms are expected to range from 12 feet by 14 feet to 12 by 16 feet.
8. New power feeders linking the campus electrical power distribution room to the various, separate construction phase buildings will be installed as copper, XHHW-2 insulated conductors. Where possible, these power feeders will be routed in underground, PVC schedule 40 conduit.
9. New power feeders feeding new electrical power panels in the various, separate construction phase buildings will be installed as copper, XHHW-2 insulated conductors. Where possible, these power feeders will be routed in underground, PVC schedule 40 conduit.
10. Branch circuit wiring will not be smaller than 20 Ampere rated and #12 stranded copper, THWN insulated.
11. Typically, any branch circuit panels older than 25 years old are recommended to be replaced.
12. The existing power distribution switchboards are recommended to have the existing circuit breakers removed and made available to the school district as spare parts.

The existing Manufacturing Technology area has a large number of older machine tools. Most of the tools appear serviceable with questionable tolerance specifications. Notable in their absence are the computer assisted machine and fabrication tools found in larger fabrication facilities.

The CTE areas may need power/ data communications capabilities more integrated with project layout areas to make the transition to a more current fabrication technology base.

The State of Oregon mandated 1.5% of construction cost being dedicated to project renewable energy is expected to result in a sizeable photovoltaic array on the roof of the modernized school roof systems.

Student Safety

All power receptacles in areas accessible to students will be Child proof configured.

The CTE areas with operator safety requirements requiring a remote emergency power shutdown pushbutton will be configured to de-energize all receptacles and equipment in the area. The pushbutton station will be located in an accessible location in the area, but under ready instructor observation.

The natural gas supply to student science areas will be equipped with a pushbutton controlled natural gas solenoid valve. The pushbutton will initiate the closure of the solenoid valve. In order to re-energize the solenoid valve (allow natural gas flow, a key switch, contact closure will be required. Loss of building electrical power will also initiate the closure of the solenoid valve.

illumination

Efficient energy utilization for internal space illumination is required by current energy code requirements. This means illumination levels need to be set to provide adequate light to perform intended tasks, but not excessive illumination for a reasonable range of human vision capability. The utilization of artificial lighting in spaces is based on the need for safe performance of tasks. If the space is vacated or has adequate natural (daylight) illumination, the need for artificial lighting is either not required or is reduced.

New LED luminaires with occupancy sensing as well as daylight harvesting / dimming automatic controls are recommended to be provided.

The Existing “New” gym building has the gymnasium area illuminated by 2 foot by 4 foot, metal sided, specular alzac reflector, 6 lamp luminaires. The Existing “Old” gym building has the gymnasium area illuminated by 2 foot by 4 foot, metal sided, specular alzac reflector, 6 lamp luminaires. The luminaires appear to utilize high output t8 fluorescent lamps. These luminaires are doing a good job of providing illumination.

The height of the luminaires implies getting a high reach, scissors-lift in to replace lamps. Replacing the existing “New” Gym and “Old” Gym luminaires with LED light source luminaires is recommended.

The Auditorium and theater space relies on solid state dimmed incandescent luminaires as the means of theatrical environment illumination control.

Eating area lighting in the Auditorium is via pendant, opal glass diffuser, original construction period luminaires. The central luminaires are each a cluster mount of six pendant opal glass diffusers with a common pendant base platform. The perimeter luminaires are single pendant, opal glass diffuser, original construction period luminaires. The opal glass diffusers were originally all matching. Some different, replacement diffusers are currently in place on some perimeter luminaires. It is assumed each of these luminaires is equipped with either a lowering device or a raising system to facilitate re-lamping.

1. These luminaires are viewed as architecturally significant to the auditorium. By the size of the opal glass diffusers, these glass diffusers are estimated to weigh 15 pounds each. The luminaires and glass diffusers were probably not designed to indefinitely withstand the pendant motion of a seismic event. Review of the luminaires pendant support and their opal glass diffuser mountings is required to assure their survival in case of a significant seismic event.

Lighting in the library utilizes natural daylight via the windows and overhead skylight monitor in the northern portion of the library. The southern portion utilizes an illuminated cavity with a pendant direct/indirect semi-hemispherical luminaire array to good effect. The perimeter bookcase tops are equipped with an indirect, casework shielded, luminaires.

KBPS Studio, Production Building

The existing KBPS studio, production building is energized via a PGE pad transformer. This Production building power is electrically independent from the High School Academics building complex. The electrical service for this building dates from the late 1980’s to 1990’s.

The 1000 Watt radio Transmitter is in a small shed to the north of the base of the transmitter antenna tower. Power for the transmitter and its ancillary electronics will be provided from the campus electrical room.

A communications cable pathway to link the KBPS studio, production building to the 1000 Watt radio Transmitter shed is required. The cabling required for the link will be defined.

The KBPS antenna ground plane conductor array will be repaired and maintained as operational; throughout the project work.

H. KITCHEN DESIGN

Benson Polytechnic High School
Pre-Diligence
Kitchen Scoping Narrative
April 7, 2017

Introduction

The current kitchen and cafeteria are located in the basement of the H-wing building and were constructed in 1991. The overall spaces are adequately sized based upon the current average number of meals served each day, although there are a few code violations such as inadequate placement and number of hand sinks. Per information provided in the PPS Educational specification, approximately 300-350 meals are served at lunch in one 35-minute period. Food is served in 20 minutes. Benson is an open campus which impacts the level of participation in the school lunch program. Breakfast is also available before school.

The existing kitchen is in reasonable condition, however, much of the equipment is not being used due to age and/or changes in menus and preparation methods. A long stainless steel serving counter with drop-in equipment is worn and in need of more flexible equipment to allow for menu changes. The introduction of color and upgraded finishes would make a big difference in how the lunch program is perceived and could perhaps increase participation.

Per the preferred overall master plan, Scheme L, the kitchen shall be relocated to a new building that will be constructed over part of the footprint of the existing D building. This will allow for easy access for kitchen food deliveries and place the Commons in a more centrally located area of the school with plenty of natural light and a more inviting atmosphere.

The design shall accommodate a future student population of up to 1,700. An estimate of the percentage of participation in the breakfast and lunch programs based upon this population and the impact of the new space shall need to be reviewed with PPS.

Space Allocation and Adjacencies

Square footage requirements for each area of the kitchen and server are as indicated in the PPS Education Specification, as follows:

Main Server:	1,700
Food Prep/Kitchen:	1,500
Dish Washing:	200
Dry Storage/Cart Storage:	500
Walk-in Cooler:	200
Walk-in Freezer:	200
Office:	120
Staff Restroom:	60

Kitchen:

Within the Food Prep/Kitchen area will be a receiving area for bulk food deliveries from the PPS Nutrition Services. Deliveries are once per day via a box truck as well as a delivery of milk from an outside vendor. A raised dock in the loading area is preferred in order to eliminate the need for lift-gates on the trucks.

An office or desk area with ample work space and storage is required next to the receiving area. The walk-in cooler, walk-in freezer (with separate entry door) and the dry storage room shall be close to the receiving area. A staff restroom, lockers and a mop sink should also be close by.

Prep and cooking areas shall have easy access to the refrigerated, frozen and dry food storage rooms. Scratch cooking and prep is performed on-site so work tables, meat and vegetable prep sinks, ovens, combination oven-steamers, a kettle, tilt skillet and two to four open burner will be needed. Cooking equipment shall be on casters wherever practical.

Staging space for cooked food is essential between the cooking area and the serving area. This includes large flat top work tables and hot and cold pass-through holding cabinets. Since all meals must be served in a very short amount of time, a generous amount of food holding cabinets are important.

The dish washing area shall include a large capacity 3-compartment sink for washing large cooking vessels and pans. A conveyor dish machine that will also hold tall sheet pans shall be required, along with attached soiled and clean tables, a waste collector for pre-rinsing, a hand sink and wire shelving for drying and storing clean ware. Space for trash, compost and recycling shall also be incorporated. Food is served to the students on disposable products so the dish room is for mainly washing kitchen pans and utensils.

Designated hand sinks shall be strategically placed with access to each work area. They shall be easy to see and within 20 feet from any given point.

Servery:
The server area shall ideally accommodate six food stations, 6-feet minimum in length each plus space between the stations for salad bars, milk and point-of-sale systems. Stations shall be all in a straight line or an L-shape with outside corner. Typical themed food stations included Pizza, Mexican, Hot Entrée, Deli Sandwich, Hot Sandwich and Asian. Proper design of the queuing space with traffic railing and control points is essential. Counters shall be mobile easy clean ability and flexibility. Drop-in pans shall be convertible from hot to cold to allow for menu changes.

One of the six stations can be in the Commons area, remote from the main line, in order to ease up congestion and if lineal footage at the main counter becomes a challenge.

The Commons shall have additional space for condiment stations and plumbed water stations.

Note that per federal requirements, Nutrition Services must provide students with complete meals. Ala carte service is not allowed.

<u>Existing Equipment</u>
A visit to the existing kitchen revealed that some of the equipment is still in good condition and may be able to be relocated to the new kitchen. The items with the greatest potential include stainless steel prep sinks and tables, shelving and hot holding cabinets. Other items that will need further investigation and verification from PPS staff include the convection ovens and reach-in refrigerators.

The water-wash hoods may also work but the overall sizes need to be verified with the new equipment line-up.

Some equipment items are not currently being used due to changes in menu and standards. This includes the fryers and some of the burners. Much of the existing equipment is not as energy efficient or able to multi-task for different menu items. The walk-in cooler and freezer are in reasonable shape and appear to hold proper temperature. However, they could be very difficult to dismantle and relocate, nor are they as energy efficient as new units would be.

A follow-up visit by our team and interviews with PPS staff shall be performed in order to better define exactly which pieces of equipment should be relocated to the new kitchen.

Examples of potential equipment for reuse:

Existing Prep Sink

Existing Convection Ovens

Existing Hood

Existing Prep Sink

<u>Utilities and Systems</u>

The new kitchen will require very typical systems for a commercial kitchen. These include, 110 to 140-degree hot water, cold water, natural gas, single and three phase power, type 1 grease exhaust duct(s) with exhaust and supply roof-mounted equipment, and type 2 vapor ducts with exhaust fans. An outside grease interceptor for collection of fats, oils and grease shall be specified by the mechanical engineer.

<u>Finishes</u>

Kitchen floors shall be designed for heavy wear and longevity. Quarry tile and epoxy are both great options. There are several different grades and application methods for epoxy and MMA flooring systems so it will be very important to ensure the best product and high quality installation is employed if it is selected over quarry tile.

Walls shall be have fiberglass reinforced paneling up to 8-feet in all prep areas and dishwashing areas with washable paint above. Stainless steel wall flashing shall be required under cooking hoods and may also be used as a wainscoting in the dish room. Stainless steel corner guards shall be installed on all outside corners.

The finished ceiling shall preferably be suspended with removable, vinyl-coated tiles. Lighting covers shall be shatter-proof. Preferred ceiling height is 10-feet with 9 feet as a minimum.

Serving counters must have durable finishes but also be attractive. Solid surface tops are recommended with either laminate or stainless steel sides. Adjustable sneeze guards will allow for staff to place in the vertical position for full-service or open for self-service.

Code Considerations

The new kitchen design shall meet all current city, state and national building codes fire codes, shall comply with Multnomah County Environmental Health requirements, the State of Oregon Food Sanitation Rules, and equipment shall be compliant with NSF, ANSI and UL or ETL standards. EnergyStar equipment shall be specified as applicable to each type.

Budget

The overall equipment and fixture budget, per our very preliminary estimate is $650,000. This number is based upon our experience with PPS on previous similar projects, the $700,000 budget suggested in the Master Plan Report and has a factor built-in for inflation.

Prepared by:

Jill S. Bierman, President
JBK Consulting and Design, Inc.

I. THEATER

Project: Benson Polytechnic High School – Portland, OR
Subject: Performing Arts Assessment of Existing Conditions @ Auditorium
Date: May 1, 2017
From: K. Paul Luntsford, ASTC, LC

Introduction and Overview

Although the theater building is quite old, and includes a combination of targeted modifications and upgrades which may or may not be code compliant now, it appears that there is a high level of probability that the facility can be modernized sufficiently to serve as a contemporary high school level performance venue. While the existing conditions of space do not currently provide many of the tools, technologies, or operator safety provisions required to accommodate today's standard practice for educational performing arts, the basic layout and proportions of the space are acceptable.

The Benson HS theatre appears to have enough suitable building provisions to make modernization with historic preservation a realistic possibility. Even so, substantial building renovations will be required to achieve success. Success is defined as a working, educational performing arts venue that allows students to learn and practice contemporary drama, instrumental music, choral music and technical performing arts skills, while providing their audiences with a good experience.

The observations and commentary contained in this report are limited in scope to theatrical practice only. PLA Designs are not architects, nor engineers. This report does not address matters of structural soundness or other similar elements covered by separate disciplines portions of the overall Due Diligence Report.

Auditorium and Balcony – Seating, Sightlines and Egress

The auditorium is large and well ornamented in keeping with design practice of the period when it was birthed. There are approximately 1,060 seats on the main, or Orchestra level, and 675 seats in the upper, or Balcony level. The seats appear to be mostly original, and are wood slat on cast iron, without upholstery. Seat bottoms, while hinged, do not have self-rising provisions. Lack of self-rising provisions triggers a stricter interpretation of the OSSC for minimum clearance. This presents a higher potential for design challenges at the balcony, since the existing row-to-row depth is only 34 inches. Seat width appears to be 19". The combination of narrow seat width and lack of upholstery makes sitting in the seats for an extended period likely to be quite uncomfortable. Some seats have been replaced with composite materials attached to the original cast iron standards. Vertical sightlines at the orchestra level are acceptable, though the rear section of seats under the balcony are sight and sound constrained.

Egress for ambulatory and non-ambulatory persons is not compliant with current OSSC and ADAAG and would require modification of the building and the seating / aisle layout to achieve a practicable level of compliance. A loss of 300 to 500 seats is not unreasonable to expect, to make the space code compliant without performing a full rebuild of the balcony and lobbies on both levels.

The space currently has no dedicated wheelchair spaces, though the space can be accessed by a wheelchair lift immediately outside of the house right door nearest the stage, the current slope of the main seating slab renders only the very front of the auditorium in front of the main seating area wheelchair friendly. Wheelchair seating in the balcony is not advised. Full compliance with OSSC, ANSI 117.1 and ADAAG requirements would not require a handicapped person to exit the auditorium to enter the stage, if there are provisions for ambulatory audience members to directly enter the stage from the auditorium seating area. This facility currently does not meet that contemporary requirement.

Auditorium and Balcony – General and Performance Lighting / Audio-Visual Systems
The general lighting in the space is a combination of pendant downlights, surface mount drum lights, and (4) 6-lamp chandeliers. All existing lighting fixtures appear to be fitted with incandescent lamps. The illuminance levels at the seats are inadequate for assembly purposes, and illumination coverage in the space is severely lacking in uniformity. Dedicated aisle lighting is not present. We could not discern a means of emergency lighting in the space.

Mitigation of daylight entrance at the existing windows in the space is inadequate, and renders daytime theatrical performances highly impractical, since the auditorium cannot be darkened sufficiently. The current window coverings are quite worn and most likely would not pass a flame test. Modernization of daylight control to achieve 95% or greater light entrance reduction is a key item for success.

Control stations or switches to activate room general lighting are substantially insufficient. There is a single pushbutton station located near the house right door closest to the stage, and another pushbutton station near the upstage left door. Control is limited to on and off. Zonal control of the auditorium and balcony is nonexistent. House dimmers are antiquated and outdated, and are not entirely functional.

There is no Sound or Lighting control booth present at either the Orchestra level, or the Balcony. Contemporary standard practice dictates that a sound mix location for a sound board operator be placed within the acoustic envelope shared with the audience, with provisions for the space to act as an auxiliary or accessible lighting control location. If the auditorium is to be upgraded, any slab changes and modifications required to add a control booth ought to be incorporated into the modifications already made necessary to bring the space in line with current accessibility and other relevant codes.

The existing projection booth does not appear to be in current use, and may be a candidate for the location of a dedicated Lighting Control booth. However, significant modifications to the existing space would be required to provide code-compliant accessibility to this small, elevated room. We do not recommend using the space as a location as a sound mixing location since it is in an acoustically poor location. A new accessible dedicated control booth for sound and lighting should be created as part of any renovations to the space.

Proscenium Stage – General Dimensions & Provisions
The proscenium opening is somewhat narrow and disproportionally tall (36’-0” W x 21’-7” H), which is typical of the era when it was originally built, and wing space is modest (@ an average of 7’-0” per side). Contemporary school stages would have a minimum 42’-0” W x 20’-0” H proscenium opening, and approximately 20’-0” minimum wing space on each side of the opening. These existing dimensions create challenges to lateral sightlines (all seats see all performers, since some may be past the arch opening on the same side as an interested audience member), and forces limitations to the size of sets and concert performers onstage, that can be seen by the all seats in the audience. Movement of scenery laterally on and off stage is compromised by the lack of wing space. However, existing stage left and stage right walls appear to be hollow clay tile, and are most likely non-load bearing. As a result, adding workable stage footprint by removing these walls is a very real possibility.

Additionally, the limited stage thrust, and lack of an orchestra pit severely limit the full ability to produce proper musical theatre performances, since an Orchestra would normally be down in a recessed "basement" pit space with an openable top at stage level…… no such space exists at Benson. There is a large door centered upstage that allows for the movement of large scenery and other items easily on to the stage. Replacement of the existing door, with a new acoustically rated door is advised in any modernization effort, to mitigate a serious noise contamination problem that presently exists.

Proscenium Stage – Stage Rigging Equipment
The stage rigging system consists of a mixture of wire guided iron counterweight arbors, and manual manila rope and sandbag sets. The equipment is outdated and no longer conforms to recommended safe practice. Stage draperies and drapery tracks are quite worn, and noisy. The existing complement of stage drapery is severely lacking compared to contemporary high school theatres. The rigging fly loft is not tall enough to accommodate a 'full fly' stage rigging system. However, it does include a suspended gridiron near the roof. Replacing the stage rigging with like kind will certainly require a structural evaluation of the existing gridiron to determine allowable loading capacity for contemporary stage rigging. Such an evaluation may find that the gridiron and roof structure over the stage, would require structural modifications. Such modification would like take up some of the stage footprint and height, both of which are already quite limited. It is likely that the only practical means for provision of contemporary stage rigging would be use of vertical lift, motorized hoists located at the gridiron.

Stage Safety Issues
Access to the Fly Gallery, Gridiron and other ancillary spaces above the stage is better than most of the other PPS high schools, yet there are still some significant safety concerns. The stage-right organ loft has a door that opens directly to the stage volume, yet is12'-14' above the stage floor. Work lighting on the stage, stage galleries, and gridiron is practically non-existent. Addition of supplemental work lighting in technical circulation areas should be an easy and relatively inexpensive prospect.

The whole of the stage lighting system (dimmers, distribution devices, & controls), is antiquated and inadequate. No part of the system is salvageable and the system would not be a viable option even if the space was to be converted into merely a lecture hall, and not a true performing arts venue.

Provision of an adequate stage lighting system may prove the most challenging aspect to the successful conversion of the space into a legitimate performing arts space, while still preserving a maximum percentage of historical surfaces at the ceiling. When the building was designed, ante-proscenium stage lighting (located at the ceiling) had not yet been invented. Significant modifications to the plaster ceiling, attic, and balcony rails will need to be made to allow for an adequate number of lighting positions, as well as means to provide both safe access and working conditions for students at those locations, as teaching stage lighting techniques is an integral part of a technical theatre education. An alternative approach is possible, where the entire lighting beam is suspended below the existing ceiling, and is held in place with motorized hoists located above the ceiling.

As is the case with the stage lighting system, all other technical systems for performing arts are either worn, obsolete, broken or missing and should be replaced with new, if this building is retained and modernized for use as a contemporary, educational performing arts facility.

BACKSTAGE SUPPORT AREAS

Like the auditorium and stage, the backstage area shows promise. The existing dressing rooms are small, but manageable, but are currently ill-equipped to support a contemporary drama program. They currently lack adequate power provisions, ambient and makeup lighting, or storage. However, providing the necessary equipment and lighting to the current spaces should not be difficult. With regard to quantity of actor spaces, that is a function of the level of dramatic performances that the educational plan supports for this school. There is limited circulating crossover corridor space surrounding the sides and rear of the stage, separating & connecting the backstage areas from/to the stage. There is direct public access to the women's dressing room door, which should be remedied. No true scene shop space exists, and there is a significant lack of storage for sets, props, costumes and other elements. A single storage area is present which connects to the stage, dressing rooms, and loading dock.

The loading dock provides street access to NE Irving street, and is ample.

Access to backstage support areas for persons with mobility disabilities is not ideal. A ramp currently exists that provides access to the stage and men's dressing room. It is not possible to directly access the women's dressing room via wheelchair without first passing through either the stage or the men's dressing room and backstage storage area. This is well outside contemporary OSSC & ADA requirements.

Conclusion
Significant challenges exist in modifying the space to provide compliant accessibility, adequate front of house stage lighting positions, modern & functional stage rigging, and extended stage depth & wing space. However, the historic value and charm of the space should not be discounted. The challenges and shortcomings listed in this report are not impossible obstacles. Further evaluation from other members of the design team may be required to assess the architectural and structural viability or modernizing the space. To put it simply, from a purely theatrical perspective, the 'bones' of the space are there. Enhancing the connective tissue that does exist, and supplementing with new systems and equipment to add the tissues that are currently missing, would provide a viable and contemporary performing arts facility that would serve the educational needs of the district, as well as the local community at large, all while honoring the historical context and character of the original building elements.

Respectfully Submitted,

PLA Designs, Inc.

K. Paul Luntsford, ASTC, LC
Principal

pladesigns inc
theater planners · lighting consultants

Report

Project: Benson Polytechnic High School – Portland, OR
Subject: Performing Arts Proposed Modernization Scope @ Auditorium
Date: March 30, 2017
From: K. Paul Luntsford, ASTC, LC

OVERVIEW

Refer to the Existing Conditions Assessment Report for reasons to replace, improve or modernize selected building and equipment elements in the Auditorium / Theatre. This report defines our recommendations for replacement, improvement or other modernizations of selected building elements and/or equipment systems in order to bring the facility to current performing arts educational values.

The work scope would be divided into Building Provisions and Equipment Systems.

1. BUILDING PROVISIONS

A. Accessibility in auditorium and to stage: Modifications to allow access by wheelchair to the extent practicable, as defined in OSSC and ADAAG.

B. Balcony Modifications to meet current OSSC for means of egress, seating, guards and handrails at aisles.

C. Backstage Support Areas: Should attempt to comply with PPS Program for support areas.
- Dressing & Makeup
- Crossover Circulation behind Stage
- Shop and Materials Storage
- Security
- Accessibility

2. EQUIPMENT SYSTEMS

A. SECTION 09 65 51 – SPRUNG WOOD STAGE FLOOR
1) Replace the existing wood floor system with a contemporary, durable sprung floor system that complies with ANSI and ESTA standards for educational performing arts stages.

B. SECTION 11 61 61 – STAGE RIGGING AND DRAPES

- MOTORIZED RIGGING HOISTS (ONSTAGE): To prevent addition of lateral forces exceeding 5% of the original, new rigging should consist of vertical lift, zero-fleet angle hoists, each with not less than (5) lifting lines. Hoists would anchor to the top side of the existing gridiron, staggered per side of stage, and have integral stiffener backbone members to prevent lateral forces from being introduced to building.
- TRACKS AND DRAPES ONSTAGE: All new drapery tracks should be provided for Grand Drape, Midstage Traveler and Rear Traveler. All other drapes should be tied to batten without tracks.

All new masking and decorative traveler drapes should use Inherently Flame Resistant polyester synthetic velour for simple maintenance and maximum useful life.

- MOTORIZED SELF-CLIMBING TRUSS HOIST (FRONT-OF-HOUSE): To avoid disruption of the existing historic ceiling finishes, a self-climbing hoist truss should be added to the auditorium. This will accommodate critically important Front-of-house stage lighting, which is currently absent from the theatre.

C. SECTION 11 61 63 – FLOWN ACOUSTIC REFLECTORS & PORTABLE TOWERS (ONSTAGE)

1) Flown Reflectors: Curved reflector panels, supported on the stage rigging, provide proper acoustic environment for rehearsal and performance by band, choral and orchestral musicians. When not needed (during drama), the panels store up in the stage loft where they are out of the way.
2) Portable Towers: Curved, vertical reflector panels, supported by a weighted roller base, provide a critical complement to the flown reflectors, with regard to proper acoustic environment for rehearsal and performance by band, choral and orchestral musicians. When not needed (during drama), the towers roll off to a separate storage area where they nest together to take up less space.

D. SECTION 12 61 13 – FIXED, UPHOLSTERED AUDIENCE SEATING

1) Orchestra Level: Replace all existing seating. New seating shall include the following features:
   i. Self-rising seats
   ii. Ornamental end panels at aisles
   iii. Upholstery rated for 3 hour comfort and 40 year durability
   iv. Finishes compatible with interior.
   v. Damage resistant materials.
   vi. Armrests
   vii. No tablet arm provisions.
   viii. Aisle Lighting integrated to end panels.
   ix. Design based on minimum 21” seat width
   x. 18 deg seatback angle.
2) Balcony Level: Replace all existing seating. New seating shall include all of the same features as the Orchestra Level, except that seatback angle shall be 14 deg and seat design may need to be compacted to adjust for narrow row spacing.

E. SECTION 26 09 61 – LIGHTING CONTROLS FOR PERFORMING ARTS VENUES

1) General and Work Lighting: Controls shall be simple digital preset with processor, with integration over sACN network. Human interface devices shall be easy for non-skilled users, and shall be software based. System shall equally serve solid state and tungsten sources.
2) Production Lighting: Configured to equally serve solid-state lighting and tungsten. Shall include sACN and RDM distribution and control. Processor shall integrate with house lighting controls.
3) BASIS of Concept: ETC Paradigm, NET3, Sensor3 ThruPower, ION console.

F. SECTION 26 09 62 – POWER DISTRIBUTION DEVICES FOR PRODUCTION LIGHTING

1) Located at catwalks, galleries, stage wall, floor pockets and on selected motorized rigging hoist assemblies.
2) Fed by panelboards, relay cabinets and dimmers.

3) UL Listed and Labeled for Theatre Hard Service Usage.

G. SECTION 26 09 63 – PRODUCTION LIGHTING FIXTURES AND ACCESSORIES
  1) Should include a mixture of 40% tungsten-halogen source and 60% solid-state monochromatic / RGBA sources. All solid-state lighting shall be fully digital and have resolution at not less than 16-bit for full, deep and smooth fades.
  2) Cabling and accessories should be included to allow adaptation, adjustment and creative flexibility with lighting.

H. SECTION 26 09 69 – GENERAL LIGHTING FOR PERFORMING ARTS VENUES
  1) House Lighting:
    i. To the maximum extent practical, all existing lighting fixtures should be renovated or replaced as is appropriate to the fixture (functional, historical, practical) to operate with solid-state LED light engines and drivers.
    ii. All house lighting fixtures must be able to perform a smooth, 16-bit resolution fade from full to zero output, emulating an incandescent, square-law dimming curve.
    iii. Color reference shall be 2700 Kelvin with a CRI rating of not less than 80.
    iv. L70 should occur at no less than 50,000 hours.
    v. Chandeliers and other existing ornamental fixtures should be cleaned, restored and have internal wiring and sockets replaced with new equipment, by a shop that can provide an acceptable label from an independent, approved testing laboratory.
  2) Work Lighting
    i. To the maximum extent practical, all existing lighting fixtures should be renovated or replaced as is appropriate to the fixture (functional, historical, practical) to operate with solid-state LED light engines and drivers.
    ii. Color reference shall be 2700 Kelvin with a CRI rating of not less than 80.
    iii. Shielding shall be considered a high priority.

Respectfully Submitted,

PLA Designs, Inc.

K. Paul Luntsford, ASTC, LC
Principal

ASTC
American Society of Theatre Consultants

J. AV & ACOUSTICS

AUDIO-VIDEOSYSTEMS
Benson Polytechnic High School
Portland Public Schools

April 26, 2017

INTRODUCTION
This document summarizes observations of existing audio-video (AV)systems at Benson Polytechnic High School and describes programmatic-level recommendations and opinions of probable costs to satisfy current Portland Public Schools (PPS) design guidelines and typical systems for these facilities. Site visits were conducted on 11/04/2016, 11/23/2016 and 12/21/2016 to obtain a cursory assessment of existing conditions and equipment in the spaces.

AV systems discussed herein focus on the following spaces:
- Auditorium
- New Gymnasium
- Music Classroom
- Media Center/Library
- Cafeteria

General Goals and Assumptions
The systems are expected to be high quality with good performance, although not exotic or esoteric. Low cost and simplicity of design and operation are primary goals. The AV capabilities are generic and are not intended to provide a detailed description of the systems and their implementation.

The design process should be based on EASE or similar computer modeling, per PPS Guidelines. Recommendations and associated budgets should be expected to evolve during design, based on further Owner input.

AUDITORIUM
- Auditorium AV, per PPS Guidelines 27-41-18, optimized for speech reinforcement. Live music sound reinforcement proposed as an additive alternate.
- Two operating modes:
  - “Plug-n-play” mode for simple events operated by non-technical persons
  - Live music option - console mode for use by technical operators. console in sound booth on balcony level in front of existing projector booth, with portable tablet control from anywhere within the auditorium
- One projection screen on the stage.
- Video Projector located at balcony level (long throw lenses).
  - Existing blackout shades need to be either repaired or replaced.
- Central loudspeaker cluster
  - Likely can fit in existing niche above stage, but will require further dimensional measurements and assessment.
  - Semi-distributed speakers may be needed for under-balcony coverage
  - Multichannel surround sound not required

- Three wireless microphones; two handheld and one lavaliere
- Lectern gooseneck-style wired microphone
- Pair of hanging microphones for stage coverage.
- I/O plates for audio/video connectivity
- Production intercom system
- Assistive Listening System.
- Extra conduit runs or category cable between sound booth and stage for rental equipment connection flexibility

Existing equipment was observed as follows:

- Sound Reinforcement Loudspeakers - Speaker horns of unknown origin and condition are located in architectural niche above stage and appear to no longer be in use. University CSO-6 speaker columns (2) are mounted on both sides of the stage. These are antiquated and inappropriate for this type of application, a central speaker cluster is recommended.

- Portable Speakers - Kustom brand speaker cabinets were found in storage behind the stage. These are not appropriate for permanent installations, but may be useful in portable applications.

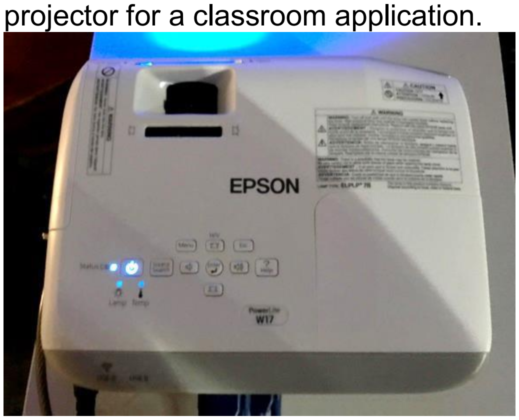
- Mackie 1402VLZ Mixer - This is a relative low-quality analog mixer unsuitable for a large space such as this. However, it may be repurposed for the Music Classroom, or for use as portable equipment.

These existing items should be evaluated during design for possible re-use:

- Biamp Advantage One microphone mixer with Advantage EX expansion module
- XLR patch bay
- Rane MA6 Power Amplifier with MT6 transformer kit
- Symetrix dual Compressor/Limier
- Biamp Advantage Dp/M 2 Distribution preamp/mixer

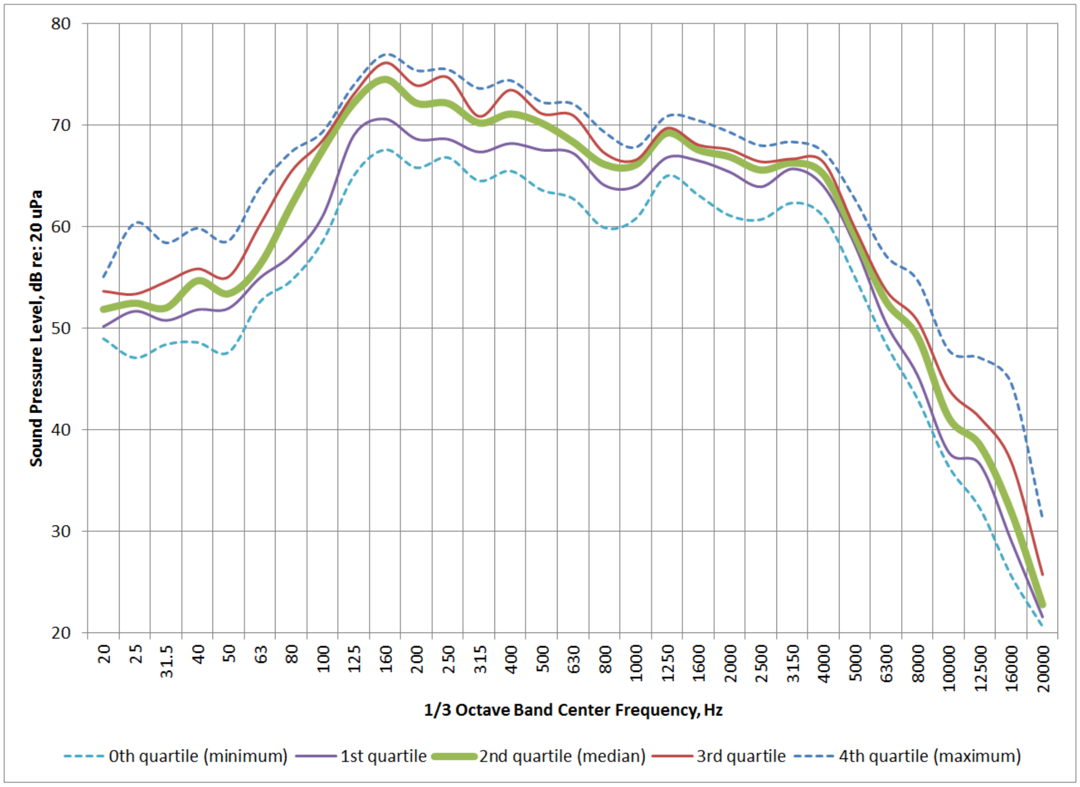
Loose existing items

- Audio Technica ATW-R700 with ATW-T702 handheld wireless microphones are outdated and likely no longer compliant with FCC code.
- Epson PowerLite W17 – 2,800 lumen WXGA (1280 x 800) 3 LCD projector is antiquated and inadequate for this space. However, it may be useful as a backup projector for a classroom application.



Performance of existing conditions

- The existing sound system was tested for speech intelligibility and coverage. The coverage was found to be poor (shown in the figure below), withhigh variability in sound levels at different seating locations, mostly due to a “split source” system (speakers flanking each side of the proscenium) resulting in severe phase cancellations along the centerline of the Auditorium. Speech intelligibility was also observed to be poor due to excessive reverberation at low frequencies.



NEW GYMNASIUM

- Standard Gymnasium Sound System, per PPS Guidelines 27-41-17
- Central speaker cluster
    - Speech system for sporting events or presentations.
    - Performance audio not required
- No video systems planned.
- Three wireless microphones; two handheld and one lavaliere
- I/O plates for audio connectivity.
- Assistive Listening System.

Existing equipment was observed as follows:

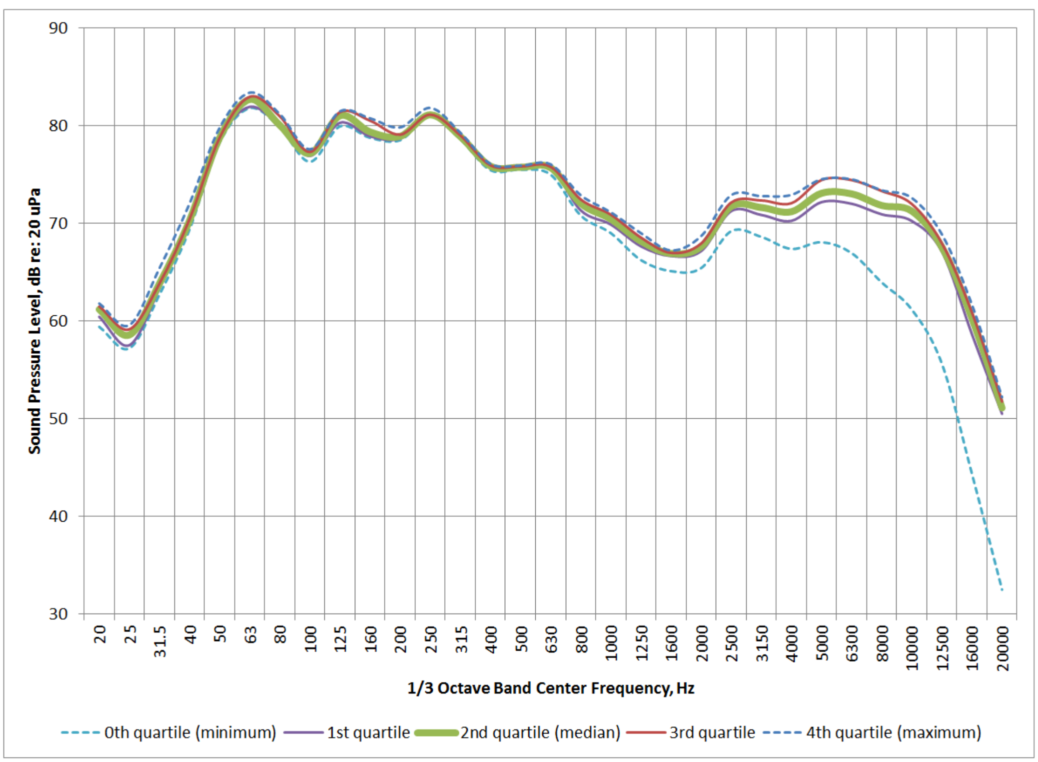
- Four speakers mounted in the rafters aimed at the bleachers.

- Peavey XR8300 2-channel mixer/amplifier – This item is inadequate for such a large system, but may be reused in a portable application.

- Audio Technica ATW-R2100al with ATW-T702 handheld wireless microphones are antiquated and likely no longer compliant with FCC code.

Performance of existing conditions

- The exiting sound system was tested for speech intelligibility and coverage. While the coverage was excellent (shown by consistent sound levels throughout the space in the figure below), the speech intelligibility rating was very poor due to excessive reverberation and low and mid frequencies.



MUSIC CLASSROOM

- Standard Classroom AV, per PPS Guidelines 27-41-13, 27-41-16, and 27-41-16.10
- Two channel recording and playback
- Hanging ceiling microphones for recording
- Stereo speakers on front wall for playback
- AV Input panel for microphones, laptop and other audio sources.
- Standard classroom AV functionality is also assumed
- Assistive Listening System.
- No existing AV equipment was observed.

MEDIA CENTER/LIBRARY

- Assume typical Library AV systems.
- No existing AV equipment observed.

CAFETERIA

- Assume typical Library AV systems.
- No existing AV equipment observed.

RECOMMENDATIONS

Video Displays – General
The most critical and permanent element of an AV system is the display screen. In fact, from the user's point of view, the screen is the very heart of the AV system.

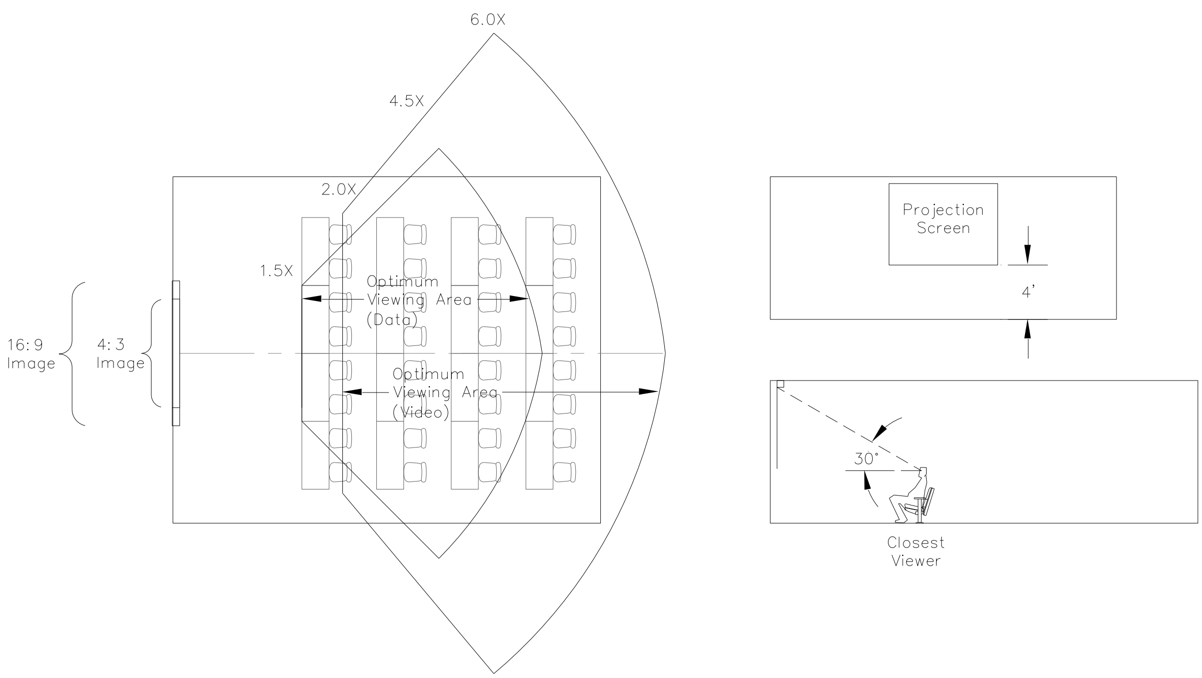
Image Size and Shape
The image size (projection screen or LCD display) must be large enough to provide good viewing to the farthest viewer and not too large for the nearest viewer, and placed at a reasonable viewing angle for all viewers. Greenbusch recommends screens be sized and located to meet the following criteria:

Image Types	***Viewing Distance***		***Maximum Viewing Angle***	
	Max	***Min***	***Horizontal***	***Vertical***
General images, such as • Video on DVDs • Most “Power-point” slides • Images from videoconferencing cameras	6 x Image Height	2 x Image Height	50°	±30°

Image Types	***Viewing Distance***		***Maximum Viewing Angle***	
	Max	***Min***	***Horizontal***	***Vertical***
Detailed images, such as • Typical computer screens • High-density text • Detailed items on a document camera • Maps • Spreadsheets • HDTV, such as BluRay disks	4.5 x Image Height	1.5 x Image Height	45°	±30°

The screen must also be located at a height to provide good sight lines for all viewers. In general, for seated viewers in rooms with flat floors this means that the bottom of the screen should be at least 4 feet above the floor to avoid blocking of the image by persons sitting in front of viewers. In addition, the top of the screen should be less than 30 degrees above the horizon for all viewers to avoid discomfort.

This criteria is illustrated below:



In some larger rooms, the screen size may be limited by the ceiling heights, resulting in the screen being somewhat smaller than it should be. However, viewing conditions should be optimized as much as practical within architectural limitations.

Another consideration is the aspect ratio of the screens. Standard video has an aspect ratio of 1.33 (4 to 3, width to height). However, newer video technologies (such as HDTV and most computer-graphics formats) use a "widescreen" aspect ratio, with the most frequent ratios being 1.78 and 1.85 (approximately 16:9 and 16:10). This also matches the "widescreen" ratio used for most widescreen DVDs and BluRays.

A 16:9 ratio is recommended.

Brightness and Contrast
The system must also provide sufficient brightness and contrast for the type of images being displayed, at the lighting levels expected for each type of presentation. This is a function of the “brightness” (light power) of the video display, and the lighting of the room. Maximizing contrast requires careful attention to the control of ambient lighting.

In general, a minimal design goal would be 25-30 foot-Lambert’s for projection or 250-300 Nits for direct view displays. Additional rated output should be planned as all displays systems loose light power as they age.

Video Projectors
The video projectors should be capable of displaying various scan rates and resolutions, from NTSC rates to high-resolution computer graphics. They will also need to provide sufficient light power to give sufficient contrast.

It is also important to carefully consider noise (of cooling fans) when choosing and locating the projectors, to avoid compromising the acoustics of the rooms. For the auditorium, it is recommended that the projector be mounted in the control booth or other enclosed space to keep the projector noise from intruding into the hall itself.

Lighting
Where front projection is used, the lighting will need to be dimmed during presentations, and nearly off for high-quality projection. It is very important to keep light off the video projection screens to the greatest extent possible. Careful design of the lighting and lighting controls will be necessary to achieve dark screens for the video display while simultaneously providing some lighting for the presenter and other functions.

The lighting should be zoned and dimmable (or bank-switched). The lighting over the seating area should be controlled independently of the lighting for the stage/presenter area (where the screen is located). This will provide the ability to have some light for note taking, while leaving the screen area adequately darkened for effective video presentation.

Windows and skylights should be equipped with blackout shades to block the incoming light.

Audio
The systems should be configured with automatic microphone mixers, which will automatically turn each microphone input on whenever a signal is detected on that input, and will mute that microphone input when no signal is found. This also allows the system to automatically reduce the master gain as more microphones turn on, to keep the threshold of feedback constant. Thus, with only one microphone active, the full potential gain is available, while with multiple microphones on, feedback stability is still maintained.

The systems should also have automatic gain controls, to help to maintain relatively constant volume (loudness) as the voice levels and microphone distance varies from talker to talker. These features will provide a "plug and play" mode of operation for non-technical users, for use with 1 to 6 microphones, with only the remote on/off and master volume control. The ability for technical users to control the system with an external mixing interface is recommended.

For large room systems, limiting or other method of protecting the equipment from being operated beyond its designed power capabilities should also be included. This will produce two benefits: it protects the equipment from damage, and it protects the listeners from discomfort or hearing damage from systems with high output capability.

For natural sound and to minimize feedback, it is especially important that microphones be matched to the design of the system, and that the systems be tuned using the selected microphones. Simple automatic level control should also be included.

Permanent distance learning and video-conferencing capability is not needed, nor are any of the rooms being designed for the more demanding acoustics such applications would require.

Loudspeakers
Based on the architectural geometry, Greenbusch recommends a centrally located speaker cluster above the stage for the auditorium with the addition of a semi-distributed speaker system to cover the areas under the balcony obstructed from direct line of the cluster. In the main Gymnasium, Greenbusch recommends the sound system be designed using a central speaker cluster.

Assistive Listening
Permanent assistive listening systems should also be included, per ADA and ADAAG. Receivers can be shared between rooms, a quantity equal to or greater than 4% of the total seating capacity is typically required by Codes.

Control
Most users will be non-technical persons, who are somewhat unfamiliar with AV systems, so ease of use is paramount. Greenbusch recommends a wall mounted button panel for classrooms. Programmable touchscreens are recommended for more complex systems such as the Auditorium and Main Gymnasium.

Acoustics
Acoustics are critical for the sound systems to perform their intended purposes. It is especially important that noise and reverberation criteria be met to achieve sufficient intelligibility of speech, whether amplified or not.

Please refer to the Acoustical Narrative for acoustical recommendations and requirements.

AV Raceway and Infrastructure
Raceway (conduit) should be provided for AV device wiring, including loudspeakers, microphone outlets, video projectors, IO panels and interfaces, and control panels. In general, conduits will run directly home to the equipment rooms/racks/cabinets. Conduits for analog microphone circuits should be ferrous metal, for additional shielding.

In the equipment rooms, conduits should terminate in large terminal boxes mounted on the walls. Cable trays should be provided for wiring between terminal cabinets, and to and between equipment racks.

Equipment Rooms and Racks
The head-end equipment for AV should be located in locked equipment rooms and/or racks. This keeps equipment centrally located, secure from theft, tampering, and "knob twiddlers". For standard floor-standing racks, each rack is approximately 2 feet square, plus working and circulation clearance of at least 3 feet in front and back of the rack, for a minimum of 16 square feet (2 x 8) per rack.

The equipment space must be ventilated to maintain temperatures below 80 degrees and above 40 degrees, with sufficient humidity control to prevent condensation.

In other rooms AV equipment could be located in a smaller pullout or swing out equipment racks in casework or AV closets.

Power for AV Systems
The AV systems should have dedicated power circuits for the associated equipment. Each circuit and all receptacles should have oversized, insulated grounds and dedicated neutrals.

Special technical grounding should be provided for audio equipment. Each equipment rack should have a ground bar attached to the grounding system.

BUDGET RECOMMENDATIONS

Since this costing is based on concepts rather than a design, it is intended to be a preliminary budgetary recommendation rather than a construction cost estimate. It will change as the design continues to evolve, and could vary from final bids due to bidding and market conditions.

Some costs shown are given as a range, to account for variations in future design decisions, and unknown conditions that are typical of renovations.

Room Types	***Budget Range***
Auditorium AV (sound system optimized for speech reinforcement, not live music)	**$100,000 - $150,000**
Auditorium AV (live music additive alternate)	**$50,000**
Gymnasium Audio	**$75,000 - $125,000**
Music Classroom AV	**$25,000 – 40,000**
Library AV	**$40,000 – 100,000**
Cafeteria Audio	**$25,000 – 50,000**

The estimates are for the installed cost of complete systems, and include:

- AV equipment
- Wiring, equipment racks, and other installation materials
- Labor
- Profit and overhead for the AV contractor

Exclusions
The above estimates do not include the following items, which are expected to be included in the Division 26 (electrical) cost estimate or in other categories by the estimator:

- Owner-furnished items to be integrated with AV:
  - Portable projection systems
  - Computers
  - Classroom AV Carts and the video equipment therein
- Casework related to AV:
  - Tables
  - Cabinets
  - Lecterns
- Communication systems
  - Data wiring and patching
  - Data switches and routers
- AV Raceway (such as conduits and boxes: Division 27)
  - Electrical power to feed AV, including:
    - AV racks: each requiring a 20amp, 120volt single phase, dedicated circuit, with special grounding conductor
    - Video projector: each requiring a 15amp, 120volt single phase, dedicated circuit
  - Floor boxes
- Building permits or fees
- Sales tax or other taxes
- Bidding or construction contingency
- Escalation (inflation)

    - The estimates are given in early 2017 dollars
- Profit and overhead for General Contractor or others tiered above the AV Contractor (such as markup by the General Contractor or Electrical Contractor)

DATE: April 26, 2017

TO: *Joseph Echeverri, AIA, LEED AP BD+C*

FROM: *Seth Tomlinson, INCE*

RE: *Benson Polytechnic High School Modernization – Acoustics Condition Assessment*

Transmitted by: ☐ Mail ☐ Delivery ☐ Fax ☒ E-mail

1.0 INTRODUCTION

This document summarizes observations from site visits conducted on 11/04/16, 11/23/16, 12/21/16, 1/25/17, and 1/26/17 at Benson Polytechnic High School in Portland, Oregon. Preliminary recommendations are given for the Auditorium, Band Room, Gymnasium, and for acoustical separation of proposed classrooms above shop spaces. Opinions of probable costs are also provided for preliminary budgeting purposes.

2.0 AUDITORIUM

The following existing finishes were noted:

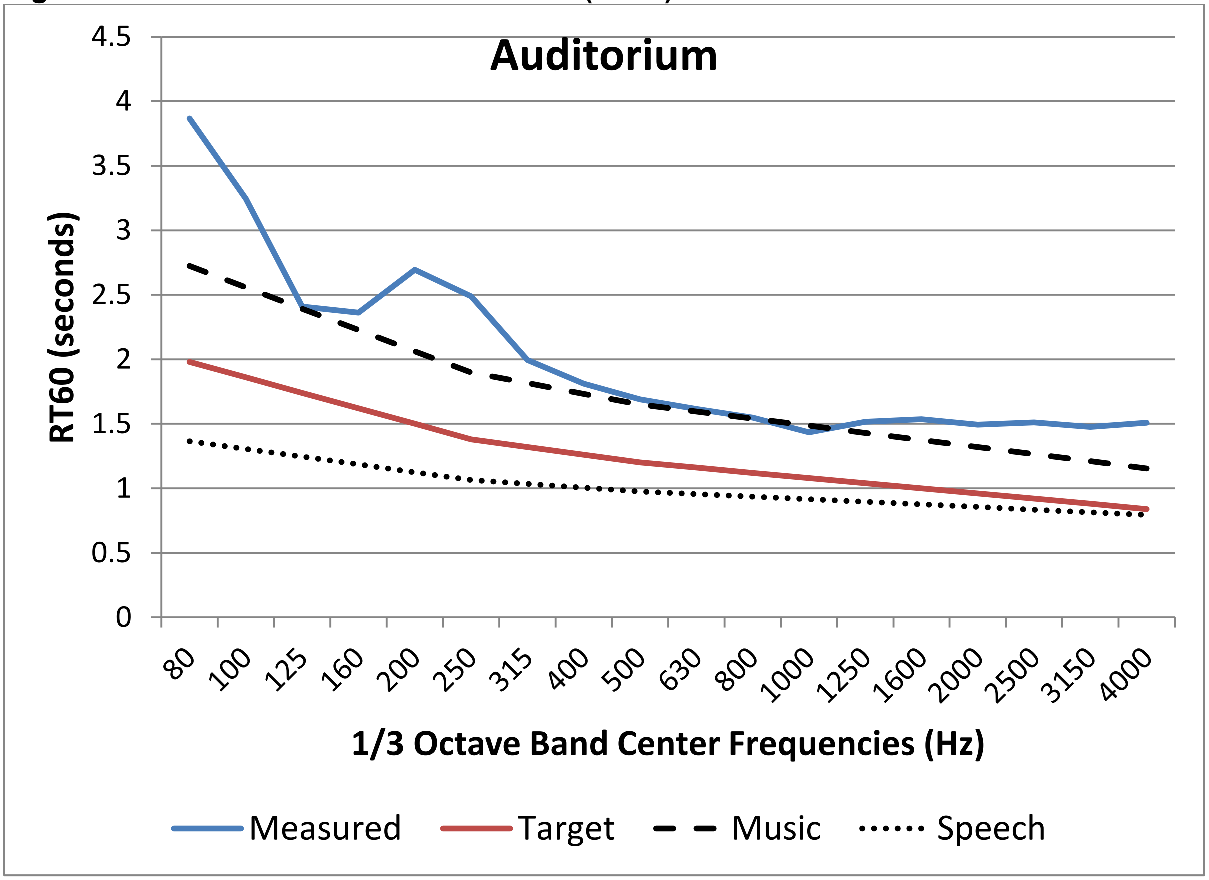
- Flooring: hard surface, wooden seats
- Walls: Gypsum/plaster, wood, window curtains, acoustical tile
- Ceiling: Gypsum/plaster, wood, acoustical ceiling tile

Reverberation time measurements were made in the space. The auditorium has a mid-frequency reverberation time of 1.7 seconds and low frequency reverberation of up to 3 or more seconds. This reverberation time is appropriate for supporting orchestral music, but is high for supporting other programing such as assemblies, theater, speech or lecture. It is our understanding that the programing for the space is more speech focused than music focused. A mid band reverberation time of 1.2 seconds would be a compromise that would support some musical programming. Low frequency reverberation should not exceed 2 seconds in order to support good speech intelligibility.

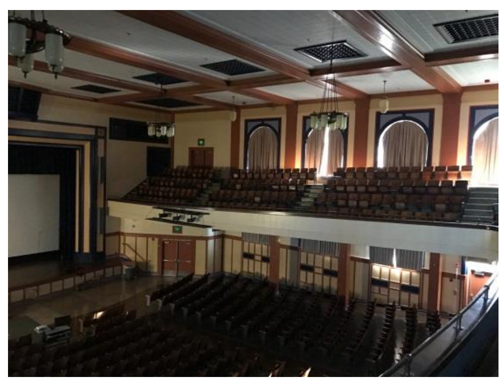
The current hard seating should be replaced with upholstered seating. Seating with perforated seat bottoms is preferred, helping to reduce reverberation, minimize acoustical differences between occupied and unoccupied conditions, and more consistency between rehearsals and performances or between events with different audience sizes.

In order to bring the reverberation time down to 1.2 seconds approximately 3,000 sq. ft. of acoustically absorptive material would need to be added to the space in addition to the upholstered seating. If upholstered seating is not included, additional treatment would be needed. In particular, material with an emphasis on low frequency absorption is needed. For budget considerations, consider $15 per sq. ft. of treatment for **$45,000** in the Auditorium. Additionally, some of the existing material may need to be removed and replaced with more absorptive material, particularly at lower frequencies. It is also possible that some of the acoustical tiles have been painted over time. The measured and target reverberation times are shown in the figure below.

Figure 1: Auditorium Reverberation Time (RT60)




Wall and Window Treatments


Balcony and Ceiling

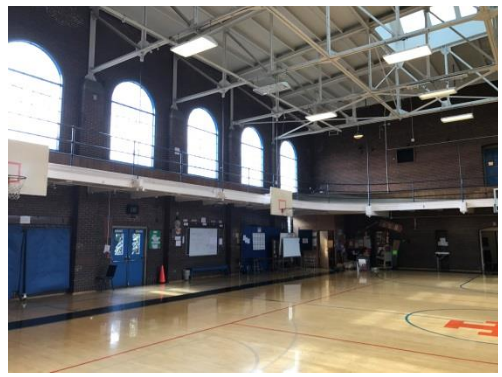
3.0 AUX GYM

The following finishes were noted:

- Flooring: wood athletic floor
- Walls: brick, windows, and spare wall padding
- Ceiling: acoustical ceiling tile

We understand that significant upgrades are not planned for this space. However, background mechanical noise was measured in the space at 65 dBA. The typically acceptable background sound level in a gymnasium is 50 dBA. We recommend a budget of **$8,000** for acoustical mitigation or replacement of noisy mechanical equipment in this space. Acoustical upgrades would be recommended if a sound system is added or if any of the anticipated uses include instruction, assemblies or similar.


Noisy Mechanical Equipment


Finishes

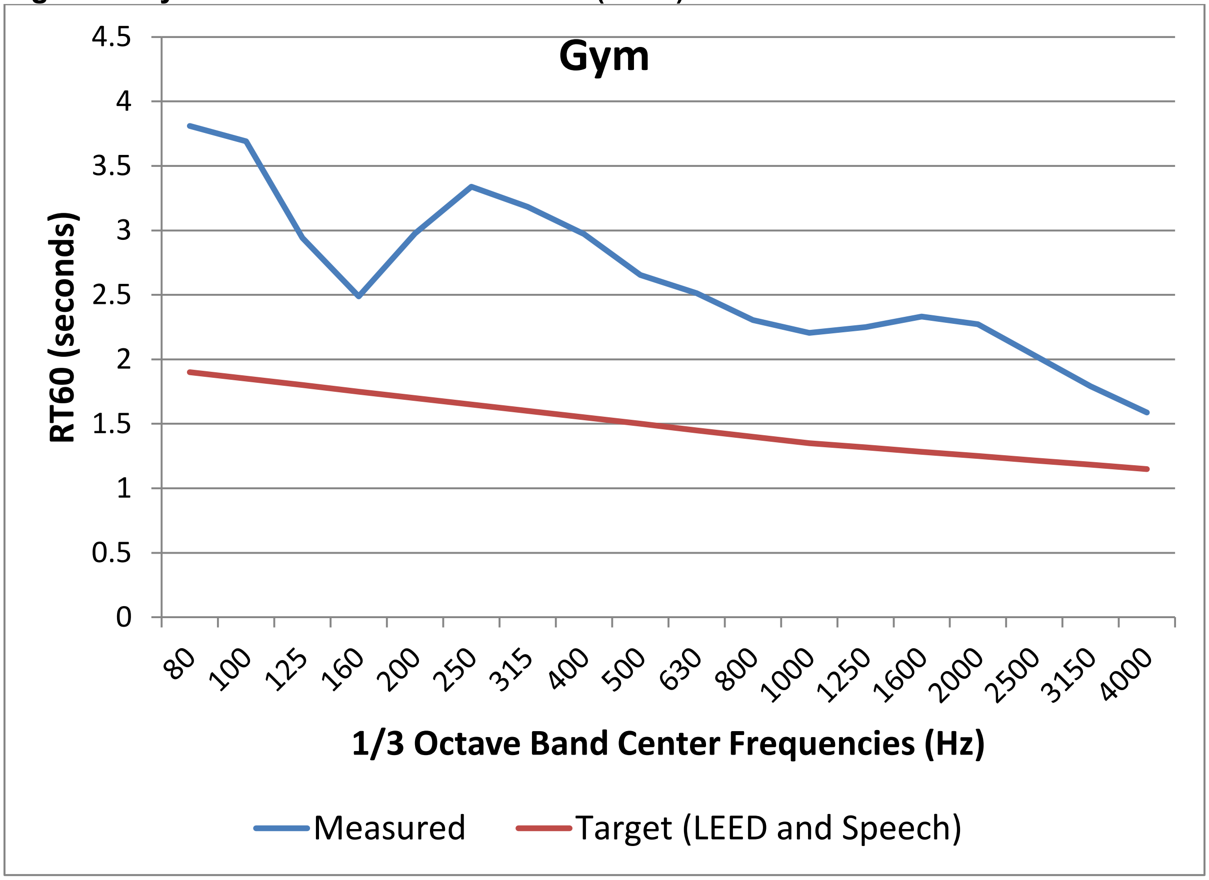
4.0 NEW GYM

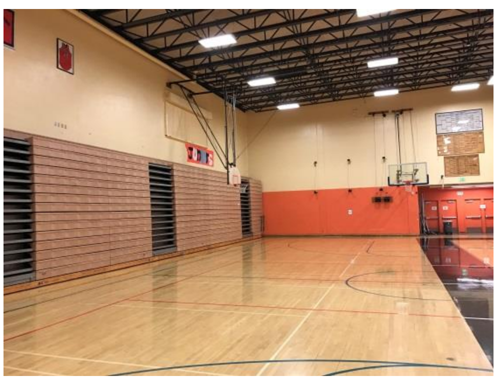
The following finishes were noted:

- Flooring: wood athletic floor
- Walls: painted masonry, retractable bleachers, and wall padding
- Ceiling: Tectum Acoustical Tile

Reverberation was measured in the New Gym. Mid frequency reverberation time is 2.7 seconds. Portland Public Schools Requires a LEED Silver certification, which limits large gymnasiums to a mid-frequency reverberation time of 1.5 seconds or less. Low frequency reverberation times should not exceed 2 seconds in order to support speech intelligibility of the sound system. New acoustical finishes are recommended to reduce reverberation and improve amplified speech intelligibility. The existing acoustical ceiling tile will likely need to be replaced or supplemented with a higher-performance product. Approximately 7,000 sq. ft. of material is needed to reduce the reverberation time to acceptable levels. For budget considerations consider $15 per sq. ft. of treatment for **$105,000** for acoustical treatments in the New Gym. Measured and ideal reverberation times for the New Gym are shown in Figure 2 below.

Figure 2: Gymnasium Reverberation Time (RT60)





New Gym Finishes

Ceiling Finish (Tectum Acoustical Tile)

5.0 BAND CLASSROOM

Acoustics

The Band Room is proposed to be relocated to the lower level in the existing Cafeteria space or the Kitchen/Servery below the Auditorium. This presents a number of challenges. The existing ceiling height is not ideal for support of a band room due to low frequency response issues. It would be necessary to remove the existing ceiling to increase the height of the space. Floor to floor height is 15 ft. 8 in. Incorporating a ceiling leaves approximately 14 ft. to 15 ft. for the floor to ceiling height.

The proposed floor area would be 50 ft. x 65 ft. With this foot print and a ceiling height of approximately 14 ft. the low frequency response starts to decrease around 250 Hz (lower is better). With a ceiling height of approximately 15 ft. the low frequency response starts to decrease around 240 Hz. Typically the minimum height recommended would be 18 ft. With the proposed footprint and 18 ft. ceiling height robust low frequency response would extend down to 200 Hz. The lower ceiling height reduces the low frequency response by approximately 1/3 an octave. While not an ideal situation, this space can still function well to support music.

The lower ceiling height also affects the loudness of music performed in the space, but with the proposed dimensions the affect is small, less than 1 dB louder for the 14 ft. ceiling height vs. the more typical 18 ft.

The construction above the Band Room should have achieve minimum sound isolation rating of STC 60. The current floor structure above appears to be reinforced concrete, but the thickness in unclear. Assuming 3” of concrete adding a resiliently suspended gypsum ceiling with an insulated cavity of 4” will achieve a rating in excess of STC 60. This would put the ceiling at approximately 15 ft. above the floor.

Removal of the current ceiling may require a modification of the existing air return system serving the auditorium since it uses this space to return air. This modification may have a significant cost impact for the mechanical system. Closer review of the construction between the Band Room and Auditorium will also be needed to ensure adequate sound isolation between the spaces.

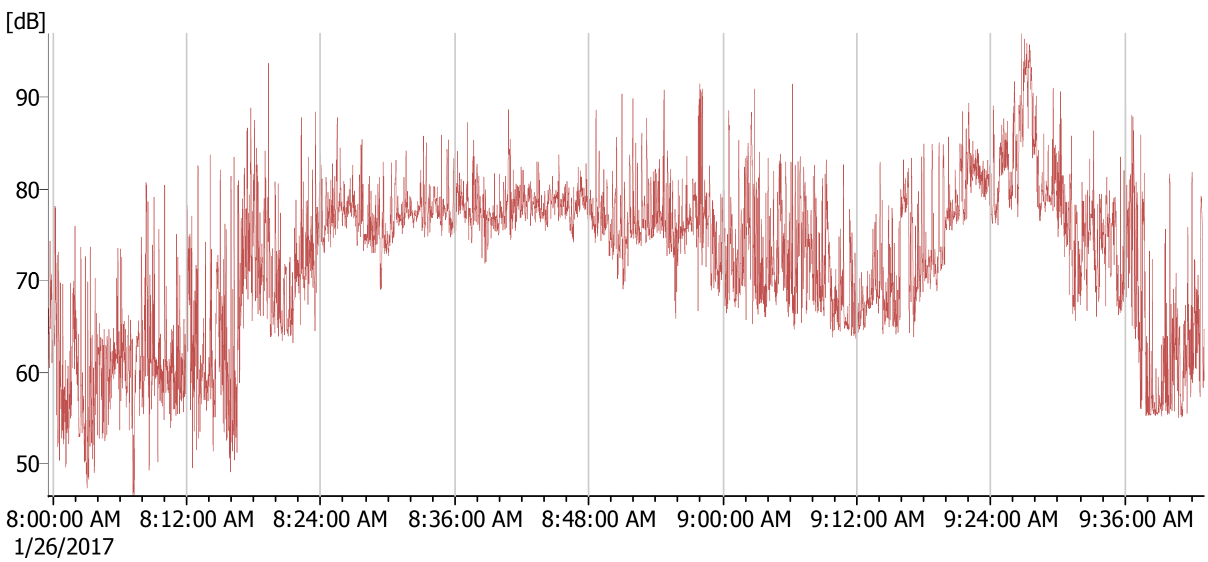
The band room would have a combination of acoustically absorptive and diffusive surfaces. Approximately 1,500 sq. ft. of acoustically absorptive material and 500 sq. ft. of diffusive material would be needed. For budget considerations consider $15 per sq. ft. of treatment for **$30,000** for acoustical treatments in the Band Room.

6.0 CLASSROOMS ABOVE SHOPS

Acoustics

Additional classrooms are being considered above some of the shop spaces. Sound measurements were made of activities in the existing shop spaces in order to determine the level of sound isolation that would be needed for the classrooms above. Typical shop activity measured from 78-90 dBA, with occasional louder events at approximately 97 dBA and the loudest events (hammering) as loud as 104 dBA. A graphic showing sound levels over time in one of the shops is shown below. In order to acoustically isolate classrooms above the shop spaces the floor-ceiling construction should have an STC of 65. With concrete on deck construction this can be achieved with approximately 3” concrete deck and a spring-suspended gypsum board ceiling system with insulation in the cavity. With this level of construction most events in the shops would be inaudible in classrooms above (assuming all exterior doors and windows are closed). During quiet times (e.g. no instruction, exam administration, etc.) loudest events (hammering) would likely be slightly audible above the background (assuming typical HVAC levels in a classroom), but shouldn't be distracting. A construction of 5" of concrete and 2 layers of GWB at the spring-suspended ceiling (STC 70) would make even the loudest events all but inaudible in the classrooms above. A number of other systems are available depending on the floor construction of the new classroom spaces above. Consider $8 per sq. for the suspended ceiling. For a 30'x30' classroom, budget **$7,200 per classroom** for suspended ceilings above shops.

E112 Finish Carpentry Sound Pressure Levels (Lmax dBA re: 20 µPa)



Sound isolation for other areas adjacent to shops will depend on the sound sensitivity of the area. Spaces with sensitivity similar to classrooms would need a similar level of sound isolation, double stud walls with 2 layers of gypsum board on each side, STC 65. Buffer spaces such as corridors, storage or utility rooms are very effective to isolate sound from noisy shop spaces. Doors into corridors should be acoustically rated, at least STC 45. Budget **$5,000** for each acoustically rated door. Roll up doors at the Auto Shop should be located away from sound sensitive areas or spaces as roll up doors do not provide much acoustical isolation. If sound sensitive spaces cannot be located away from these doors consider large acoustically rated sliding doors, or a pair of roll up doors.

Special construction may also be needed if sensitive areas are near shop windows. High STC windows range from approximately STC 40-45 and are typically laminated and insulated or triple paned. Ratings higher than STC 45 are available, but are very thick specialty constructions. We recommend avoiding relites.

III. PREFERRED DESIGN

The Design Narrative and Design Drawings reflect the final design approach for the project based on stakeholder input and reconciliation of the cost estimate using the information provided by the district's cost estimator.

The project is assumed to be a phased project, with students occupying campus for the duration of construction. The phasing program and diagrams reflect this approach.

This section includes:

A. Guiding Principles
B. Scheme L.1 Diagrams
C. Phasing Analysis

HONOR THE UNIQUE HISTORY AND CULTURE OF BENSON POLYTECHNIC HIGH SCHOOL

+ Holds a rich, 100-year history.
+ Honor the past, embrace the future.
+ Deliver integrated academic and career technical education and opportunities to students.

SUPPORT A COMPREHENSIVE EDUCATIONAL EXPERIENCE FOR STUDENTS:

+ Campus should include sufficient onsite resources to allow students to conveniently access school-based sports and/or performing and fine arts programs.
+ Students' educational experiences are bolstered through their participation in elective courses and extracurricular opportunities.

PROVIDE HANDS-ON, PROJECT-BASED LEARNING OPPORTUNITIES THAT ARE IMBUED WITH RIGOR AND RELEVANCY:

+ Provide students with state of the art and industry-standard tools, materials, equipment, and technology.
+ Support "learning by doing".
+ Allow students to directly experience real world applications of abstract academic concepts.
+ Provide spaces that can adapt to new industry innovations and education delivery methodologies.

POSITION BENSON POLYTECHNIC AS THE NATIONAL MODEL FOR STEAM AND CAREER TECHNICAL EDUCATION:

+ Continue the ability of the community to feel a sense of pride when speaking of Benson Polytechnic High School's exemplary programs and innovative learning approaches.
+ Premier resource for the development of CTE programs locally, nationally and internationally

PROVIDE AGILE, FLEXIBLE, AND ADAPTABLE FACILITIES THAT SUPPORT CHANGING EDUCATIONAL AND INDUSTRY NEEDS:

+ Make spaces adaptable to changing needs brought about by economic shifts, industry advances, and new equipment.
+ Encourage collaboration with a variety of group settings and flexible furnishings.
+ Design open and inviting spaces that draw students into centers of activity and discussion.
+ Develop spaces that support innovative educational approaches.

CELEBRATE DIVERSITY AND PROVIDE A SENSE OF INCLUSION AND BELONGING AMONG STUDENTS AND FAMILIES:

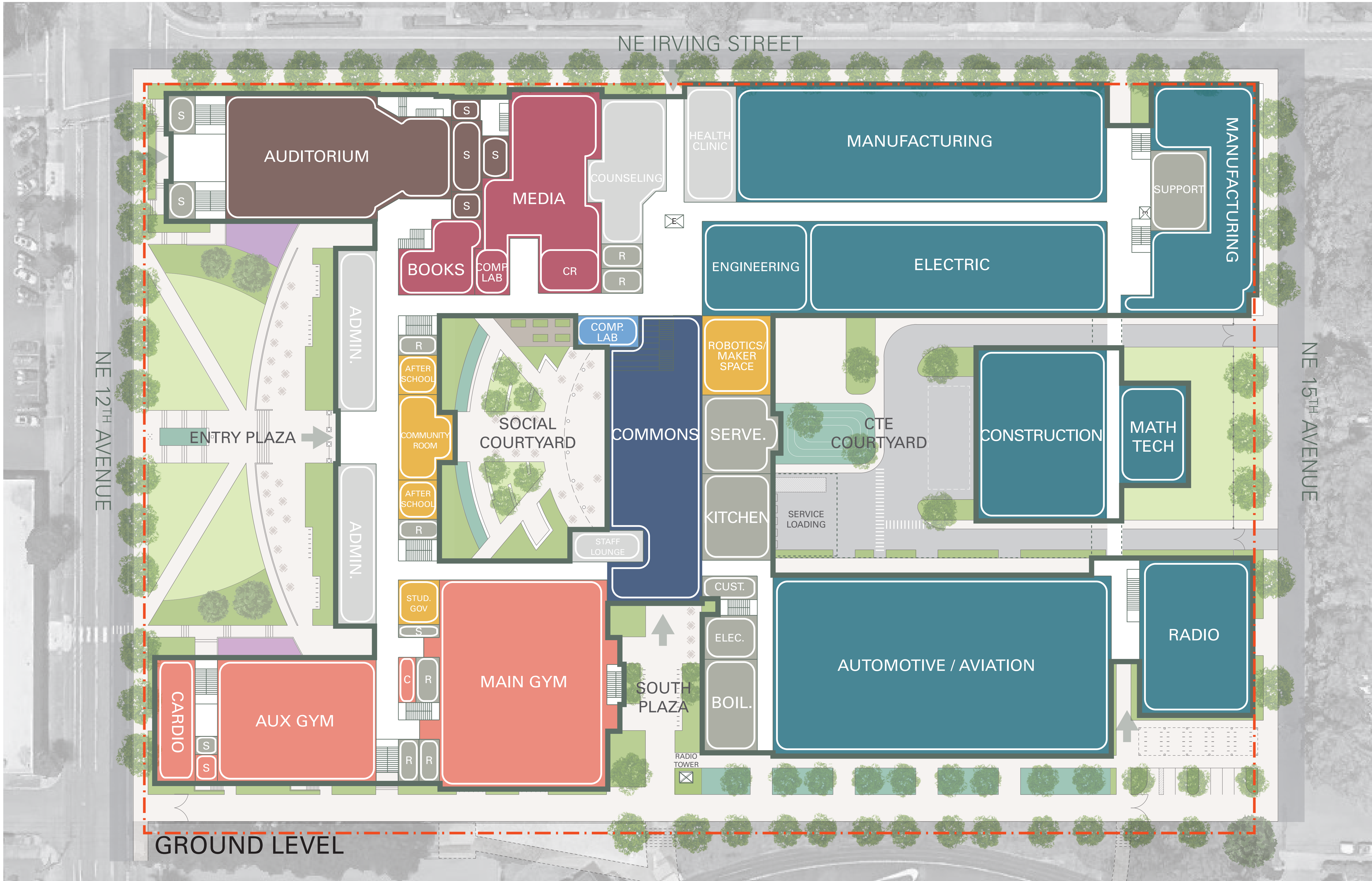
+ School environment should reflect appreciation of different cultures, socioeconomic backgrounds, and learning modalities.
+ Enable all students to have equal access to resources needed to succeed.

ENGAGE WITH THE LOCAL BUSINESS, GOVERNMENT, AND POST-SECONDARY PARTNERS TO CREATE STRONG CONNECTIONS BETWEEN EDUCATION AND INDUSTRY:

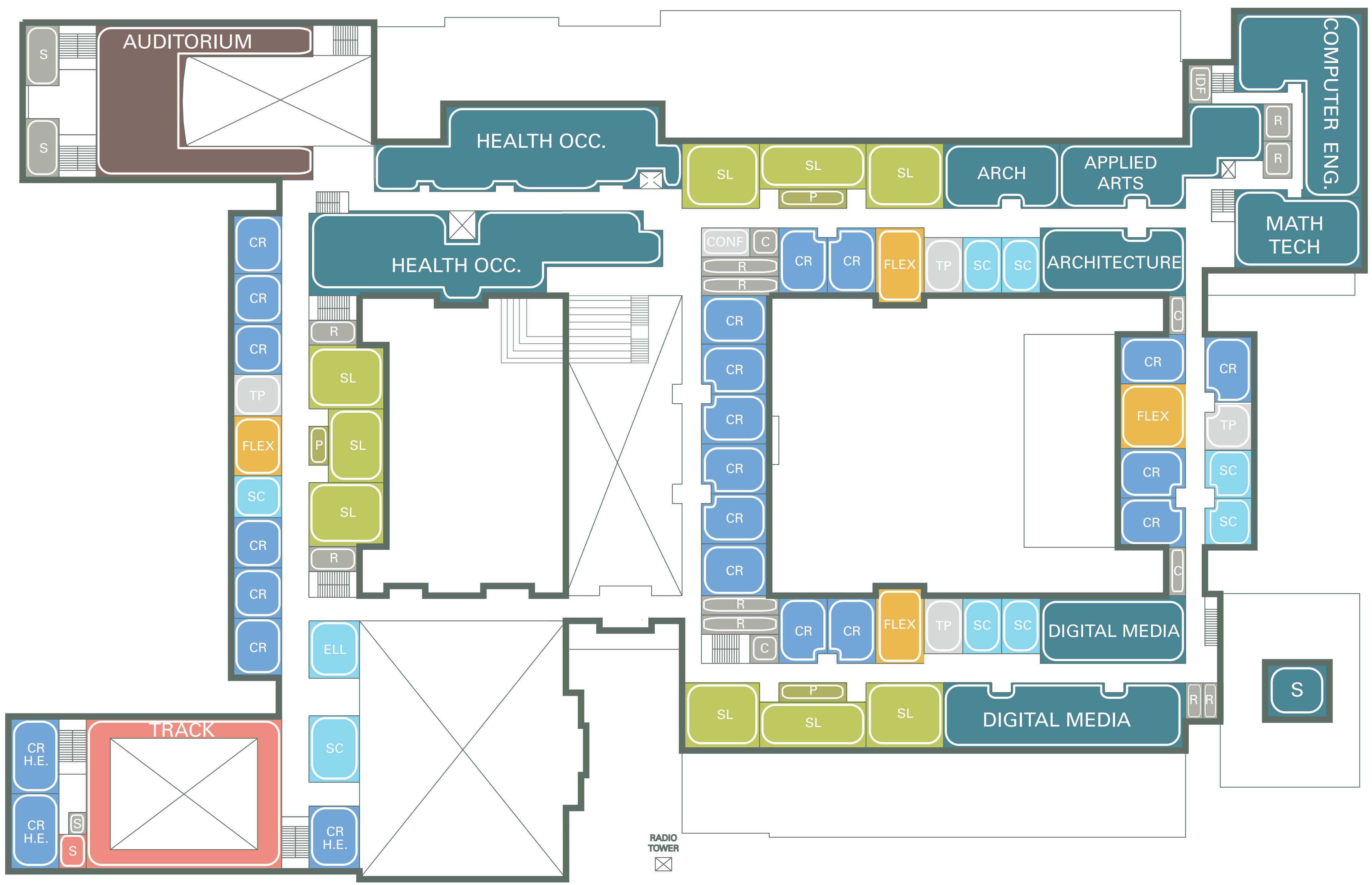
+ Link educational content to real-life applications.
+ Support partnerships with industry, government, and post-secondary education.
+ Design spaces to model real-world work environments.
+ Make certain the curriculum at Benson is relevant to our local workforce needs.
+ Develop a compelling story of "partner buy-in."

PROVIDE LEARNING ENVIRONMENTS THAT INSPIRE CREATIVITY AND COLLABORATION AMONG STUDENTS:

+ Spaces should foster exploration, collaboration, and creativity.
+ The facility should include multi-sensory environments and inspire students to "tell their stories" by expanding their horizons for investigating, designing, and creating.



bassetti architects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CR
FLEX
TP
SC
SC
DIGITAL MEDIA
ELL
SC
P
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SL
SL
DIGITAL MEDIA
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R
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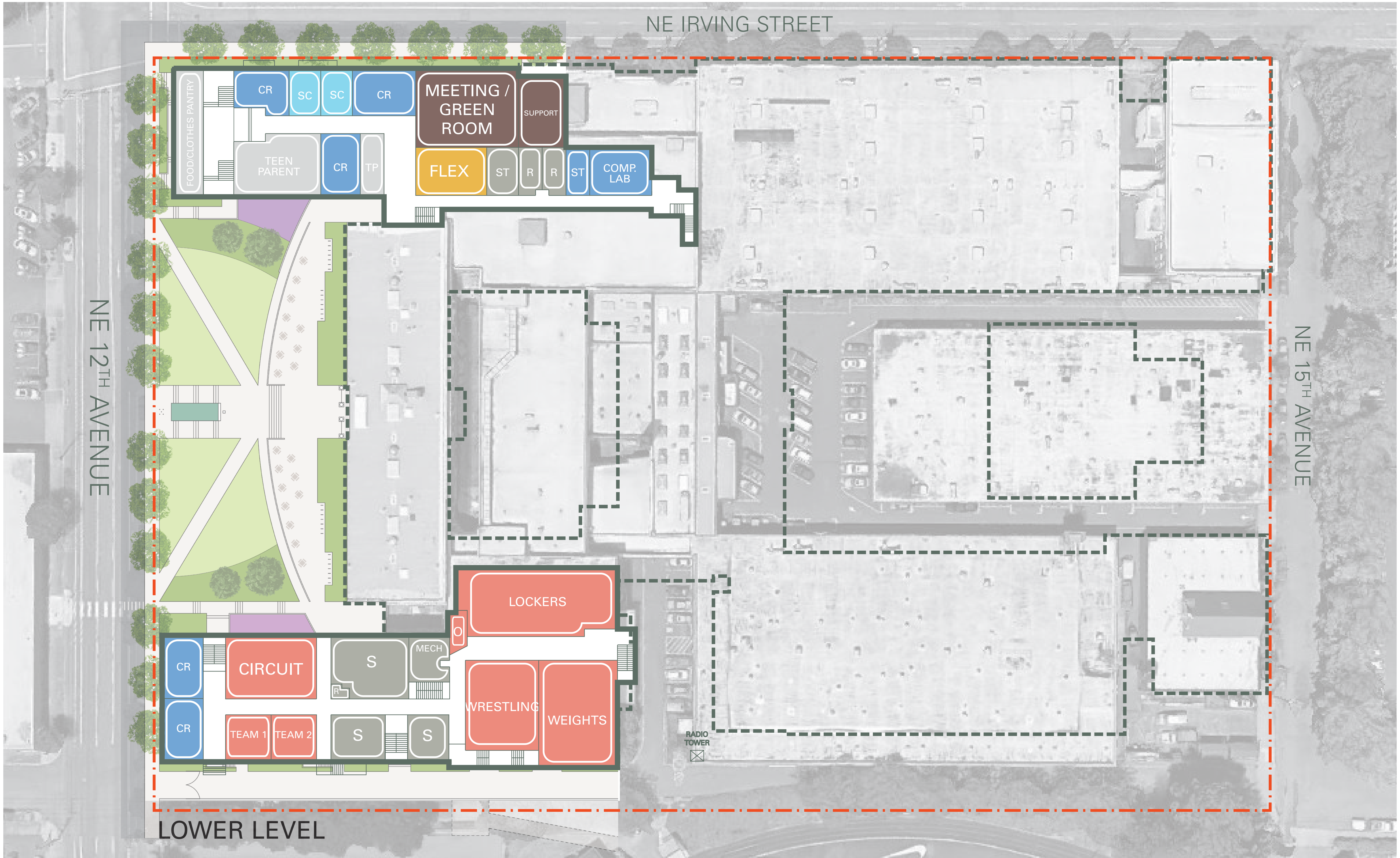
CR H.E.
CR H.E.
S
S
TRACK
CR H.E.
RADIO TOWER

UPPER LEVEL

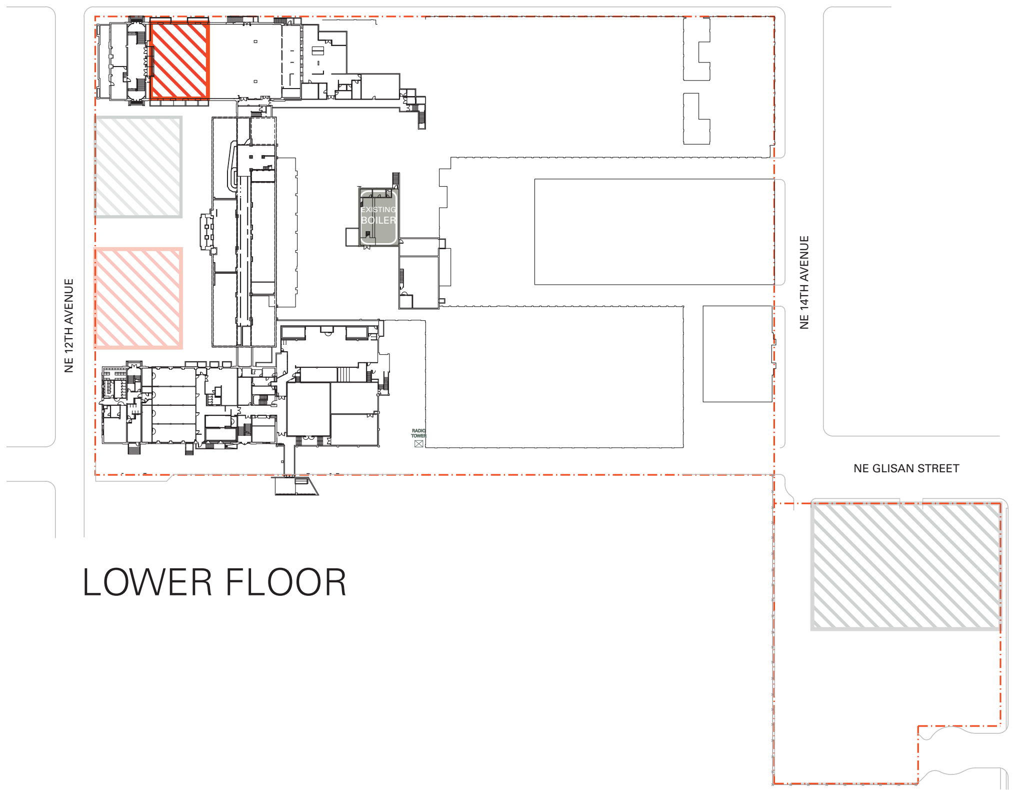


bassetti architects

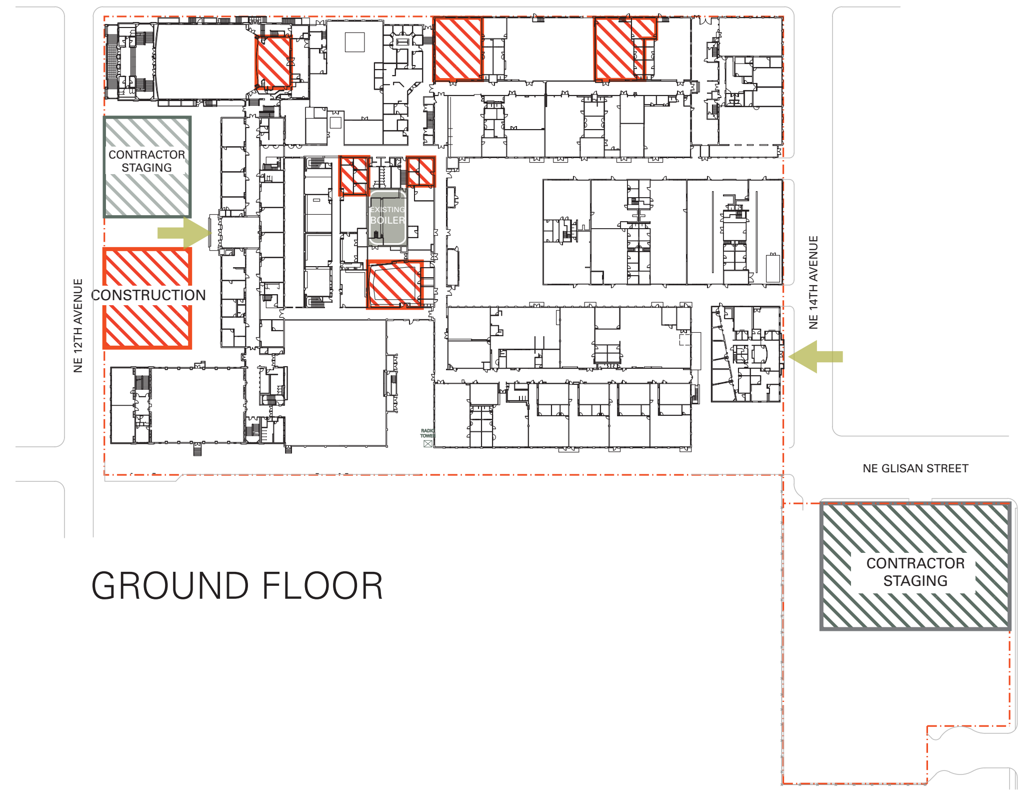
PHASING ANALYSIS

PHASING DIAGRAM SCHEME L.1 / PHASE 1A & 1B

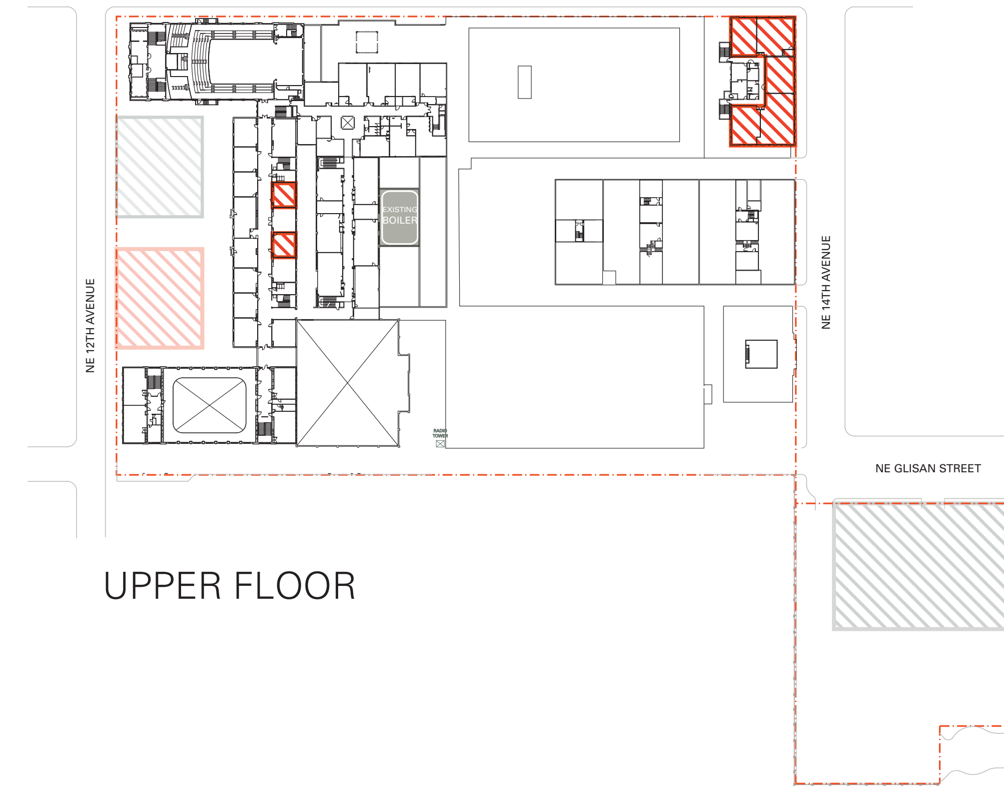
PHASE 1A / MONTHS 1-3 (SPRING START)



LOWER FLOOR

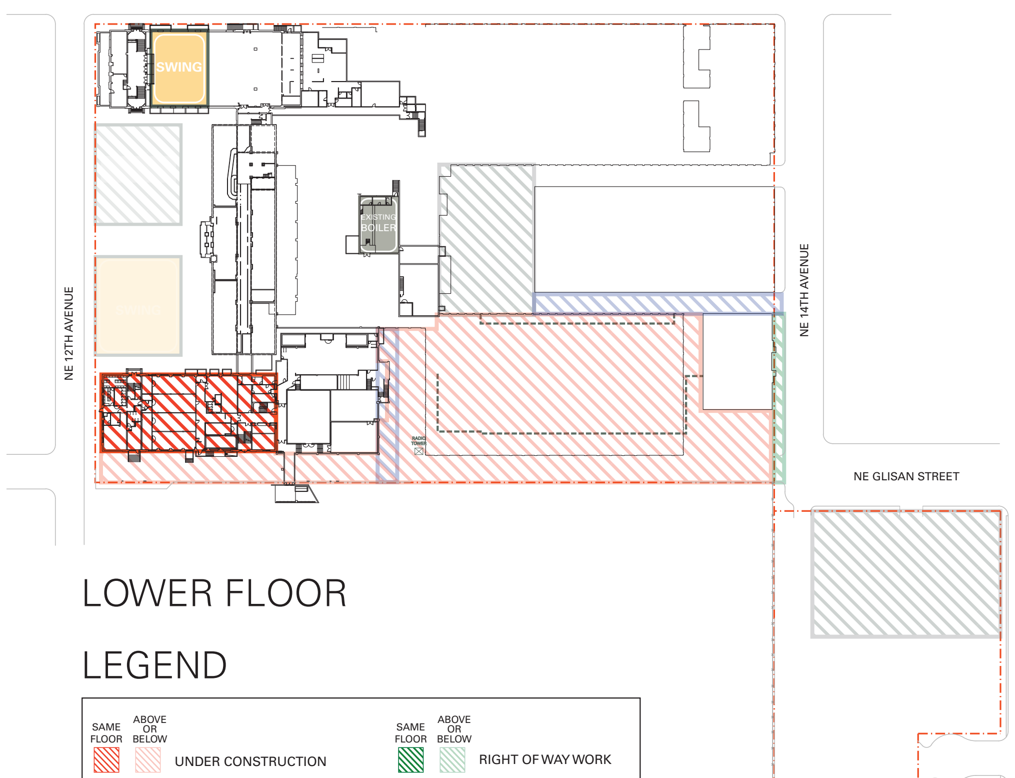


GROUND FLOOR



UPPER FLOOR

PHASE 1B / MONTHS 4-18



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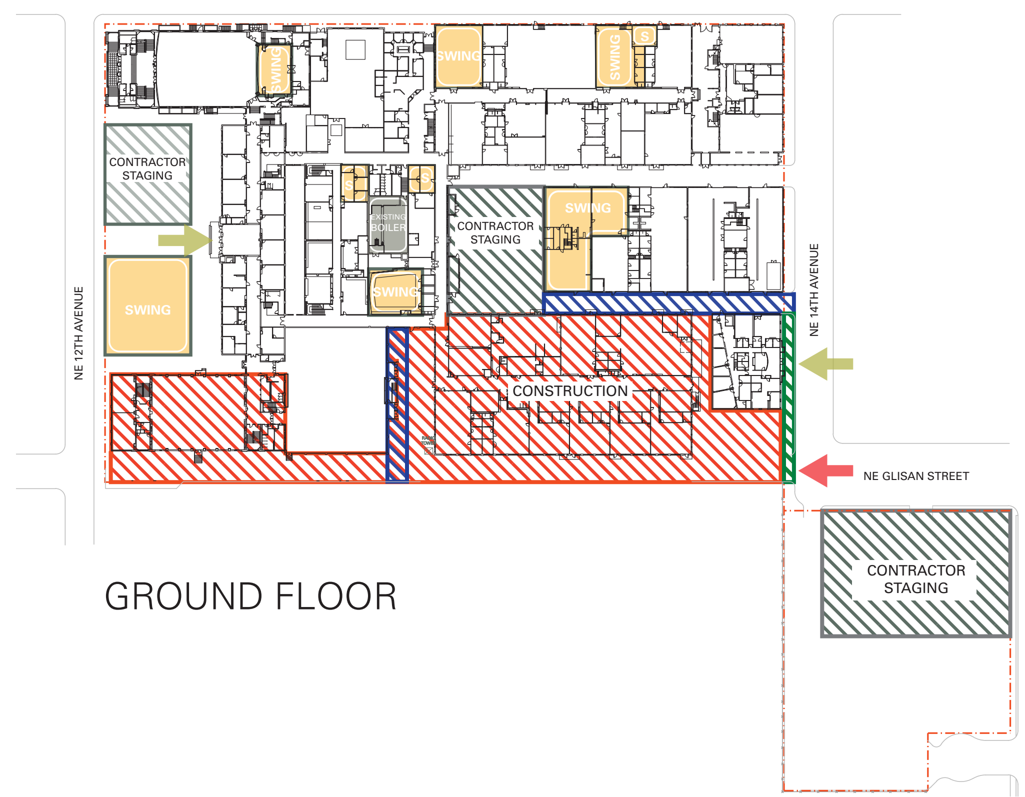
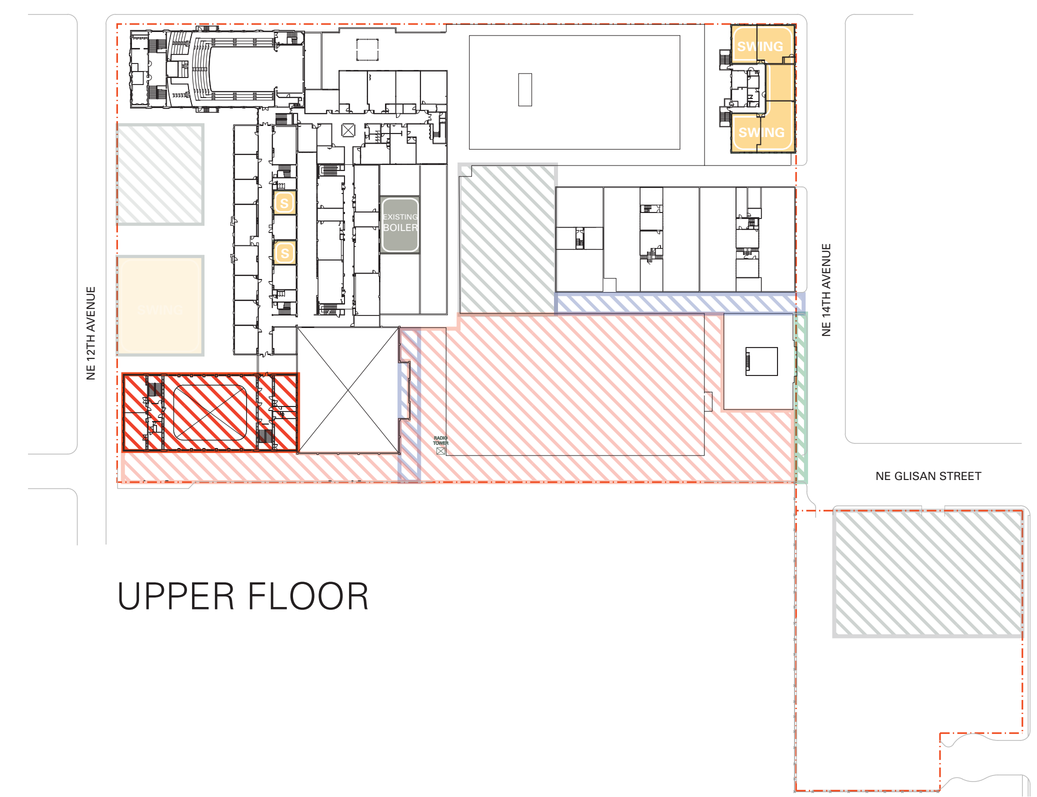


GROUND FLOOR



UPPER FLOOR

LEGEND

SAME FLOOR / ABOVE OR BELOW

- UNDER CONSTRUCTION
- UNDER CONSTRUCTION WITH EMERGENCY EGRESS PATH
- PRIMARY SCHOOL ENTRANCE
- RIGHT OF WAY WORK
- CONTRACTOR STAGING
- PRIMARY CONSTRUCTIO

PHASE 1
MOBILIZE AND DEMO

SITE LOGISTICS STUDY

BENSON POLYTECHNIC HIGH SCHOOL

Mortenson construction

PHASE 1
CONSTRUCTION

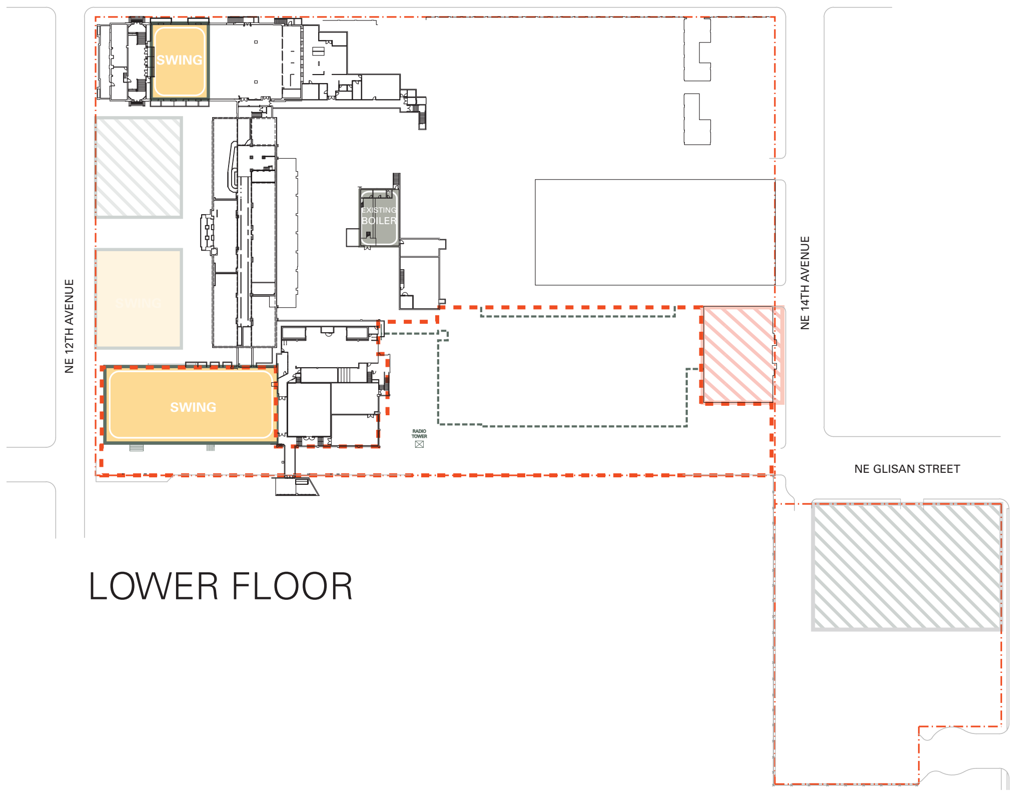
SITE LOGISTICS STUDY

BENSON POLYTECHNIC HIGH SCHOOL

Mortenson construction

PHASING DIAGRAM SCHEME L.1 / PHASE 2A & 2B

PHASE 2A / MONTHS 16-18 (SUMMER WORK)



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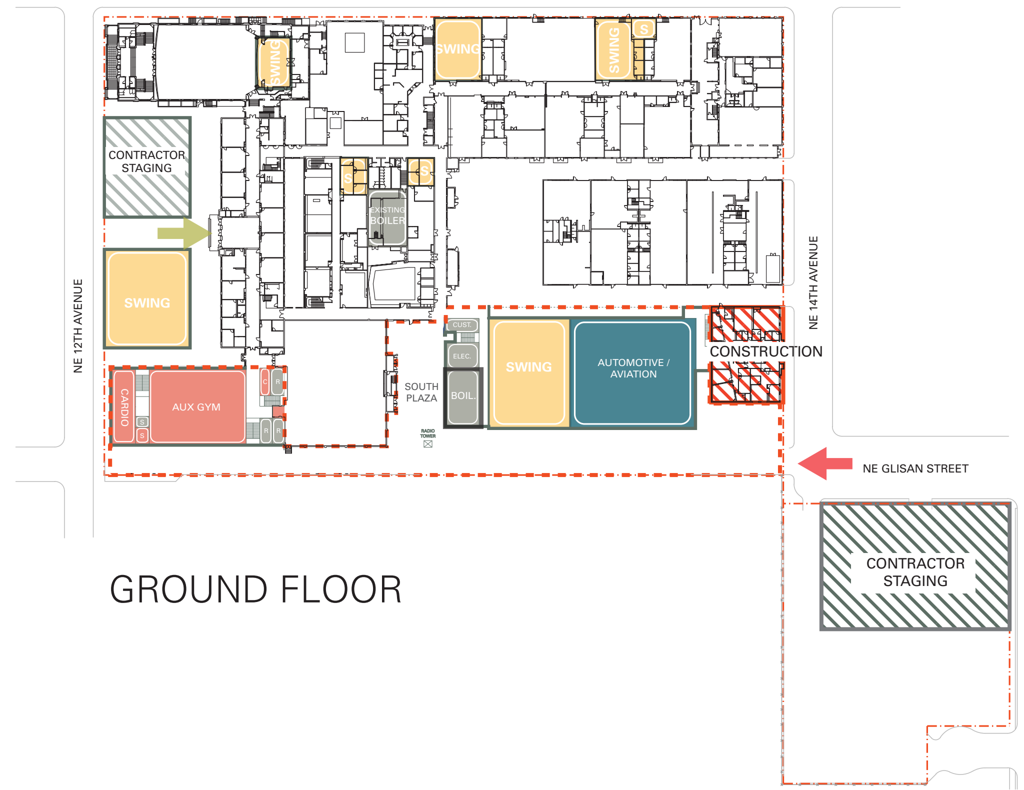
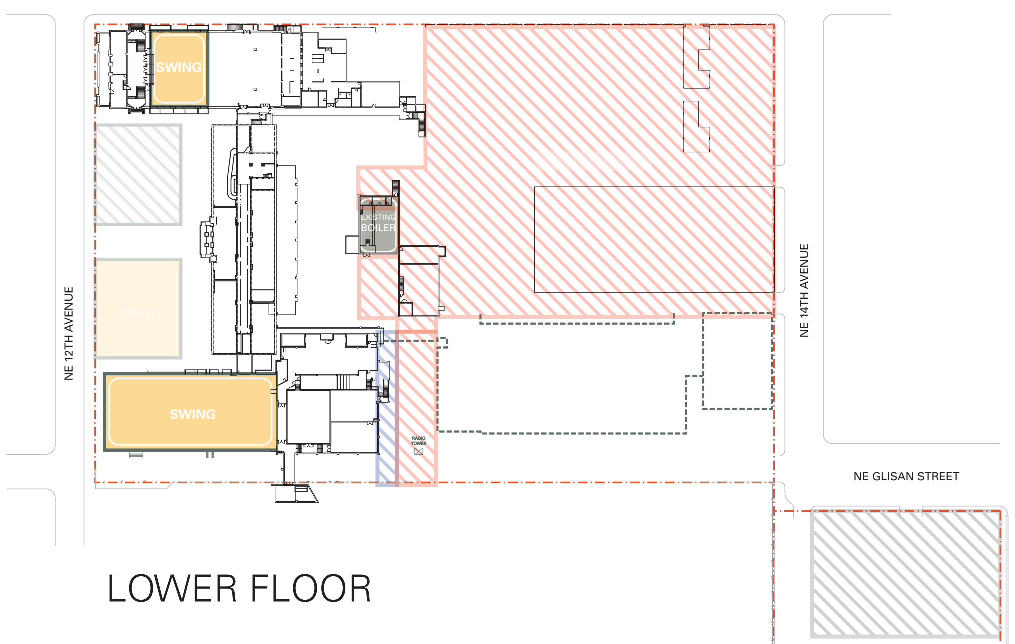


GROUND FLOOR

UPPER FLOOR

PHASE 2B / MONTHS 16-30



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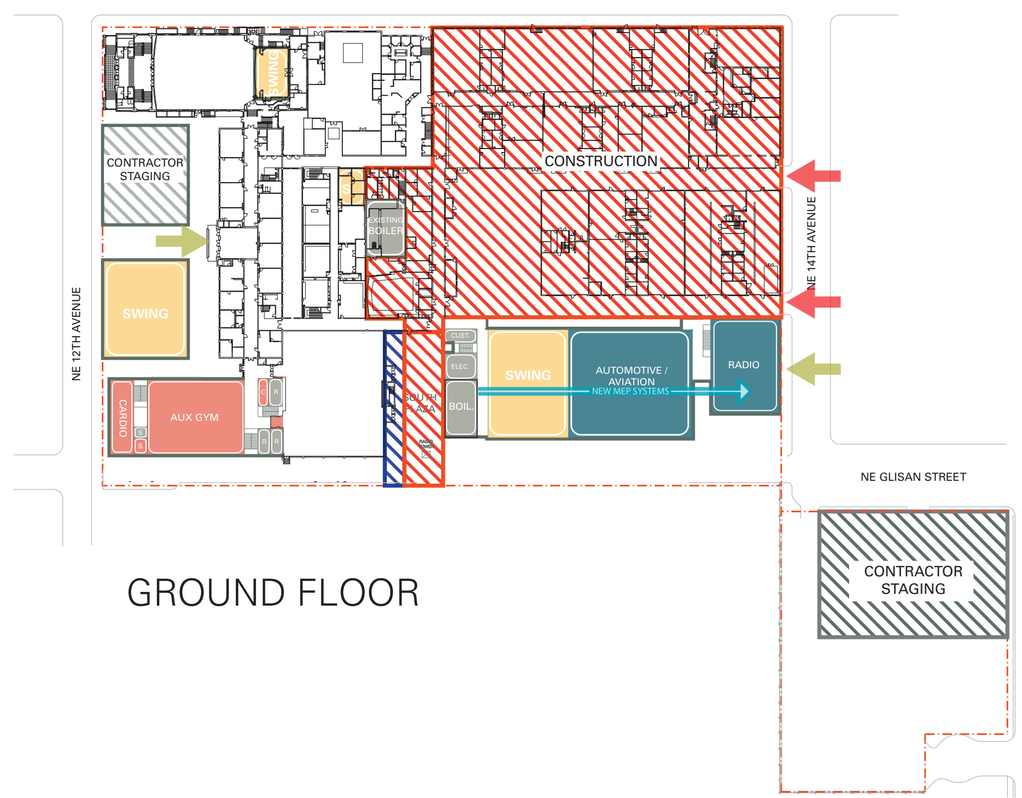
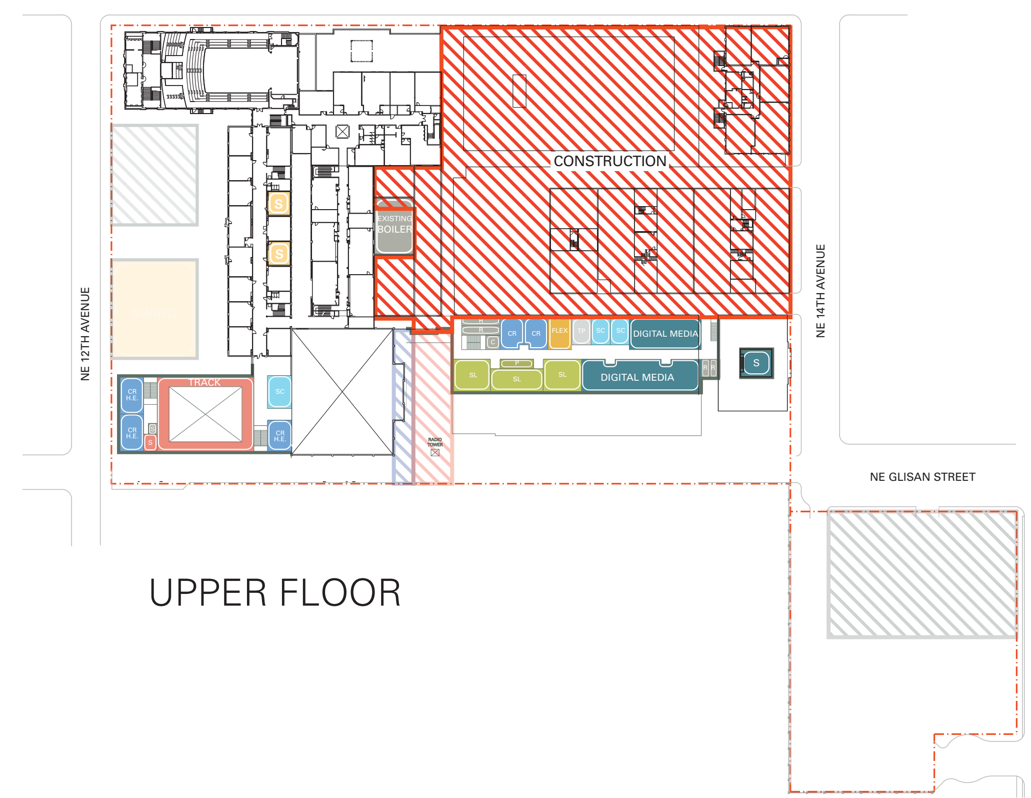
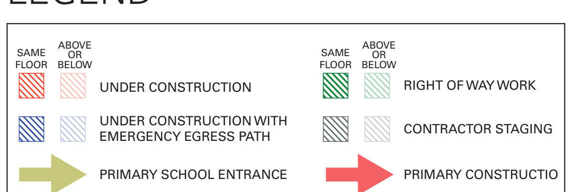


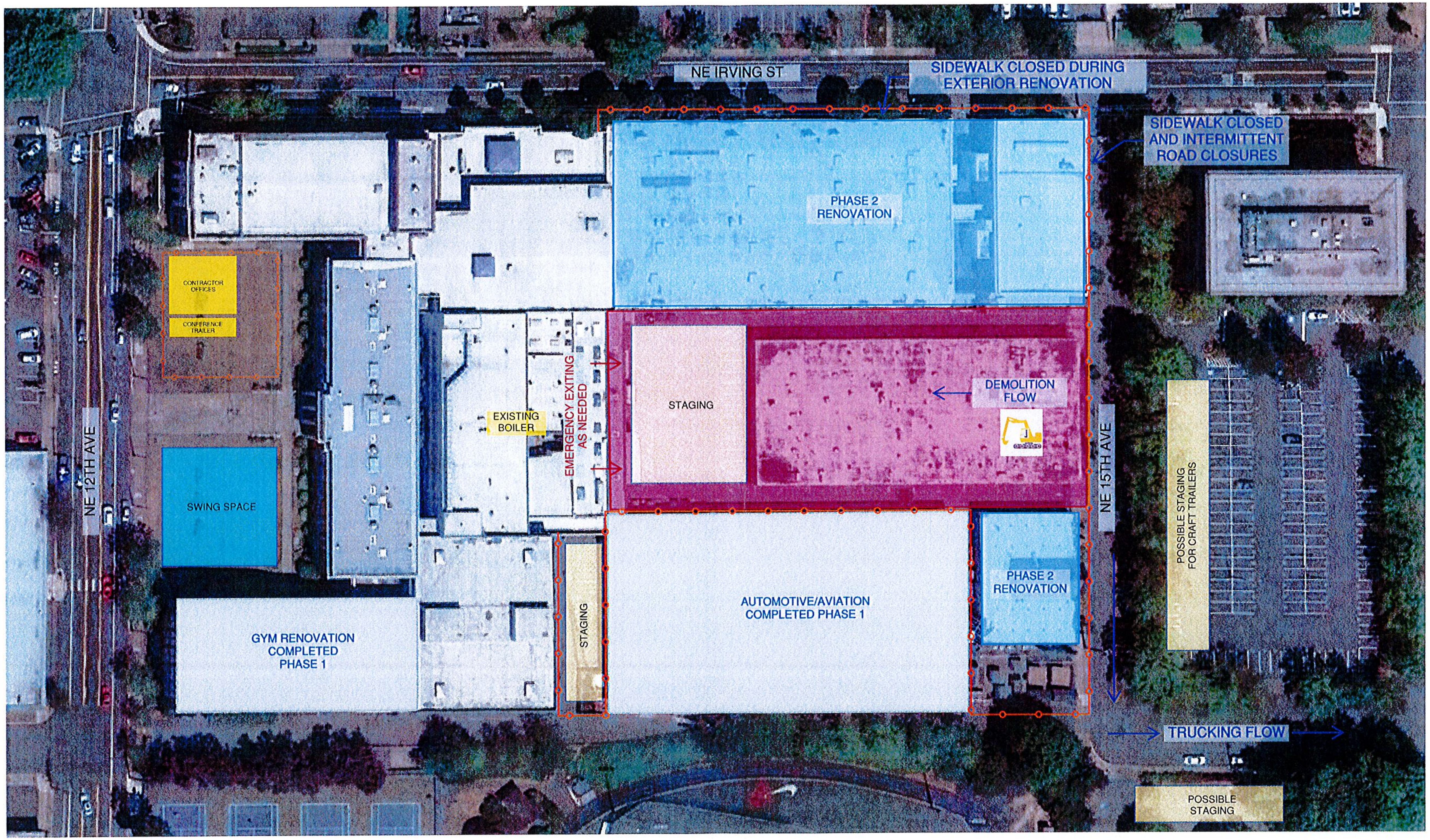
GROUND FLOOR



UPPER FLOOR

LEGEND



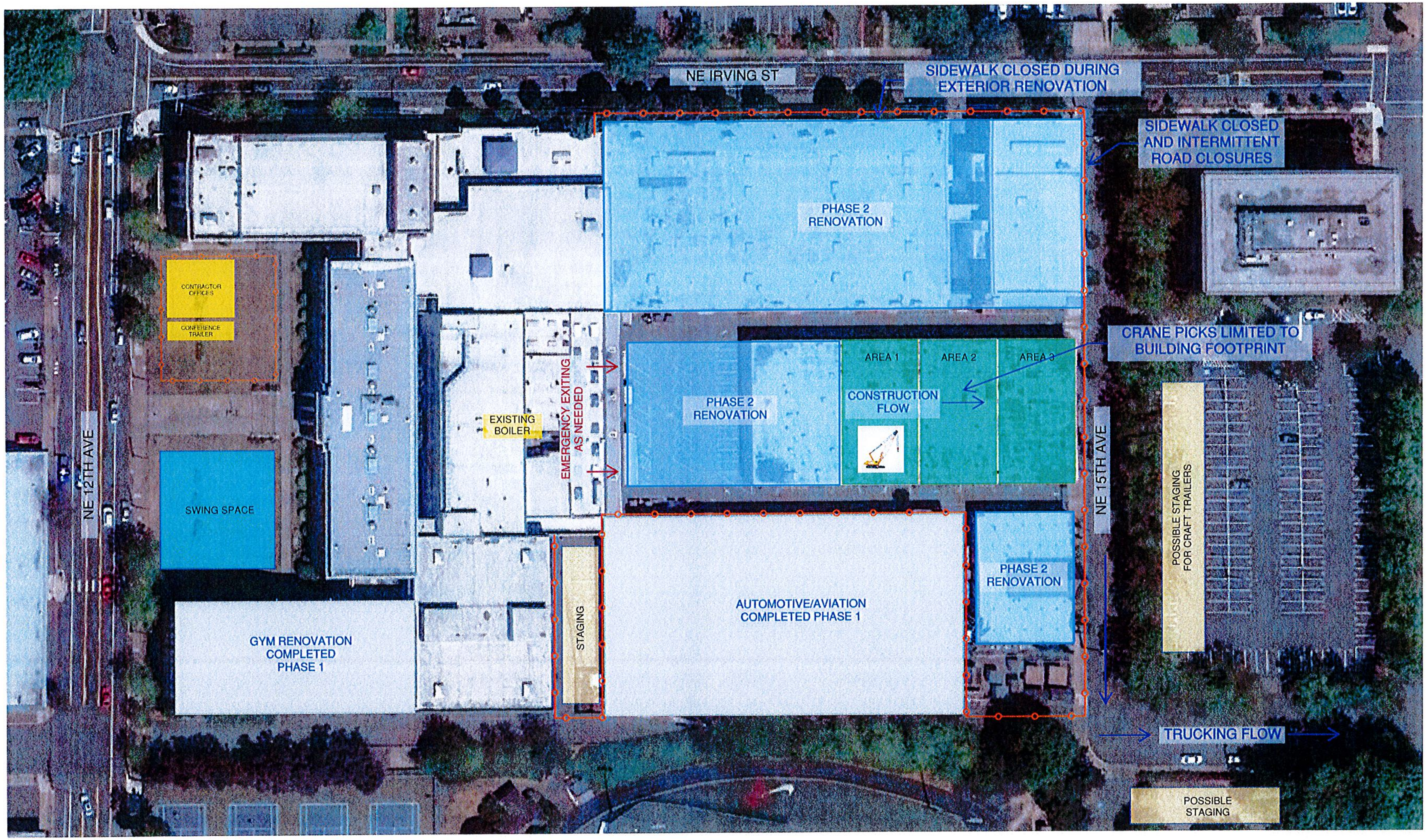


PHASE 2
MOBILIZE AND DEMO

SITE LOGISTICS STUDY

BENSON POLYTECHNIC HIGH SCHOOL

Mortenson construction



PHASE 2
CONSTRUCTION

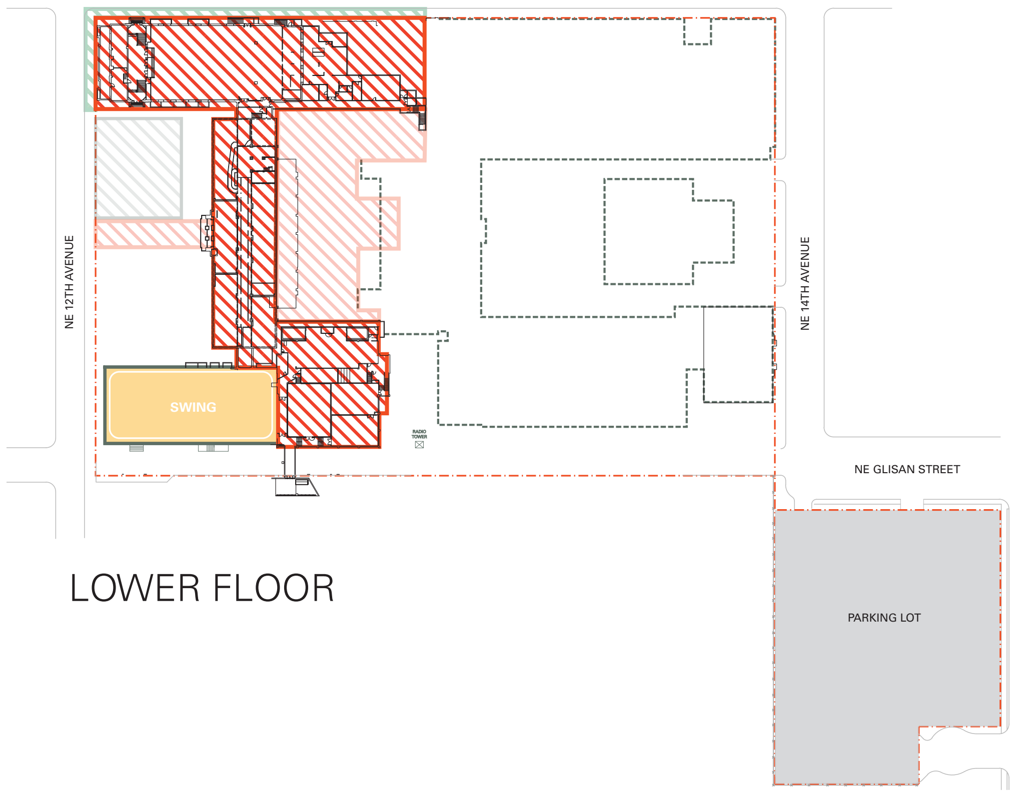
SITE LOGISTICS STUDY

BENSON POLYTECHNIC HIGH SCHOOL

Mortenson construction

PHASING DIAGRAM SCHEME L.1 / PHASE 3A & 3B

PHASE 3A / MONTHS 28-42



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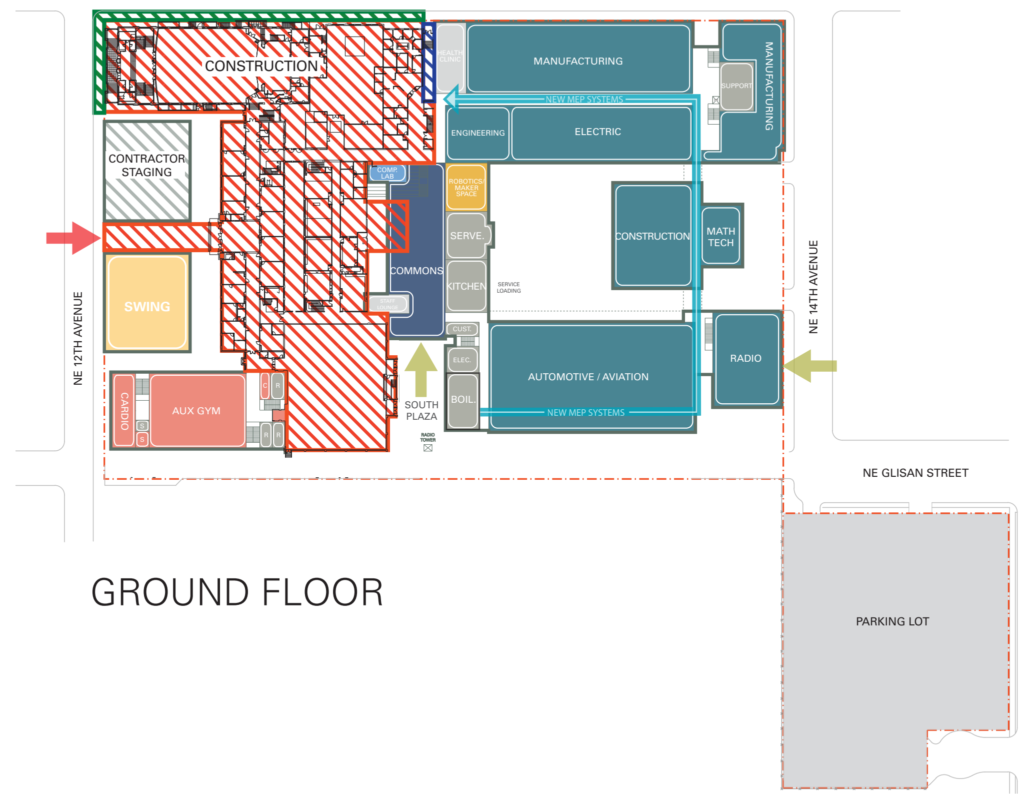
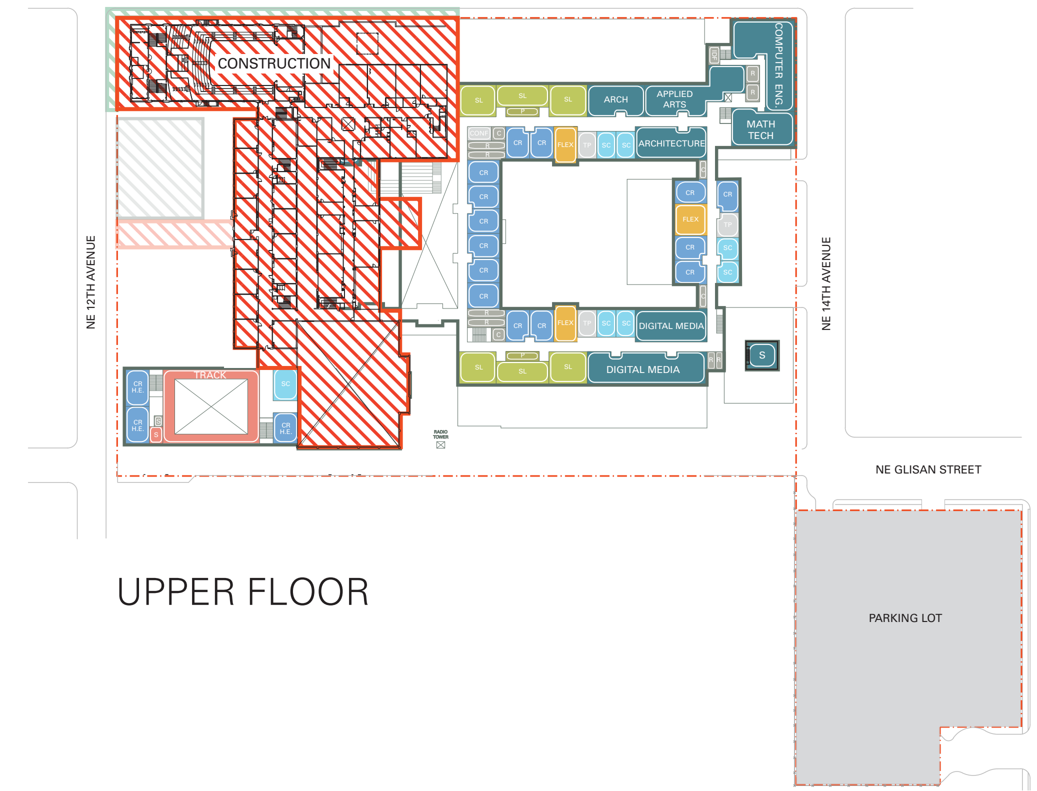
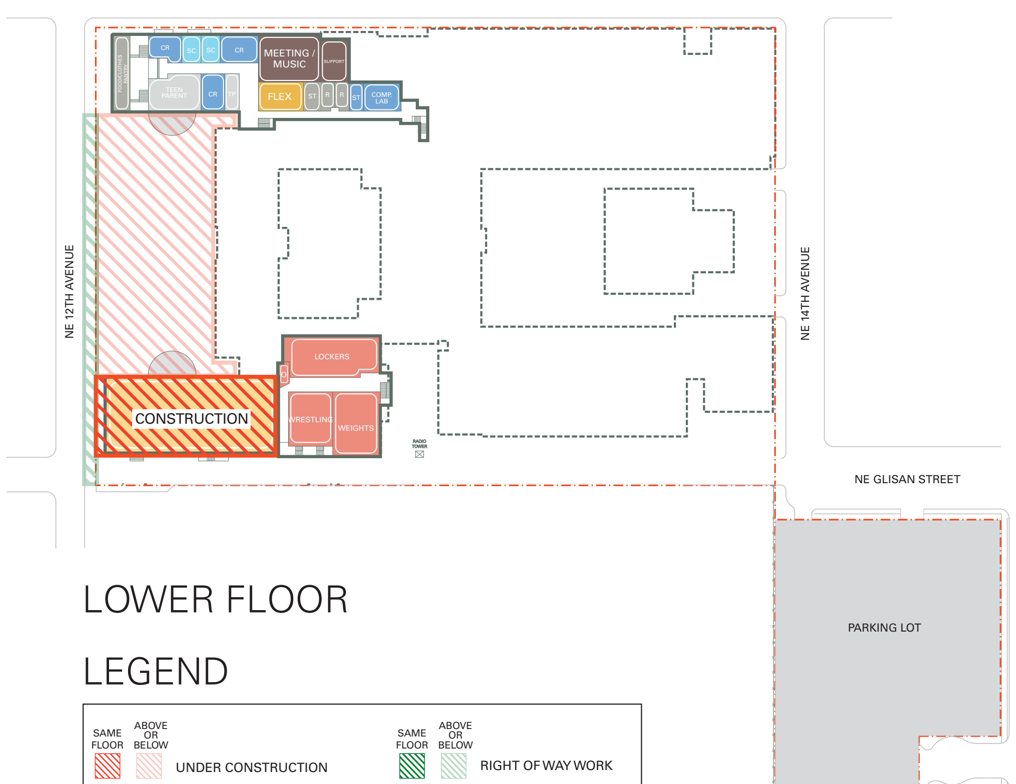


GROUND FLOOR

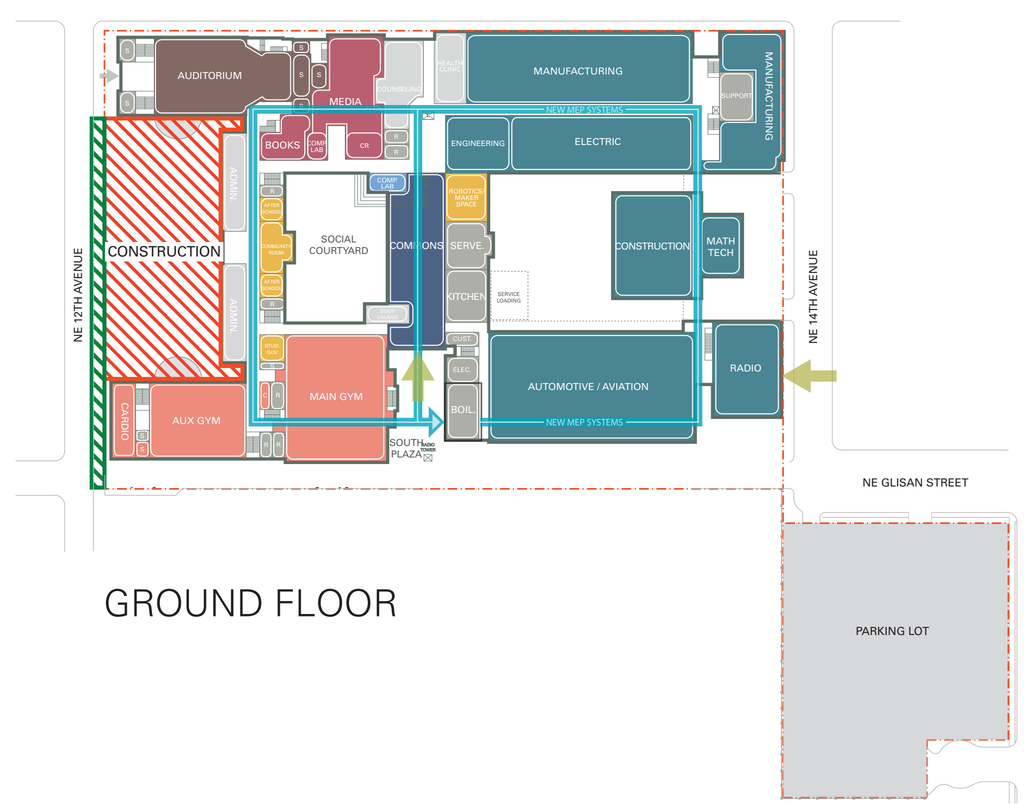


UPPER FLOOR

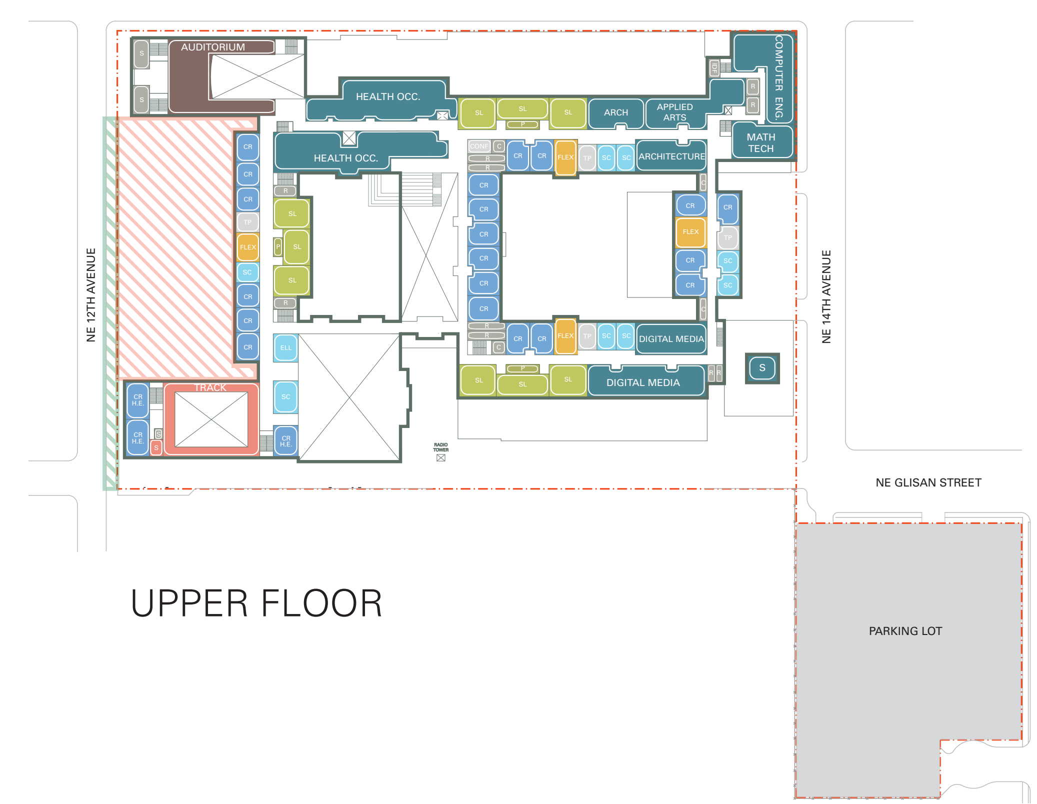
PHASE 3B / MONTHS 43-46 (WINTER FINISH)



LOWER FLOOR



GROUND FLOOR



UPPER FLOOR

LEGEND

SAME FLOOR / ABOVE OR BELOW

UNDER CONSTRUCTION

UNDER CONSTRUCTION WITH EMERGENCY EGRESS PATH

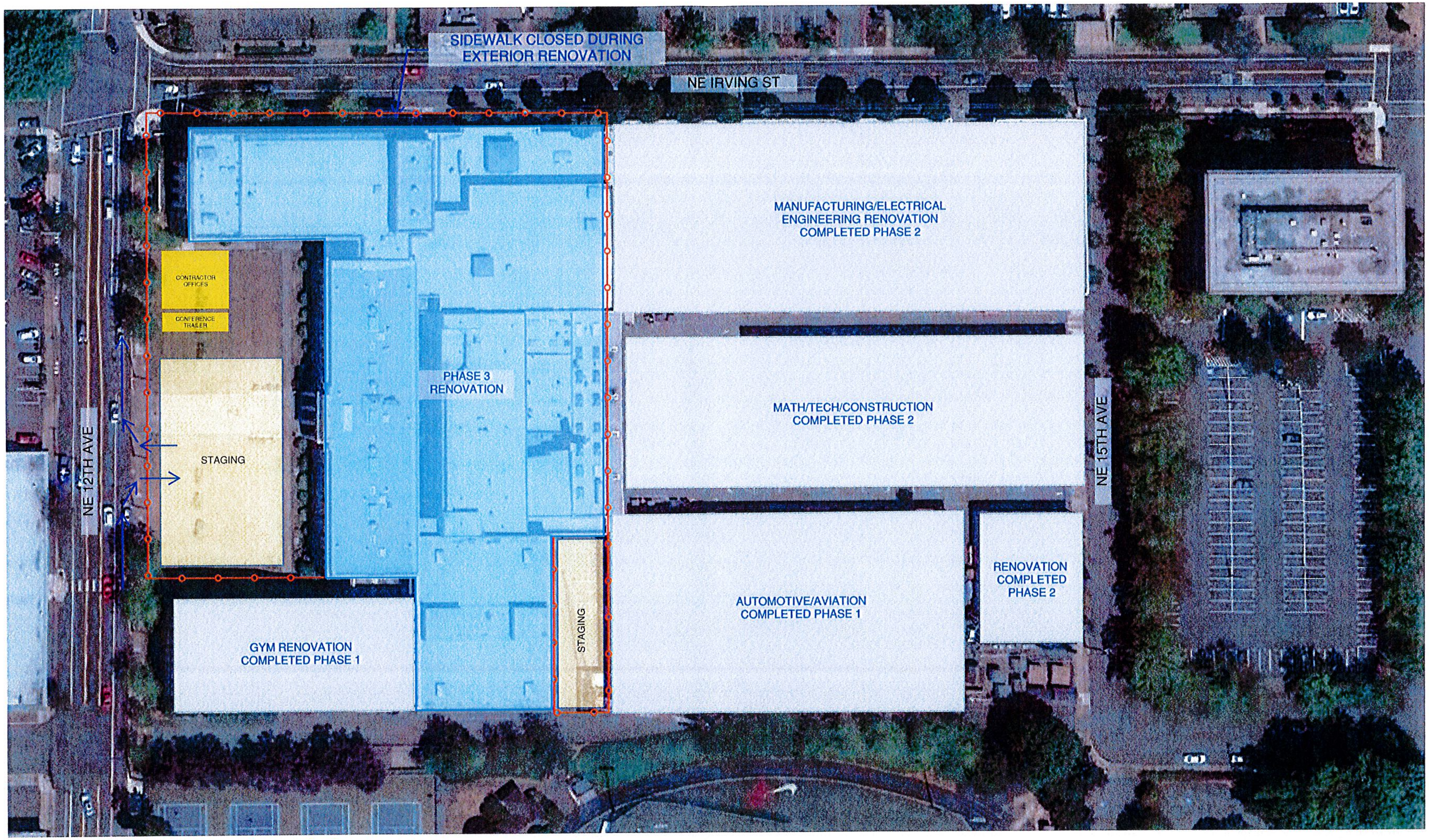
PRIMARY SCHOOL ENTRANCE

SAME FLOOR / ABOVE OR BELOW

RIGHT OF WAY WORK

CONTRACTOR STAGING

PRIMARY CONSTRUCTIO

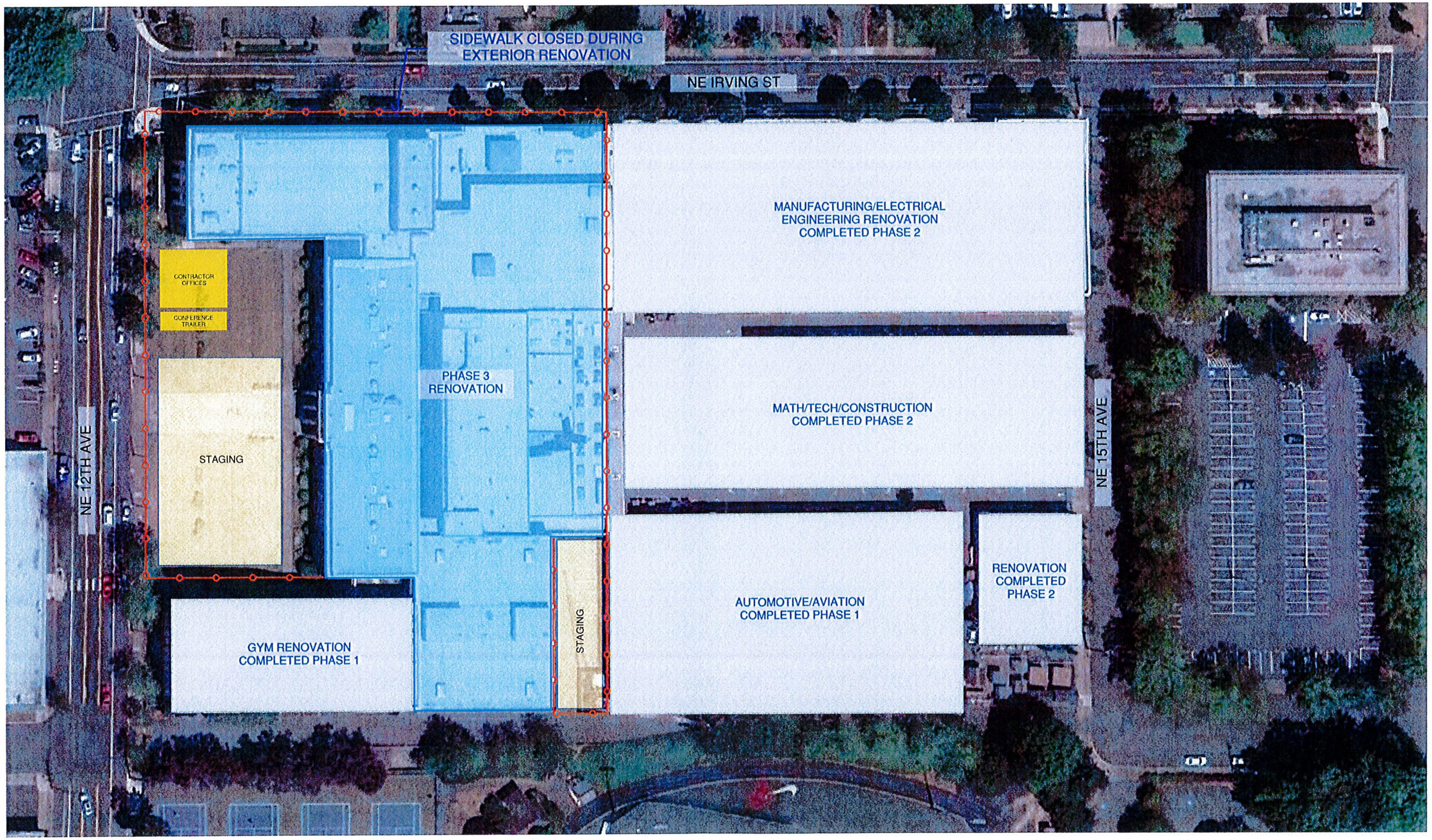


PHASE 3
MOBILIZE AND DEMO

SITE LOGISTICS STUDY

BENSON POLYTECHNIC HIGH SCHOOL

Mortenson
construction



PHASE 3
CONSTRUCTION

SITE LOGISTICS STUDY

BENSON POLYTECHNIC HIGH SCHOOL

Mortenson construction

NE 16th Dr
Pacific Street
Possible Craft Parking???
Possible Craft Parking???
Possible Craft Parking???
Possible Craft Parking???
Possible Craft Parking???
Benson Polytechnic High School
84
NE 15th Ave
NE 21st Ct
NE Hoyt St
NE Sandy Blvd
NE 9th Ave
NE 10th Ave
NE 11th Ave
NE 12th Ave
NE 14th Ave
NE 16th Ave
NE 17th Ave
NE 18th Ave
NE 19th Ave
NE 20th Ave
NE 21st Ave

IV. BUDGET MODEL

Using the unit costs and allowances from the bond estimate established by the owner's cost consultant RLB, the following budget model has been developed based on the preferred Scheme L.1.

SCHEME L
BUDGET MODEL

Scope	Scope	Area (SF)	$/SF	Estimate	Remarks
1. Main Building	Heavy +	33,865	$ 236.23	$ 7,999,929	See Historic Allowance below.
2. Old Gym Building	Heavy +	38,477	$ 236.23	$ 9,089,422	See Historic Allowance below.
3. Auditorium Building	Heavy +	40,208	$ 236.23	$ 9,498,336	See Historic Allowance below.
4. Main Gym Building	Heavy	28,244	$ 236.23	$ 6,672,080	
5. Library Building	Medium	42,068	$ 204.38	$ 8,597,858	
6. North C-Wing	Heavy +	20,124	$ 236.23	$ 4,753,893	See Historic Allowance below.
7. Foundry Building	Heavy +	19,640	$ 236.23	$ 4,639,557	See Historic Allowance below.
8. KBPS Building	Light	7,200	$ 75.00	$ 540,000	Scope reduced from original estimate
9. Automotive Building	Demo	-	$ 7.50	$ 254,708	Demolition & Abatement: 33,961 SF
10. South E-Wing	Demo	-	$ 7.50	$ 294,473	Demolition & Abatement: 39,263 SF
11. Boiler House	Demo	-	$ 7.50	$ 149,123	Demolition & Abatement: 19,883 SF
12. Science H-Wing	Demo	-	$ 7.50	$ 170,588	Demolition & Abatement: 22,745 SF
13. New Building	New	148,674	$ 243.57	$ 36,212,526	
Building Subtotal		**378,500**	**$ 234.80**	**$ 88,872,490**	
12. Site Improvements		238,140	$ 18.00	$ 4,286,520	
13. ROW Improvements		1	$ 750,000	$ 750,000	Lump Sum
14. Parking Site Improvements		65,340		included above	Assuming adjacent site may be used for contractor trailer, lay down and storage, and potential swing space. Resurface with asphalt paving.
Building & Site Subtotal			**$ 248.11**	**$ 93,909,010**	
Mark-Ups from RLB Master Plan Estimate:					
1.5% Solar Requirement			1.50%	$ 1,333,087	Based on building total only
Historic Requirements				$ 3,500,000	Allowance
General Conditions			8.50%	$ 8,393,078	
Bond & Insurances			3.00%	$ 3,214,055	
Overhead and Profit			4.50%	$ 4,965,715	
Design Contingency			10.00%	$ 11,531,495	
Building & Site Subtotal			**$ 335.13**	**$ 126,846,441**	
Escalation				Not Included	
Geotechnical and Environmental Conditions				Not Included	
Swing Space / Temporary Utilities				Not Included	Allowance assumed to be approx. $3.5 Million

V. APPENDIX

Documents included in this section provide backup for the design direction and cost analysis included in this report:

PPS 2017 Bond Masterplanning Estimate (RLB)
Board Report Presentation - January 24, 2017
MPC Meeting #8 Notes - January 5, 2017
MPC Meeting #9 Notes - January 19, 2017
MPC Meeting #10 Notes - February 23, 2017
MPC Meeting #11 Notes - March 23, 2017
MPC Meeting #12 Notes - May 4, 2017

Other references, not provided in this report include:

Benson Polytechnic High School Master Plan Report
PPS Design Standards
PPS Educational Specifications for Comprehensive High Schools
Benson Polytechnic High School Focus Option Educational Specification

PPS 2017 Bond Masterplanning

Benson HS Concept Rev1 - FINAL

CONTENTS

1.00 Estimate Summaries

- Grand Summary with Margins & Adjustments Distributed
- Grand Summary with Margins & Adjustments Undistributed
- Uniformat Level 3 Summary

PPS 2017 Bond Masterplanning
Benson HS Concept Rev1 - FINAL

Location Summary

GFA: Gross Floor Area
Rates Current At January 2017

Location	GFA SF	Cost/SF	Total Cost
A BUILDING			
A1 NEW CONSTRUCTION	155,000	328.63	50,937,449
A2 RENOVATION			
A2A Light Renovation	7,200	201.04	1,447,459
A2B Medium Renovation	72,687	275.76	20,043,852
A2C Heavy Renovation	150,372	318.73	47,927,842
A2 - RENOVATION	*230,259*	*$301.48*	*$69,419,153*
A - BUILDING	***385,259***	***$312.40***	***$120,356,602***
B SITEWORK			
B1 ON-SITE WORK			6,857,115
B2 OFF-SITE WORK			1,011,926
B - SITEWORK			***$7,869,041***
ESTIMATED NET COST	**385,259**	**$332.83**	**$128,225,643**
MARGINS & ADJUSTMENTS			
GMP Contingency (Excluded)			Excl.
ESTIMATED TOTAL COST	**385,259**	**$332.83**	**$128,225,643**

PPS 2017 Bond Masterplanning

Benson HS Concept Rev1 - FINAL

Location Summary

GFA: Gross Floor Area
Rates Current At January 2017

Location		GFA SF	Cost/SF	Total Cost
A BUILDING				
A1 NEW CONSTRUCTION		155,000	243.57	37,752,815
A2 RENOVATION				
A2A Light Renovation		7,200	149.00	1,072,800
A2B Medium Renovation		72,687	204.38	14,855,707
A2C Heavy Renovation		150,372	236.23	35,522,214
	A2 - RENOVATION	*230,259*	*$223.45*	*$51,450,721*
	A - BUILDING	***385,259***	***$231.54***	***$89,203,536***
B SITEWORK				
B1 ON-SITE WORK				5,082,222
B2 OFF-SITE WORK				750,000
	B - SITEWORK			***$5,832,222***
	ESTIMATED NET COST	**385,259**	**$246.68**	**$95,035,758**
MARGINS & ADJUSTMENTS				
Solar Requirements (1.5%)	2 %			$1,425,537
Geotech. Conditions				Excl.
Historic Requirements				$3,500,000
General Conditions	8.5 %			$8,496,710
Bonds & Insurances (2.85%)	3 %			$3,091,053
Overhead & profit	4.5 %			$5,019,708
Design Contingency	10 %			$11,656,877
GMP Contingency (Excluded)				Excl.
	ESTIMATED TOTAL COST	**385,259**	**$332.83**	**$128,225,643**

PPS 2017 Bond Masterplanning
Benson HS Concept Rev1 - FINAL

Elements Summary

Gross Floor Area: 385,259 SF
Rates Current At January 2017

Description		Cost/SF	Total Cost
A1010	Standard Foundations	$5.28	$2,035,000
A1020	Special Foundations	$1.17	$450,000
A1030	Slab on Grade	$3.42	$1,317,070
B1010	Floor Construction	$7.91	$3,048,476
B1020	Roof Construction	$18.25	$7,030,137
B2010	Exterior Walls	$8.83	$3,401,184
B2020	Exterior Windows	$8.73	$3,361,880
B2030	Exterior Doors	$0.60	$232,500
B3010	Roof Coverings	$9.62	$3,706,575
B3020	Roof Openings	$0.24	$94,000
C1010	Partitions	$5.13	$1,976,250
C1020	Interior Doors	$1.81	$697,500
C1030	Fittings	$2.21	$852,500
C2010	Stair Construction	$0.36	$140,000
C3010	Wall Finishes	$2.41	$930,000
C3020	Floor Finishes	$3.02	$1,162,500
C3030	Ceiling Finishes	$3.22	$1,240,000
D1010	Elevators & Lifts	$0.58	$225,000
D2010	Plumbing Fixtures	$4.83	$1,860,000
D3090	Other HVAC Systems & Equipment	$13.28	$5,115,000
D4010	Sprinklers	$1.41	$542,500
D5010	Electrical Service & Distribution	$3.22	$1,240,000
D5020	Lighting and Branch Wiring	$7.24	$2,790,000
D5030	Communications & Security	$4.43	$1,705,000
E1090	Other Equipment	$1.17	$450,000
E2010	Fixed Furnishings	$4.43	$1,705,000
E2020	Movable Furnishings		Excl.
F1020	Integrated Construction	$97.66	$37,622,910
F2010	Building Elements Demolition	$4.44	$1,711,442
F2020	Hazardous Components Abatement	$5.38	$2,072,331
G1020	Site Demolition and Relocations	$2.26	$868,890
G1030	Site Earthwork	$1.27	$488,781
G1040	Hazardous Waste Remediation		Excl.
G2010	Roadways	$1.95	$750,000
G2040	Site Development	$10.94	$4,213,332
	ESTIMATED NET COST	$246.68	$95,035,758

MARGINS & ADJUSTMENTS

PPS 2017 Bond Masterplanning

Benson HS Concept Rev1 - FINAL

Gross Floor Area: 385,259 SF
Rates Current At January 2017

Elements Summary

Description		Cost/SF	Total Cost
MARGINS & ADJUSTMENTS (continued)			
Solar Requirements (1.5%)	2 %		$1,425,537
Geotech. Conditions			Excl.
Historic Requirements			$3,500,000
General Conditions	8.5 %		$8,496,710
Bonds & Insurances (2.85%)	3 %		$3,091,053
Overhead & profit	4.5 %		$5,019,708
Design Contingency	10 %		$11,656,877
GMP Contingency (Excluded)			Excl.
ESTIMATED TOTAL COST		**$332.83**	**$128,225,643**

2.00 Basis of Estimate

PPS 2017 Bond Masterplanning
Benson HS Concept Rev1 - FINAL

Project Details

Description

Basis of Estimate

The project comprises of renovation and addition to Portland Public School's Benson Polytechnic High School and associated sitework.

Items Specifically Included

ESTIMATE PRICING:

- Pricing is based on Construction Costs as of January 2017.
- Margins and Adjustments are included in the estimate.
- Items included or excluded are detailed in the estimate. Other assumptions, inclusions and exclusions are listed below.

GROSS FLOOR AREA:

- New Construction - 155,000 SF
- Light Renovation - 7,200 SF
- Medium Renovation - 72,687 SF
- Heavy Renovation - 150,372 SF

The following assumptions have been made in the preparation of this estimate:

- Other parts/areas of the existing buildings, not noted in the above GFA were assumed that require no scope of works and are excluded from this estimate.

- The project will be competitively bid amongst Sub-Contractors (at least 3).
- The works will be carried out during normal working hours.
- The Contractor will be required to pay prevailing wage rates.
- Resources are available locally.

ITEMS SPECIFICALLY INCLUDED:

- Please note where allowances have been made, we would request the Design Team and Owner to review the sum to ensure the allowance meets their intent.

- We have included budget allowance only for hazardous components abatement of building components. An estimate from an Environmental consultant is required to get more accurate costs for these works.

- We have included an allowance of $450,000 for Food services equipment. An estimate from Food Services consultant is required to get more accurate cost for these works.

- Sub-Contractors Overheads and Profit are included in the unit rates.

PPS 2017 Bond Masterplanning
Benson HS Concept Rev1 - FINAL

Project Details

Description

The following items have been specifically included in Margins and Adjustments:

. Solar Requirements (1.5%)
. Geotechnical Conditions (Excl.)
. Historic Requirements ($3,500,000)
. General Conditions (8.5%)
. Bonds and Insurance (2.85%)
. Overhead & Profit (4.5%)
. Design Contingency (10%)
. GMP Contingency (Excl.)

Items Specifically Excluded

ITEMS SPECIFICALLY EXCLUDED:

. Items marked as "Excl." in the estimate.
. Shiftwork or overtime working or acceleration.
. Double handling or materials due to site access restrictions.
. Delays or working restrictions on the Contractor.
. Rock or concrete excavation.
. Underground services encountered during excavation.
. De-watering required during excavation other than surface water.
. Assumes disposal of materials to a local dump only.
. Allow for improvements to existing site, other than that shown in estimate.
. Walls coverings besides that shown in estimate.
. Moveable furnishings to classrooms.
. Interior Landscaping.
. Loose furniture, FF&E & equipment, besides that included in estimate.
. The affects of potential unfair Contract Conditions which may affect Bid pricing.
. Building & Statutory Industry Fringe Benefits.
. All Building Certification costs.
. Statutory Authorities' charges, contributions (and compliance orders).
. The implications of proposed Construction legislation which may occur during the Construction period.
. Lack of competition amongst Sub-Contractors bidding the Project.
. Unavailability of local resources to undertake specific trades and the affect on bid pricing from non-regional bidders.
. Uncompetitive bidding due to the complexity of the project Sub-Contractors work loads.
. Abnormal changes in market conditions affecting our assessment of escalation.

PPS 2017 Bond Masterplanning
Benson HS Concept Rev1 - FINAL

Project Details

Description

- Construction Management Fees.
- Development Soft Costs including; Land, Financing and Legal costs.
- GMP Contingency.
- Escalation

Documents

DESIGN DETAILS USED FOR THE ESTIMATE:

This estimate is based upon measured quantities and built-up rates prepared from the following information :

Project Information for Pre-Diligence Cost Report (DRAFT) by Bassetti Architects
December 22, 2016

Civil Drawings
None included

Landscape Drawings
None included

Structural Drawings
None included

Mechanical/Electrical/Plumbing/Technology Drawings
None included

3.00 Estimate Detail

PPS 2017 Bond Masterplanning
Benson HS Concept Rev1 - FINAL

Location Elements Item

A BUILDING
A1 NEW CONSTRUCTION

GFA: 155,000 SF Cost/SF: $243.57
Rates Current At January 2017

Description		Unit	Qty	Rate	Total
A1010	**Standard Foundations**				
7	Standard foundations	SF	155,000	7.50	1,162,500
8	Elevator pit - complete incl. waterproofing	Item			20,000
60	Premium for stepped footings, retaining walls, additional earthwork	SF	155,000	5.50	852,500
	Standard Foundations			***$13.13/SF***	***$2,035,000***
A1030	**Slab on Grade**				
9	Slab on grade, incl. base course and vapor barrier	SF	75,197	8.00	601,576
	Slab on Grade			***$3.88/SF***	***$601,576***
B1010	**Floor Construction**				
10	Structural steel floor framing (assumes 12 psf + 10% allowance for misc. metals and connections)	T	526.70	4,500.00	2,370,150
11	Concrete topping slab over metal deck	SF	79,803	8.50	678,326
	Floor Construction			***$19.67/SF***	***$3,048,476***
B1020	**Roof Construction**				
13	Metal roof deck	SF	75,197	4.25	319,587
149	Structural steel roof framing (assumes 9 psf + 10% allowance for misc. metals and connections)	T	372.23	4,500.00	1,675,035
	Roof Construction			***$12.87/SF***	***$1,994,622***
B2010	**Exterior Walls**				
14	Exterior wall assembly; brick veneer, weather-resistive barrier, rigid insulation, sheathing, flashings, metal stud framing, secondary support steel, vapor barrier, batt insulation, and finished gyp board to the inside face of exterior wall	SF	52,541	54.00	2,837,214
61	Allowance for work to exterior walls at interface between (N) and (E)	SF	18,799	30.00	563,970
	Exterior Walls			***$21.94/SF***	***$3,401,184***
B2020	**Exterior Windows**				
15	Curtainwall - Qty is Allowance	SF	6,568	115.00	755,320
16	Exterior storefront windows (assumes 25% glazing of exterior walls)	SF	13,136	85.00	1,116,560
	Exterior Windows			***$12.08/SF***	***$1,871,880***
B2030	**Exterior Doors**				
17	Exterior doors	SF	155,000	1.50	232,500
	Exterior Doors			***$1.50/SF***	***$232,500***
B3010	**Roof Coverings**				
150	Low-slope membrane roof system	SF	75,197	18.00	1,353,546
	Roof Coverings			***$8.73/SF***	***$1,353,546***

PPS 2017 Bond Masterplanning

Benson HS Concept Rev1 - FINAL

Location Elements Item

A BUILDING
A1 NEW CONSTRUCTION (continued)

GFA: 155,000 SF Cost/SF: $243.57
Rates Current At January 2017

Description		Unit	Qty	Rate	Total
B3020	**Roof Openings**				
19	Skylights - Qty is Allowance	SF	752	125.00	94,000
	Roof Openings			***$0.61/SF***	***$94,000***
C1010	**Partitions**				
20	Partitions, incl. CMU walls	SF	155,000	12.00	1,860,000
21	Allowance for rough carpentry	SF	155,000	0.75	116,250
	Partitions			***$12.75/SF***	***$1,976,250***
C1020	**Interior Doors**				
22	Interior doors and glazing	SF	155,000	4.50	697,500
	Interior Doors			***$4.50/SF***	***$697,500***
C1030	**Fittings**				
23	Specialties; Includes markerboards, tackboards, signage, corner/wall protection, fire extinguishers, etc.	SF	155,000	5.50	852,500
	Fittings			***$5.50/SF***	***$852,500***
C2010	**Stair Construction**				
25	Metal pan stair	Flight	7	20,000.00	140,000
	Stair Construction			***$0.90/SF***	***$140,000***
C3010	**Wall Finishes**				
26	Wall finishes	SF	155,000	6.00	930,000
	Wall Finishes			***$6.00/SF***	***$930,000***
C3020	**Floor Finishes**				
27	Floor finishes	SF	155,000	7.50	1,162,500
	Floor Finishes			***$7.50/SF***	***$1,162,500***
C3030	**Ceiling Finishes**				
28	Ceiling finishes	SF	155,000	8.00	1,240,000
	Ceiling Finishes			***$8.00/SF***	***$1,240,000***
D1010	**Elevators & Lifts**				
29	Elevator	Stop	5	45,000.00	225,000
	Elevators & Lifts			***$1.45/SF***	***$225,000***
D2010	**Plumbing Fixtures**				
30	Plumbing fixtures and pipework	SF	155,000	12.00	1,860,000
	Plumbing Fixtures			***$12.00/SF***	***$1,860,000***
D3090	**Other HVAC Systems & Equipment**				
31	HVAC, incl. DDC controls	SF	155,000	33.00	5,115,000
	Other HVAC Systems & Equipment			***$33.00/SF***	***$5,115,000***

PPS 2017 Bond Masterplanning

Benson HS Concept Rev1 - FINAL

Location Elements Item

A BUILDING GFA: 155,000 SF Cost/SF: $243.57

A1 NEW CONSTRUCTION (continued) Rates Current At January 2017

Description	Unit	Qty	Rate	Total
D4010 Sprinklers				
32 Fire sprinklers	SF	155,000	3.50	542,500
Sprinklers			***$3.50/SF***	***$542,500***
D5010 Electrical Service & Distribution				
33 Electrical service and distribution	SF	155,000	8.00	1,240,000
Electrical Service & Distribution			***$8.00/SF***	***$1,240,000***
D5020 Lighting and Branch Wiring				
34 Lighting and branch wiring	SF	155,000	18.00	2,790,000
Lighting and Branch Wiring			***$18.00/SF***	***$2,790,000***
D5030 Communications & Security				
35 Systems; Fire alarm, PA, tel/data, security. A/V backbone, etc.	SF	155,000	11.00	1,705,000
Communications & Security			***$11.00/SF***	***$1,705,000***
E1090 Other Equipment				
36 Allowance for kitchen equipment	Item			450,000
Other Equipment			***$2.90/SF***	***$450,000***
E2010 Fixed Furnishings				
146 Casework, furnishings, misc. equipment in (N) addition	SF	155,000	11.00	1,705,000
Fixed Furnishings			***$11.00/SF***	***$1,705,000***
E2020 Movable Furnishings				
39 Movable furnishings incl. carts, desks, chairs, etc. -- Excluded	Item			Excl.
Movable Furnishings				***Excl.***
G1030 Site Earthwork				
40 Allowance for structural excavation, misc. earthwork	SF	75,197	6.50	488,781
Site Earthwork			***$3.15/SF***	***$488,781***
NEW CONSTRUCTION			***$243.57/SF***	***$37,752,815***

PPS 2017 Bond Masterplanning

Benson HS Concept Rev1 - FINAL

Location Elements Item

A BUILDING

A2 RENOVATION

A2A Light Renovation

GFA: 7,200 SF Cost/SF: $149.00
Rates Current At January 2017

Description		Unit	Qty	Rate	Total
A1030	**Slab on Grade**				
145	Infill, patch and repair (E) slab on grade, where modifications occur	SF	7,200	6.00	43,200
	Slab on Grade			***$6.00/SF***	***$43,200***
B1020	**Roof Construction**				
89	Allow for seismic strengthening/upgrades to (E) building	SF	7,200	20.00	144,000
	Roof Construction			***$20.00/SF***	***$144,000***
E2020	**Movable Furnishings**				
39	Movable furnishings incl. carts, desks, chairs, etc. -- Excluded	Item			Excl.
	Movable Furnishings				***Excl.***
F1020	**Integrated Construction**				
165	Allowance for light renovation - interiors	SF	7,200	30.00	216,000
166	Allowance for light renovation - structural	SF	7,200	19.00	136,800
167	Allowance for light renovation - exterior envelope upgrades	SF	7,200	15.00	108,000
168	Allowance for light renovation - MEP upgrades	SF	7,200	45.00	324,000
	Integrated Construction			***$109.00/SF***	***$784,800***
F2010	**Building Elements Demolition**				
82	Minor demo of partitions/doors/glazing, full demo of finishes, fittings, and casework	SF	7,200	5.00	36,000
	Building Elements Demolition			***$5.00/SF***	***$36,000***
F2020	**Hazardous Components Abatement**				
48	Plaster abatement on walls	SF	7,200	3.50	25,200
49	Flooring abatement	SF	7,200	1.75	12,600
50	Asbestos ceiling abatement	SF	7,200	2.75	19,800
59	Misc. abatement	SF	7,200	1.00	7,200
	Hazardous Components Abatement			***$9.00/SF***	***$64,800***
	LIGHT RENOVATION			***$149.00/SF***	***$1,072,800***

PPS 2017 Bond Masterplanning
Benson HS Concept Rev1 - FINAL

Location Elements Item

A BUILDING

A2 RENOVATION — GFA: 72,687 SF Cost/SF: $204.38

A2B Medium Renovation — Rates Current At January 2017

Description		Unit	Qty	Rate	Total
A1020	**Special Foundations**				
86	Allowance for shoring/underpinning of (E) foundations/walls	Item			150,000
	Special Foundations			***$2.06/SF***	***$150,000***
A1030	**Slab on Grade**				
145	Infill, patch and repair (E) slab on grade, where modifications occur	SF	34,043	6.00	204,258
	Slab on Grade			***$2.81/SF***	***$204,258***
B1020	**Roof Construction**				
89	Allow for seismic strengthening/upgrades to (E) building	SF	72,687	20.00	1,453,740
104	Premium for seismic strengthening to Gym for immediate occupancy (Level 4)	SF	28,689	15.00	430,335
	Roof Construction			***$25.92/SF***	***$1,884,075***
B3010	**Roof Coverings**				
18	Replace (E) roof incl. demo	SF	34,043	21.00	714,903
	Roof Coverings			***$9.84/SF***	***$714,903***
E2020	**Movable Furnishings**				
39	Movable furnishings incl. carts, desks, chairs, etc. -- Excluded	Item			Excl.
	Movable Furnishings				***Excl.***
F1020	**Integrated Construction**				
157	Allowance for medium renovation - interiors	SF	72,687	34.00	2,471,358
158	Allowance for medium renovation - structural	SF	72,687	20.00	1,453,740
159	Allowance for medium renovation - exterior envelope upgrades	SF	72,687	18.00	1,308,366
164	Allowance for medium renovation - MEP upgrades	SF	72,687	70.00	5,088,090
169	Allowance for stairs renovation/upgrades	Item			60,000
170	Allowance for elevator renovation/upgrades	Item			50,000
172	Pemium for medium renovation, interiors incl. equipment - Gym	SF	28,689	12.00	344,268
	Integrated Construction			***$148.25/SF***	***$10,775,822***
F2010	**Building Elements Demolition**				
75	Demo partitions, interior doors, finishes, casework, fittings, MEP etc.	SF	72,687	6.50	472,466
	Building Elements Demolition			***$6.50/SF***	***$472,466***
F2020	**Hazardous Components Abatement**				
48	Plaster abatement on walls	SF	72,687	3.50	254,405
49	Flooring abatement	SF	72,687	1.75	127,202
50	Asbestos ceiling abatement	SF	72,687	2.75	199,889

PPS 2017 Bond Masterplanning
Benson HS Concept Rev1 - FINAL

Location Elements Item

A BUILDING

A2 RENOVATION

A2B Medium Renovation (continued)

GFA: 72,687 SF Cost/SF: $204.38
Rates Current At January 2017

	Description	Unit	Qty	Rate	Total
59	Misc. abatement	SF	72,687	1.00	72,687
	Hazardous Components Abatement			***$9.00/SF***	***$654,183***
	MEDIUM RENOVATION			***$204.38/SF***	***$14,855,707***

PPS 2017 Bond Masterplanning

Benson HS Concept Rev1 - FINAL

Location Elements Item

A BUILDING

A2 RENOVATION
A2C Heavy Renovation

GFA: 150,372 SF Cost/SF: $236.23
Rates Current At January 2017

Description		Unit	Qty	Rate	Total
A1020	**Special Foundations**				
86	Allowance for shoring/underpinning of (E) foundations/walls	Item			300,000
	Special Foundations			***$2.00/SF***	***$300,000***
A1030	**Slab on Grade**				
145	Infill, patch and repair (E) slab on grade, where modifications occur	SF	78,006	6.00	468,036
	Slab on Grade			***$3.11/SF***	***$468,036***
B1020	**Roof Construction**				
89	Allow for seismic strengthening/upgrades to (E) building	SF	150,372	20.00	3,007,440
	Roof Construction			***$20.00/SF***	***$3,007,440***
B2020	**Exterior Windows**				
52	(E) wood windows repairs/upgrades	EA	340	3,800.00	1,292,000
53	(E) steel windows major repairs/upgrades	EA	36	5,500.00	198,000
	Exterior Windows			***$9.91/SF***	***$1,490,000***
B3010	**Roof Coverings**				
18	Replace (E) roof incl. demo	SF	78,006	21.00	1,638,126
	Roof Coverings			***$10.89/SF***	***$1,638,126***
F1020	**Integrated Construction**				
160	Allowance for heavy renovation - interiors	SF	150,372	40.00	6,014,880
161	Allowance for heavy renovation - structural	SF	150,372	28.00	4,210,416
162	Allowance for heavy renovation - exterior envelope upgrades	SF	150,372	20.00	3,007,440
163	Allowance for heavy renovation - MEP upgrades	SF	150,372	80.00	12,029,760
169	Allowance for stairs renovation/upgrades	Item			120,000
170	Allowance for elevator renovation/upgrades	Item			60,000
171	Pemium for heavy renovation, interiors incl. equipment - Auditorium	SF	38,737	16.00	619,792
	Integrated Construction			***$173.32/SF***	***$26,062,288***
F2010	**Building Elements Demolition**				
70	Heavy interior demolition	SF	150,372	8.00	1,202,976
	Building Elements Demolition			***$8.00/SF***	***$1,202,976***
F2020	**Hazardous Components Abatement**				
48	Plaster abatement on walls	SF	150,372	3.50	526,302
49	Flooring abatement	SF	150,372	1.75	263,151
50	Asbestos ceiling abatement	SF	150,372	2.75	413,523

PPS 2017 Bond Masterplanning
Benson HS Concept Rev1 - FINAL

Location Elements Item

A BUILDING

A2 RENOVATION — GFA: 150,372 SF Cost/SF: $236.23

A2C Heavy Renovation (continued) — Rates Current At January 2017

Description		Unit	Qty	Rate	Total
59	Misc. abatement	SF	150,372	1.00	150,372
	Hazardous Components Abatement			***$9.00/SF***	***$1,353,348***
	HEAVY RENOVATION			***$236.23/SF***	***$35,522,214***

PPS 2017 Bond Masterplanning

Benson HS Concept Rev1 - FINAL

Location Elements Item

B SITEWORK

B1 ON-SITE WORK

Rates Current At January 2017

Description		Unit	Qty	Rate	Total
G1020	**Site Demolition and Relocations**				
41	Demo and remove (E) buildings, complete	SF	115,852	7.50	868,890
	Site Demolition and Relocations				***$868,890***
G1040	**Hazardous Waste Remediation**				
117	Allowance for hazardous waste remediation of site - Excluded	Item			Excl.
	Hazardous Waste Remediation				***Excl.***
G2040	**Site Development**				
4	On-site work	SF	234,074	18.00	4,213,332
	Site Development				***$4,213,332***
	ON-SITE WORK				***$5,082,222***

PPS 2017 Bond Masterplanning

Benson HS Concept Rev1 - FINAL

Location Elements Item

B SITEWORK

B2 OFF-SITE WORK

Rates Current At January 2017

Description		Unit	Qty	Rate	Total
G2010	**Roadways**				
5	Off-site work	Item			750,000
	Roadways				***$750,000***
	OFF-SITE WORK				***$750,000***

BENSON POLYTECHNIC BOARD OVERVIEW / JANUARY 24, 2017

PROJECT OVERVIEW /

Main Building construction, circa. 1916

CONSTRUCTION BUDGET

$122 Million

PROJECT BUDGET

$202 Million

STUDENT DESIGN CAPACITY

1,700

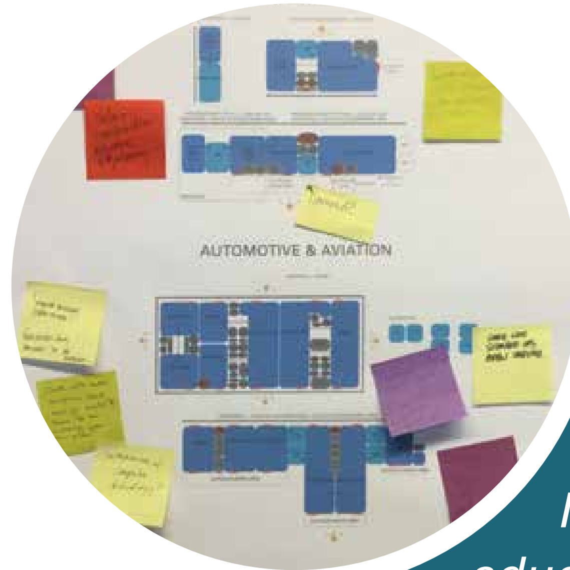
PROPOSED BUILDING AREA

+/- 368,000 SF

KEY PROJECT CHALLENGES

+ Historic landmark
+ Constrained urban site
+ Extensive health and safety upgrades required, incuding seismic upgrade of unreinforced masonry (URM) buildings and providing universal ADA access throughout campus
+ Phased construction with student occupancy

MASTER PLAN COMMITEE (MPC) PROCESS /



RECENT WORKSHOP ACTIVITIES

+ Guiding Principles
+ Preferred master plan schemes
+ CTE program studies
+ Building design studies (Schemes A-J)
+ Phasing overview

UPCOMING ACTIVITIES

+ Design refinement
+ Ed Spec development
+ Community partnerships

Innovative education delivery should help inform the vision for the modernization of Benson

1. Honor the unique history and culture of Benson Polytechnic High School.
2. Engage with the local business, government, and post-secondary partners to create strong connections between education and industry.
3. Provide hands-on, project-based learning opportunities that are imbued with rigor and relevancy.
4. Provide agile, flexible, and adaptable facilities that support changing educational needs.
5. Provide learning environments that inspire creativity and collaboration among students.
6. Support a comprehensive educational experience for students.
7. Celebrate diversity and provide a sense of inclusion and belonging among students and families.
8. Position Benson Polytechnic as a national model for STEAM and Career Technical Education (CTE).

PRE-DESIGN DILIGENCE /

INFORMATION GATHERING

+ Review of as-built documents provided by PPS
+ Consultant site visits
+ Historic renovation assessment
+ Systems assessments (MEP, structural, acoustic, theatrical, etc.)
+ Sound engineer testing of CTE shops
+ Phase 1 Environmental Site Assessment
+ Detailed equipment survey
+ Interviews with over 20 departments, including all Career Technical Education (CTE) department heads, alumni, and administration.

ESTIMATE COORDINATION

+ Heavy Remodel
+ Medium Remodel
+ Light Remodel
+ Demolition
+ On-site and Off-site Improvements

CONTINUING EFFORTS

+ Development of Benson Polytechnic High School Focus Option Ed Spec
+ Design refinement
+ Building survey and photo documentation
+ BIM model
+ Geotechnical soils investigation
+ Phase 2 Environmental Site Report
+ Testing (structural, acoustic, etc.)
+ Ongoing student and staff engagement

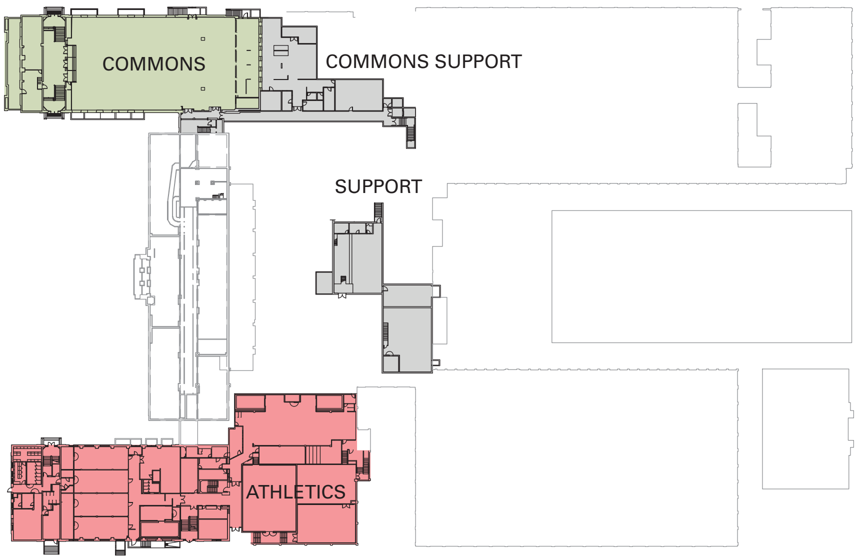
CATEGORIES

1. **Water Quality:** Modernization would include replacement of plumbing piping and fixtures.
2. **Fire /Life Safety:** Aged fire alarm and sprinkler systems will be upgraded for improved safety.
3. **Asbestos:** Abatement and removal.
4. **Lead Paint:** Abatement and removal.
5. **Building Envelope:** Modernization would upgrade exterior walls, windows and roof to repair damage, improve energy efficiency and increase durability.
6. **ADA:** Substantial upgrades to make all areas of the school universally accessible and compliant with current codes.
7. **Radon:** Modernization would provide a new radon mitigation system below new foundations.

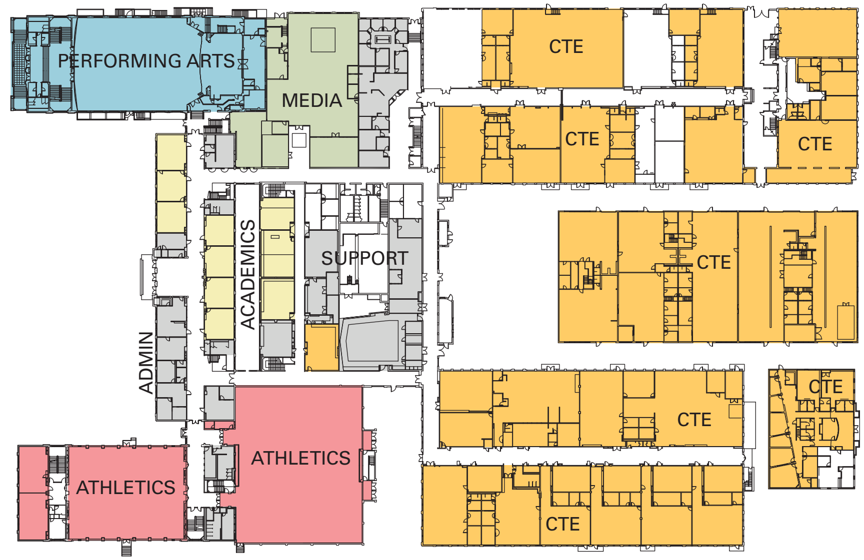
CATEGORIES (...continued)

8. **Seismic:** URM buildings and other structures would receive a complete structural upgrade to meet current building codes.
9. **Security Systems/Fencing:** Secure entry and video surveillance system upgrades to control access. Exterior service access and central plazas to be fenced and secured during school hours.
10. **Auditorium/Stage:** Aging theatrical lighting and rigging systems to be updated for improved safety and maintainability.

EXISTING PROGRAM DIAGRAM /



LOWER LEVEL



GROUND FLOOR

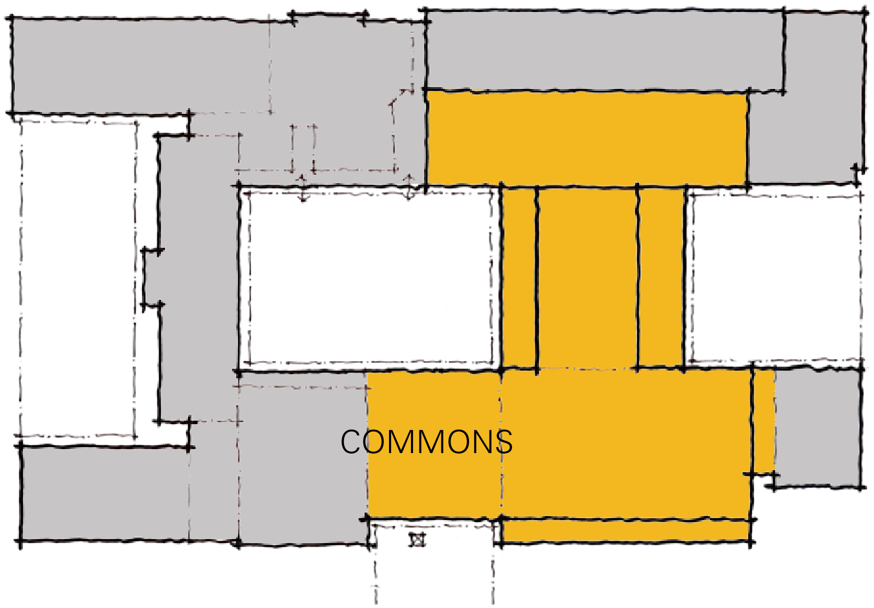
LEGEND

- Administration & Support
- Commons & Media Center
- Academics
- Athletics
- Performing Arts
- CTE

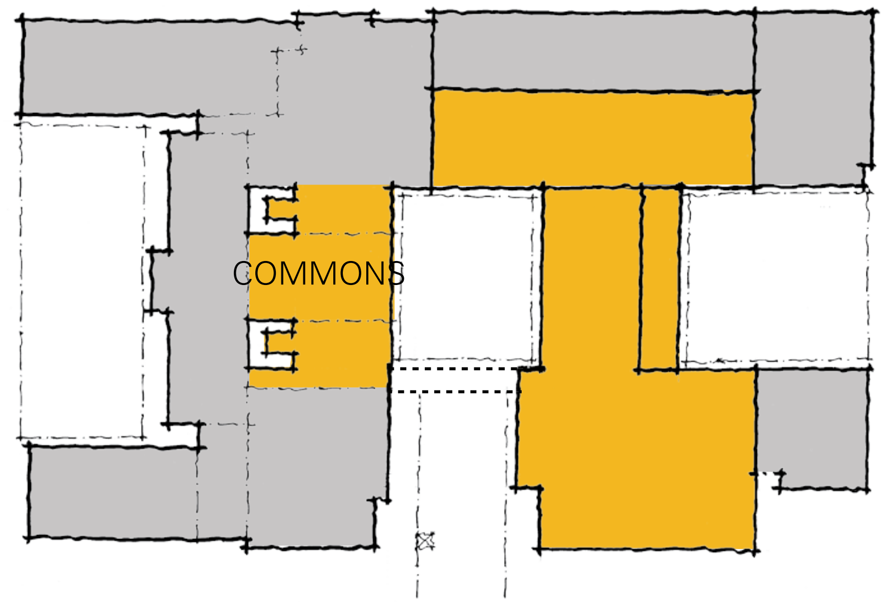
UPPER FLOOR

DESIGN APPROACH / EXISTING RENOVATION & NEW CONSTRUCTION

SCHEME 1



SCHEME 2



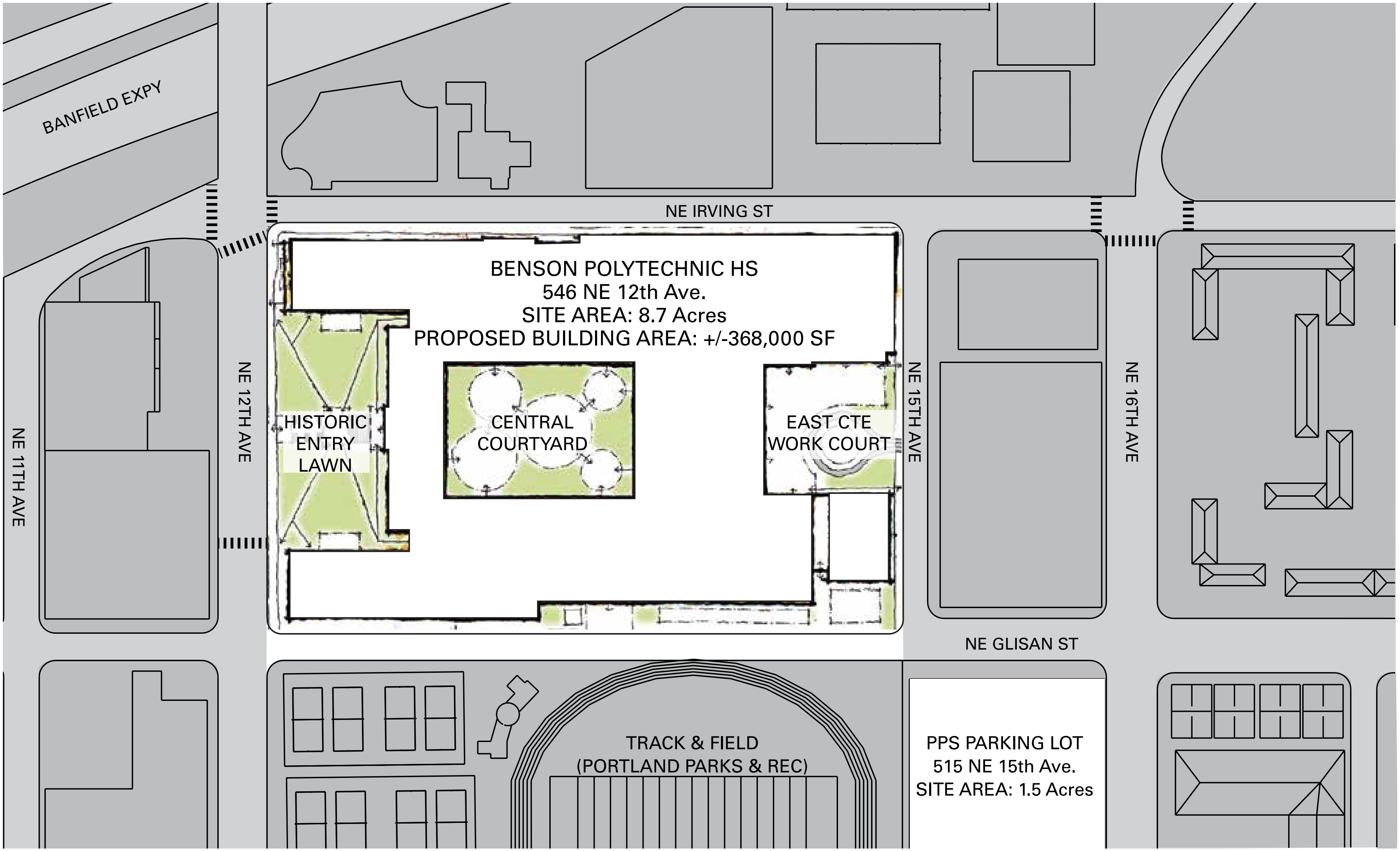
New Construction

Renovation of Existing

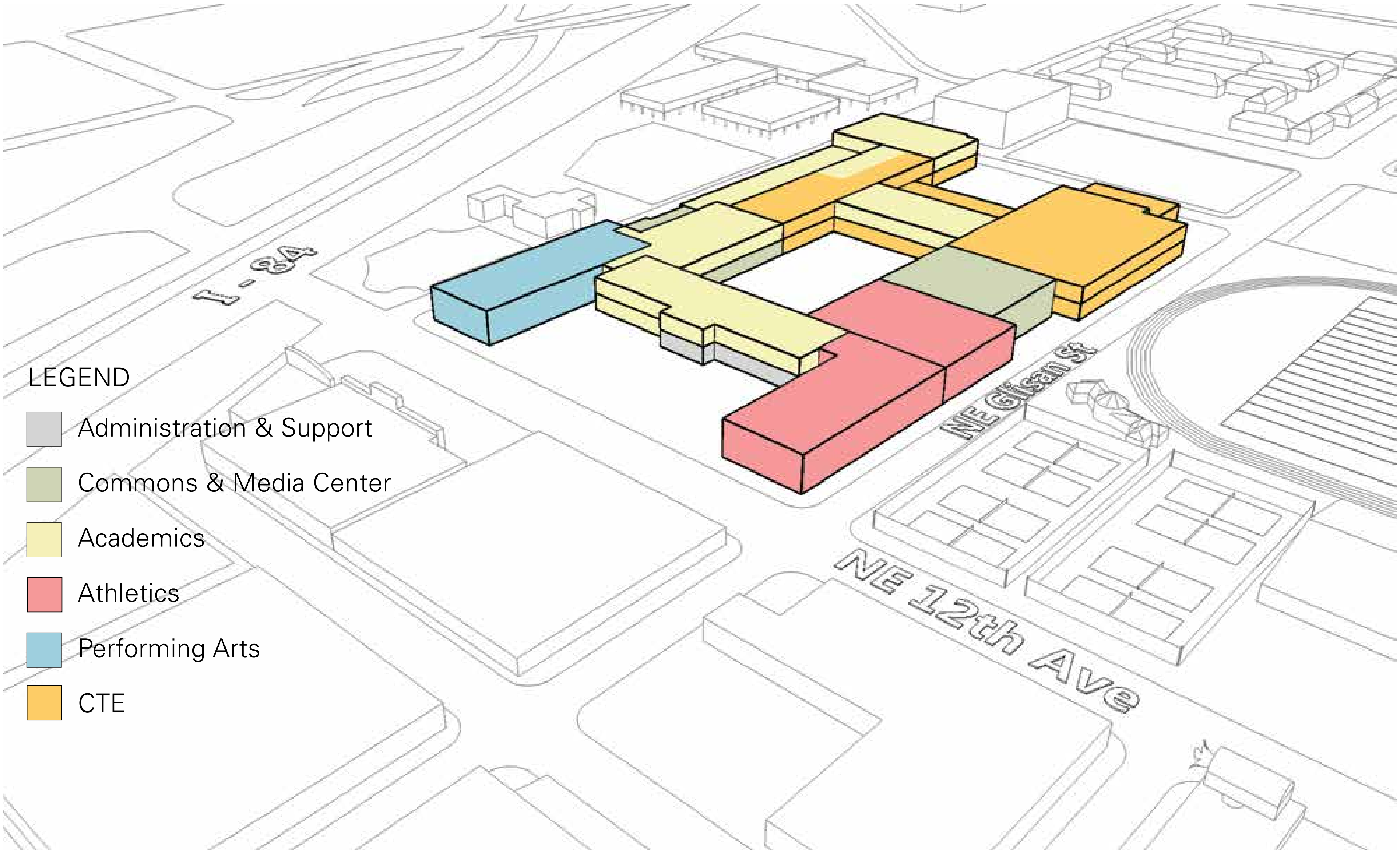
COMMON THEMES

+ New Commons at the heart of the school.
+ Maintaining and modernizing historic buildings to the west and north.
+ Providing a protected courtyard at the center and a shared work courtyard to the east.
+ Addressing service and delivery access from the east and south.
+ Integrating academic classrooms and CTE shops within the school for better collaboration.
+ Enhancing daylighting, transparency, and natural ventilation.
+ Providing flexible and adaptable spaces that will meet the needs of Benson Tech now and in the future.
+ Balancing program, budget and phasing considerations.

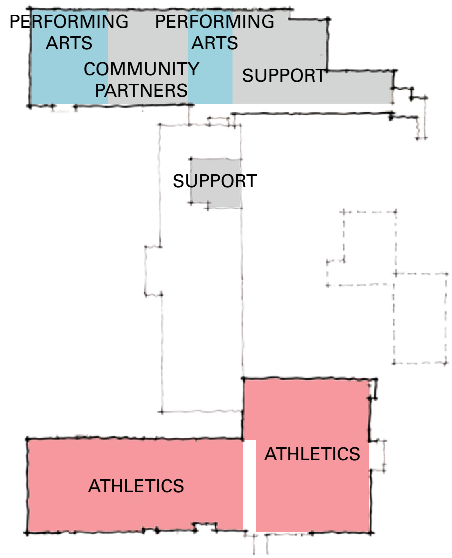
SCHEME 1 / SITE PLAN



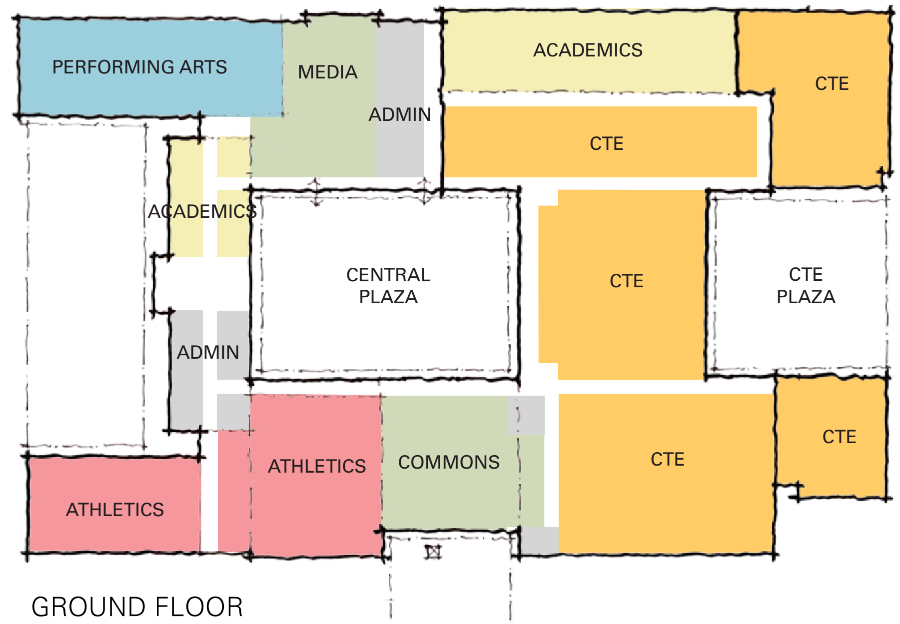
SCHEME 1 / MASSING DIAGRAM



SCHEME 1 / PLAN DIAGRAM



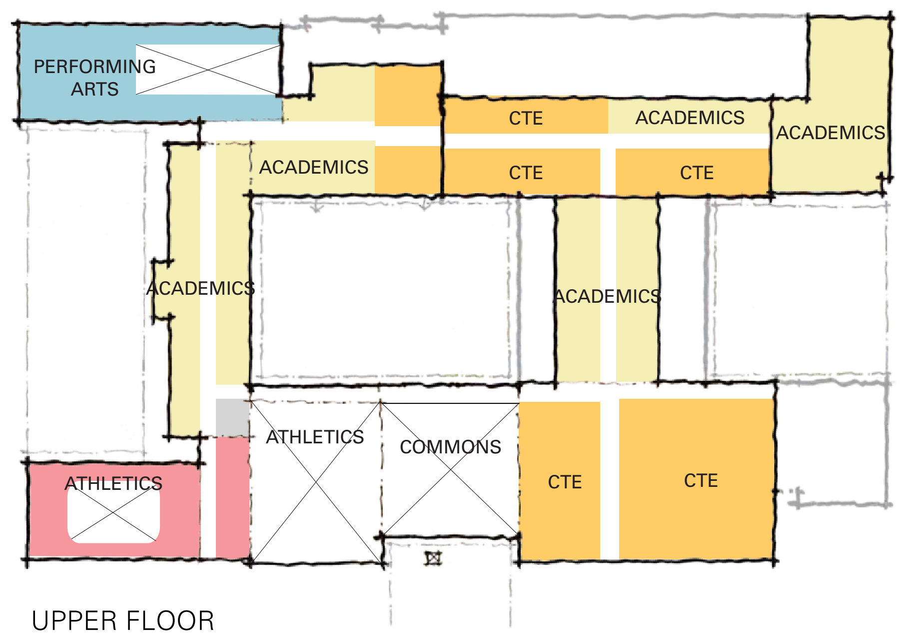
LOWER LEVEL



GROUND FLOOR

LEGEND

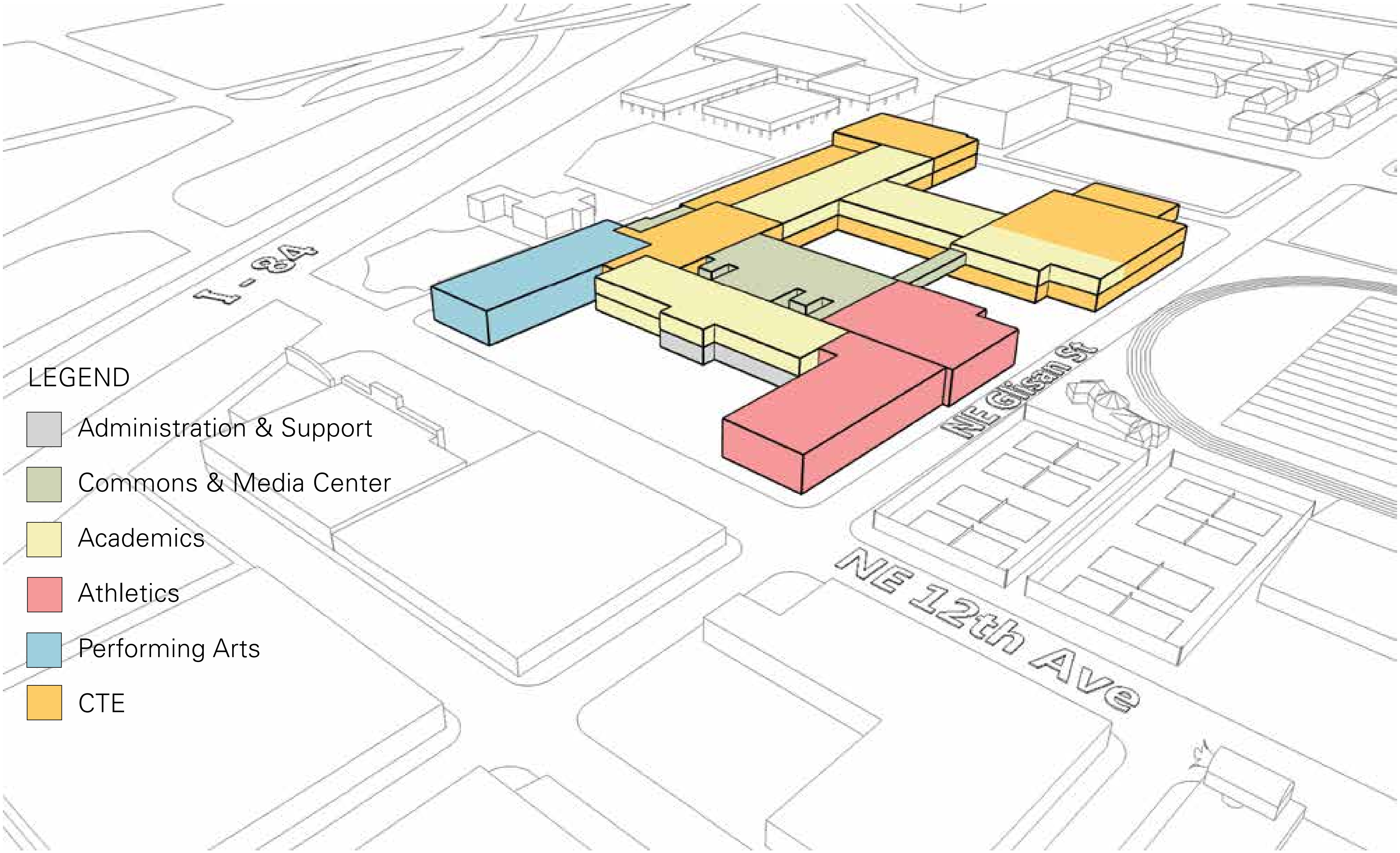
- Administration & Support
- Commons & Media Center
- Academics
- Athletics
- Performing Arts
- CTE



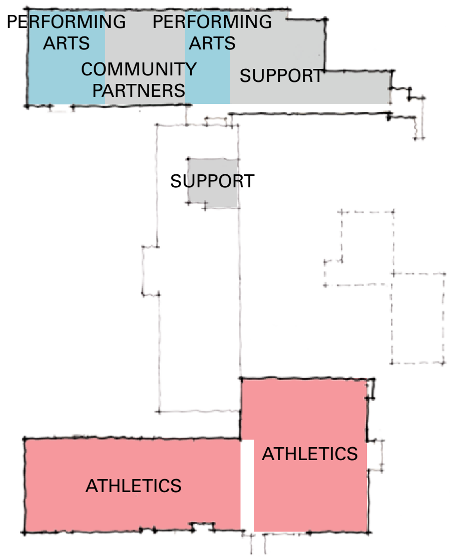
UPPER FLOOR

SCHEME 2 / SITE PLAN

SCHEME 2 / MASSING DIAGRAM



SCHEME 2 / PLAN DIAGRAM



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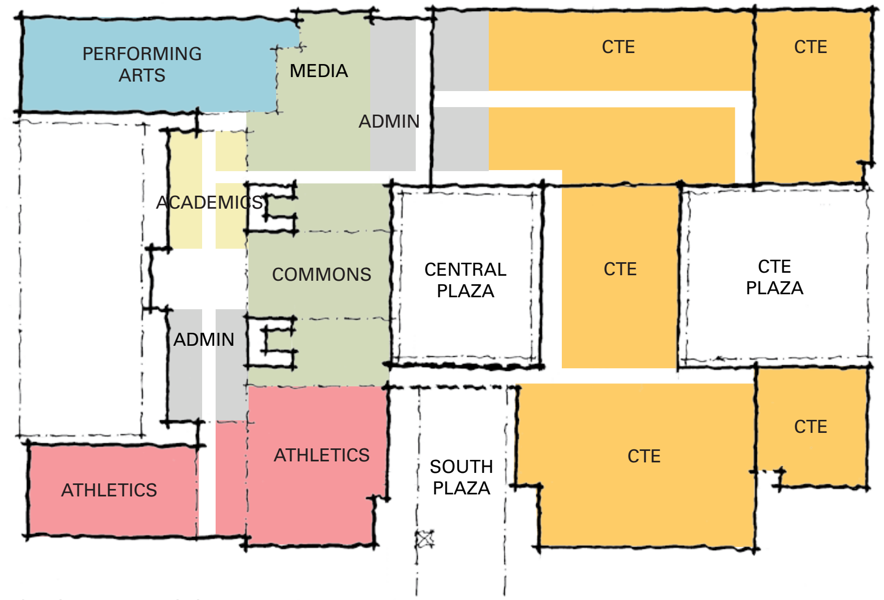
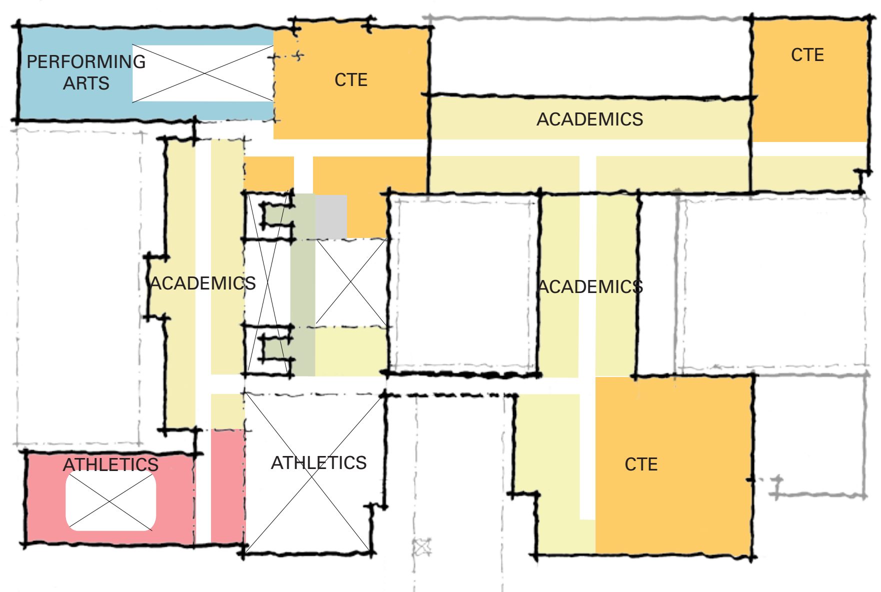


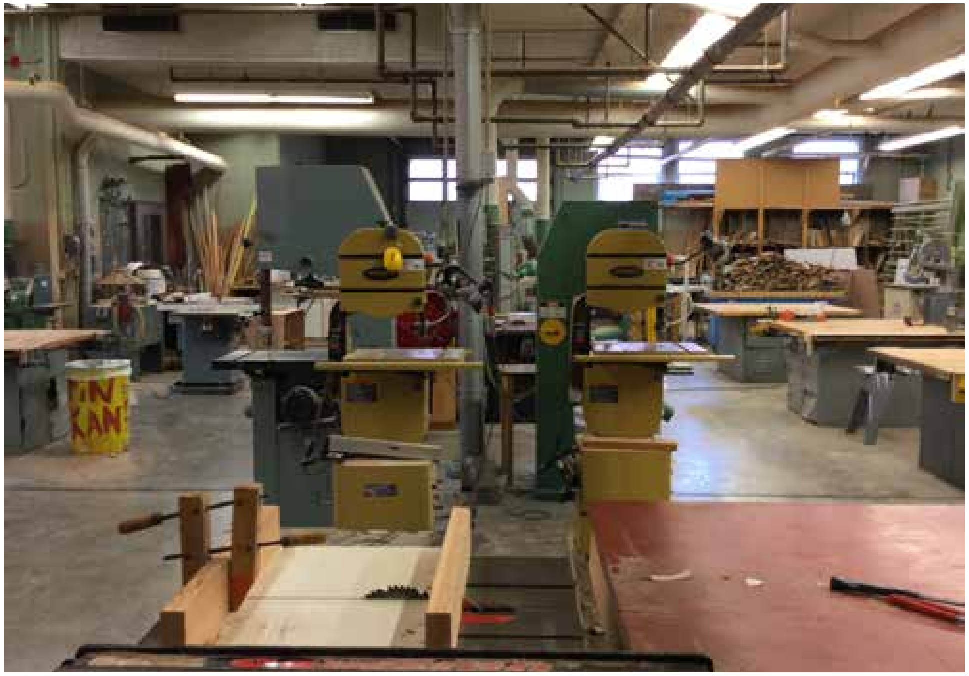
GROUND FLOOR



UPPER FLOOR

LEGEND

- Administration & Support
- Commons & Media Center
- Academics
- Athletics
- Performing Arts
- CTE



INITIAL PHASING ASSUMPTIONS FOR BENSON POLYTECHNIC HS

+ All Benson Tech programs will remain on-site during construction.
+ If off-site options are presented or available before the start of construction, reductions in swing costs or durations may be achieved.
+ Maximize efficiency in programs to minimize swing space needs.
+ No increase to student capacity before and during construction.
+ Non-Benson programs will be relocated off-site before the start of construction.
+ Utilize adjacent PPS parking site for swing or contractor space, if possible.
+ Main gym and theater will each be unavailable for one school year.
+ Swing of Main Gym and Auxiliary Gym will allow P.E. programs to continue to operate on-site.

Master Planning Committee Meeting #8 Notes

Benson Polytechnic High School
January 5, 2017

MEETING DETAILS

Meeting Location:

Benson Polytechnic High School,
546 NE 12th Ave, Portland, OR 97232

Attendees:

Portland Public Schools (PPS):
Jerry Vincent, Office of School Modernization Chief
Jen Sohm, Project Manager

Master Planning Committee Members:
Paul Anthony, PPS School Board
Curtis Wilson Jr., Principal
Maya Brown
Simon Criswell
Kevin B. Clark
Angel Dawson
Brian Gerber
Reuben Gilmore
Tammy Hite
Luke Hotchkiss
Dave Ketah
Jacob M. Masters
Irina Phillips
Jim Piro
Julie Tonroy
Matt Pellico
Richard Spies

Design Team
Lorne McConachie, Bassetti Architects
Joe Echeverri, Bassetti Architects
Cary Dasenbrock, Bassetti Architects
Dianna Montzka, Bassetti Architects
Nancy Hamilton, Nancy Hamilton Consulting

Others
Amy Ruiz
Scott Bailey

Pre - Design Goals:

Identify the vision, philosophy, and objectives of the school.

Provide a consistent and diverse voice for user groups in the pre - planning phase of the project.

Prioritize the objectives to attain cost certainty for the project moving forward.

Agenda:

6:00 - 6:15 Introductions
- MPC and Design Team Introductions
- Project Update - PPS
  - + Tasks since last PMC
  - + Budget
- Bassetti Architects
  - + 60-day Process and beyond

6:15 - 6:30 Guiding Principles
- Results from survey and discussion

6:30 - 6:55 Program Studies (Individual Activity)
- Overview
- CTE Programs and Academic Cluster Diagrams
  - + Observations
  - + Are we covering everything?
  - + Adjacencies

6:55 - 7:10 Preferred Masterplan Schemes
- Results from survey and discussion

7:10 - 8:00 Building Studies (Small Group Activity)
- Overview
- Small group discussion

8:00 - 8:10 Subcommittee Report

8:10 - 8:20 Closing Thoughts & Next Steps

8:20 - 8:30 Public Comment

Notes Issued Date:

January 16th, 2017

PROJECT UPDATE

Jen Sohm, the PPS Project Manager for Benson Modernization, gave a brief update:

The construction budget has been established at $122 million

+ This budget is for the hard costs of the modernization, including building modifications to meet the program requirements (currently assumed to be 385,000 SF) as well as the environmental, ADA, HVAC, security and seismic upgrades.
+ Soft costs such as escalation, design/permitting, swing/phasing, and Fixtures, Furnishings and Equipment (FF&E) are carried outside of this budget.

Over the past 6 weeks, the design team has done the following:

+ Met with staff for 20+ departments
+ Existing conditions surveys
+ Preliminary cost analysis
+ Begun an equipment survey
+ Developed program studies
+ Developed design options

GUIDING PRINCIPLES SUMMARY

The group reviewed the Guiding Principles established in the Master Plan, and additional subsets that were added from a survey sent prior to the meeting. The following list includes all of the original principles in black and new subsets in red. Design decisions moving forward will be tested against these principles.

GUIDING PRINCIPLES

HONOR THE UNIQUE HISTORY AND CULTURE OF BENSON POLYTECHNIC HIGH SCHOOL:

+ Holds a rich, 100-year history.
+ Honor the past, embrace the future.
+ Deliver integrated academic and career technical education and opportunities to students.

ENGAGE WITH THE LOCAL BUSINESS, GOVERNMENT, AND POST-SECONDARY PARTNERS TO CREATE STRONG CONNECTIONS BETWEEN EDUCATION AND INDUSTRY:

+ Link educational content to real-life applications.
+ Support partnerships with industry, government, and post-secondary education
+ Design spaces to mimic real-world work environments
+ *Make certain the curriculum at Benson is relevant to our local workforce needs*
+ *Develop a compelling story of "partner buy-in"*

PROVIDE HANDS-ON, PROJECT-BASED LEARNING OPPORTUNITIES THAT ARE IMBUED WITH RIGOR AND RELEVANCY:

+ Provide students with state of the art and industry-standard tools, materials, equipment, and technology
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+ Make spaces adaptable to changing needs brought about by economic shifts, industry advances, and new equipment.
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+ School environment should reflect appreciation of different cultures, socioeconomic backgrounds, and learning modalities.
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+ Continue the ability of the community to feel a sense of pride when speaking of Benson Polytechnic High School's exemplary programs and innovative learning approaches.
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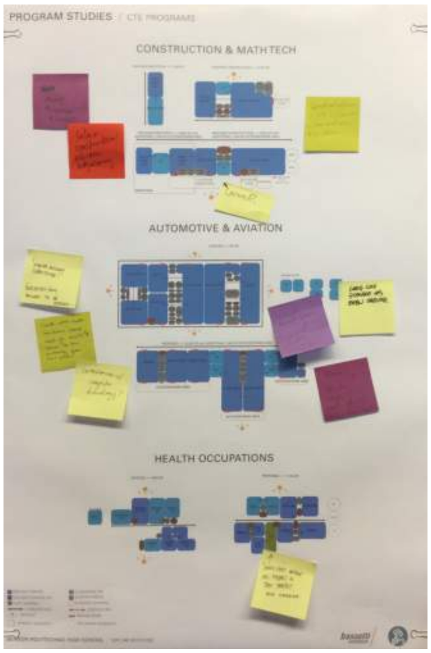
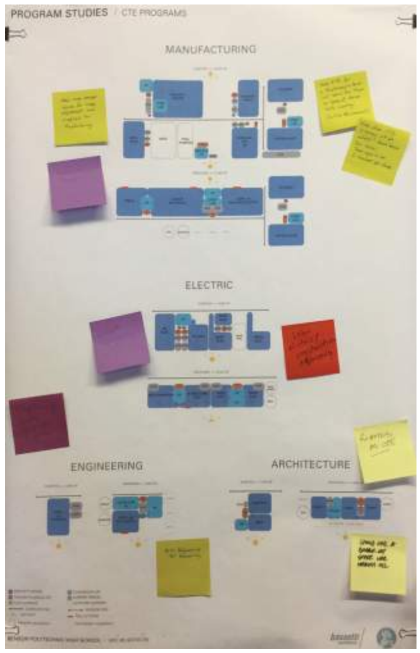
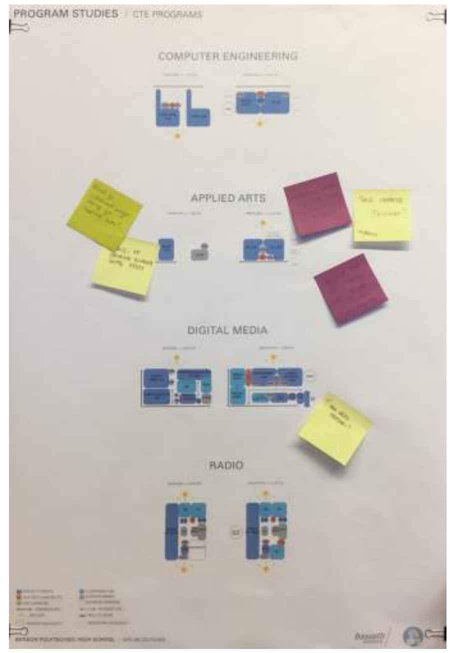
+ Campus should include sufficient onsite resources to allow students to conveniently access school-based sports and/or performing and fine arts programs.
+ Students' educational experiences are bolstered through their participation in elective courses and extracurricular opportunities.

PROGRAM STUDIES - INDIVIDUAL ACTIVITY

This activity allowed the MPC members to give feedback on program diagrams that were developed based on discussions with each department head. The design team was looking for feedback on adjacencies, observations, and any missing components. The boards showed a diagram of the existing program space and a diagram for the proposed program space.







Construction & Math Tech
+ More material storage
+ Solar construction/electric adjacency desired
+ Clarify if part of the outdoor work area covered
+ Impractical adjacency of CTE with classrooms, too much noise and vibrations

Automotive & Aviation
+ Integration with computer technology
+ Inadequate storage
+ Looks like storage has been reduced

Health Occupations
+ Flex space should occur amidst all majors as they connect; free workplace

Manufacturing
+ Need large storage for equipment and supplies
+ Inadequate storage
+ Need FTE for a maintenance person and space for them to keep all the tools running

Electric
+ Solar electric/construction adjacency

Engineering
+ Needs room for growth
+ Arts adjacency desired

Architecture
+ Could use a break-out space

Computer Engineering

Applied Arts
+ Need additional project storage
+ Adjacency to Math Tech Geometry desired

Digital Media
+ Four dark rooms don't seem necessary

Radio

PREFERRED MASTERPLAN CONCEPT REVIEW

Based on recent input, the preferred Master Plan schemes were reviewed and additional comments made to help guide the next iterations of the design. Additional comments are in red.

MASTERPLAN CONCEPT A

PROS

+ Sense of community of student centered experience
+ By making buildings transparent, you can showcase the programs
+ Easy zoning of public/private
+ Good re-use of building, more cost efficient
+ Preserves more historic integrity
+ Access to light and space
+ Ability to renovate according to need
+ Comfortable and familiar
+ Less future-forward
+ *Good flow of spaces*
+ *Greater access to freight delivery and removal*
+ *Greater space for outdoor makerspace adjacencies and storage*
+ *Possibility of lower hard and soft construction costs*
+ *Simpler construction logistics*
+ *Less interruption to scholastic and extracurricular proceeding*
+ *Allows KPBS and some other historic buildings to remain*
+ *Allows some programs to continue to operate in existing rooms during construction*
+ *Central Commons*

CONS

+ Auto shop not connected and breaks up plan to create this as a focal point
+ Courtyard would seem cramped
+ Less connection between green (field) and building
+ Don't want distributed science across building
+ Need better access to second floor classrooms in auto building
+ Does not improve access to CTE
+ Interior courtyard too small
+ Inefficient use of plan
+ No overlook from roof
+ Dark, narrow hallway
+ A lot of ADA/seismic costs required
+ No interior connection
+ *Not very imaginative*
+ *Keeps an uninviting feeling to the campus*
+ *Doesn't have good flow through the center*
+ *Too little demo, very few spaces in remaining existing building that are adequate for program needs*

MASTER PLAN CONCEPT A

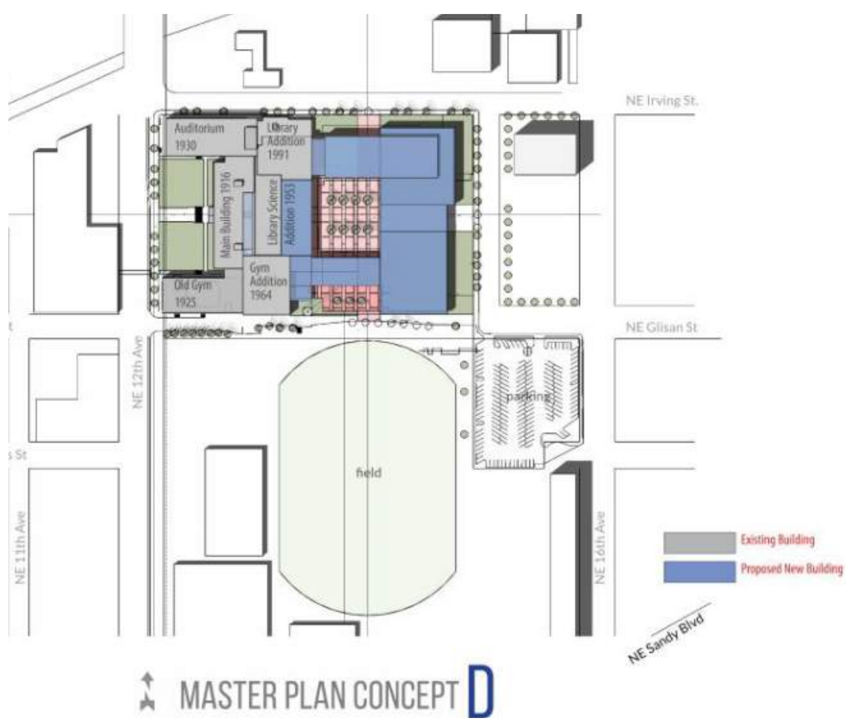
MASTERPLAN CONCEPT D

PROS

- Having more new buildings allows designing spaces to serve today's needs
- Building greets in all directions
- Great access to daylight
- Open but easily secured
- New space could be designed to higher seismic standard
- Creating interaction by compactness
- More flexibility to re-imagine space
- New constructions offers better flexibility and fewer unknowns
- Strong interior connections
- Roof terrace could be used as school spirit space
- Green space provides for congregation off street
- Natural flow of students leads to open space
- More opportunity for service on perimeter edges
- *Better circulation*
- *Has the flexibility to use space in different ways and to create spaces that work best for the Benson Community*
- *Connection to field*
- *Courtyard size and location*

CONS

- Less reuse of (E) assets
- Higher cost
- Tunnel feel of N/S pedestrian connection
- Outdoor space conflicts with N/S axis
- Limited access to first floor CTE space
- Center space could be dark
- Noise and smell from Auto shop to other parts of the building
- *Demolishes KBPS Building*
- *Access from NE Irving Street problematic due to heavy traffic*
- *Presumably more expensive than the voters will endorse*
- *Improved freight delivery and removal access.*
- *Larger space for outdoor makerspace adjacencies and storage*
- *Needs to reduce possible higher hard and soft construction costs*
- *Needs to improve construction logistics*
- *Concerns with how interior courtyard would function with needs of loading/maintenance traffic throughout the day*



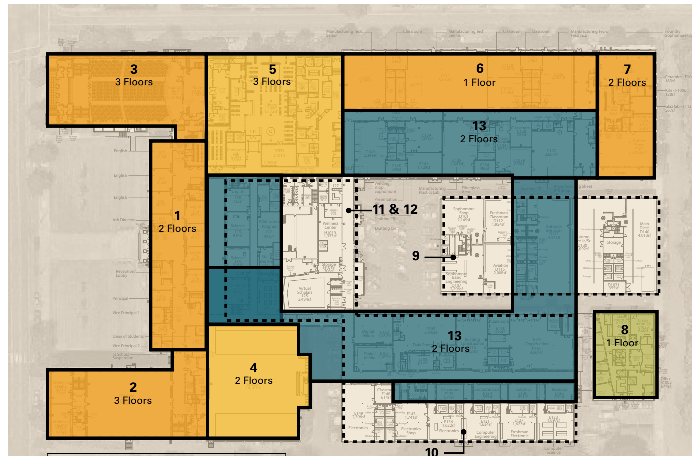
BUILDING STUDIES - SMALL GROUP ACTIVITY

In this small group activity, the meeting attendees got into three groups. Each group went over new Schemes E-H in detail and discussed the positive aspects (+) and aspects that should change (Δ).

After the activity, it was not clear that any one scheme was favored over another. From the +/Δ notes the group leaders received, it was clear that there was a preference towards a social courtyard and a separate CTE work courtyard. If a third floor is needed for program area, such as in Schemes F and G, the spaces should be thoughtfully integrated with the other floors to avoid feeling isolated from the rest of the school.

Other considerations included:
+ Securing the courtyard with gates
+ Providing some parking on-site
+ Maintain integrity of historic front lobby
+ Showing integrated site designs

BUILDING STUDIES - SCHEME E



Scheme E Big Ideas

- Variation on option “D” from masterplan
- Commons to the west off of the historic entry
- Central courtyard opens to the south
- Service from the courtyard and east side
- Two story U-addition above shops
- Preserve North shops, demo South shops
- Preserve Foundry and Radio buildings

+ Positive

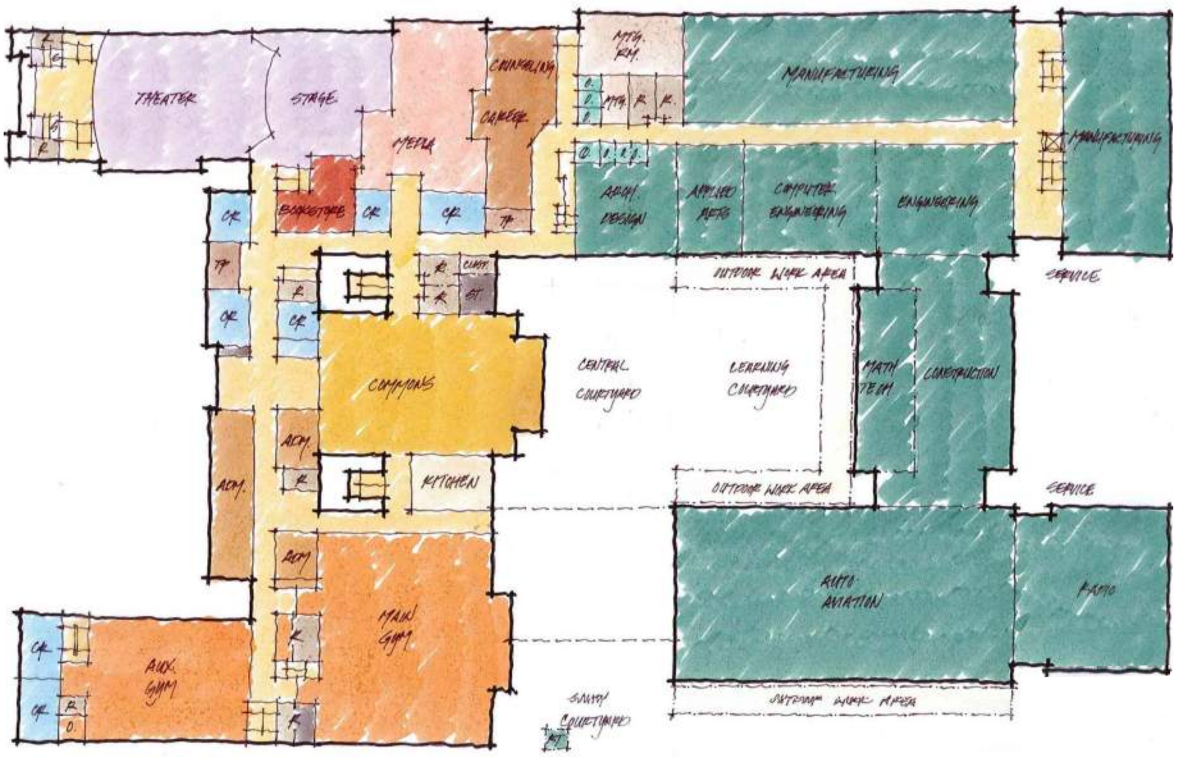
- Terracing for view to south
- Interior flow
- South courtyard to field connection
- Bigger alleyways
- Good space for loading
- Rectilinear auto
- Central Commons
- Axial formality of Commons
- Keep upper track in old gym

General Notes

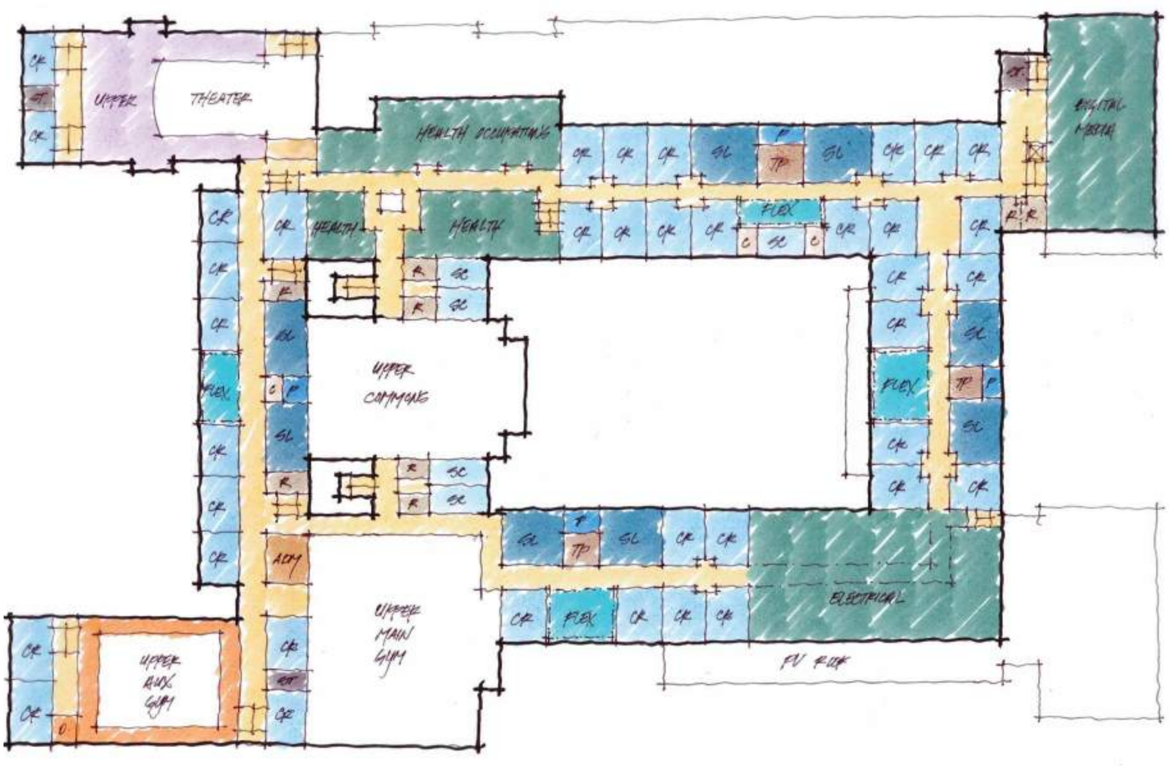
- Consider security needs for open courtyard
- Consider the potential ramifications of a grand stand being located at the north end of the playing fields at a future date
- Consider potential noise and acoustical issues from CTE outdoor work areas located in a central courtyard
- Clarify the quality of the exterior space in the south plaza
- Clarify what the large central courtyard is going to look like
- Clarify what would happen to the interior historical elements and architecture on the east wall of the main entry if a corridor from the main entry leads into a new Commons at this location
- Emissions from radio tower may have implications relative to placement of building elements
- Clarify how service issues are going to be addressed along the south edge of CTE (Glisan), in addition to outdoor work areas

Δ Change

- Engineering has no access to daylight
- Welding/manufacturing needs direct access for big projects
- Maintain integrity of lobby
- Being able to have internal circulation continue as a full loop, through electrical, would be preferred, if able to also accommodate Electrical’s CTE program needs
- Digital Media should be by Radio, not above the foundry, too loud
- Digital Media and Radio should be adjacent to Applied Arts
- Architecture wants to be directly adjacent to construction
- Electric on the second floor could be challenging with material deliveries and supplies
- Go around historic lobby to enter commons.

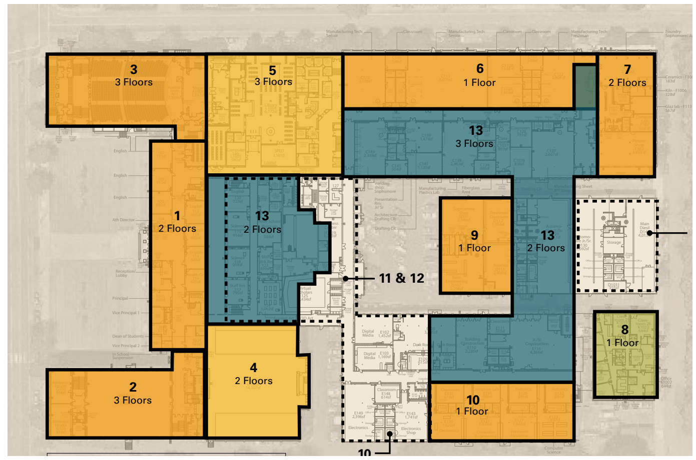


FIRST FLOOR



SECOND FLOOR

BUILDING STUDIES - SCHEME F



Scheme F Big Ideas

- + Variation on option "A" from masterplan
- + Commons to the west off of the historic entry
- + Central courtyard opens to the south
- + Service from the courtyard and east side
- + Preserve North shops, Foundry, Radio, portion of Automotive, and South shops
- + Three story addition over North shops
- + Two story addition over Automotive and South shops

+ Positive

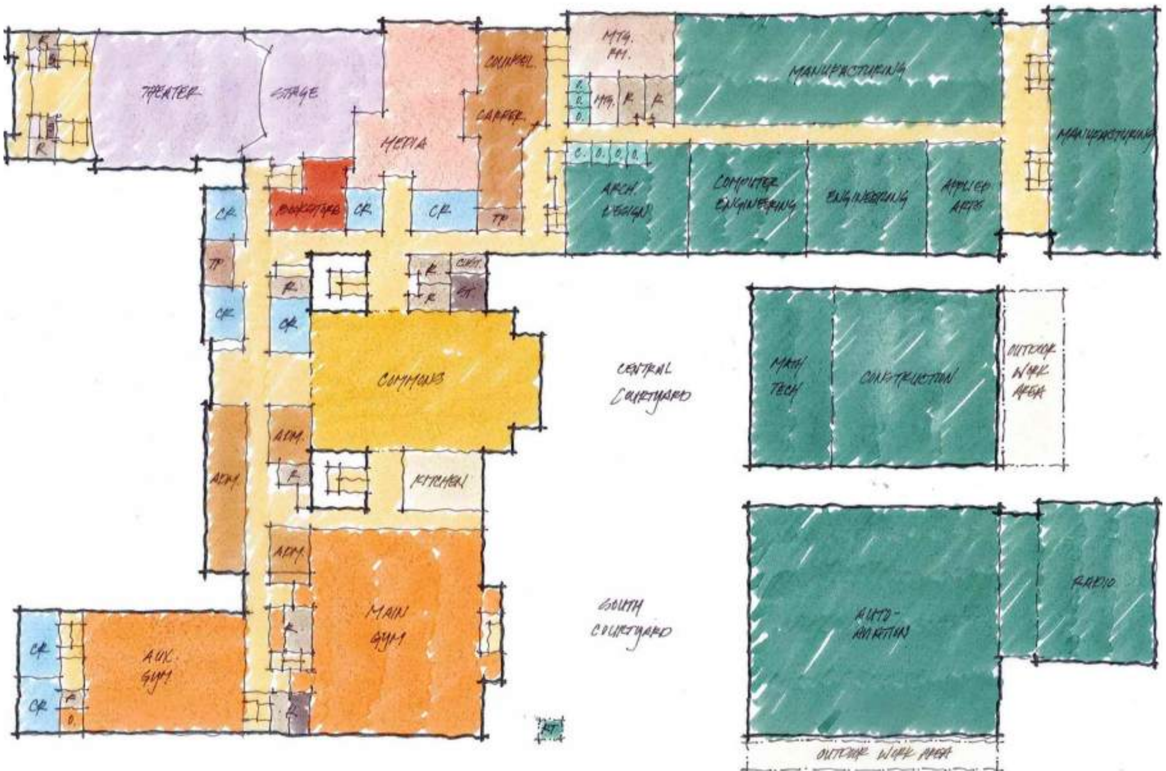
- + Scheme seems to appear to have better delivery and access than previous
- + Going up three floors appears to offer some good benefits
- + More loading options

Δ Change

- + No interior circulation
- + Square Auto doesn't work as well as rectilinear Auto
- + Architecture wants to be directly adjacent to construction
- + Balance parking and courtyard

General Notes

- + Explore idea of kitchen service loading into basement off gym
- + Consider how access,flow, and layout occur in any of the schemes for Auto/Aviation
- + Wants to see front lawn as the main gathering space
- + If social courtyard is to the south, school would want to develop "Ivy Hill" into terraced seating



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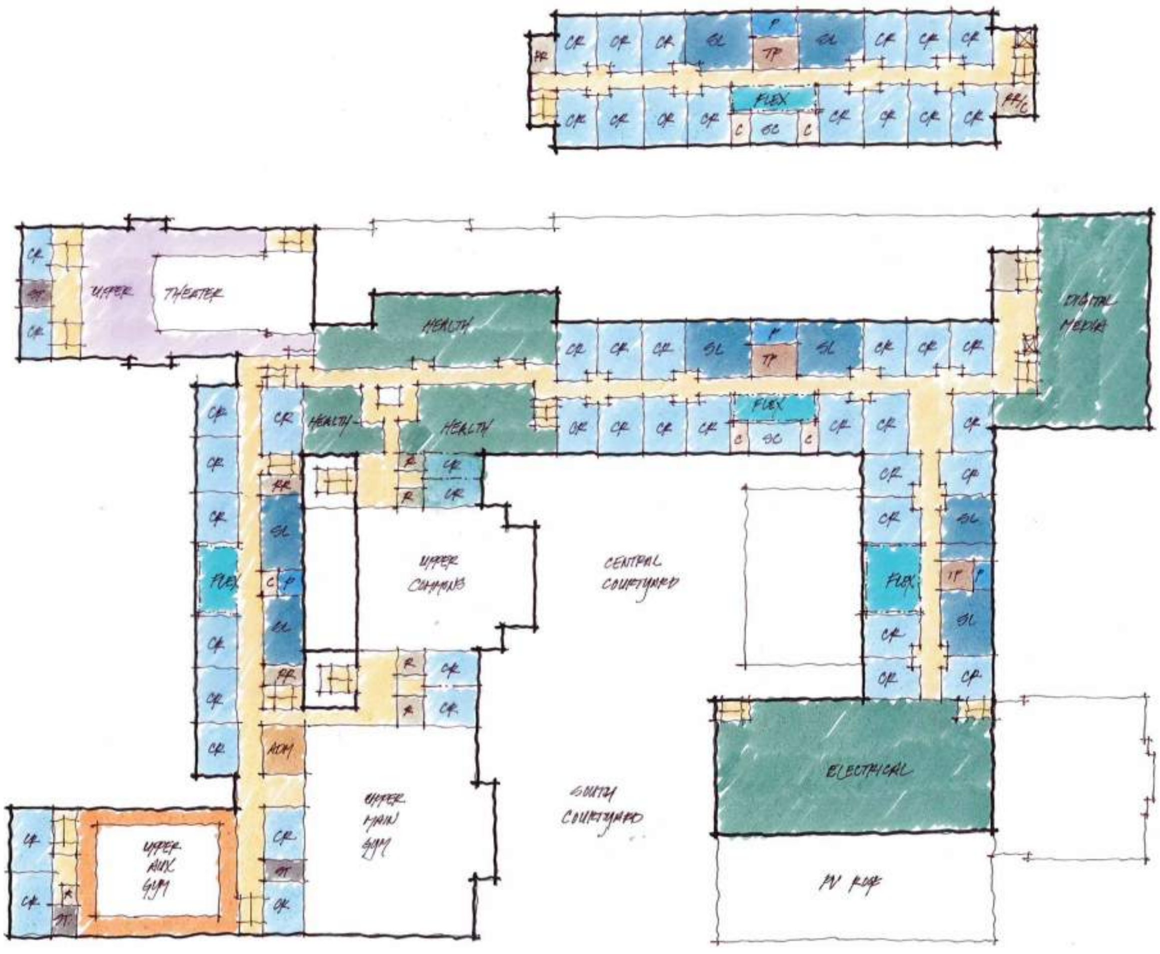
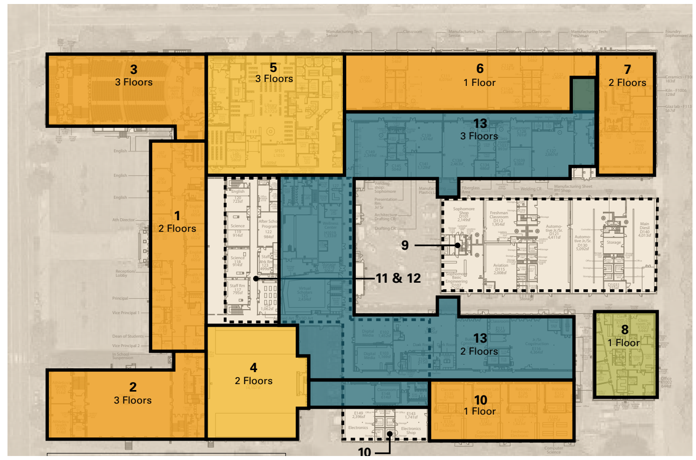


SECOND & THIRD FLOOR

BUILDING STUDIES - SCHEME G



Scheme G Big Ideas

- New variation
- Restores East side of 1916 building, adding more daylight
- Commons facing south courtyard and east courtyard
- Multiple courtyards
- Preserve North and South shops, Foundry, and Radio. Demolish Automotive building
- Two story addition over South shops
- Three story addition over North shops

+ Positive

- Central courtyard protected
- Better chance for green space
- Commons connection to field
- Good light
- Clear courtyard more flexible
- Axial quality of formal front entry carrying all the way through to the east
- Offers opportunity to consider an exterior circulation space at the second floor south of the north CTE spaces – Engineering, Computer Engineering, and Architectural Design
- Series of distinctive exterior courtyard spaces – potentially better acoustical separation
- Bigger front courtyard and learning/ "work" courtyard
- Closer parking
- Commons to south
- Commons next to gym for events
- Integration of academics with CTE

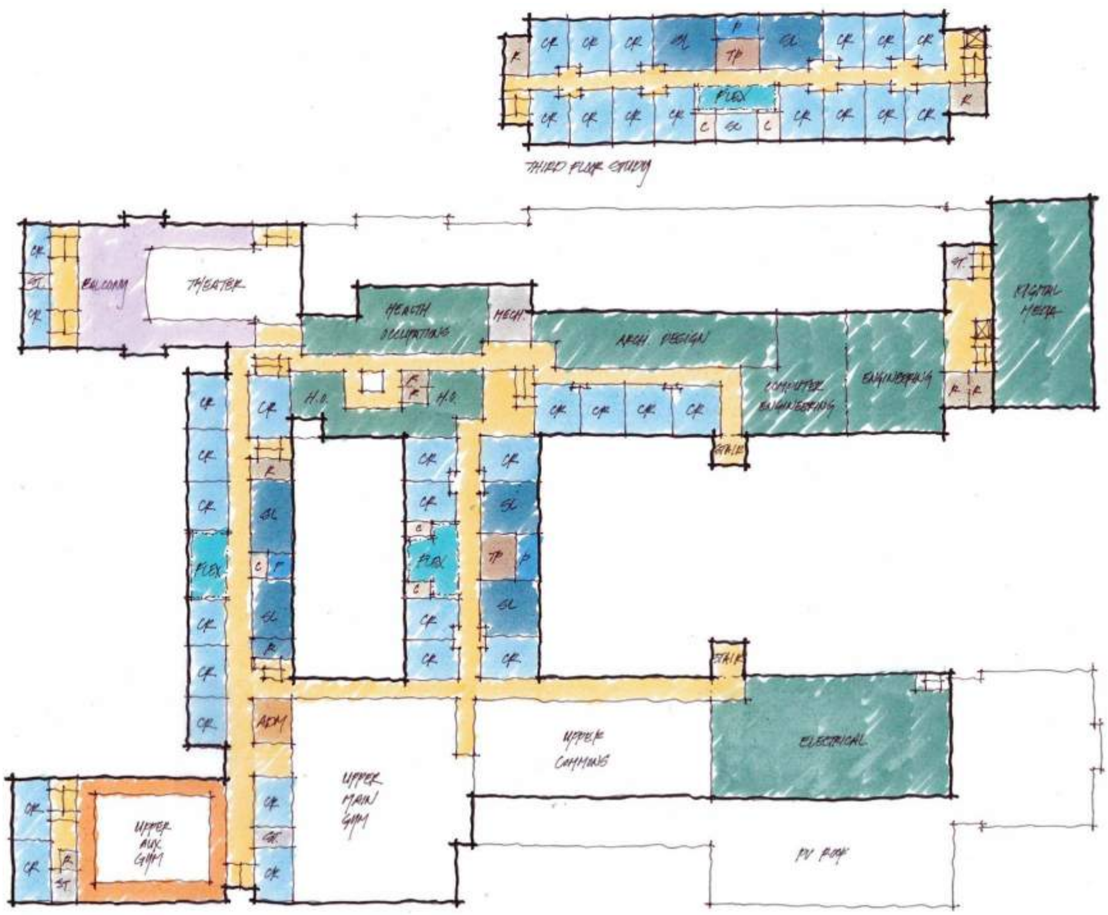
Δ Change

- Don't like open ended access/court
- Security of courtyard more difficult
- Distance of interior travel is too long
- Preference for more centralized Commons seen in Schemes E and F
- Too much courtyard space

General Notes

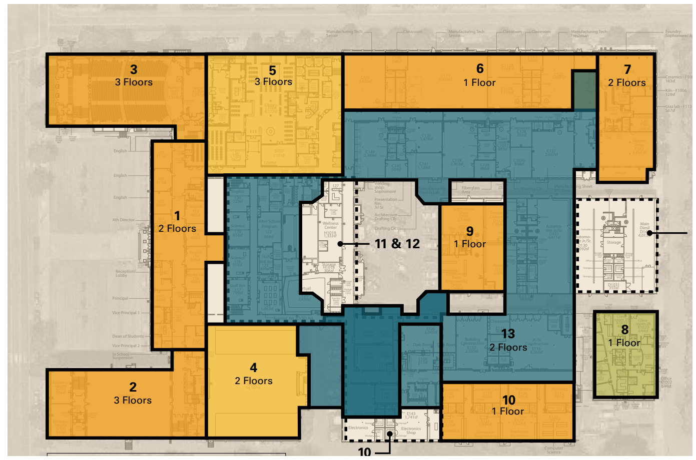
- Clarify how stair access/vertical circulation works in all the schemes
- Don't have long endless corridors without spatial variation and interest

FIRST FLOOR



SECOND & THIRD FLOOR

BUILDING STUDIES - SCHEME H



Scheme H Big Ideas

- + Variation on option "D" from masterplan
- + Commons face North and South
- + Central courtyard
- + Preserve North wing, portion of South wing and Automotive, Foundry, and Radio
- + Two story square-shape addition

+ Positive

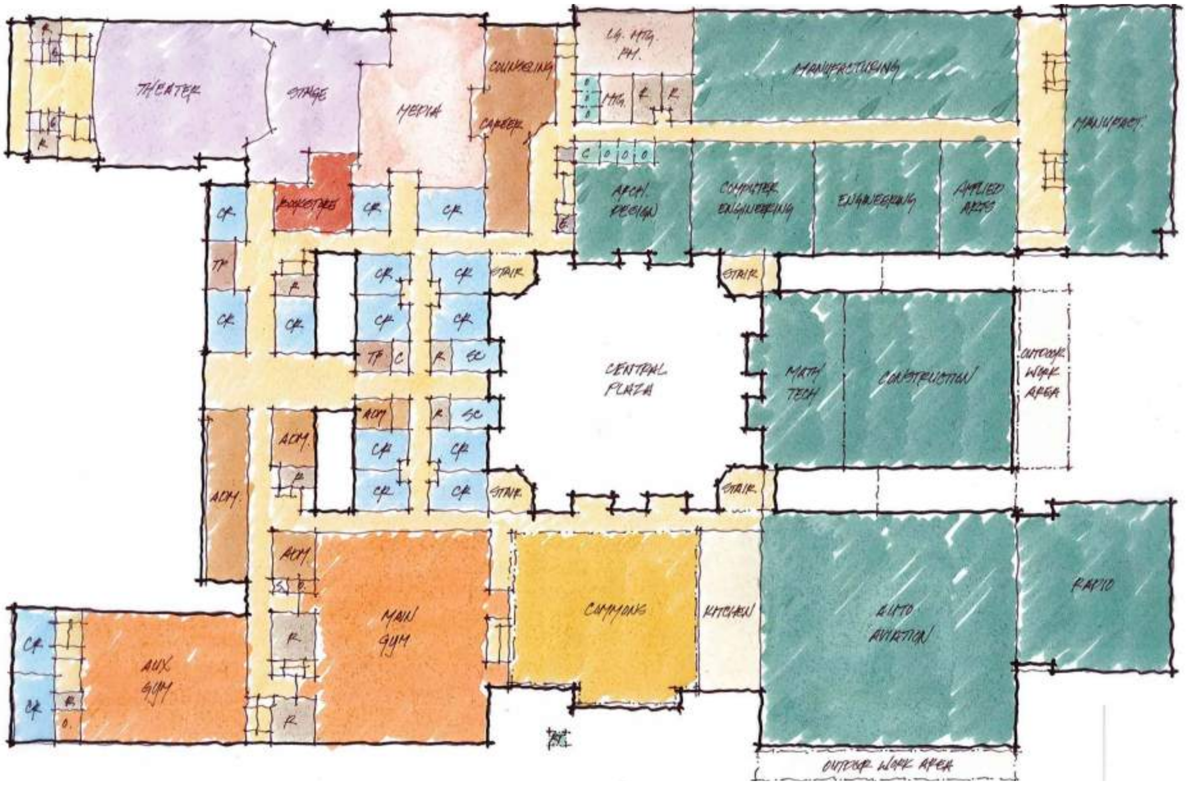
- + Circulation flows well
- + Stair on central courtyard for view
- + Central courtyard is a good size
- + Bays used for breakout learning
- + No noise nuisance from the outdoor work areas

Δ Change

- + Dead-end access aisles
- + Small courtyard only has one door like now
- + Small courtyard is too small

General Notes

- + Learning garden opportunity
- + Medical garden opportunity
- + PE/Health garden opportunity
- + Grow bamboo for construction
- + Low maintenance landscape
- + Clarify what is the far east exterior space for. It is preffered that it not be used for parking. On site space is too valuable. PPS and City are looking at option of dedicating street parking to faculty/staff as an alternative to on-site parking during school hours.



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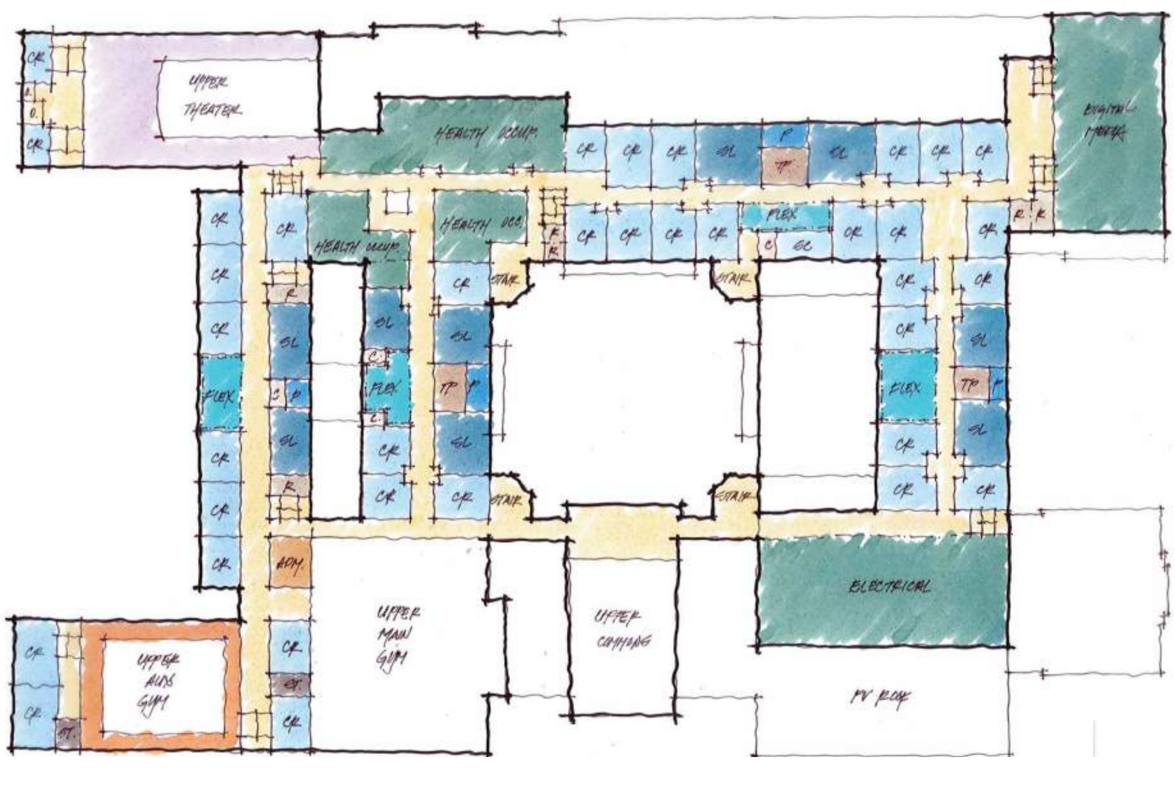

SECOND FLOOR

CLOSING THOUGHTS

Each small group presented their feedback, and the major themes from the discussions were as follows:

+ The group was happy about the process and where the design is headed
+ Continue to develop more detailed understanding of program and budget requirements
+ Interested in a work courtyard and a social courtyard
+ Connections to the south field is strongly desired
+ Integration of academics with CTE is a positive
+ MPC requested that the design team look for opportunities to engage more with students

Public Comments:

+ Innovative education delivery should help inform the vision for the modernization of Benson (Comment from Scott Bailey)

Next Steps:

+ Generate Schemes for next MPC meeting January 19th.
+ Develop site landscape plans to show how exterior spaces might be programmed
+ Develop preliminary phasing options

Master Planning Committee Meeting #9 Notes

Benson Polytechnic High School
January 19, 2017

bassetti architects

PPS

MEETING DETAILS

Meeting Location:

Benson Polytechnic High School,
546 NE 12th Ave, Portland, OR 97232

Attendees:

Portland Public Schools (PPS):
Jen Sohm, Project Manager

Master Planning Committee Members:
Paul Anthony, PPS School Board
Curtis Wilson Jr., Principal
Maya Brown
Simon Criswell
Kevin B. Clark
Brian Gerber
Reuben Gilmore
Tammy Hite
Luke Hotchkiss
JaNae Jamison
Rob Johns
Dave Ketah
Jacob M. Masters
Irina Phillips
Jim Piro
Matt Pellico
Bryan Smith
Richard Spies

Design Team
Lorne McConachie, Bassetti Architects
Caroline Lemay, Bassetti Architects
Joe Echeverri, Bassetti Architects
Cary Dasenbrock, Bassetti Architects
Dianna Montzka, Bassetti Architects
Nancy Hamilton, Nancy Hamilton Consulting

Others
Amy Ruiz
Lesley Keith

Pre - Design Goals:

Identify the vision, philosophy, and objectives of the school.

Provide a consistent and diverse voice for user groups in the pre - planning phase of the project.

Prioritize the objectives to attain cost certainty for the project moving forward.

Agenda

6:00- 6:25 5 min	Update Project Update - Portland Public Schools + Tasks since last MPC
15 min	Review of MPC #8 input - Bassetti + Guiding Principles + Program Studies + Schemes E-H + Other input from constituencies?
5 min	Phasing Considerations and Assumptions - Bassetti
6:25 - 7:40 15 min	Design Refinement (Small Group Activity) Overview + Schemes I and J - Bassetti + Site programming and preliminary design - Mayer/Reed
45 min	Group Breakout and Discussion + Observations + Adjacencies + Site design input + Phasing input
15 min	Group Discussion
7:40 - 7:45	Subcommittee Report
7:45 - 7:50	Closing Thoughts & Next Steps
7:50 - 8:00	Public Comment

Notes Issued Date:

February 21, 2017

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UPDATE (02/21/17): Project budget to remain at $122 Million.

Over the past 2 weeks, the design team has:

+ Moved forward with new scheme revisions
+ Incorporated landscaping into each scheme

Phase I Environmental Assessment has been completed

+ The parking lot south east of site was given to Benson in 1989 from Portland Parks and Recreation.
+ Soil testing has been recommended under the hydraulic oil lift in the Automotive building.

Jen met with Portland Parks and Rec staff to review master plan, survey, parking lot & field use and school connection to field. Part of the parking along the south driveway is not on PPS property.

REVIEW OF MPC #8:

GUIDING PRINCIPLES

The group reviewed the Guiding Principles established in the Master Plan, and additional subsets that were added from MPC meeting #8. The following list includes all of the original principles in black and new subsets in red. Design decisions moving forward will be tested against these principles.

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OTHER INPUT

After the results from MPC #8 were discussed, there were several general comments about the design moving forward.

+ A community partnership space is desired near the entrance to the building
+ MPC would like the ed spec to encourage and show the story of how Benson is tying into the local business community
+ Maximum utilization of the existing envelope is highly desired
+ PBOT is aware of the Glisan connection idea but has not weighed in on it
+ Challenges of on-site parking:
    + Portland Bureau of Transportation has previously discussed the possibility of street parking around the site being dedicated to Benson Tech use
    + Create as much effective education space as possible-rather than on-site parking space
+ Buildings needs a complete interior pedestrian circulation loop:
    + Students currently go through rain to get from one building to another
    + A full loop would increase safety
+ Avoid isolation of any programs or academics
+ More research needs to be completed on radio tower concerns
+ Need secure and covered bike storage near front entrance:
    + Students currently carry bikes to interior courtyard through school
    + Separate student and teacher bike storage is desired
+ Clear way-finding is important
+ The design team should pay special attention to acoustics and how sound will be controlled between CTE and academic spaces if closely adjacent to each other

PHASING CONSIDERATIONS

Bassetti presented general and site specific phasing considerations and asked that the group keep these in mind in their critique of the design schemes. Further development of phasing scenarios will come as the design schemes and options are narrowed down.

Critical Issues For Complex Remodels

+ Communication
+ Safety
+ Traffic
+ Emergency Access
+ Safe Exiting
+ Construction Access / Staging
+ Utility Coordination
+ Stormwater
+ Dirt / Dust / Rats
+ Noise and Acoustical Issues
+ Occupancy

Opportunities

+ Student Learning
+ Community Engagement

Initial Phasing Assumptions For Benson Polytechnic HS

+ All Benson Tech programs will remain on-site during construction.
+ If off-site options are presented or available before the start of construction, reductions in swing costs or durations may be achieved.
+ Maximize efficiency in programs to minimize swing space needs.
+ No increase to student capacity before and during construction.
+ Non-Benson programs will be relocated off-site before the start of construction.
+ Utilize adjacent PPS parking site for swing or contractor space, if possible.
+ Main gym and theater will each be unavailable for one school year.
+ Swing of Main gym and Auxiliary Gym will allow P.E. programs to continue to operate on-site.

DESIGN REFINEMENT

Bassetti presented Schemes I and J, which are evolutions of the Schemes E-H that were reviewed in the last MPC meeting. The common themes are:

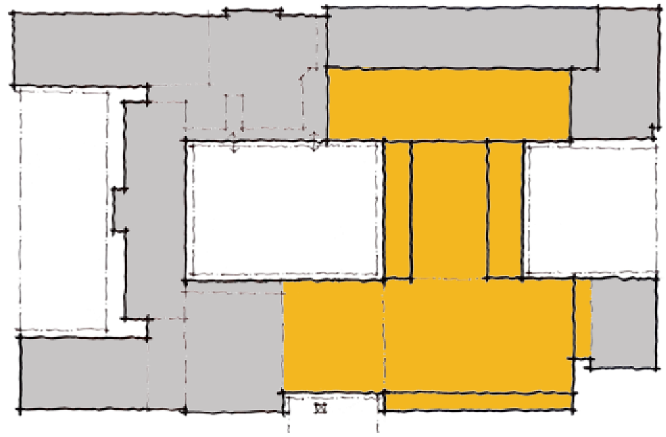
+ Maintaining and modernizing historic buildings to the west and north and the KBPS building (located in the southeast corner of the site).
+ Providing a protected courtyard at the center and a shared work courtyard to the east.
+ Addressing service and delivery access from the east and south.
+ Integrating academic classrooms and CTE shops within the school for better collaboration.
+ Enhancing daylighting, transparency, and natural ventilation.
+ Providing flexible and adaptable spaces that will meet the needs of Benson Tech now and in the future
+ Balancing program, budget and phasing considerations.

Mayer/Reed presented landscape concepts and imagery associated with each scheme. The presentation focused on the following issues:

+ Site Programming
+ Site Access
+ Front Entry: addressing ADA and student gathering
+ Central Courtyard: addressing circulation and variety
+ Work Court: addressing access and flexibility
+ South Edge: addressing access to fields

The group then divided into small groups to discuss what was working (+) and what needs to change (Δ) in each scheme. The following pages capture the comments recorded from all the groups.

BUILDING STUDIES - SCHEME I



Scheme I Big Ideas

+ Commons to the south of social courtyard
+ Protected courtyard at the center, shared work courtyard to the east
+ Service and delivery access from the east and south
+ Enhancing daylighting, transparency, and natural ventilation
+ Flexible adaptable spaces

+ Positive

+ Good spatial relationship between commons and gym
+ Has a nice core to circulate around/orient to

Δ Change

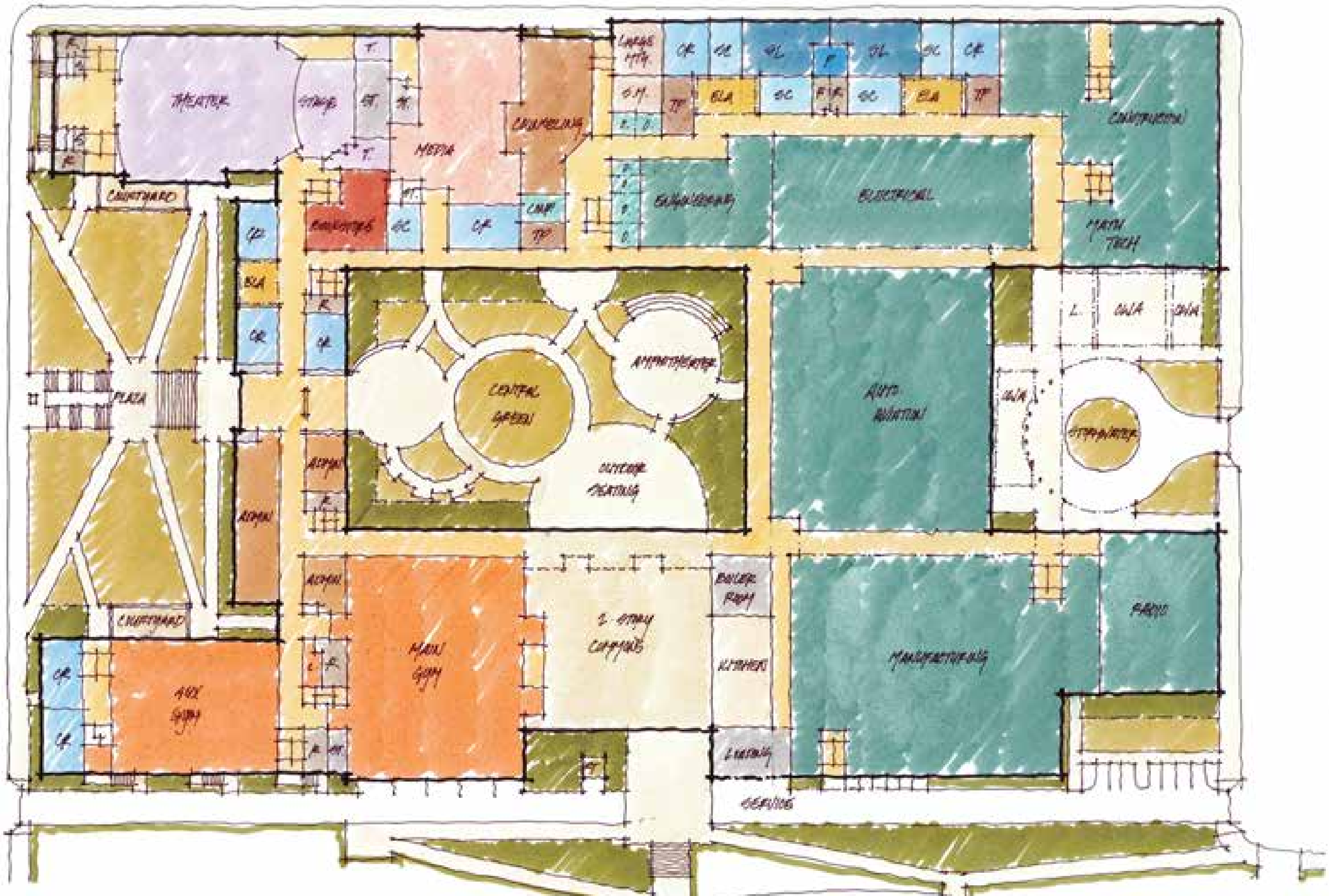
+ Electrical CTE needs solar access and daylighting
+ Auto shop needs an easily navigable loop to get cars in and out on a fairly regular basis
+ Commons is isolated
+ Commons only has access from one side, in J, there is access from both sides
+ Don't isolate Teen Parent in the basement
+ Engineering too far from manufacturing
+ Hallway length by commons too long
+ Need maintenance access to middle

General Notes

+ Need truck waiting zones
+ Flexibility of work court
+ Central trash/recycling – CTE spaces can use roll carts for scraps
+ Engineering- core of cluster
+ Health Occupations would prefer to move once rather than stay in the same place

Site Landscape Notes

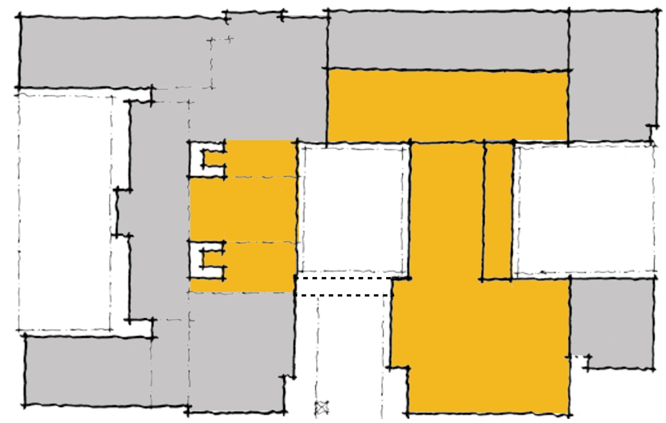
+ Show how outdoor spaces are used as teaching spaces
+ Concerns with how two story building will shade the south side of the interior court
+ Location of service area impacts: internal circulation, distance from kitchen, how much of south drive is secured from general vehicular access
+ Mixed feelings about the camellias south of the old gym. Many students have slipped of the decomposing flower.
+ Take advantage of the front lawn angle grade embankment
+ Pull out lane needed in outdoor work area
+ Develop options for covered outdoor areas
+ Activate main entrance usability for vehicles, pedestrian, and bicyclists. Address the choke points for student drop-off



GROUND FLOOR

SECOND FLOOR

BUILDING STUDIES - SCHEME J



Scheme J Big Ideas

+ Commons to the west of social courtyard
+ Protected courtyard at the center, shared work courtyard to the east
+ Service and delivery access from the east and south
+ Connection from inner courtyard to athletics field
+ Enhancing daylighting, transparency, and natural ventilation
+ Flexible adaptable spaces

+ Positive

+ Creates clearer public access/egress to gym entry and is easily zoned for after hour use
+ Opportunities for Athletics/PE to spill out into a courtyard
+ Commons as the heart of the school gives ability to connect and relate to other parts of the school
+ Enhances horizontal and vertical visual connections throughout the school
+ Creates a Commons that is inviting, where students will want to hang out

Δ Change

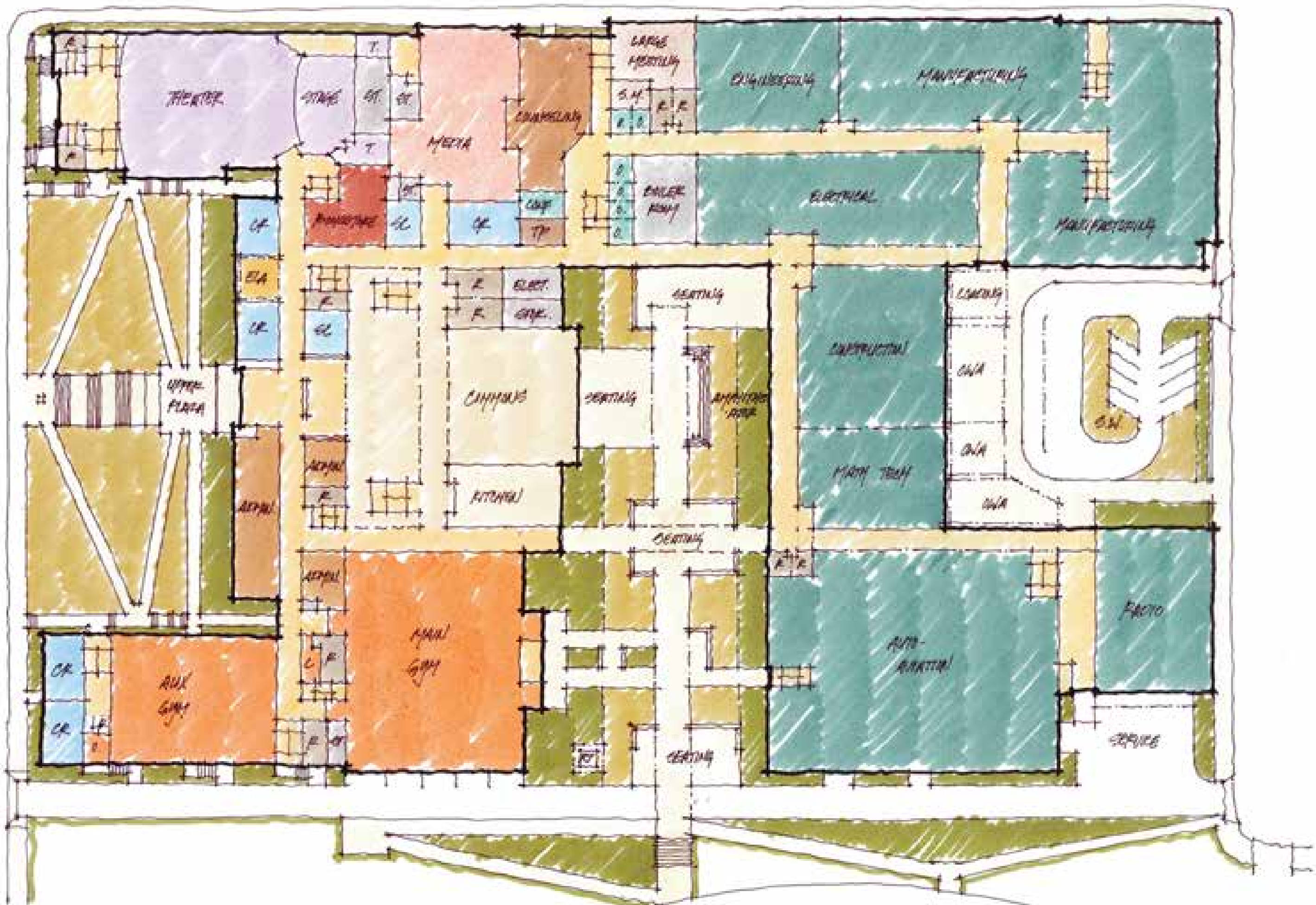
+ Electrical CTE needs solar access and daylighting
+ Don't isolate Teen Parent in the basement

General Notes

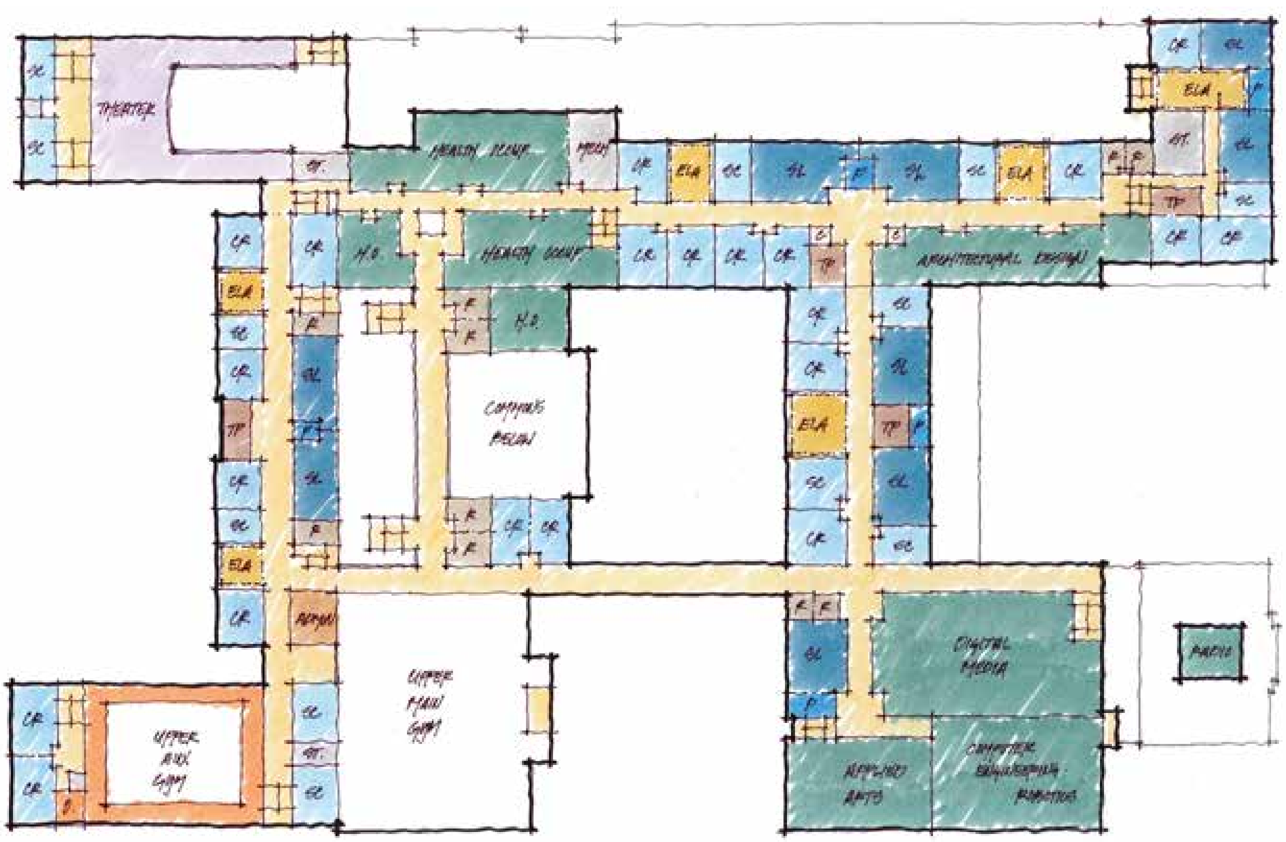
+ Restrooms for Auditorium are currently inadequate and will be even more so if auditorium functions autonomously under certain performance conditions

Site Landscape Notes

+ Show how outdoor spaces are used as teaching spaces
+ Parent drop off on 12th and 15th is highly congested. Consider how front lawn redesign could include a pull out/drop off loop.
+ SPED buses and athletic buses pick up/drop off in the middle of the site, consider where this will occur in the redesign.
+ Fire drill assembly is the football field. Connection mid site is not adequate for the volume of people. Connection at east needs to be formalized; stairs, ramp (people currently walk down the hillside – all bare soil).
+ Desire to remove all cars from the site needs to be assessed.
+ Location of service area impacts: internal circulation, distance from kitchen, how much of south drive is secured from general vehicular access



GROUND FLOOR



SECOND FLOOR

CLOSING THOUGHTS

Subcommittee Report

+ No additional information at this time

Announcements:

+ January 31st - Joint MPC meeting at PPS
  + Meeting will showcase results of bond public opinion poll
  + The design progress of Benson Tech, Madison HS, and Lincoln HS will be presented
+ February 6th - Public hearing
+ February 13th - Board meeting
+ School tours have been postponed to late February, early March due to heavy rain and muddy conditions
+ Board reports of all other schools on the bond will be released to the public at a later date

Public Comments

+ Clear wayfinding and zoning the school for community access should be considered in the design.

Next MPC Meeting will be February 23rd.

Master Planning Committee Meeting #10 Notes

Benson Polytechnic High School
February 23, 2017

MEETING DETAILS

Meeting Location:

Benson Polytechnic High School,
546 NE 12th Ave, Portland, OR 97232

Attendees:

Portland Public Schools (PPS):
Jerry Vincent, Office of School Modernization Chief
Jen Sohm, Project Manager

Master Planning Committee Members:
Curtis Wilson Jr., Principal
Simon Criswell
Kevin B. Clark
Reuben Gilmore
Tammy Hite
Luke Hotchkiss
JaNae Jamison
Kristin Kennedy
Dave Ketah
Jacob M. Masters
Jim Piro
Julie Tonroy
Bryan Smith
Richard Spies
Lisa White

Design Team
Lorne McConachie, Bassetti Architects
Joe Echeverri, Bassetti Architects
Cary Dasenbrock, Bassetti Architects
Dianna Montzka, Bassetti Architects
Carol Mayer-Reed, Mayer-Reed Landscape Architecture
Anne Samuel, Mayer-Reed Landscape Architecture

Agenda

6:00- 6:20 — Update
5 min — Project Update - Portland Public Schools
+ Tasks since last MPC
+ Industry Outreach Approach
+ Student Engagement Approach

15 min — Review of MPC #9 input - Bassetti

6:20 - 7:40 — Design Refinement (Small Group Activity)
15 min — Scheme K
+ Whats working (+), what needs improvement (Δ), as seen through the lenses of our Guiding Principles
+ Teams will review the scheme, basing their comments within the context of a different set of two Guiding Principles per group

45 min — Report Back & MPC Discussion

7:50 - 8:00 — Wrap-Up
5 min — Public Comment
5 min — Closing Thoughts & Next Steps

Pre - Design Goals:

Identify the vision, philosophy, and objectives of the school.

Provide a consistent and diverse voice for user groups in the pre - planning phase of the project.

Prioritize the objectives to attain cost certainty for the project moving forward.

Notes Issued Date:

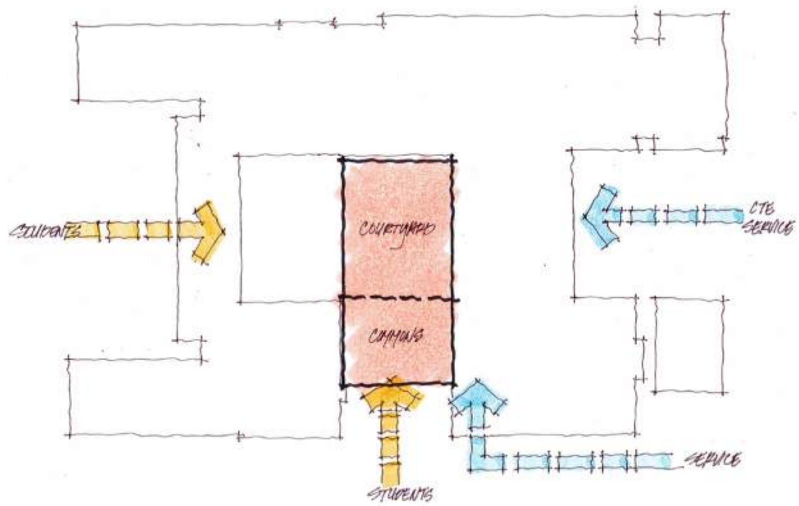
March 1, 2017

PROJECT UPDATE

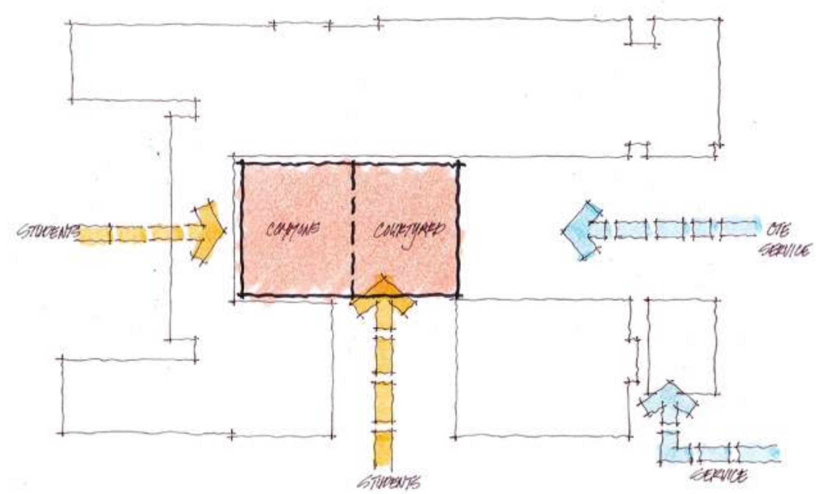
Over the past 5 weeks, the design team has:

+ Merged Scheme I and J resulting in Scheme K
+ Updated landscaping for Scheme K
+ Equipment Inventory and Program Scenario Plans completed
+ Tech Show Outreach
+ Preliminary report back from Acoustic Engineer
+ Phase II ESA and other structural testing to be scheduled after May bond vote

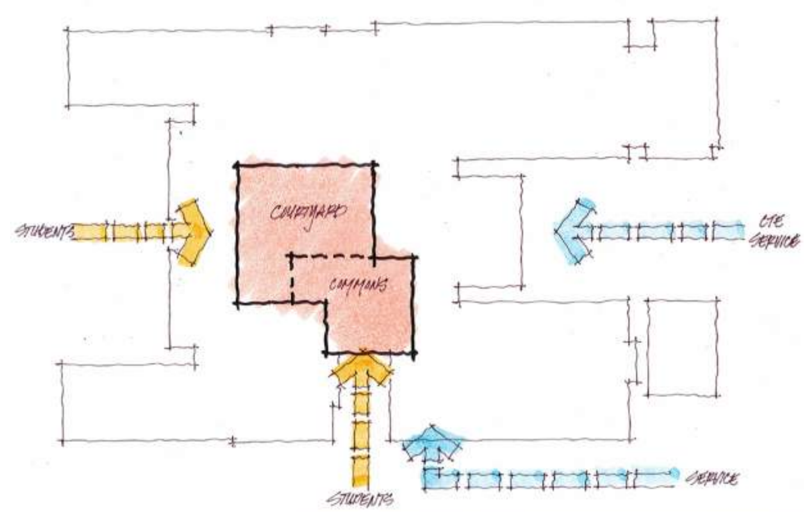
SCHEME K DIAGRAMS



SCHEME I

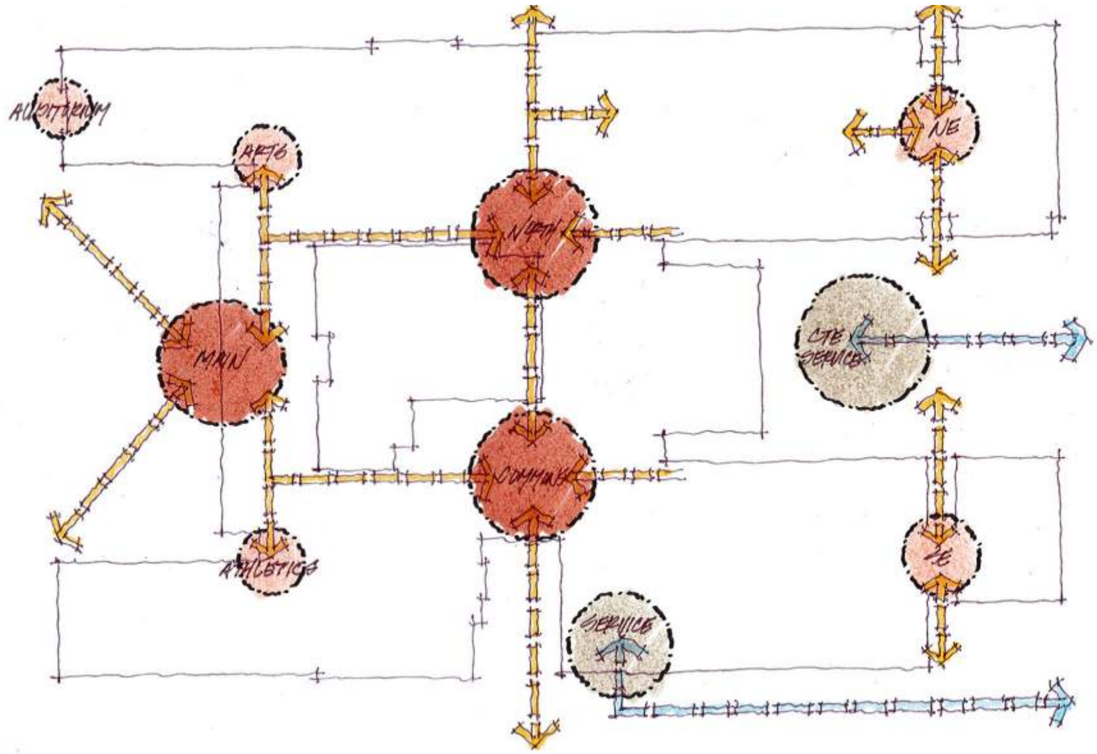


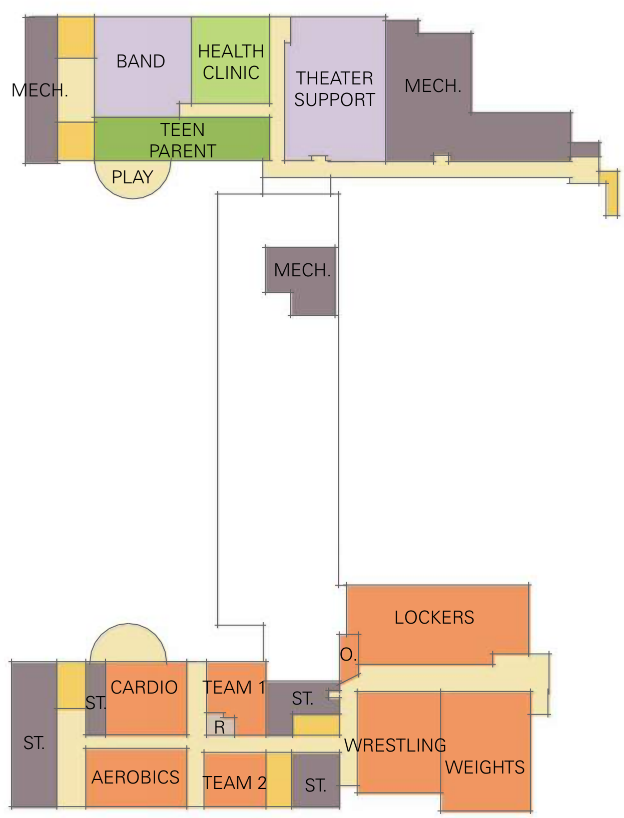
SCHEME J



SCHEME K

SCHEME K DIAGRAMS





LOWER LEVEL

BUILDING STUDIES - SCHEME K

Scheme K Big Ideas

+ Commons at "Heart of School" creates indoor/ outdoor space and links 1st and 2nd floors.
+ Protected social courtyard at the center, shared work courtyard to the east
+ Efficient service access for whole school and CTE uses
+ Enhance daylighting, transparency, and natural ventilation
+ Flexible adaptable spaces
+ Integrate academic programs and CTE programs through vertical relationships
+ Maintain historic structures and facades at the perimeter of the site
    + Enhance primary defining characteristics of the school as a landmark
    + New additions juxtapose historic character and polytechnical education in the 21st century

The four groups reviewed Scheme K, basing their comments within the context of a set of two Guiding Principles per group.

GUIDING PRINCIPLES GROUP 1:

ENGAGE WITH THE LOCAL BUSINESS, GOVERNMENT, AND POST-SECONDARY PARTNERS TO CREATE STRONG CONNECTIONS BETWEEN EDUCATION AND INDUSTRY

PROVIDE AGILE, FLEXIBLE, AND ADAPTABLE FACILITIES THAT SUPPORT CHANGING EDUCATIONAL AND INDUSTRY NEEDS

+ Positive

+ No comments to report

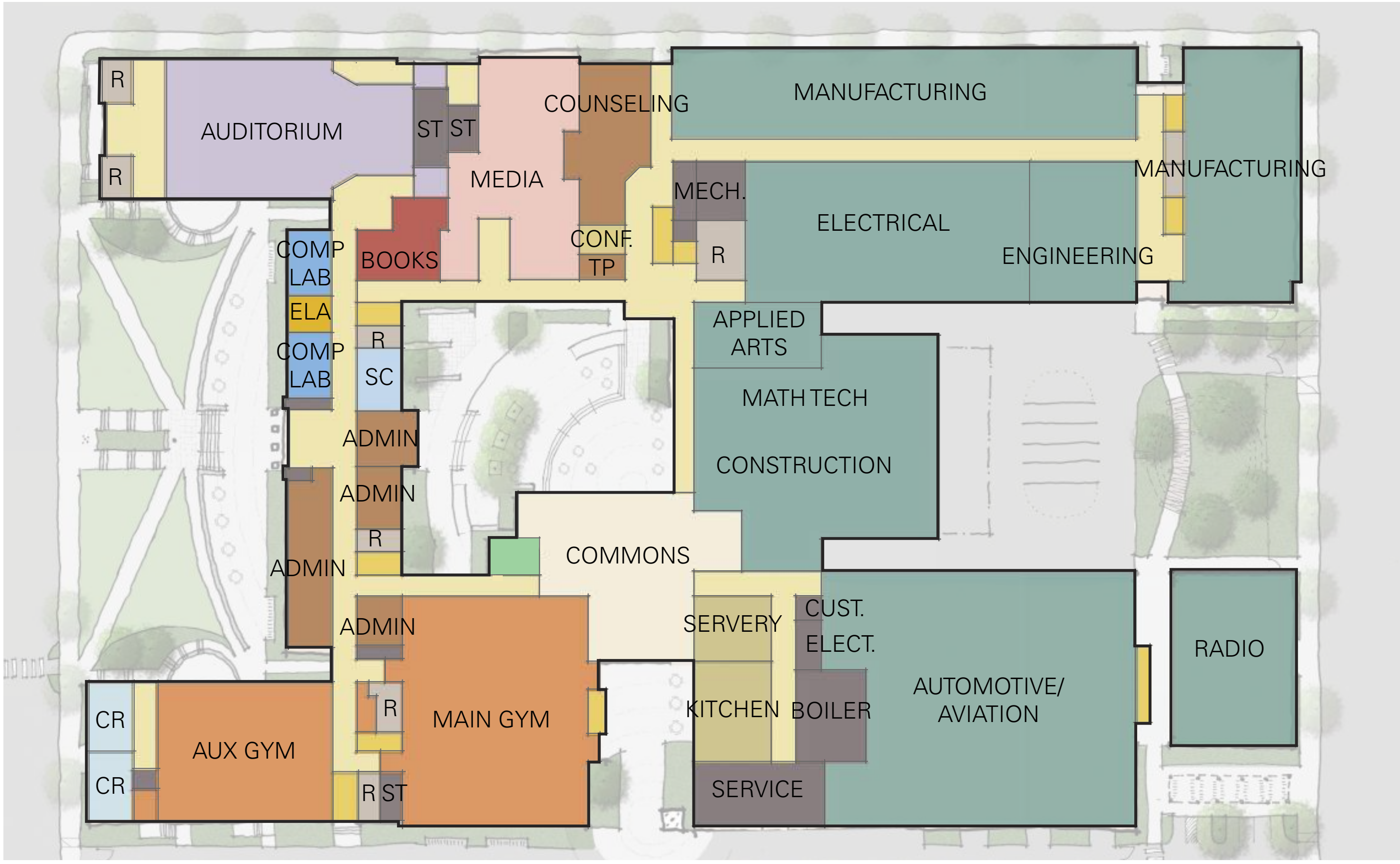
General Comments

- Confirm whether or not there is a need for any mezzanine/two story spaces in any CTEs
- Confirm what type of access is provided from the south
- Verify how ADA access to the south fields is addressed
- Flexibility includes a robust wifi network and technology backbone (comment from group 3).
- Dedicated program spaces should still be designed for adaptability over the long term. Specifically, Auto/Aviation having the potential to adapt the program to future technologies such as spacecraft and aquatic vehicles.

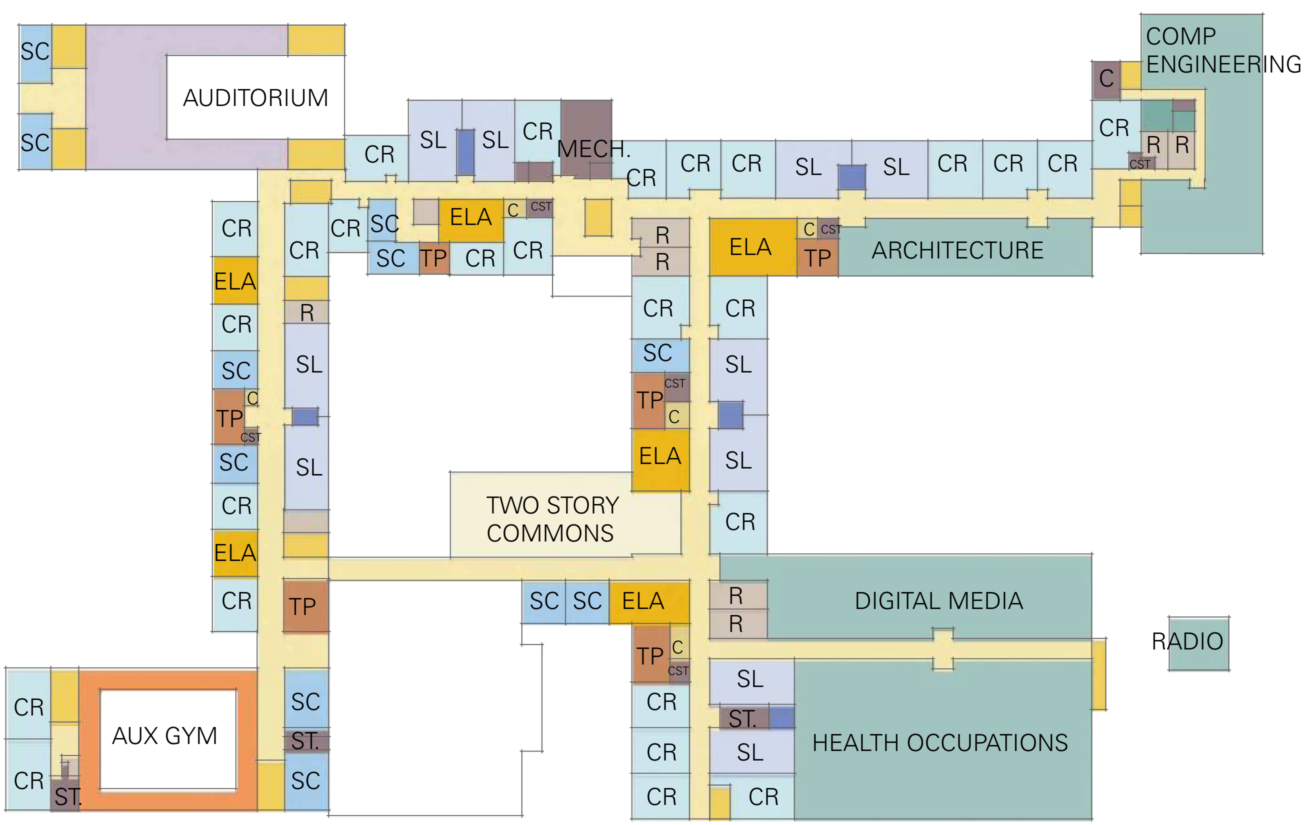
Δ Change

- More engagement needs to be happening with Community Partners to confirm/verify program needs
- Create more opportunity for interaction between Architectural Design and other CTEs
- Confirm how the CTE spaces are actually being used. Clarify if they are enclosed or open spaces
- Consider providing shared use flex spaces for the CTE programs
- Look into opportunity for use of roof space adjacent to Architectural Design with light (green roofs & photovoltaic panels).
- Provide covered areas adjacent to CTEs
- Re-evaluate size of CTE service yard (too big in Scheme K).
- Consider the value of adding a Maker Space as part of the program
- Have a designated space to greet, tour, and present to community partners. Give Benson the ability to showcase their school, culture identity, and diversity (comment from group 3).

SCHEME K DIAGRAMS



GROUND FLOOR



SECOND FLOOR

GUIDING PRINCIPLES GROUP 2:

HONOR THE UNIQUE HISTORY AND CULTURE OF BENSON POLYTECHNIC HIGH SCHOOL

SUPPORT A COMPREHENSIVE EDUCATIONAL EXPERIENCE FOR STUDENTS

+ Positive

+ No comments to report back

General Comments

- The basement is a good location for indoor bike storage
- The basement is a good location for computer labs
- staff lounge/lunch room is needed
- Design minimum slopes and edges in the courtyard for a streamlined design
- The courtyard feels too big
- Consider the opportunity for fruit trees and medicinal plants in the courtyard

Δ Change

- Consider how the site will drive the future and how the school can evolve
- Consider the identity of the schools wings. Explore how these wings can memorialize history and then develop a new identity to help wayfinding (comment from group 3).
- Consider a museum or gallery spaces throughout the building that is dedicated to the history of Benson.

GUIDING PRINCIPLES GROUP 3:

PROVIDE HANDS-ON, PROJECT-BASED LEARNING OPPORTUNITIES THAT ARE IMBUED WITH RIGOR AND RELEVANCY

POSITION BENSON POLYTECHNIC AS THE NATIONAL MODEL FOR STEAM AND CAREER TECHNICAL EDUCATION

+ Positive

+ Industry space at center is a good idea
+ Scheme provides a variety of sizes and flexible spaces
+ Breakout areas offer opportunities for hands on learning outside of the classroom

General Comments

- Make solar and green rooftop learning space available
- South roof access is needed
- Teacher planning on the ground floor is wasted space
- Move the Health Clinic out of the basement to avoid stigma
- Consider adding a lower level to the main building
- Give the opportunity for transparency of shop spaces off of walkways for tours
- Provide more vertically connected views throughout the building
- Provide storage near the front entry or an alcove for the student store/kiosk
- Clarify locker count for the ed-spec. Consider if it is necessary to provide one for every student.

Δ Change

- Consider moving the Architecture department right above Construction and Math Tech
- Moving tables allow for flexibility in different education delivery
- Where corners are present at circulation notes, windows should be provided to allow clear wayfinding.
- Consider how isolated the radio program is and how it can be better integrated with the school. Consider a second floor connection
- Engineering can be adaptable through access to power and data from the ceiling

GUIDING PRINCIPLES GROUP 4:

CELEBRATE DIVERSITY AND PROVIDE A SENSE OF INCLUSION AND BELONGING AMONG STUDENTS AND FAMILIES

PROVIDE LEARNING ENVIRONMENTS THAT INSPIRE CREATIVITY AND COLLABORATION AMONG STUDENTS

+ Positive

+ Commons is in a good location that is inclusive and open for everyone
+ Interior courtyard
+ Vertical connection between CTEs and Academics is creating collaboration opportunities
+ Providing good outdoor spaces and exposure to greenery inspires creativity and collaboration
+ Transparency and height of the commons inspires collaboration and creativity with views outside and to other programs
+ With good wayfinding access, Health Clinic in the basement is ok because privacy is key
+ Ramp at front entrance is working very well for universal access
+ The landscape design of the front entrance is giving a great sense of safety and retreat from the busy road.
+ Inclusion is being achieved with small SPED classrooms scattered throughout learning clusters
+ Location of Media Center and its surrounding programs provide a quiet zone

Δ Change

- Remove admin space from front entry so there is a direct visual and physical pathway into the central courtyard and direct access to commons.
- Clarify how main gym can be accessed. If it can be accessed through the East side in the south courtyard, this would create inclusive access for all through a protected and safe pedestrian walkway in the south alley.
- Clarify if the gated south alleyway is open to pedestrians
- Consider how roll-up doors off the commons would increase inclusion and collaboration as well as fresh air flow from south to north.
- Explore how retractable awnings could be used in the central courtyard to provide some covered areas.
- Consider how the symbolic circular theme of collaboration in the landscape can transition to a physical sculpture at the heart of the center courtyard circle. This sculpture would showcase rotating work from each CTE and would represent history, collaboration, inspiration, inclusiveness, and alumni.
- Consider green roofs in addition to solar panels for teaching opportunities on the roof
- Cover outdoor bike parking with solar panels
- Consider bioswales rather than grass in the two triangular lawn areas closest to 12th street. This would increase the feeling of safety and protection to students using the back part of the lawn or upper plaza.
- Explore pedestrian pathways from the second floor of the south wing to the second floor of the north wing. If students are still going outside,provide covered areas in the CTE bioswale.
- Consider how all stormwater could be captured on-site
- Consider how art, history, diversity, and culture can be embedded throughout the building

CLOSING THOUGHTS

To close the meeting, each MPC member shared a positive (+) and a change (Δ) on Scheme K with the group.

+ Positive	Δ Change
Lisa White: + The commons location is good and the exposure to green spaces is a plus.	• The internal courtyard may be too large and lead to it being underutilized. Landscaping maintenance is also a concern.
Richard (Dick) Spies: + The ground floorplan is very flexible.	• The commons space should be moved north so it is more embedded with the courtyard. • The second level may not be as flexible as the ground floor. The spaces are harder to push and pull. • There is a lack of vertical connections between the ground and second floor
Simon Criswell: + The CTE courtyard is working well.	• Architecture should be moved directly over Construction
Jacob M. Masters: + The curvature of the front entry plaza feels very inviting.	• The plan is only showing two computer labs and their location isn't embedded within the programs that use them. • Laptop carts that completely replace shared computer labs should be considered
Luke Hotchkiss: + The location of Construction at the center of the building is great.	• There are concerns about one single path for entry and exit of the CTE courtyard rather than a one-way entry and exit flow.
Reuben Gilmore: + Positive feedback was given on the location of the commons.	• No changes to comment on
Curtis Wilson Jr.: + Positive feedback was given on the location of Tech Geometry and Construction at the center of the building. + Access for admin to park by the Radio building is great.	• Security of alley is great • The wellness center needs to be moved from the basement

+ Positive	Δ Change
Julie Tonroy: + The courtyard and front landscaping is great. Students perform better with more access to greenery and outdoor areas. + The design is doing a good job of showcasing what is going on "under the hood".	• Would like to see an exploration into travel time on the second floor between the South and North wings, specifically travel time to get from Digital Media to Computer Engineering.
Kevin B. Clark: + Positive feedback was given on the central courtyard.	• Not convinced about the location of the commons. • Not convinced that it is efficient to cluster the science labs throughout the second floor.
Tammy Hite: + The courtyard at the center works well for several reasons, one being that it would be a great space for student gatherings and events. + Entrances to the building are being considered well.	• It would be nice to see the hallway between Manufacturing and Electric lit up more, through light wells, etc. Right now it still feels "maze-like".
Dave Ketah: + The bioswale in the CTE courtyard is great.	• In the front entrance lawn, the triangles closest to 12th street could be turned into bioswales. • Use the center node of the center courtyard circle as a display area for program work. • Admin space directly east of the front door should be removed so there is immediate transparency to the central courtyard when one enters the building.
Bryan Smith: + The Extended Learning Areas provide great opportunities.	• The Athletics entrance should be from the south alley way. • Having all of the Admin space at the front of the school is not very compelling and hides the student presence. • Laptop Chrome carts should replace the computer labs
Jim Piro: + Positive feedback was given on the courtyard, front of building, and the academic classrooms on the second floor.	• Would like to see the ability to show off work at the center of the school. • If Math Tech was closer to the commons, there would be a good opportunity to see workshop spaces.

DESIGN ACTION ITEMS

With the feedback from this MPC meeting, the design action items moving forward are as follows:

1. Refine clarity of circulation and access to daylight for every space
    + Explore a connection of the North and South wings with a bridge on the East edge.

2. Explore the Commons proportion and shape
    + Push the Commons North to create a more cohesive core with views from the second floor and better access to daylight for classrooms around the courtyard.
    + Create a stronger connection to the south field access. Address concerns over trash and service deliveries at that location.

3. Landscape
    + Provide two driveways in the CTE courtyard to create a fluid path of in and out car circulation.

4. Enhance vertical connections with two-story circulation spaces and/or learning spaces

Master Planning Committee Meeting #11 Notes

Benson Polytechnic High School
March 23, 2017

MEETING DETAILS

Meeting Location:

Benson Polytechnic High School,
546 NE 12th Ave, Portland, OR 97232

Attendees:

Portland Public Schools (PPS):
Jerry Vincent, Office of School Modernization Chief
Jen Sohm, Project Manager
Jeanne Yerkovich, Director of Career Learning/CTE

Master Planning Committee Members:
Curtis Wilson Jr., Principal
Paul Anthony
Simon Criswell
Kevin B. Clark
Reuben Gilmore
Tammy Hite
Luke Hotchkiss
Rob Johns
Dave Ketah
Jacob M. Masters
Jim Piro
Julie Tonroy
Richard Spies
Irina Phillips

Public
James Walton, Benson Student
Jeff Strachan, Alumni
Teresa Tran, ASB President
Moses Tran, ASB Treasurer

Design Team
Lorne McConachie, Bassetti Architects
Joe Echeverri, Bassetti Architects
Cary Dasenbrock, Bassetti Architects
Dianna Montzka, Bassetti Architects

Pre - Design Goals:

Identify the vision, philosophy, and objectives of the school.

Provide a consistent and diverse voice for user groups in the pre - planning phase of the project.

Prioritize the objectives to attain cost certainty for the project moving forward.

Agenda

6:00- 6:20	Update
5 min	Project Update - Portland Public Schools + Industry Outreach Update + Student Engagement Update + Educational Specification Update
5 min	Brief Recap - Scheme K
10 min	Design Refinement - Scheme L
6:20 - 7:45	Design Refinement (Small Group Activity)
45 min	Scheme L Review
20 min	Report Back + Whats working (+), what needs improvement (Δ)
20 min	MPC Group Discussion
7:45 - 8:00	Wrap-Up
5 min	Subcommittee Report
5 min	Public Comment
5 min	Closing Thoughts & Next Steps

Notes Issued Date:

March 29th, 2017

PROJECT UPDATE

Tasks since last MPC

- Modified Scheme K resulting in Scheme L
- Student Outreach at NW Youth Careers Expo
- Consolidated industry partners connections list
- CTE Advisory Committee survey released
- Equipment survey and program scenarios reviewed with teachers
- Scenario plans updated

Tasks through May bond

- Expand survey to other partners
- Garner input for Ed Spec development
- Student information gathering at lunch: April 4th and 5th
- Student Facebook survey
- Room data sheets and program summary draft to be issued to MPC for review in April

After bond, if "approved"

- Coordinated industry outreach and continued input from industry partners
- Focused review of educational specifications with industry partners as details are developed
- Reconciliation of systems with budget
- Student focus groups
- Identify student process, integrate into design process

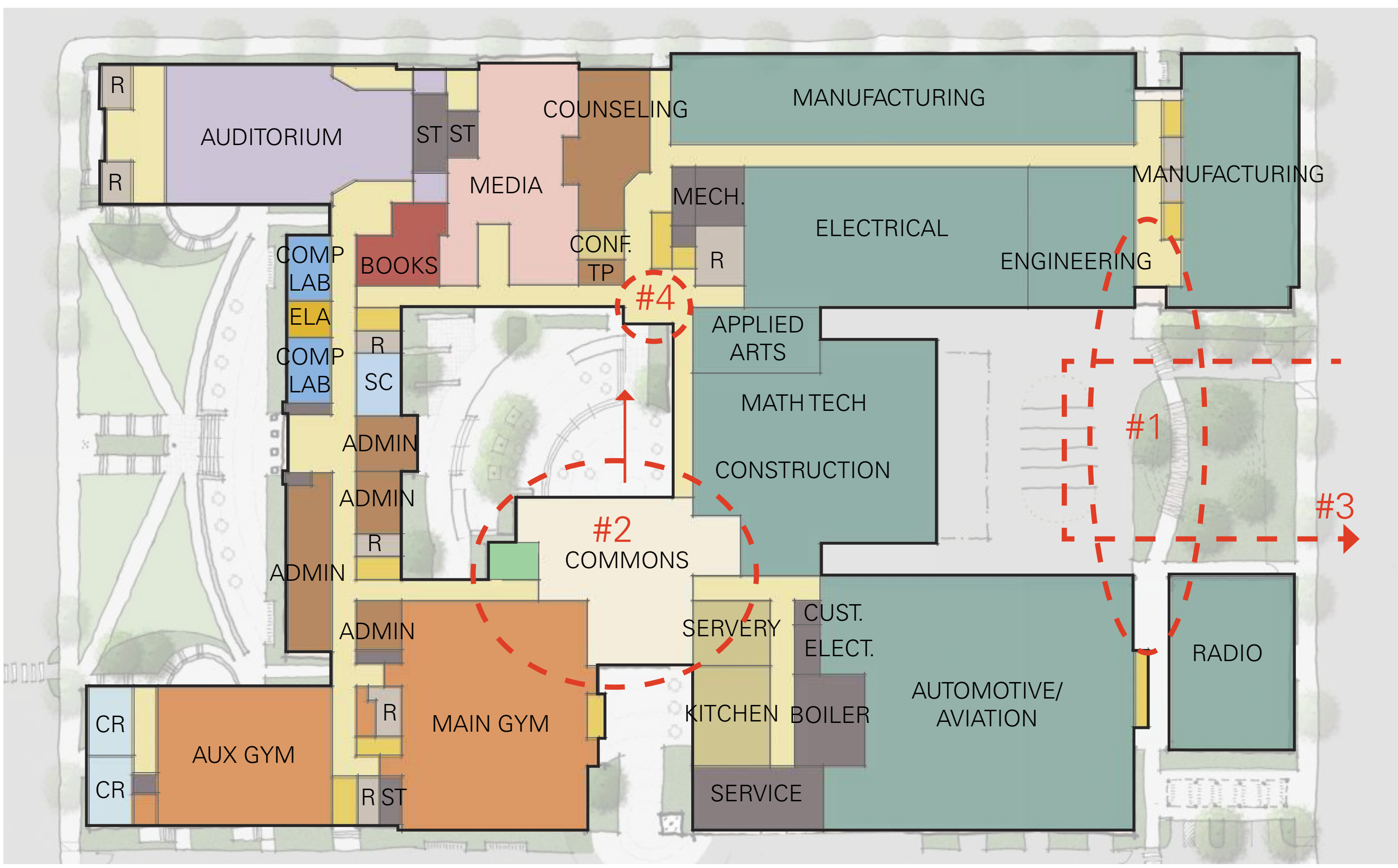
SCHEME K OVERVIEW AND ACTION ITEMS

1. Refine clarity of circulation and access to daylight for every space:
   + Explore a connection of the North and South wings with a bridge on the East edge.

2. Explore the Commons proportion and shape:
   + Push the Commons North to create a more cohesive core with views from the second floor and better access to daylight for classrooms around the courtyard.
   + Create a stronger connection to the south field access. Address concerns over trash and service deliveries at that location.

3. Landscape:
   + Provide two driveways in the CTE courtyard to create a fluid path of in and out car circulation.

4. Enhance vertical connections with two-story circulation spaces and/or learning spaces.



BUILDING STUDIES - SCHEME L

Scheme L Big Ideas

+ Stretch Commons north to connect the north and south wings
+ Protected social courtyard at the center, shared work courtyard to the east
+ Athletics entrance court to the south
+ Efficient service access for whole school and CTE uses
+ Enhance daylighting, transparency, and natural ventilation
+ Flexible adaptable spaces
+ Integrate academic programs and CTE programs through vertical relationships
+ Maintain historic structures and facades at the perimeter of the site
    + Enhance primary defining characteristics of the school as a landmark
    + New additions juxtapose historic character and polytechnical education in the 21st century

+ Positive

+ Digital media makes sense in the lower level
+ Plug and play of programs is evident and shows the flexibility of spaces being considered
+ CTE spaces located away from radio tower is good
+ Community room location at front of school is good
+ Keep the 3rd computer lab in the media center
+ Circulation and flow through school is working well – connection of north and south CTE wings at the east end of the school.
+ Social courtyard space is good addition from previous masterplan schemes
+ Improved security conditions at east edge of CTE courtyard
+ North wing location of Health Clinic is good
+ Student space flowing from Commons out into and across CTE courtyard is working well.

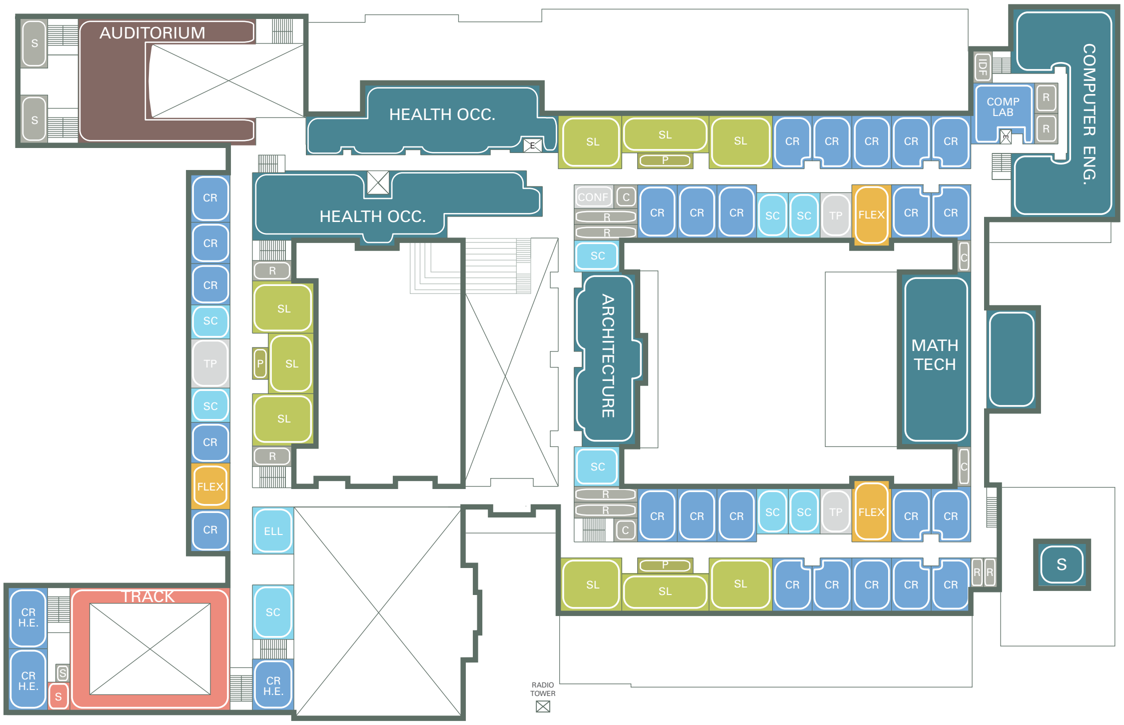
General Comments

- 16’ potential clearance for house deliveries in the CTE courtyard - consider this for the pedestrian bridge.
- Consider PV panels and storm water treatment as teaching tools.
- Prepare structure of new building to be able to hold PV on roof
- Potential for a wind turbine to be donated from industry partners
- Security considerations and separation of pedestrian path and Auto/Aviation vehicle access along south edge of SE CTE wing (Auto/Aviation).
- Don’t let CTE courtyard turn into a sea of asphalt
- Explore the extent of electrical shielding needed in CTE spaces.

Δ Change

- Shift Automotive wing further south to reduce pedestrian walkway and gain additional space in work courtyard
    - Integrate radio tower
    - Proximity to courtyard
- Sound in CTE courtyard is a concern for classrooms above
- Interior hallway connection across, but exterior to the Auto shops, is desired
- Move Architecture to the NE part of the north wing
- Architectural Design prefers more direct adjacency to Construction/Math Tech
- Consider shifting the 2nd floor north wing further north to gain more south facing rooftop
- Explore more visual connections in social courtyard to CTE spaces. There could be demonstration spaces rather than computer labs off of the commons
- Shift Math Tech north. This would result in a larger outdoor work area and south light
- Have demonstration spaces at the front of the school to showcase work
- Increase visibility from staircases into CTE and classroom spaces
- Create views into CTE courtyard from north hall at the social courtyard
- Think more about view corridors
- Applied Arts needs to be adjacent to manufacturing for welding
- Consider vehicle flow, pedestrian, and bike access along NE 12th
- Digital Media needs closer adjacency to Radio
- Consider alternative arrangements for Construction and Math Tech so as to allow service needs to be met in CTE courtyard
- Explore alternative layouts for Auto/Aviation CTE that might allow fuller use of existing SE CTE structure
- Explore costs of Science labs being on the first floor rather than the 2nd floor and look at the plumbing vs. vent cost of being on the 2nd floor.
- Make sure the roofs are equipped for future solar panel use
    - Talk with NW Solar Resource Center as a resource
    - There is a policy for payback from solar
- Band room similar to Roosevelt High School is desired
- Consider a car pull out off of 12th ave for kid drop off to reduce traffic

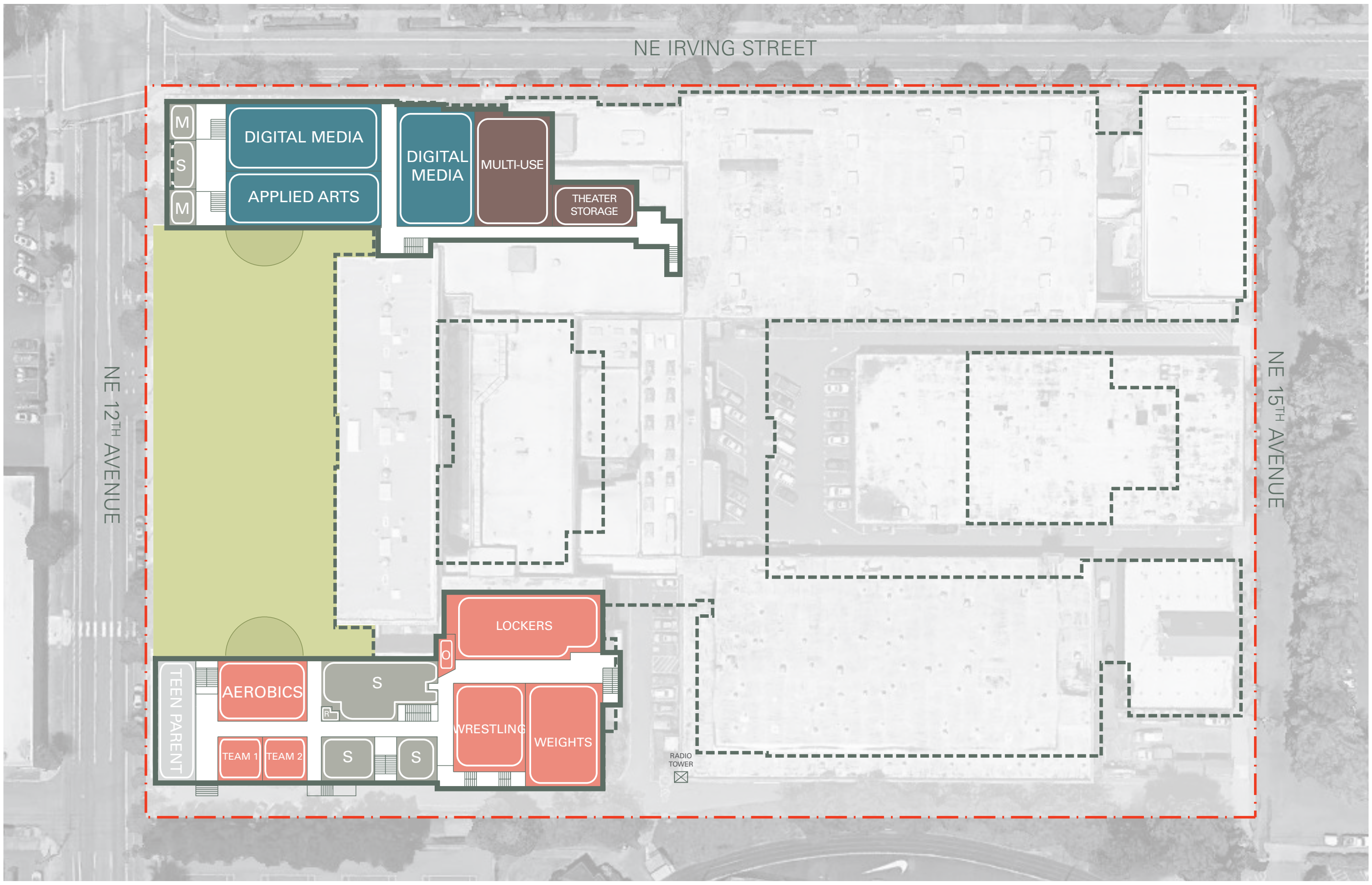
SCHEME L DIAGRAMS



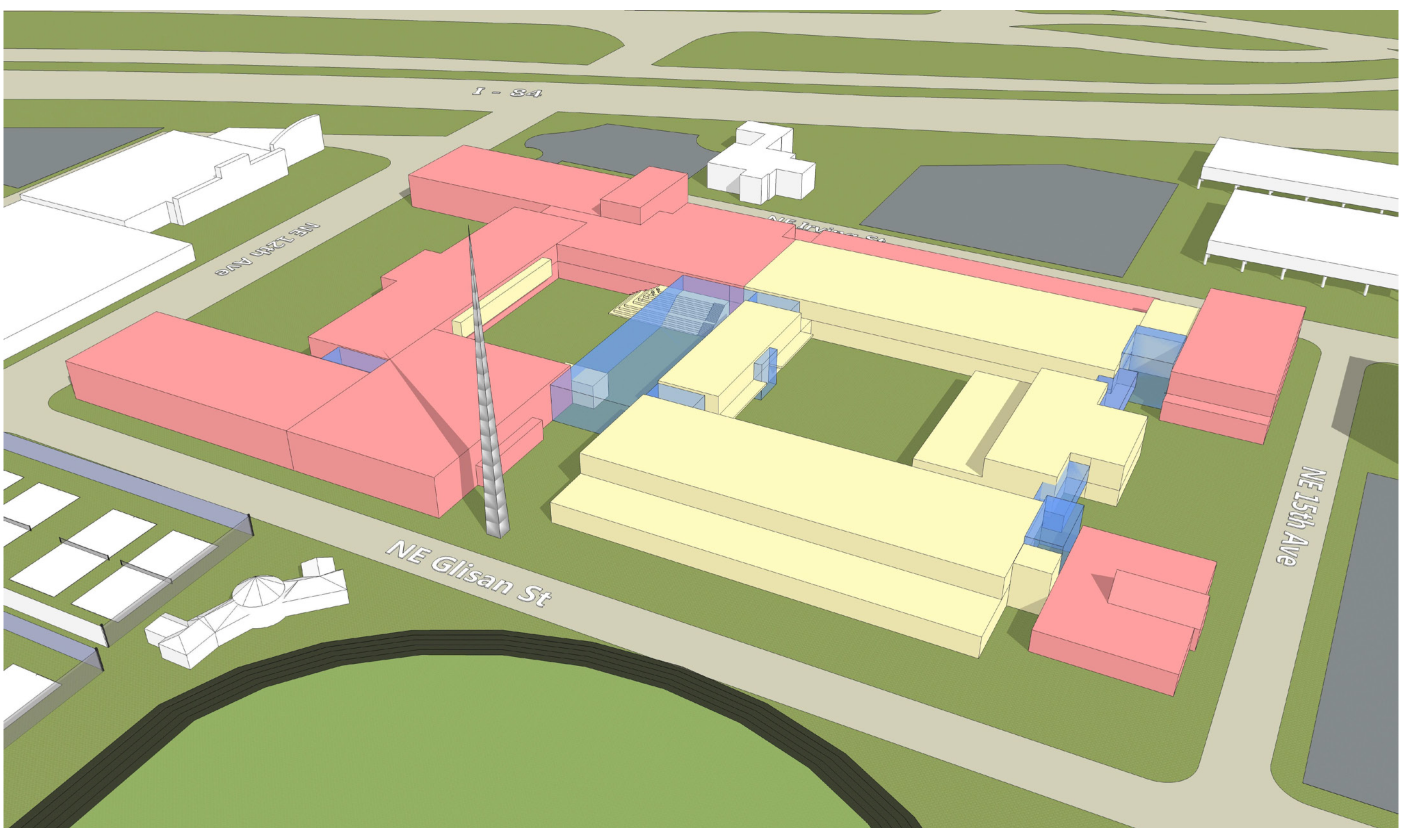
SECOND FLOOR

GROUND FLOOR

SCHEME L DIAGRAMS



LOWER LEVEL OPTION 1



3D MASSING

CLOSING THOUGHTS

To close the meeting, each MPC member shared a positive (+) and a change (Δ) on Scheme L with the group.

+ Positive	Δ Change
Irina Phillips: + The commons location is working well, it makes a good southern connection to the field and a good vertical connection with the learning stair.	• The setback of Automotive and the second floor south wing is not convincing yet.
Richard (Dick) Spies: + There is a nice balance of open spaces. + The circulation diagram is working more cohesively.	• It would be interesting to have more information within the landscaping elements and how student work can be showcased in the courtyards. • More work needs to be done on vertical visual connections
Simon Criswell: + The entryway is working well.	• The school district and architects should really consider gender neutral locker rooms in addition to gender neutral restrooms.
Jacob M. Masters: + Art and digital media in the lower level is working well.	• The elevator in the middle of the hallway near counseling needs to be changed.
Luke Hotchkiss: + The size and security of the CTE courtyard is working well and the absence of parking is essential in that courtyard.	• There are concerns with the level of sound happening in the CTE courtyard and how that will affect the classrooms above.
Reuben Gilmore: + The flow of paths throughout the school are working well.	• It would be nice to see the south wing rooftop be an inhabitable outdoor space
Curtis Wilson Jr.: + The wellness center on the ground floor next to counseling is a great location	• No changes to comment on.

CLOSING THOUGHTS

+ Positive	Δ Change
Julie Tonroy: + The transparency of the entryway and circulation are working well.	• No changes to comment on.
Kevin B. Clark: + The circulation, CTE courtyard, and wrap-around service access are all working well	• There are some concerns with unknowns at this point in the process, like how will the rooftops be used.
Tammy Hite: + No positive feedback to comment on.	• There are concerns with the CTE courtyard turning into a parking lot. • It is important to consider the school uses after hours, what spaces are needed for those activities, and how they will be zoned and secured from the rest of the school.
Dave Ketah: + The circulation has really improved.	• There are concerns with the practicality of construction costs and science labs being so spread out throughout the building.
Rob Johns: + No positive feedback to comment on.	• Math-Tech could be rearranged with Architecture to create stronger proximity connections. • There are still concerns with the traffic on 12th Ave and one solution includes a turn around/drop off area where the front lawn currently is. • Digital media could benefit from being closer to Radio
Jim Piro: + The design is all coming together nicely.	• No changes to comment on.

PUBLIC COMMENT

James Walton, a Benson student, shared two Δ's with the group:

- Shift Automotive wing further south to reduce pedestrian walkway and gain additional space in work courtyard.
- Band room is needed.

A Benson Tech alumni, Jeff Strachan, added that the group is touching all the bases and gave his encouragement.

PPS COMMENT

Jeanne Yerkovich, Director of Career Learning/CTE for PPS, shared the hiring of Jay Keuter, CTE Strategic Business Partnerships Manager for PPS, who will play a major role in developing business partnerships for the district.

DESIGN ACTION ITEMS

The design is on the right track and the consensus is that the building layout and circulation is working well. Minor modification to be explored include:

1. Creating stronger connections between Digital Media and Radio, and Architecture with Construction than what is shown currently.

2. Updating the landscape plan to integrate with the current layout.

3. Refinements of circulation paths in regard to view corridors and gathering spaces.

4. Continue to explore efficiencies to reduce area and maintain budget.

5. Integrate strategies for flexibility and adaptability into Educational Specification currently in development.

6. Discuss drop-off area off of NE12th Avenue with district's traffic engineer.

Master Planning Committee Meeting #12 Notes

Benson Polytechnic High School
May 4, 2017

MEETING DETAILS

Meeting Location:

Benson Polytechnic High School,
546 NE 12th Ave, Portland, OR 97232

Attendees:

Portland Public Schools (PPS):
Jen Sohm, Project Manager

Master Planning Committee Members:
Simon Criswell
Kevin B. Clark
Angel Dawson
Brian Gerber
Rob Johns
Dave Ketah
Julie Tonroy
Richard Spies
Irina Phillips

Public
Marv (with Rob Johns)
Leandrea Riggins - PES/Alumni

Design Team
Lorne McConachie, Bassetti Architects
Joe Echeverri, Bassetti Architects
Dianna Montzka, Bassetti Architects

Agenda

6:00 - 6:10	**Introduction & Update** Review Agenda Process Update + Student Engagement + Steps Forward
6:10 - 7:00 10 min	**Future Industry Trends (Small Group Activity)** Educational Specification Overview
30 min	Small Group Discussion and Brainstorming + Identify potential trends in the industries related to Benson + Identify trends to include in Ed Spec
10 min	Report Back
7:00 - 7:45 15 min	**Design Refinement (Group Activity)** Scheme L.1 Review Design Approach and Imagery Overview - Historic, Contextual, Juxtaposition
20 min	Image Boards Activity
10 min	Report Back
7:45 - 8:00	**Wrap-Up**
5 min	Subcommittee Report
5 min	Public Comment
5 min	Closing Thoughts & Next Steps

Pre - Design Goals:

Identify the vision, philosophy, and objectives of the school.

Provide a consistent and diverse voice for user groups in the pre - planning phase of the project.

Prioritize the objectives to attain cost certainty for the project moving forward.

Notes Issued Date:

May 16th, 2017

PROJECT UPDATE

Tasks since last MPC

- + Minimal modifications to Scheme L resulting in Scheme L.1
- + Student information gathering at lunch
- + Architecture Jr. class outreach
- + Room data sheets and program summary drafts issued to MPC for review
- + Educational Specification Draft of CTE and Academic program summary sections completed and sent out for review.

Tasks through May bond

- + Expand survey to other partners
- + Garner input for Ed Spec development

After bond, if "approved"

- + Key Meetings:
  - + Portland Bureau of Transportation (PBOT)
  - + Portland Landmarks Commission
  - + Portland Bureau of Development Services
- + Existing Conditions Investigation
  - + Phase II Environmental Report
  - + Geotechnical Testing
  - + Structural Testing
  - + Traffic Impact Report
- + Educational Specification Refinement
- + Student Facebook Survey

Industry Outreach

- + Connecting with industry partners needs to be a grassroots effort
- + Subcommittees and/or individuals need to keep PPS informed on Benson's CTE vision as partnerships develop
- + The MPC suggested partnership opportunities with Oregon Health and Science University (OHSU), Portland Community College (PCC), and Portland Development Commission (PDC).
- + There is a 24 month window of time during the design phase where industry input on the Ed Spec will be considered, but as that window of time goes on, fewer changes can be made.

EDUCATIONAL SPECIFICATION OVERVIEW

A brief summary of the Educational Specification was given to the MPC members and the details of the CTE programs were reviewed on boards around the room.

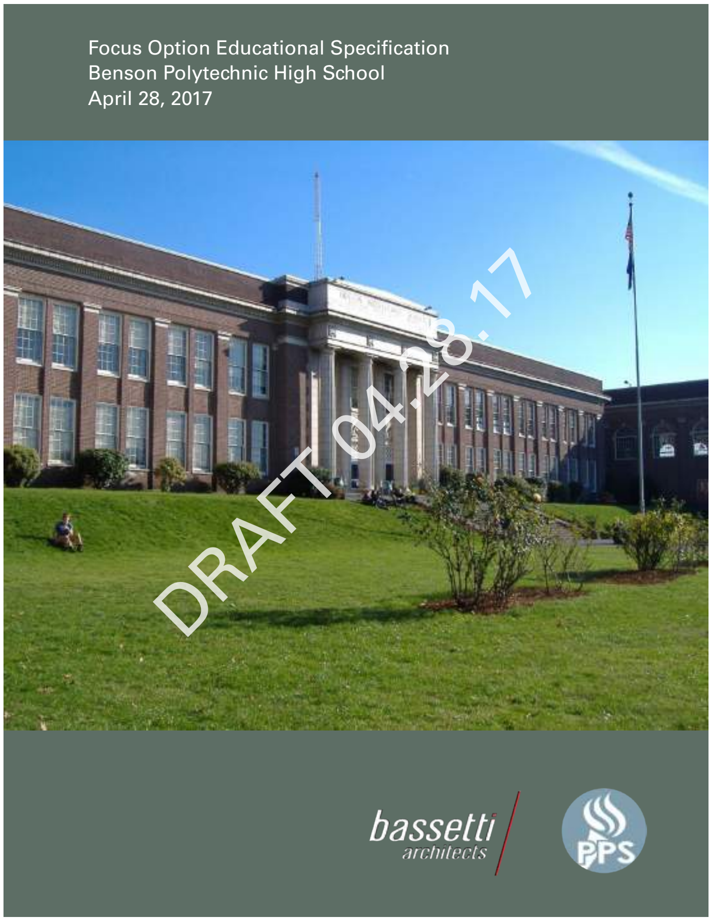


TABLE OF CONTENTS

ED SPEC ACTIVITY NOTES

In discussing and brainstorming future industry trends, boards were set up around the room with each CTE program summary, their program adjacencies, future trends, and a detailed diagram of their space. MPC members went around the room and added their thoughts on additional adjacencies, future trends, and potential partners or resources. The information collected is reflected in the table below and will be included in the Ed Spec document. Examples of these boards are attached at the end of the document.

Program of Study	Other Program Adjacencies	Future Trends	Potential Partners/Resources/Notes
Design and Applied Arts	+ Construction		+ Allow for project spaces outdoors + Create visual connections to other areas
Architecture	+ Design and Applied Arts + Add urban design, sustainability, fashion product design to the architecture program, or as an extension of the program	+ Alternative energy + Materials +	+ Create flexible partitions between class areas + Create visual connection to other classes + Provide covered outdoor area for models and larger scale projects
Automotive/Aviation		+ Neurotech (Sensor, command, control systems) + Unmanned aerial, terrestrial, orbital platforms + Rail systems + Grid control + 100% electrical vehicles +	+ Explore a partnership with Boeing + Look into Drive Oregon as a potential partner-tie in with solar and solar battery storage + Develop composite technologies and continue to teach basic riveting (Aviation)
Computer Engineering		+ Quantum AI + Hybrid systems (biological and technological systems) + Neurotechnology	+ The Technological University in Willsonville is interested in connecting with Benson HS
Construction	+ Electric	+ Pre-fabricating parts of homes + Construction material lab (CL,LLP, etc.)	
Math Tech			+ The Technological University in Willsonville is interested in developing math programs at PPS and Benson HS
Digital Media	+ Design and Applied Arts		+ Film/Television production could also tie into tech theater in the Auditorium

ED SPEC ACTIVITY NOTES

Additional comments on the Ed Spec

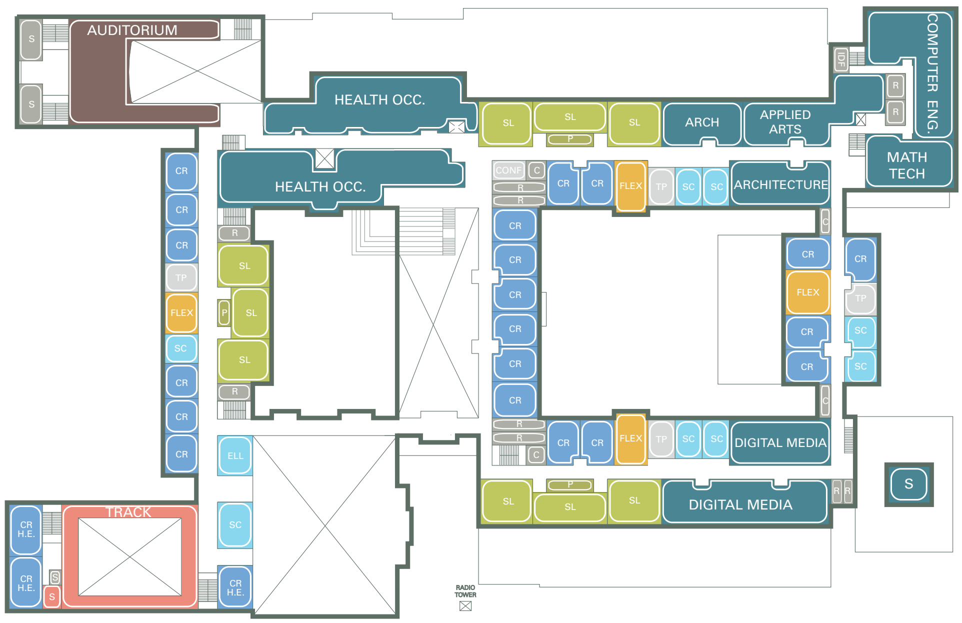
+ Consider greater connectivity between CTE programs.
+ Consider visual and physical connectivity of the CTE programs inside and outside of their designated space. Consider how the wall type can enable or inhibit these connections.
+ A question was raised about IT connectivity throughout the building. Bassetti responded with the intent to use a system that includes a central MDF room with satellite IDF rooms spread throughout the building and a fiber backbone with CAT 6 cables. Wifi will also be provided throughout the building.

Program of Study	Other Program Adjacencies	Future Trends	Potential Partners/Resources/Notes
Electric	+ Maker Space	+ Electric bikes and scooters + Batteries + Electric vehicles charging station	+ Bonneville Environmental Fund + Solar 4R Schools + Contact Todd McConachie for partnership with Portland General Electric.
Engineering		+ Hybrid tech (artificial and biological) + Neurotechnology (Sensor, command, control systems). + Social Robots/Artificial intelligence + Merged Reality systems + Nano/picotechnology + Mota Materials and smart materials	+ Confirm storage needs and amount supplied in the detailed diagram
Health Occupations		+ Bioinformatics + Smart Medicine (Pharmaceuticals, devices, materials) + Theragnostic or Theranostic medicine (i.e technology that diagnoses and treats) + Robotics (surgical and social) + Metamaterials + AI and Quantum AI + Regenerative Medicine + Neuroprosthetics	
Manufacturing	+ Design and Applied Arts Materials Science	+ Nano/Pico sciences + Social robotics, nanobots, etc. + Green energy technologies + Metamaterials + Neurotechnology (Sensor, command, control, etc.)	

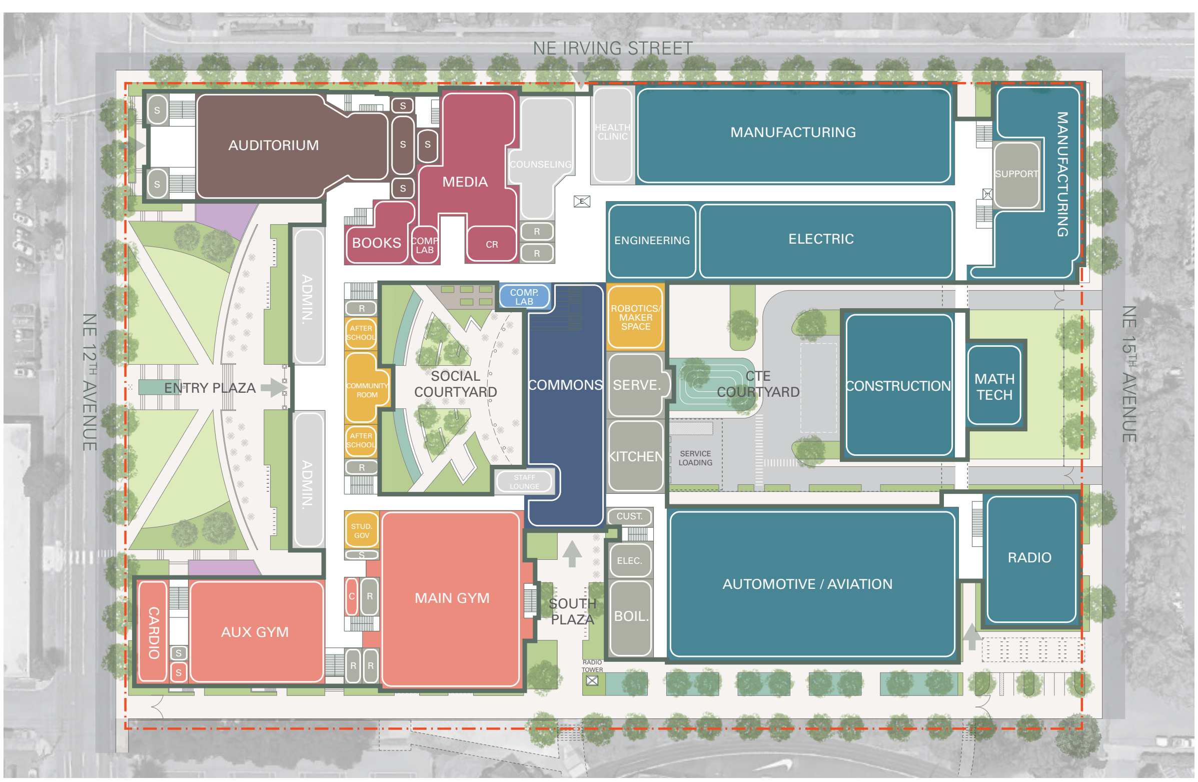
SCHEME L DIAGRAMS AND IMAGERY ACTIVITY

Scheme L.1 was developed after minimal modifications to Scheme L. Scheme L.1 was presented in conjunction with imagery of external facades, internal vertical connections, and landscapes (shown in the next section). The purpose of this activity was to start developing a material and architectural language for the re-design of Benson Tech.

When re-designing a building, a design can take on a historic, contextual, or juxtaposed relationship with the existing building. The imagery boards presented to the MPC showed a variety of these three options. MPC members then gave comments on the type of relationship the new Benson Tech should have with the historic school.



UPPER LEVEL

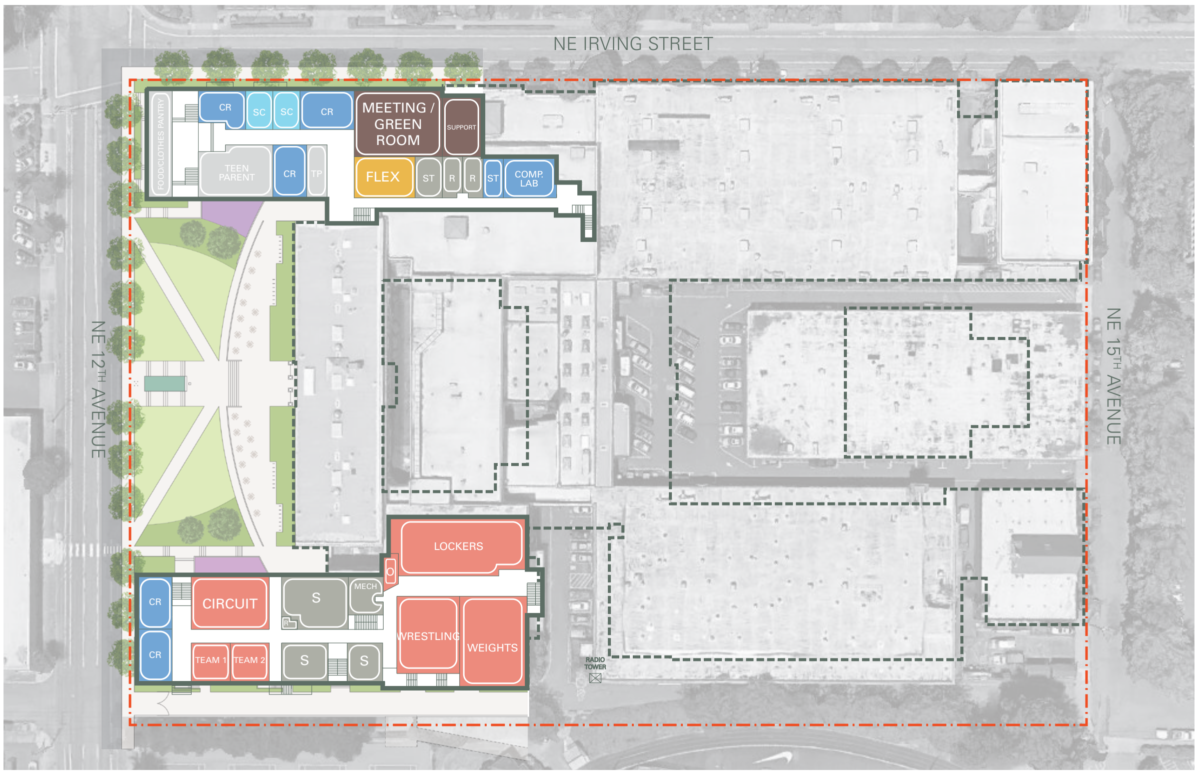


GROUND LEVEL

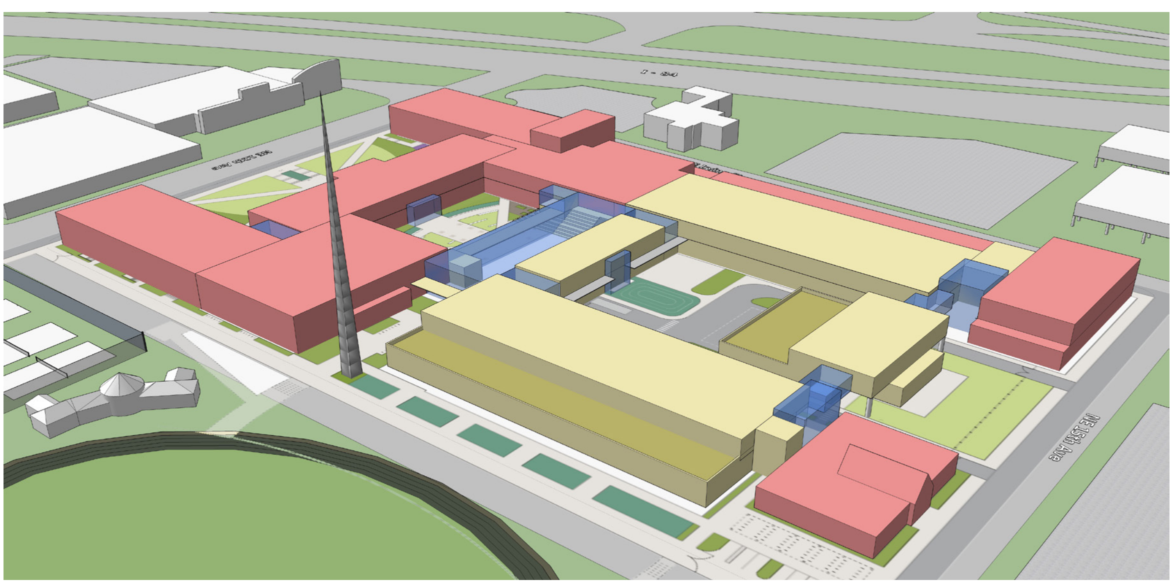
SCHEME L DIAGRAMS

Comments on Scheme L.1

+ Bridge the outdoor roof on the CTE East wing to connect the north and south wings to the outdoor area.
+ Car parking on site may be intermittently available when the Math Tech trailer is not parked on site
+ Connect the upper commons to the southern rooftop
+ Re-organize Architecture program to be one grouping on one side of the hallway
+ Consider acoustics of classrooms above Construction CTE
+ Use rooftops for outdoor space and science labs
+ Push Auto CTE south for more room in the CTE courtyard
+ Alcoves around basement windows should be bigger to maximized daylight

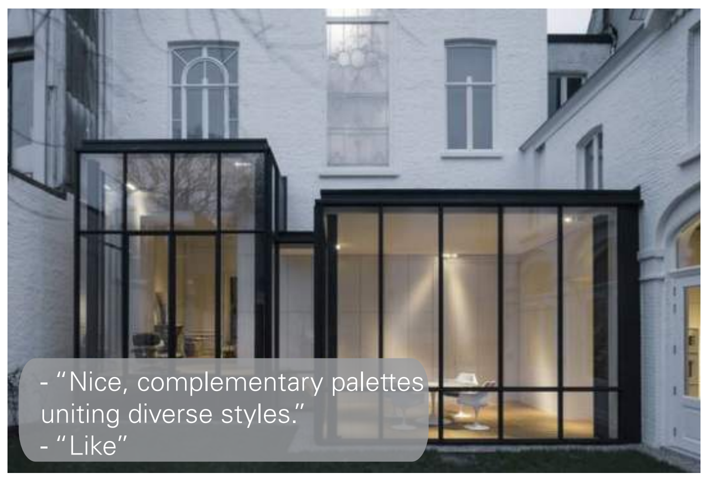


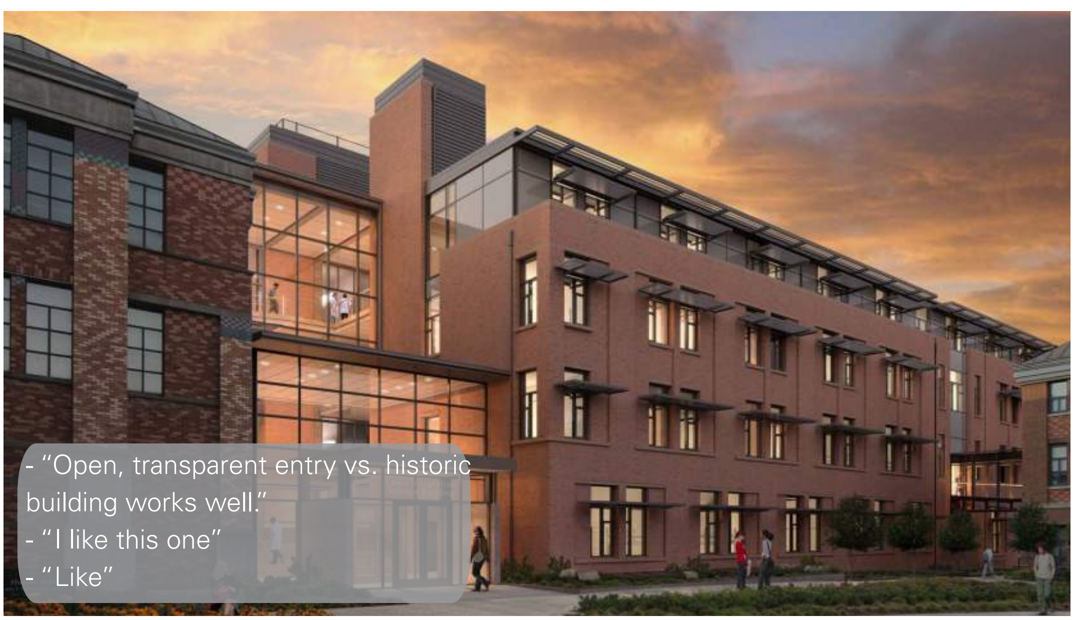
LOWER LEVEL



IMAGERY ACTIVITY - FACADES

The images below were tagged with "likes", with the majority of comments reflecting the desire to have a juxtaposition between contemporary and historic facades. Specific comments are shown on each individual image. One MPC member suggested the Contemporary Jewish Museum by Daniel Libeskind as a precedent. Another MPC member suggested the new engineering building at OSU as a precedent.





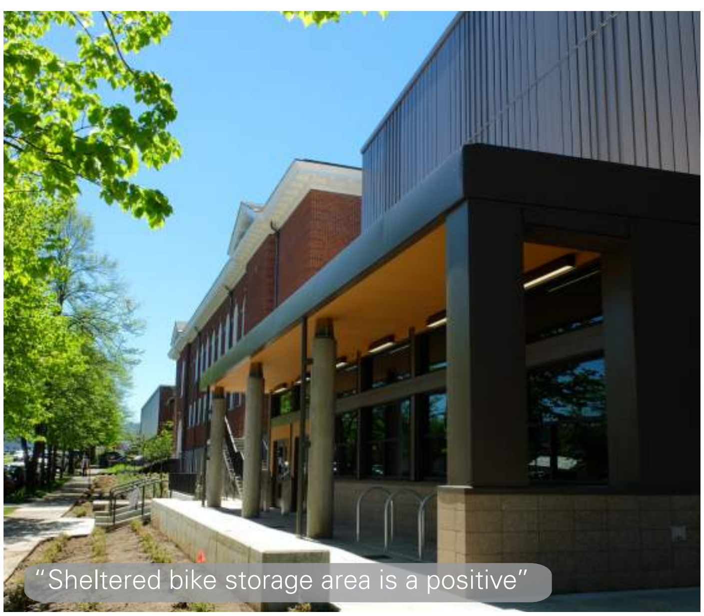
IMAGERY ACTIVITY- FACADES

Additional Comments

+ Show a 21st century facade for those driving by. The building should reflect a strong image of sustainability and act as a billboard for a new way of thinking.
+ Iconic architecture is desired in juxtaposition with the historic facade
+ The building should scream creativity and innovation
+ It would be better to seamlessly integrate and juxtapose a new building material rather than mimic the historic facade
+ Support a contemporary look to the building.
+ The historic facade represents the past 100 years, and the new architecture should speak to the next 100 years of Benson Tech.
+ Blend the industrial needs (i.e. ventilation stacks) of the building with the architecture

Using contemporary architecture as a connecting point between two historic buildings is a positive

"Historic vs. Contemporary is good"

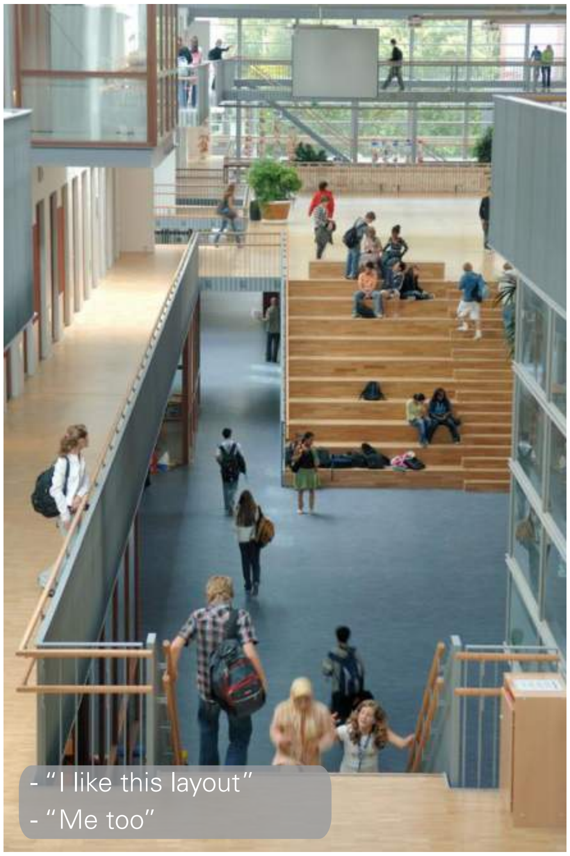


"Sheltered bike storage area is a positive"

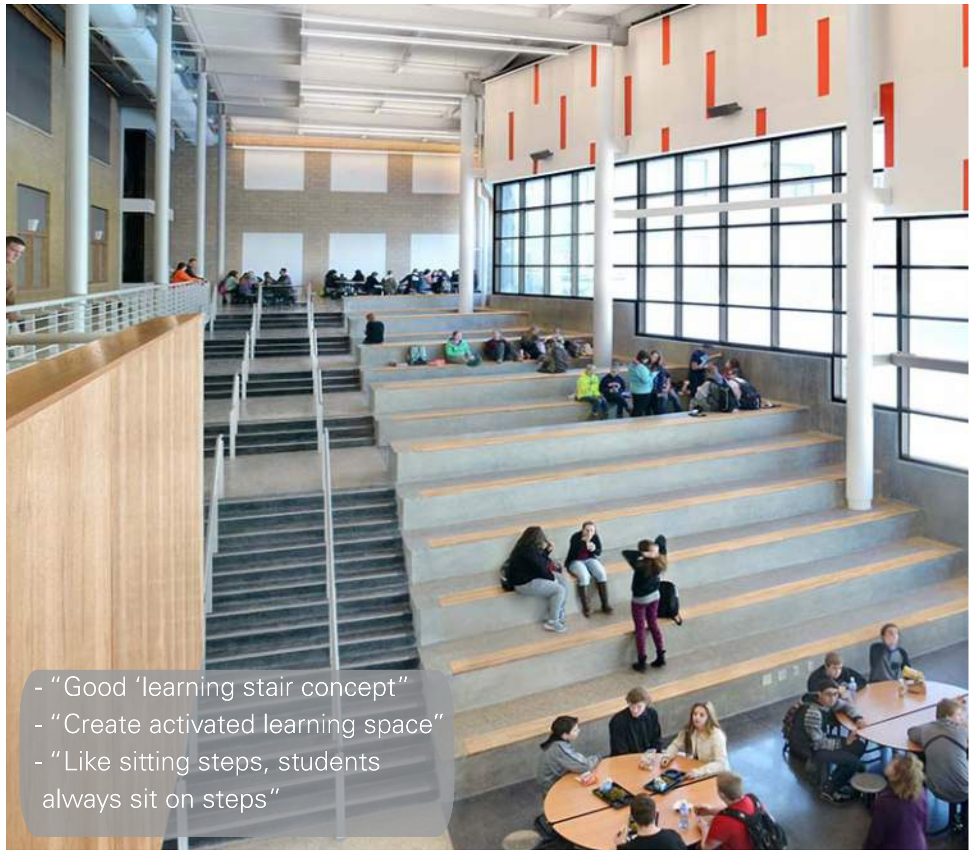
Use this fabric for 2nd floor addition

IMAGERY ACTIVITY- INTERNAL VERTICAL CONNECTIONS

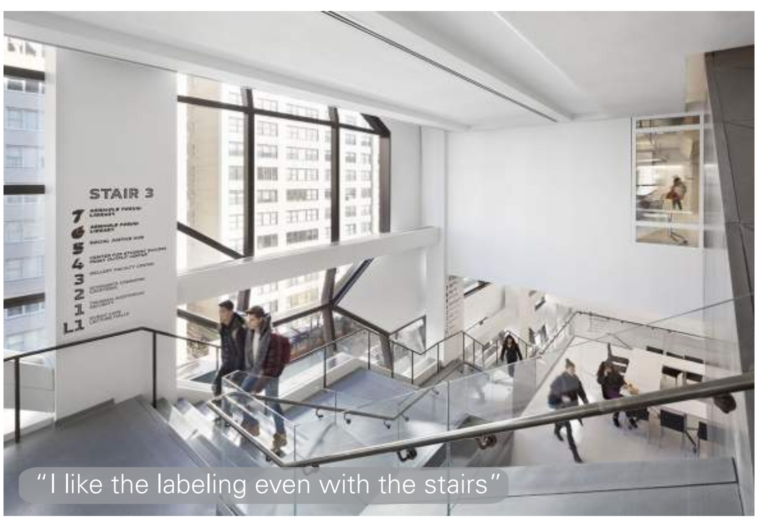
The images below were tagged with "likes" or comments expressing what the individual did or did not like about an image. Ample natural daylight, views out to greenery, and multiple learning stairs are desired.



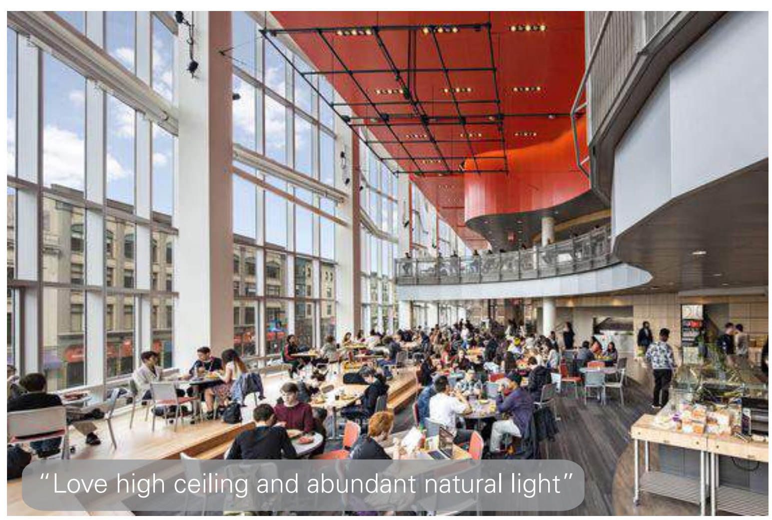
- "I like this layout"
- "Me too"



- "Good 'learning stair concept"
- "Create activated learning space"
- "Like sitting steps, students always sit on steps"



"I like the labeling even with the stairs"

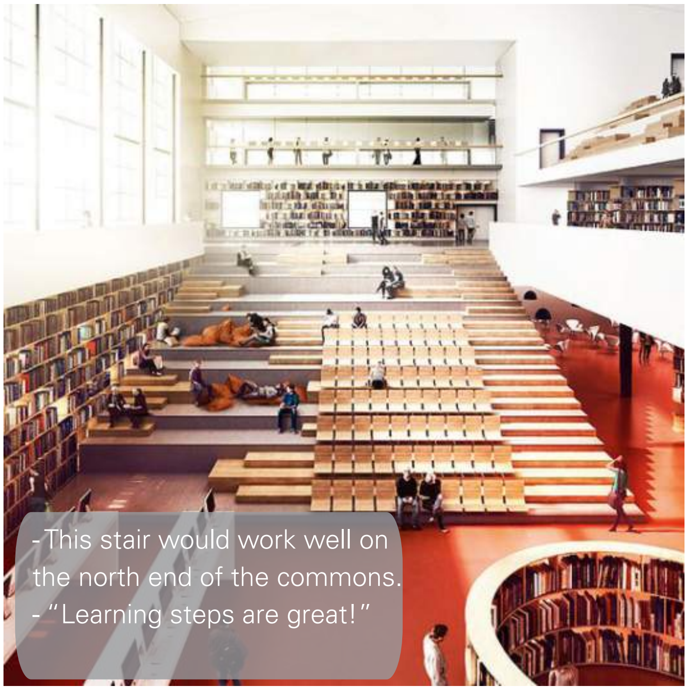


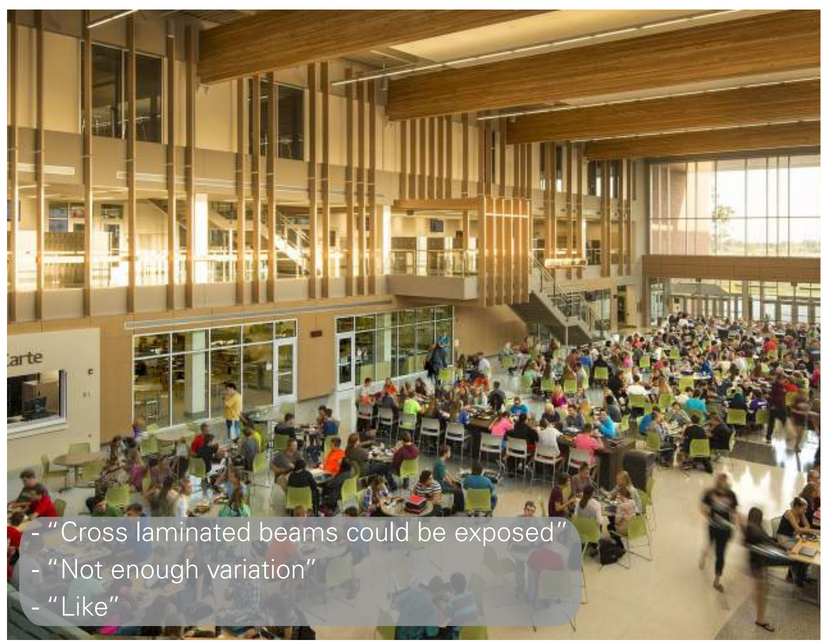
"Love high ceiling and abundant natural light"

IMAGERY ACTIVITY - INTERNAL VERTICAL CONNECTIONS

Additional Comments

+ Students already use the stairways as seating areas throughout the day and during lunch, so one or multiple learning stairs would be successful in the re-design
+ Permanent wayfinding graphics and signage is desired throughout the school





IMAGERY ACTIVITY - LANDSCAPE

The images below were tagged with "likes" or comments expressing what the individual did or did not like about an image.

"Like the beds that incorporate seating"

"I like the grass/pavement mix-potentially in the interior courtyard."

- "I like the green roof."
- "Can we have this in storm water collection areas?"

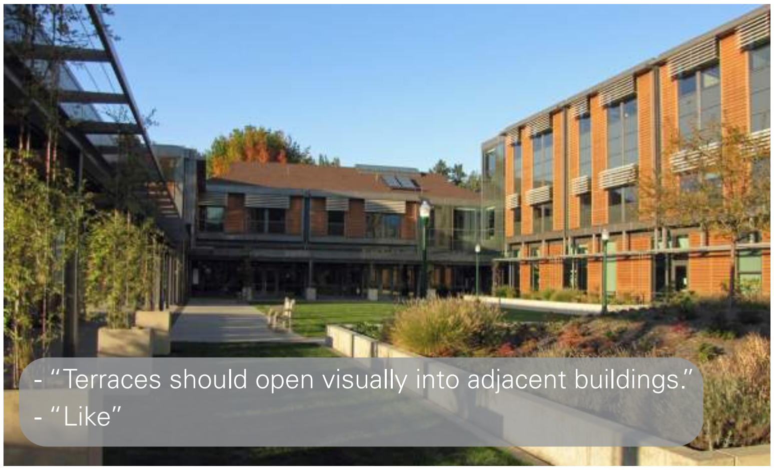
"I like the ceiling."

"Find areas to connect landscape and water with the architecture."

IMAGERY ACTIVITY - LANDSCAPE

Additional Comments

- + Incorporate water and plant life into the landscape and integrate it with the building
- + The building should reflect a strong image of sustainability and act as a billboard for a new way of thinking

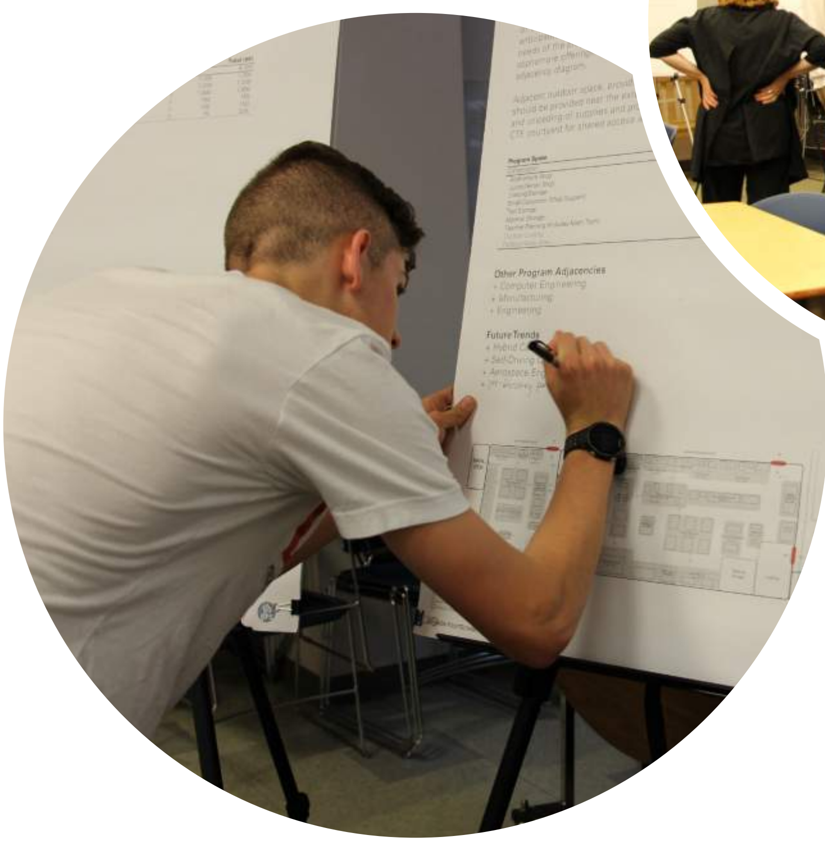


SUBCOMMITTEE REPORT

+ Tie into Jay Keuter (PPS) and coordinate industry outreach efforts
+ Tie into Alumni Foundation and coordinate efforts

PUBLIC COMMENT

No Public Comment



ED SPEC SUMMARY / DESIGN & APPLIED ARTS

Summary

The Design & Applied Arts CTE Program requires two lab spaces to support drawing/sketching/painting within a 2D Lab, and sculpting within a 3D Lab. The 3D Lab also needs an adjacent kiln room and access to outdoor space to allow Raku firing. Storage and Teacher Planning should be provided between the two lab spaces so they can be shared, providing easy access to both spaces, and allowing for teacher supervision of the learning spaces.

Program Space	Teaching Stations	Quantity	Area (SF)	Total (SF)
Design and Applied Arts				*3,110*
2D Art Lab	1	1	1,200	1,200
3D Art Lab	1	1	1,500	1,500
Kiln Room		1	100	100
Art Storage Room		1	160	160
Teacher Planning		2	75	150
Outdoor Work Area				500

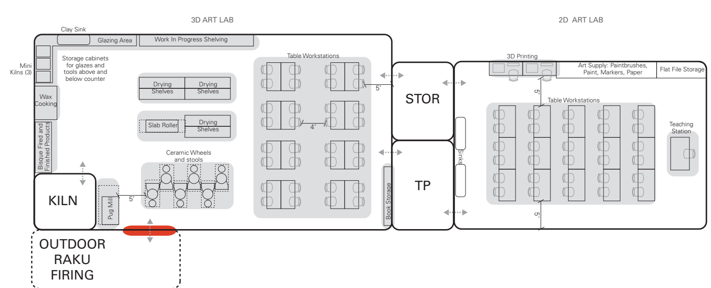
Other Program Adjacencies

+ Manufacturing
+ Digital Media
+ Architecture

Future Trends in the Industry

Due to the need to support a wide range of possibilities for personal expression, the potential trends in Applied Arts are wide and varied. A few examples include:

+ Digital Mixed Media
+ Virtual Reality
+ Kinetic Sculpture (Wood, Metal, etc.)
+



EQUIPMENT FOOTPRINT
EQUIPMENT WORKING AREA
GENERAL EQUIPMENT AREA
COUNTER TOP
RR (REST ROOM)
CR (CLASSROOM)
TP (TEACHER PLANNING)
ROLL-UP DOOR
EOS (ENGINE ON STAND)
RC (ROLLING CART)

BENSON POLYTECHNIC HIGH SCHOOL / 2017.05.04

ED SPEC SUMMARY / ARCHITECTURE

Summary

The Architecture CTE program consists of three main lab spaces: a freshman drafting room, a sophomore computer lab, and a junior/senior architecture lab. Students develop drawing, drafting and model making skills in industry relevant software and techniques, and apply these to project designs.

Pin-up space and collaboration space is important for critique and display of student work. Collaboration with other Industry and Engineering Academy programs is also a critical aspect of the adjacency considerations as the drafting skills feed into other programs – most notably Engineering, Construction and Manufacturing. Access to outdoor space is also desired, with visibility to the Construction program work court.

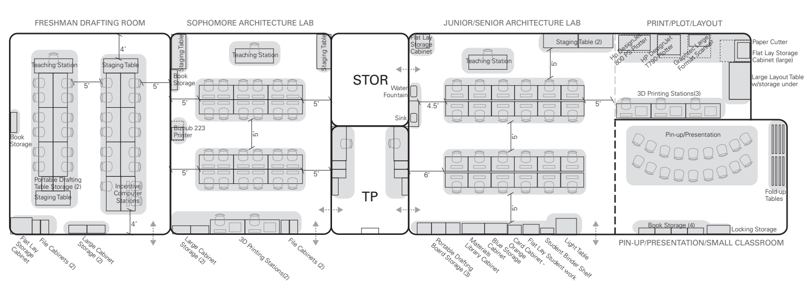
Program Space	Teaching Stations	Quantity	Area (SF)	Total (SF)
Architectural Design				*4,360*
Freshman Drafting Classroom	1	1	980	980
Sophomore Architecture Lab	1	1	980	980
Junior/Senior Architecture Lab	1	1	1,200	2,025
Pin-Up/Presentation/Small Classroom		1	600	incl. above
Plot/Print/Layout Room		1	225	incl. above
Storage		1	150	150
Teacher Planning		3	75	225

Other Program Adjacencies

+ Construction
+ Engineering
+ Manufacturing

Future Trends

+ Large format monitors
+ 3D printing and laser printing for model making and project construction
+ Parametric design
+ 3D BIM drafting and rendering
+ Virtual Reality
+



EQUIPMENT FOOTPRINT
EQUIPMENT WORKING AREA
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TP (TEACHER PLANNING)
ROLL-UP DOOR
EOS (ENGINE ON STAND)
RC (ROLLING CART)

Summary

The Automotive/Aviation CTE program provides hands-on learning opportunities for the automotive and transportation-based industries. Projects include engine technology and rebuild, general and advanced automotive technologies, diesel and hybrid systems, small vehicles, and aviation technologies.

All of the shop spaces need ground-level, exterior access for a clear drive path from one or both ends of the spaces. Furthermore, it is required that the access roads to the entry and exit of the entry points can accommodate the turning radius of various types of cars and trucks.

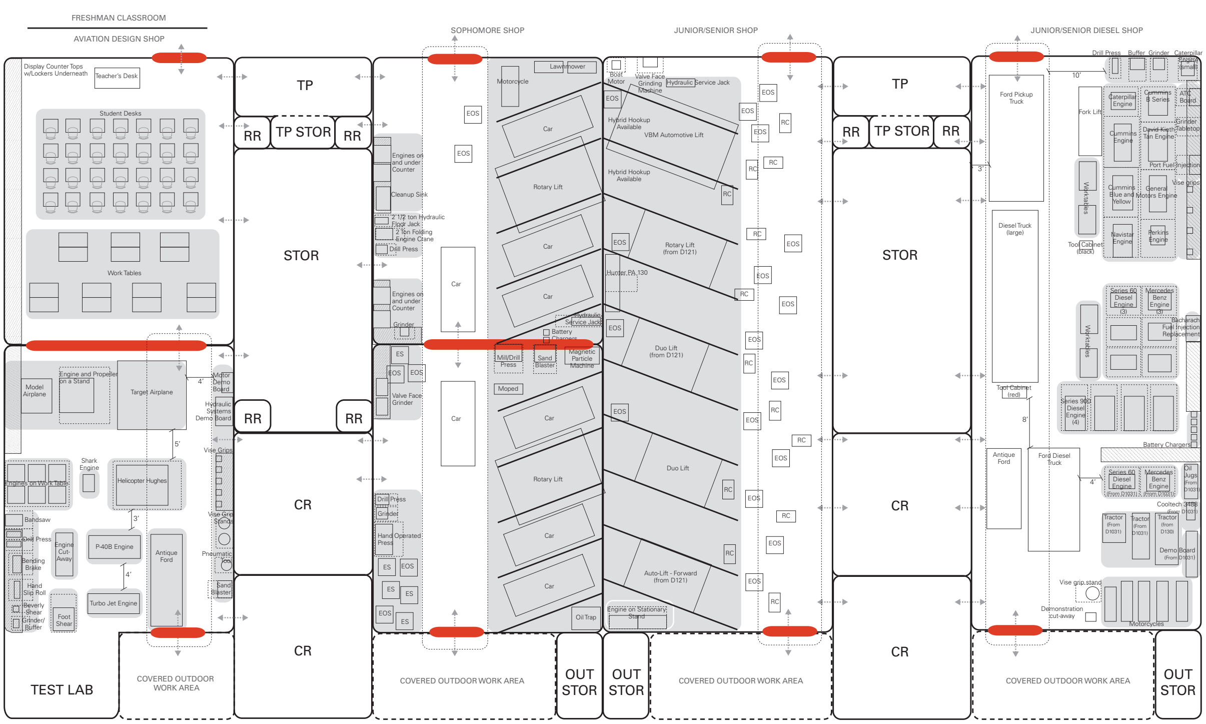
Program Space	Teaching Stations	Quantity	Area (SF)	Total (SF)
Automotive & Aviation				*22,160*
Freshman Classroom	1	1	2,000	2,000
Sophomore Shop	1	2	2,000	4,000
Junior/Senior Shop	1	1	4,000	4,000
Junior/Senior - Diesel Shop	1	1	4,000	4,000
Small Classroom (Shop Support)		4	600	2,400
Equipment and Tool Storage		2	1,200	2,400

Other Program Adjacencies

+ Computer Engineering
+ Manufacturing
+ Engineering

Future Trends

+ Hybrid Cars
+ Self-Driving Cars
+ Aerospace Engineering
+



EQUIPMENT FOOTPRINT
EQUIPMENT WORKING AREA
GENERAL EQUIPMENT AREA
COUNTER TOP
RR (REST ROOM)
CR (CLASSROOM)
TP (TEACHER PLANNING)
ROLL-UP DOOR
EOS (ENGINE ON STAND)
RC (ROLLING CART)

Summary

The Computer Engineering CTE program instructs students in a variety of computer specialties, including programming, software engineering, and hardware configuration.

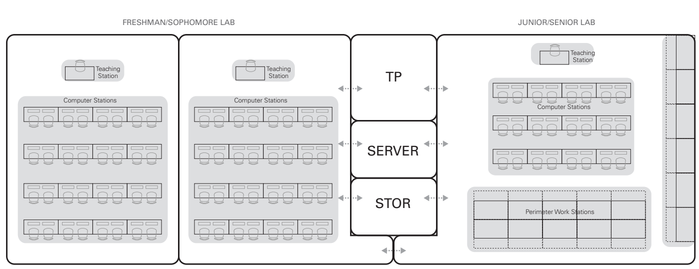
Program Space	Teaching Stations	Quantity	Area (SF)	Total (SF)
Computer Engineering				*4,725*
Freshman Classroom	1	1	1,200	1,200
Sophomore Classroom	1	1	1,200	1,200
Junior/Senior Lab	1	1	1,800	1,800
Storage		1	150	150
Server Closet		1	150	150
Teacher Planning		3	75	225

Other Program Adjacencies

+ Electric
+ Manufacturing
+ Engineering
+ Automotive

Future Trends

+ Virtual Reality
+ Artificial Intelligence
+



EQUIPMENT FOOTPRINT
EQUIPMENT WORKING AREA
GENERAL EQUIPMENT AREA
COUNTER TOP
RR (REST ROOM)
CR (CLASSROOM)
TP (TEACHER PLANNING)
ROLL-UP DOOR
EOS (ENGINE ON STAND)
RC (ROLLING CART)

ED SPEC SUMMARY / CONSTRUCTION

Summary

The Construction CTE program provides students with hands-on experience in woodworking, cabinetry, rough framing and finish carpentry. Students gain experience in proper tool usage techniques, fabrication techniques, including pre-fabrication. Juniors and seniors gain real world experience constructing projects both on- and off-site. Traditionally, the off-site project has been the construction of the Benson House, however the long term availability of this program is not anticipated, so alternatives must be considered in the planning of the spatial needs of the program. Integration with the Math Tech program for freshman and sophomore offerings is also planned into the program and reflected in the program adjacency diagram.

Adjacent outdoor space, providing areas for work, loading and material storage should be provided near the exterior access doors in shop spaces for easy loading and unloading of supplies and products. This space should also be adjacent to the CTE courtyard for shared access with other CTE programs.

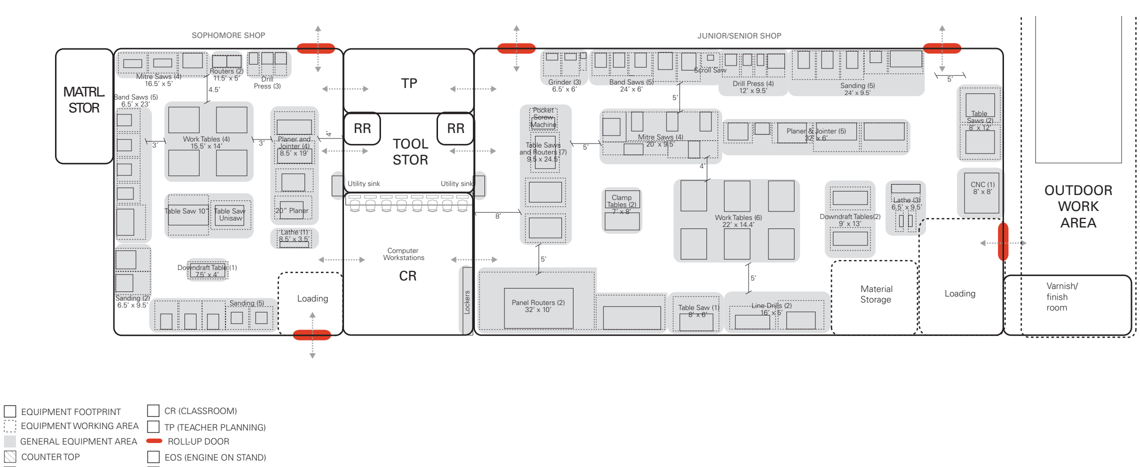
Program Space	Teaching Stations	Quantity	Area (SF)	Total (SF)
Construction				*9,275*
Sophomore Shop	1	1	2,000	2,000
Junior/Senior Shop	1	1	4,500	4,500
Loading/Storage		2	200	400
Small Classroom (Shop Support)		1	600	600
Tool Storage		2	400	800
Material Storage		2	300	600
Teacher Planning (includes Math Tech)		5	75	375
Outdoor Loading				1,000
Outdoor Work Area				2,000

Other Program Adjacencies

+ Computer Engineering
+ Manufacturing
+ Engineering

Future Trends

+ Hybrid Cars
+ Self-Driving Cars
+ Aerospace Engineering
+



ED SPEC SUMMARY / MATH TECH

Summary

The Math Tech CTE program is composed of two programs:

+ Tech Geometry, where freshman learn project-based math skills through construction activities.
+ Tech Algebra, where sophomores learn project-based math skills through screen printing and business activities.

The Tech Geometry curriculum currently includes building tiny homes for the homeless, but the long term funding and viability of this program is not a given, and they plan to transition into a Habitat for Humanity program that includes building a single-wide trailer home.

The Sophomore Lab is focused on heat press printing and screen printing and provides Benson swag and merchandise for the school, the sports teams, and other clubs and organizations.
Both programs require a proximate classroom space and tool and material storage.

The Math Tech program has a strong desire to be adjacent to the Construction CTE program as they share many tools and materials. A large outdoor work area for a Tech Geometry Shop is required for their 16' x 72' singlewide trailer and 20' x 8' shipping container. Loading and material storage should be directly adjacent to the exterior rolling door for easy loading and unloading of supplies and products.

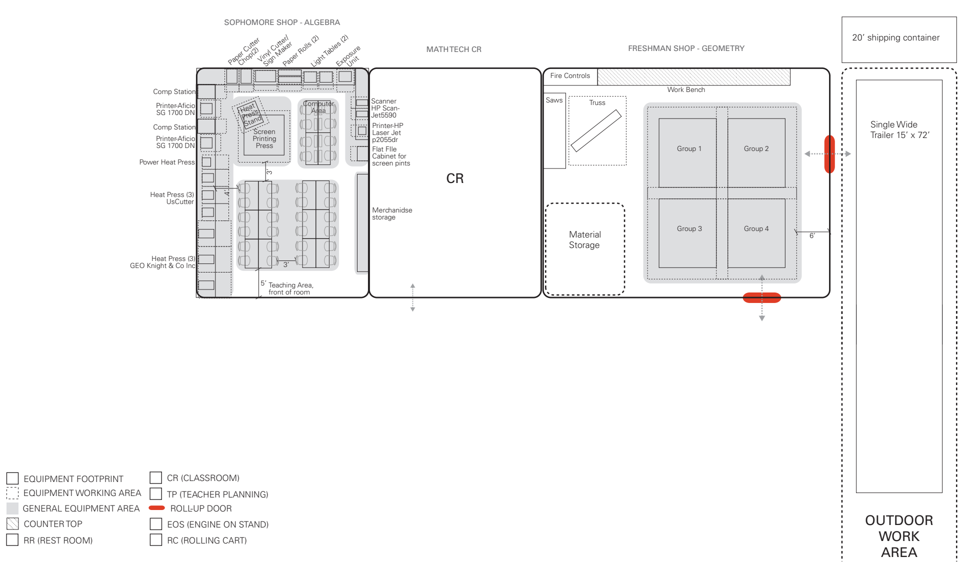
Program Space	Teaching Stations	Quantity	Area (SF)	Total (SF)
Construction: Math Technology				*5,000*
Large Classroom	1	1	1,200	1,200
Sophomore Lab - Algebra	1	1	1,200	1,200
Freshman Shop - Geometry	1	1	2,000	2,000
Tool Storage		1	200	200
Material Storage		1	400	400
Outdoor Work Area				750

Other Program Adjacencies

+ Construction
+ Math

Future Trends

+ Habitat for Humanity – Single wide house construction
+



BENSON POLYTECHNIC HIGH SCHOOL / 2017.05.04

bassetti architects

Summary

The Digital Media CTE Program exposes students to a production environment working in video production, website graphics and development, and photography. Studio spaces support the production of these subject areas, while computer labs and classrooms support the editing and execution of their projects.

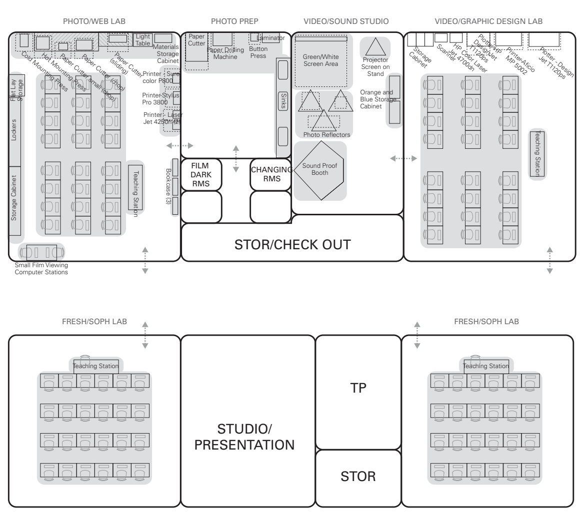
Program Space	Teaching Stations	Quantity	Area (SF)	Total (SF)
Digital Media				*7,160*
Freshman Classroom	1	1	850	850
Sophomore Classroom	1	1	850	850
Photo/Web Lab	1	1	1,200	1,500
Printing/Plotting/Layout		1	300	incl. above
Video/Graphic Design Lab	1	1	1,200	1,200
Video/Sound Studio		1	600	600
Photo Prep		1	460	460
Studio/Presentation		1	600	600
Storage		4	200	800
Teacher Planning		4	75	300

Other Program Adjacencies

+ Radio

Future Trends

+ Animation
+ Virtual Reality
+



- EQUIPMENT FOOTPRINT
- EQUIPMENT WORKING AREA
- GENERAL EQUIPMENT AREA
- COUNTER TOP
- RR (REST ROOM)
- CR (CLASSROOM)
- TP (TEACHER PLANNING)
- ROLL-UP DOOR
- EOS (ENGINE ON STAND)
- RC (ROLLING CART)

BENSON POLYTECHNIC HIGH SCHOOL / 2017.05.04

Summary

The Electric CTE program provides students with hands-on electric experience in residential and commercial applications. Students gain experience in equipment and tool safety, and codes and regulations within projects including circuit board wiring, house wiring, security system installation, fire alarm wiring, industrial automation, robotics, and motor control.

Adjacent outdoor space, providing areas for work, loading and material storage should be provided near the exterior access doors in shop spaces for easy loading and unloading of supplies and products. This space should also be adjacent to the CTE courtyard for shared access with other CTE programs.

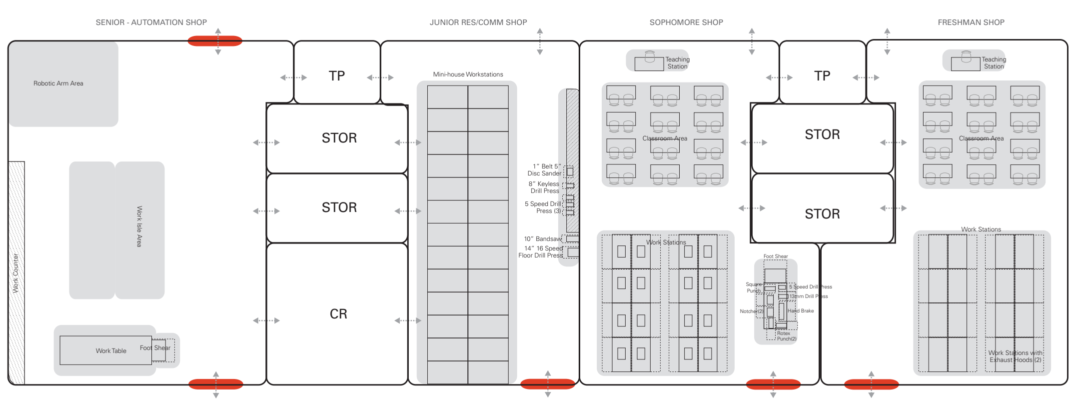
Program Space	Teaching Stations	Quantity	Area (SF)	Total (SF)
Electrical				*9,900*
Freshman Shop	1	1	1,800	1,800
Sophomore Shop	1	1	1,800	1,800
Junior - Res/Comm Elec Shop	1	1	1,800	1,800
Senior - Automation Shop	1	1	2,400	2,400
Small Classroom (Shop Support)		1	600	600
Storage		4	300	1,200
Teacher Planning		4	75	300

Other Program Adjacencies

+ Construction
+ Architecture
+ Robotics
+ Computer Engineering

Future Trends

+ Alternative Energy Sources – Solar PV, Wind, Etc.
+ Battery Technology
+



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BENSON POLYTECHNIC HIGH SCHOOL / 2017.05.04

Summary

The Engineering CTE program is transitioning from a complimentary elective for numerous majors to a full CTE program that can integrate with almost all of the other majors.

Students can engineer and develop a variety of projects. Currently, the focus is in developing skateboard parts, gaining design and problem solving skills through 3D Modeling and 3D Printing. The program includes design, drafting, and fabrication using high tech tools and machinery with a variety of materials including wood, metal, and plastic.

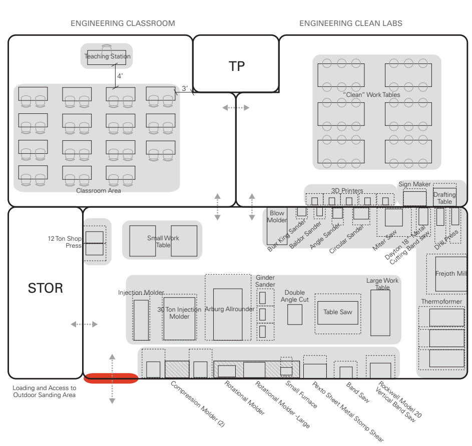
Program Space	Teaching Stations	Quantity	Area (SF)	Total (SF)
Engineering				*4,985*
Classroom / Clean Lab	2	2	980	1,960
Dirty Lab	1	1	2,000	2,000
Storage		2	400	800
Teacher Planning		3	75	225

Other Program Adjacencies

+ Manufacturing
+ Robotics
+ Architecture
+ Electrical
+ Digital Media
+ Art

Future Trends

+ High resolution wax and resin castings
+ Next generation CNC and laser cutting machines
+ Biological Materials Science
+



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RC (ROLLING CART)

Summary

The Health Occupations CTE program combines in-school coursework with real-world clinical experience to prepare students for assistant positions in nursing, dentistry, first responding, and medical fields.

Program Space	Teaching Stations	Quantity	Area (SF)	Total (SF)
Health Occupations				*11,880*
Freshman Classroom	2	2	850	1,700
Anatomy Lab	1	1	1,300	1,300
Anatomy Lab Prep		1	100	100
Nursing Lab	1	1	1,500	1,500
Sterilization Room		1	150	150
Medical Lab	1	1	1,200	1,200
Medical Scenario Clinic		1	750	750
Medical Sim Lab		1	600	600
Dental Lab	1	1	1,500	1,500
First Responder Classroom	1	1	980	980
Storage		4	150	600
Extended Learning Area		1	900	900
Conference Room		1	150	150
Teacher Planning		6	75	450

Other Program Adjacencies

+ Science

Future Trends

+ Handheld, portable x-ray system (Dentistry)
+

Summary

The Manufacturing CTE program provides students with hands on learning to design and manufacture products. Students work with various materials and learn safety of equipment and tools including lathes, CNC mills, drill presses, grinders, and band saws.

Program Space	Teaching Stations	Quantity	Area (SF)	Total (SF)
Manufacturing				*23,460*
Freshman Shop	1	1	2,500	2,500
Sophomore/Junior - Metals Shop	1	1	5,000	5,000
Senior - Machining Shop	1	1	5,000	5,000
Foundry Shop	1	1	2,592	2,592
Pattern Making Shop	1	1	4,293	4,293
Small Classroom (Shop Support)		2	600	1,200
Storage		4	300	1,200
Teacher Planning		5	75	375
Computer Design Lab		2	600	1,200
Flammable Storage		1	100	100

Other Program Adjacencies

+ Engineering
+ Robotics
+ Architecture
+ Construction
+ Electric

Future Trends

+ 3D Printing
+ Prosthetic Limbs
+