March 15, 2013

HMC Architects

INTRODUCTION:

In November of 2012, LPA performed an architectural, structural, mechanical, electrical and plumbing assessment of the San Bernardino Valley College Technical Building which was primarily built in 1963 with modifications made in the early 2000's. The building houses the following programs: Automotive Repair, Welding, Aeronautical Maintenance, Machining, Refrigeration, and Electrical. The purpose of this report was to identify building deficiencies in the areas assessed in order to inform the College of potential options for renovation, addition, or new construction within their current bond program and within the bigger context of other projects on the campus. Within this process, certain life safety issues were identified that posed immediate life safety risks to the occupants. The report also identified items that greatly affected student and staff comfort in various spaces. Based on these two basic categories, the College was extremely concerned that the safety of students and staff was at risk and that some learning environments were not conducive to housing a higher education curriculum due to the physical impacts.

In February 2013, HMC Architects along with P2S Engineers performed a more focused assessment on these specific mechanical, electrical, plumbing and architectural items cited in the LPA report. The purpose of this assessment was to confirm the life safety concerns raised in the LPA assessment and then also quantify them with a Rough Order of Magnitude Cost to address the safety and functional concerns addressed. This assessment is to be a decision making tool for the College to better understand the financial impacts of correcting the most pressing life safety issues and the items that will be triggered by DSA once the life safety issues are addressed.

EXECUTIVE SUMMARY:

This current assessment did confirm some of the life safety issues within the original LPA report. The full mechanical, electrical, and plumbing assessment by P2S is attached to provide more detail on the building's existing systems and the recommended approach to each system. The following items are those that are recommended to be addressed by the College to rectify the life safety issues and also address those spaces that have building systems that are not conducive to the learning environment they currently house. The following recommendation are organized by curriculum and then by trade. The Conceptual Cost Estimate of each solution is also provided by curriculum area and trade so the College can assess the cost implications of addressing the deficiencies by program. The detailed Conceptual Cost Estimate is attached for the College to better understand the assumptions made for each area cited as a deficiency and its related solution.

Through this latest walk, it was observed that while the electrical systems within the building are at their expected life, there were no life safety issues visible. It is recommended that if additional work is done, old panels are replaced in the process.

The three major programs that have major deficiencies are the Welding, Automotive and Aeronautics programs. The following section then cites deficiencies by these programs and then general building upgrades required to address these deficiencies. The last

section also notes code related upgrades that will be required by the Division of the State Architect when the life/safety items are addressed. It is HMC's opinion that the cost to address the life/safety and rectify subpar learning environments will be approximately **$2,300,000 in total construction cost**. This opinion is based on previous experience with the requirements of the Division of the State Architect within a major modernization. HMC recommends that once a definitive approach to the building is developed that a meeting with DSA is scheduled to confirm the State's minimum requirements for the building.

Summary of Building Deficiencies with Solution and Cost

Welding, Rooms 112B and 121 ***(Total preliminary ROM: $505,300)***
Note: As noted in the LPA report, Welding Lab 121 and the adjacent Room 21 are part of an A# that is currently closed without certification. Additional research would need to be conducted as there is a potential cost impact related to this if the closure is due to non-compliant construction.

Mechanical: ***(Total preliminary ROM: $505,300)***

WM1. Both welding labs utilize updraft ventilation at the welding stations. This places the students and staff in direct exposure to welding fumes. To mitigate this impact, it is recommended that downdraft welding station we installed. This would require the installation of the stations themselves and new ducting and exhaust systems to connect to the stations.
Preliminary ROM: $488,000

WM2. Welding Lab 121 is not equipped with a make-up air unit to balance the air that is being exhausted. This brings the space out of compliance with OSHA requirements for fresh air make-up in this type of industrial environment. It is recommended that a new make-up unit be installed for this space. This will include the installation of the unit, structural reinforcing for the unit and new ducting and distribution.
Preliminary ROM: $17,300

Automotive (***Total preliminary ROM: $228,100)***

Mechanical: ***(Total preliminary ROM: $46,000)***

AU1. The main Auto Shop Lab (116A) does not meet the minimum ventilation requirements for its industrial use. Proper ventilation in an auto shop is a key life safety item. The solution to this is to install a new constant speed roof top exhaust fan. This shall include structural reinforcing and new ducting for the system.
Preliminary ROM: $36,000

AU2. Rooms 115A/B/C serve as supply/tool rooms for the automotive and aeronautical programs. The rooms are out of compliance with code in terms of ventilation as it is completely lacking in this area. With the industrial usage, this is a life safety issue for fresh air requirements. To resolve this issue, an inline transfer fan shall be installed to correct lack of ventilation in this area.
Preliminary ROM: $10,000

Plumbing: ***(Total preliminary ROM: $182,000)***

AU3. In the Steam Clean area adjacent to the Automotive Shop, the transmission washer and boil out tank discharge directly onto the floor creating an unsafe condition in terms of the chemicals used and for a slip condition. It is recommended that floor receptors be installed adjacent to

the washer and tank and then connect those receptors to the existing interceptor.

Preliminary ROM: $11,600

AU4. The Auto Shop bays in 117A do not have fire sprinkler coverage. The entire east wing housing some Auto Body Repair and Welding also is not sprinklered. Due to the nature of these buildings and their usage, this is a life safety issue. It is recommended that the existing 8" riser feeding the overall technical building is extended to cover Auto Shop 117A while a new 4" riser shall be installed at the east building to provide protection at spaces 118, 119, 120, and 121. With the additions in the welding shop 121 not certified, costs in this area can be higher related to closing this out with DSA.

Preliminary ROM: $136,500

AU5. Due to the work necessary in Item GE3 to replace the emergency eyewash stations throughout the building, it is also necessary to replace the gas water heater that is located in the Auto Shop mezzanine to deliver the proper temperature of tepid water as required by code.

Preliminary ROM: $34,000

Aeronautics (***Total preliminary ROM: $20,900)***

Mechanical: ***(Total preliminary ROM: $20,900)***

AR1. The Fuel Storage Room in the yard is not equipped with constant ventilation as required by code. The existing fan controls shall be modified to provide a constant rate of air flow as required by code.

Preliminary ROM: $3,600

AR2. The Aeronautics Shop does not have proper ventilation. This was immediately evident during the field investigation as the space was high in temperature and stuffy even though outside conditions were very mild. It is recommended that a large roof top exhaust fan be installed so that the minimum ventilation requirements for this type of space are met. This shall include structural reinforcing and new ducting for the system.

Preliminary ROM: $17,300

General Building (***Total preliminary ROM: $1,509,400)***

Mechanical: ***(Total preliminary ROM: $58,000)***

GE1. Most of the swamp coolers on the roof are not operable. The remainder of the swamp coolers has reached their expected life. It is recommended that all eleven (11) swamp coolers be replaced to provide properly conditioned air to the various lab spaces.

Preliminary ROM: $58,000

Plumbing: ***(Total preliminary ROM: $428,000)***

GE2. Existing hose bibs throughout the building do not have backflow prevention. In order to maintain the integrity of the water systems, it is recommended that hose bibs be replaced with one that is equipped with a vacuum breaker.

Preliminary ROM: $11,000

GE3. Throughout the building, there are six (6) eyewash/facewash stations of various configurations. While they are in working condition, they have served their useful life cycle and it cannot be confirmed that they can provide the adequate flow to properly flush contaminants if used. The wash stations shall be replaced with a new eyewash station. This will

also require the replacement of the gas water heater in the mezzanine level so that the tepid water requirement from the code can be met.

Preliminary ROM: $95,000

GE4. The building sanitary sewer system feeds into a single lateral that then discharges into the public sewer system. Due to the nature of the uses of this building, various chemicals are introduced into the plumbing system and the public sewer system needs protection from these chemicals. It is recommended that a minimum 500 gallon sand/oil interceptor be installed on the main lateral prior to entering the public sewer system.

Preliminary ROM: $106,000

GE5. Condensate piping for the existing A/C units in the building is not compliant to current codes. The condensate piping should be replaced to conform to current codes. *This is not a life safety issue.*

Preliminary ROM: $28,000

GE6. The existing plumbing fixtures within the building are at their life expectancy. These should be replaced with new high efficiency fixtures. *This is not a life safety issue.*

Preliminary ROM: $188,000

Code Upgrades: ***(Total preliminary ROM: $1,023,400)***

Due to the nature of the items noted above, it is anticipated that the Division of the State Architect will require accessibility upgrades and additional fire/life safety upgrades to bring these areas up to current code. The following items are based on HMC's past experience with large modernization projects with the San Diego DSA office. It is recommended that a meeting be set with DSA as soon as a possible scope is determined in order to confirm the limits of the scope that will be required on this specific project.

GE7. Accessibility upgrades are anticipated to primarily be path of travel upgrades within the building including new doors with hardware and frames, tactile signage, additional strobe coverage, miscellaneous upgrades to handwash sinks in various labs and truncated domes to depict pedestrian and vehicular areas within the yard areas.

Preliminary ROM: $672,400

GE8. Fire/life safety code upgrades are anticipated to be modifications to the existing fire alarm system, rating separations in the exit corridors and lab areas and additional fire extinguishers for better distribution throughout the building.

Preliminary ROM: $351,000

p2s

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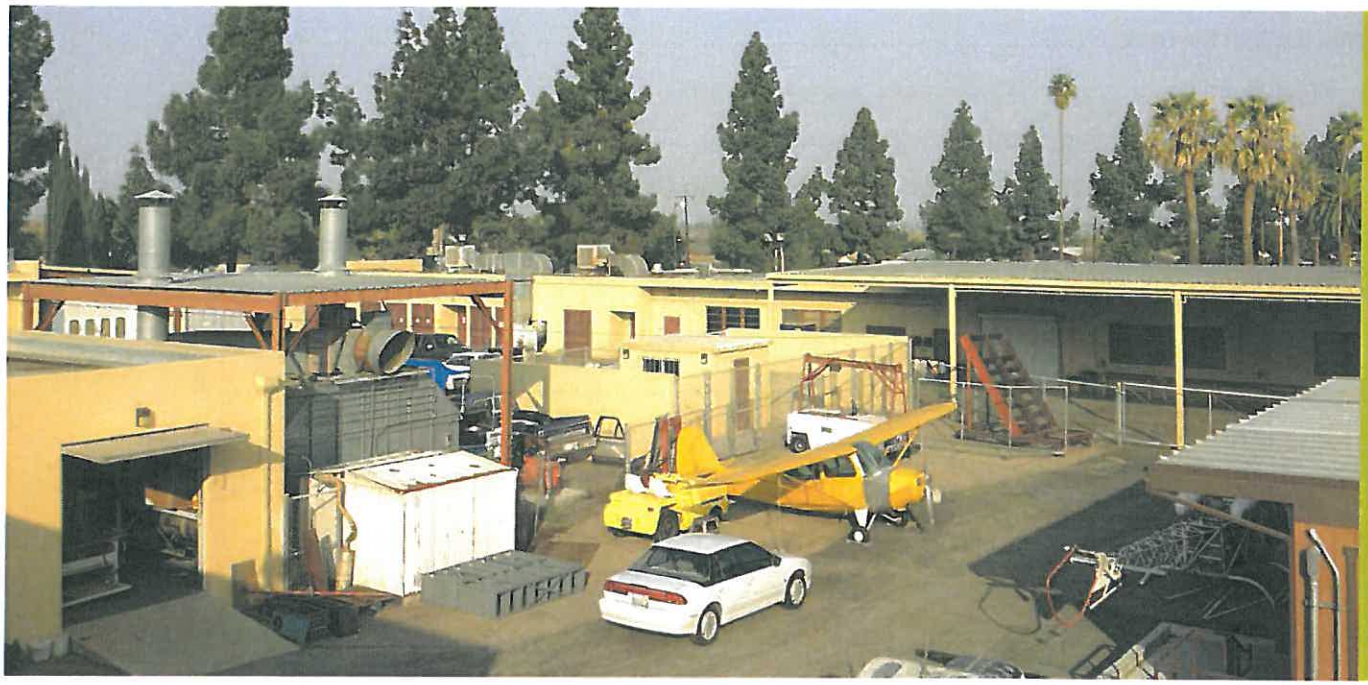
THE INTEGRITY TO SUSTAIN.



THE VISION TO CHANGE.
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San Bernardino Valley College - Tech Building

MEP Systems Assessment and Recommendations

SBVC TECH Building

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Table of Contents

Introduction

P2S Engineering visited the San Bernardino Valley College Technical Building to review the existing Mechanical, Electrical, and Plumbing installation. Our office was asked to review and note any MEP issues that are a safety concern.

The original facility was built in approximately 1963. The facility consists of multiple buildings that serve Automobile, Welding, Aeronautical Maintenance, Refrigeration, and Electrical trade classrooms. Multiple upgrades and remodels have occurred over the history of the facility.

Per discussions with SBVC Trade Tech Staff, hazardous materials, such as fuel, are stored in the Hazardous Material building. Fuels, solvents, etc are used only in small quantities for demonstration purposes and are not stored in the main buildings.

Executive Summary

Mechanical

- The Auto Shop does not meet the minimum ventilation requirements of Title 24-2008. A constant speed rooftop exhaust fan operating at 17,000 CFM shall be provided to meet the minimum ventilation requirements.
- The Fuel Storage spaces shall be provided with continuous ventilation at a minimum ventilation rate of 1 CFM/SF. The existing exhaust fans appear to be sized to meet the 1 CFM/SF; however, each fan shall be modified to operate as 24/7 and therefore taken off the wall switch. The fan controls shall be modified as necessary to operate 24/7.
- The Aeronautics Shop does meet the minimum ventilation requirements of Title 24-2008. A constant speed rooftop exhaust fan operating at 1,800 CFM shall be provided to meet the minimum ventilation requirements of the Aeronautics Shop.
- Rooms 115A/B/C must be provided with ventilation air as they are occupied spaces. A minimum of 300 CFM of ventilation air shall be provided to this space. An inline transfer fan shall be provided from the aeronautics shop.
- A majority of the swamp coolers on the roof are either in the off position or not in an operable condition. In addition, all swamp coolers have reached their useful life. In order for the building to be able to provide ventilation and cooling, all (11) swamp coolers shall be replaced in kind. For reference, the current units are Champion Cooling Corporation Model 4300DD.
- Welding Shops 112B and 121 include updraft capture hoods which poses a potential **life safety risk** to students. The use of downdraft hood is recommended for the safety of students. The existing updraft hoods shall be replaced with equivalent downdraft hoods and the ducting shall be modified to accommodate the new hoods.
- Welding Shop 21 does not include any make-up air to replace the air being exhaust and does not meet OSHA requirements. A 1,600 CFM make-up unit shall be provided for this space.

Electrical

- The existing electrical equipment is adequate for the current use.**(no life safety issues)**
- Many of the existing electrical panels were produced by a manufacturer that has not been in business since the mid-1970s. New replacement circuit breakers are not available. Replacement of the panels is not immediately necessary, but the College should consider including future budgeting to allow replacement of the existing Zinsco electrical panels. Estimated Cost $7,500 per panel replaced.
- For the most part, receptacles looked adequate but a survey of the end users should be done to verify where additional receptacles may be needed. Estimated Cost $5,000-$10,000 depending on quantity and location.
- Replace non-illuminated exist signs with internally lit or self-illuminescent exit signs. Estimated Cost (budgeting 20 locations) $10,000.

- Per documentation, the existing fire alarm system was installed in approximately 2000. It appears there is adequate ADA horn/strobe coverage throughout the building. Maintain appropriate maintenance and testing, and the system should be appropriate.

Plumbing

- Record drawings noted a 3" domestic water service to the building. The 3" service appears adequate in size to serve the existing fixture demand of the building. The pipe material used within the building appear to be galvanized piping for the most part with a combination of copper piping in areas that showed signs of alteration. The average life expectancy of galvanized pipe is typically anywhere from 40 to 50 years and can be less depending on the characteristics of the water in the area. Assuming galvanized piping was a part of the original construction which dates back to 1964, the pipes could presumably be at the end of its expected life. A consideration in repiping with copper material is highly recommended.
- Existing wall hydrants/hose bibs without backflow prevention measures were found throughout the building. They appear to be part of the original construction. We recommend replacing them with new hose bibs equipped with a vacuum breaker to prevent back siphonage and cross contamination.
- A total of 6 existing safety/emergency equipment were found in the building. Emergency eye/face wash stations were located in rooms 110 (Front Welding), T111A (Machine Shop), 116 (Auto Shop), 114 (Aeronautics Lab), and at the exterior of the Shop Building adjacent to room 119 (Welding Classroom). A combination eye/face wash and drench shower was located in the Steam Clean area by the service yard. They all appear to be in operating but poor condition. We recommend replacing them with new safety equipment and provide with "tepid water". **(life safety issue)**
- The existing building drain system of the Tech building and Shop building combined into a common sewer lateral that originated from West Esperanza St. To protect the public sewer system from pollutants and contaminants, we recommend implementing a filtration system such as an interceptor or separator. A minimum 500-gallon sand/oil interceptor should be installed on the main sewer lateral downstream of all the existing building drain branches and within the property line. Also, implement a schedule to maintain the interceptor periodically to prevent discharge of industrial waste materials into the city wastewater collection system.
- The existing drain sump and sediment interceptor in the Steam Clean Area shall be cleaned and maintained periodically. Efficiency of operation is directly related to the level of maintenance.
- The existing transmission washer and boil out tank in the Steam Clean Area have drain connections which discharges on the floor surface when in use thus creating an unsafe condition. We recommend the provision of floor receptors placed adjacent to the equipment. Extend and connect the receptor drain piping in the inlet side of the existing interceptor. Another viable solution is to extend the equipment drain to terminate above the sump drain with an approved air gap.

- Condensate drain piping of existing rooftop A/C units will have to be replaced with new piping and pipe supports as the conditions and installation of the existing drain piping are in violation of current codes and standards.
- The Tech Building is protected by an automatic wet-pipe fire sprinkler system. There are two (2) fire sprinkler risers (a 6" and an 8" respectively) located in the south end of room 114 (Aeronautics Lab). The sprinkler risers and distribution piping appear to be in good condition. However the system shall be periodically inspected, tested, and maintained per frequency noted in NFPA 25.
- Fire extinguishers were also provided throughout the building. Inspection tags are all current.
- Upright sprinkler heads were provided in areas without ceiling; pendent sprinkler heads with escutcheons in areas with ceiling. They are of the fusible link type and appear to be in good condition without signs of damage.
- Auto Shop (117) and the stand alone Shop Building east of the service yard did not have any fire sprinkler coverage. However, fire extinguishers were provided in each room and their inspection tags are all current. We recommend extending the sprinkler coverage of the 8" fire riser of the Tech Building to include Auto Shop (117). We recommend a dedicated fire sprinkler riser (minimum of 4") be provided with a wet-pipe sprinkler coverage for the Shop Building which houses the Welding Shop/classrooms (101, 100, 120, 119), and Auto Body Shop (118). **(Potential life safety issue)**
- Existing plumbing fixtures should be replaced with new high-efficiency, low-flow fixtures to reduce energy and water consumption to comply with current codes and standards. Existing hose bibs throughout the building should be replace with new fixtures equipped with a vacuum breaker.
- Clean and refurbish all existing floor drains for reuse and inspect for trap primer connection. If no trap primer was provided, replace the existing drain with a new drain and trap primer.
- The existing gas-fired tank type water heater located in the mezzanine level will have to be replaced with a larger unit to support the added demand required by the safety/emergency equipment for delivery of "tepid water". The water heater shall also be seismically secured and provided with a drain pan per current codes and standards.

Mechanical Systems

The existing mechanical systems were reviewed via a site visit as well as the available documentation. The assessment is based on the best available information.

West Building

The West Building consists of the offices, general classrooms, tool storage, and a refrigeration workroom. This area is served by a multi-zone constant volume air handler located in the mezzanine over rooms - 115A/B/C. The system consists of 8 zones and includes gas-fired reheat coils. Supply is delivered to the space and for a majority of the spaces, air is returned via transfer ducts from the space out to the corridor space which then includes a hard ducted return from the corridor.

Room 112B – Welding Shop

The welding shop is served by multiple exhaust fans, up blast and utility type, serving general exhaust, canopy exhaust hoods, and local exhaust snorkels. Supply air is provided via swamp coolers. The room also includes multiple space heaters to maintain the minimum space temperature required by the 2010 California Mechanical Code (CMC). The exhaust hoods are currently installed as updraft and pose a potential risk to students by putting them in direct exposure to the byproducts of the welding process. The use of downdraft hoods is recommended for the safety of students.

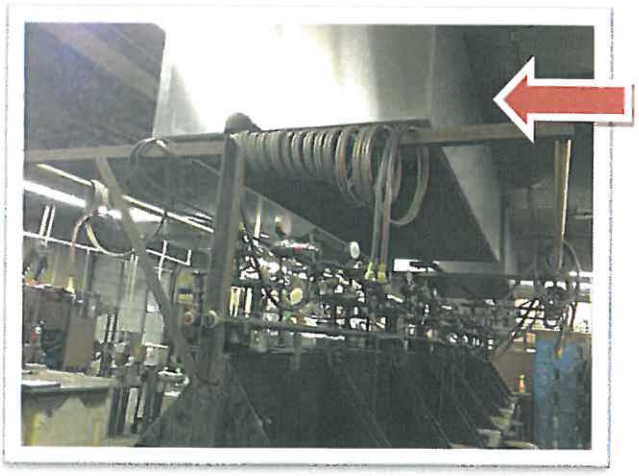


Figure M-1 - Updraft Exhaust Hood in Welding Shop 112B

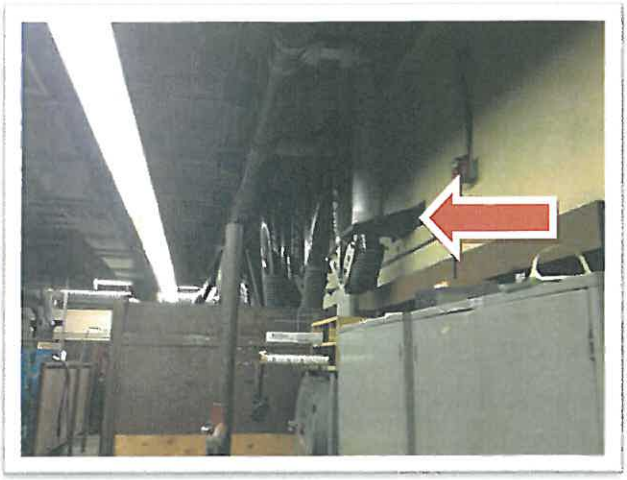


Figure M-2 - Local Exhaust Snorkels in Welding Shop 112B

Room 112A and 111B – Computer Lab and Teaching Classroom

The computer lab and teaching classroom are each served by an existing Carrier packaged unit with DX cooling and gas heating. The unit is controlled via a controller/thermostat located in the space with on/off/auto capabilities.

Room 111 – Machine Lab

The machine lab is served by three rooftop packaged Carrier units and space heaters distributed throughout the room.

Room 116A/B – Auto Shop

The automotive shop was served by multiple swamp coolers located on the roof. A local exhaust system was provided via an exhaust fan located in the space with underground ducting and local exhaust ports. The exhaust fan is controlled via a wall switch and is currently only operated when a vehicle is being serviced and the engine is on during servicing. Per Title 24-2008, Table 121-A, the minimum ventilation rate for an auto repair workshop is 1.50 CFM/SF. The point of use system currently in use does not meet the minimum ventilation requirements per code. The system must operate continuously when the space is occupied and meet the minimum ventilation rate. The point of use exhaust system can still be used in addition to the general continuous ventilation system indicated above.

The automotive area also included radiant space heaters to meet the minimum space temperature requirements of the 2010 CMC.

Room 117A/B – Auto Shop

There is a second automotive repair shop which is also served by swamp coolers and a general exhaust fan. Per Title 24-2008, Table 121-A, the minimum ventilation rate for an auto repair workshop is 1.50 CFM/SF. Base on the information available at the time of this report, it could not be verified if the exhaust fan provides adequate ventilation to meet Title 24.

Figure M-3 - Underground Local Exhaust Connection in Auto Shop 116

Room 114A – Aeronautics Shop

The aeronautics shop is served by multiple swamp coolers located on the roof. Most, if not all, of these units appeared to have the disconnect switch on the equipment in the off position rendering this equipment inactive. There are two small labs with rooftop exhaust fans in this space. These exhaust fans are controlled via a wall switch and are typically in the off position. As such, no ventilation air is being provided via mechanical means. Per Section 121 of Title 24-2008, occupied spaces must be ventilated via mechanical means or natural ventilation, which requires openings to be permanently open and within 20 feet of the naturally ventilated space. As such, the current system does not meet the ventilation requirement of Title 24.

Room 25 – Storage Building

There is a stand-alone storage building with 4 separate storage spaces. Fuel storage for the aeronautics program is provided in some of these spaces. The fuel storage rooms include an exhaust duct located near a wall and within 12 inches of the ground and a make-up air duct located on the opposite side of the room and within 12 inches of the floor. The exhaust fan is currently controlled via a wall switch interlocked with the lights. This switch is typically in the

off position unless an occupant is in the building. Per NFPA 30-18.6, liquid fuel storage areas shall be provided with either a gravity system or a continuous mechanical exhaust ventilation system. As the current system is non-continuously mechanical exhaust ventilation, it does not meet NFPA 30 and is in violation of the code. Also, NFPA 30-18.6 requires a minimum of 1 CFM/SF for liquid fuel storage areas. The existing exhaust fans need to be verified to be a minimum of 1 CFM/SF for these spaces.

Figure M-4 - Fuel Storage Room 25

Room 21 – Welding

Room 21 includes multiple snorkels for local exhaust points. However, there is no direct make-up air to the space and is completely unventilated. OSHA requires make-up air shall be clean and respirable. Per the current installation, there is no means of make-up air other than infiltration from adjacent spaces and the ambient. Without direct make-up, it is not confirmed that clean and respirable make-up air is being provided.

Room 121 – Welding

Room 121 includes multiple snorkels for local exhaust points as well an overhead exhaust hoods. There are two rooftop ARES make-up units providing direct make-up to the space.

The exhaust hoods are currently installed as updraft and pose a potential risk to students by putting them in direct exposure to the byproducts of the welding process. The use of downdraft hoods is recommended for the safety of students.

Room 115A/B– Machine Shop and Office

Room 115A/B is a single space separated by a chain link fence and is utilized as a Machine Shop on one side and an office and storage on the other side. At the present time, there is no HVAC equipment serving this space. As this is an occupiable space, per Section 121 of Title 24, ventilation must be provided to this space. This ventilation of this space does not meet the code.

Figure M-5 - Exterior View of Welding 121 and Welding 12

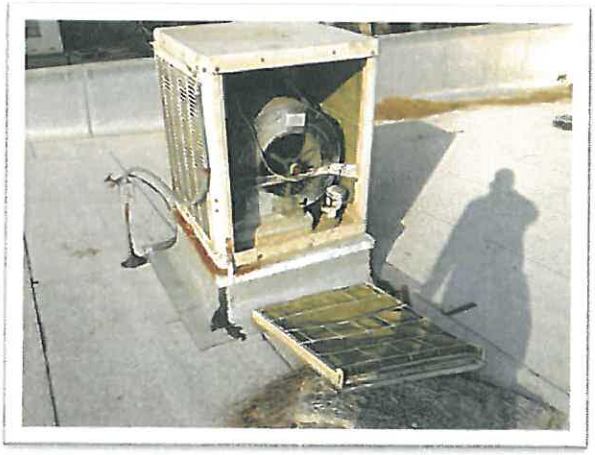


Figure M-6 – Condition of Existing Swamp Coolers

Figure M-7 – Swamp Coolers in the Off Position

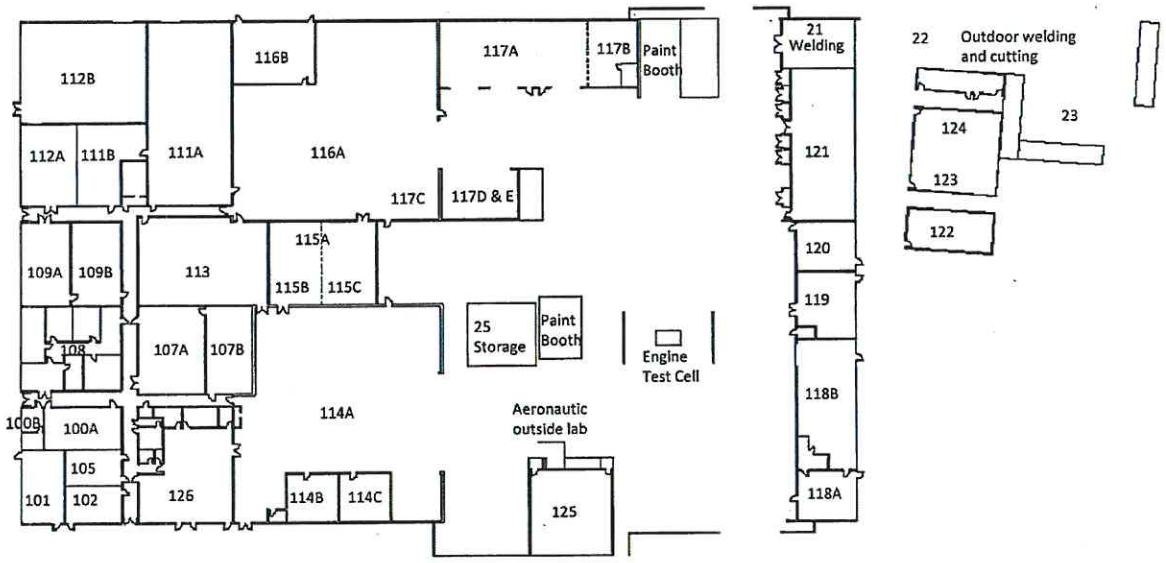


Figure M-7 - SBVC Tech Building Floor Plan

Electrical Systems

Our office reviewed the existing electrical installation for the facility and available building documentation.

Electrical Distribution

The facility is served by a 5KV medium voltage feeder that serves a 300 kVA, 4160 volt to 480 volt transformer. The transformer serves a 400 amp, 480V, 3 phase, 4 wire electrical service. This service feeds multiple step-down transformers, which in turn serve 120/208 volt electrical panels throughout the building.

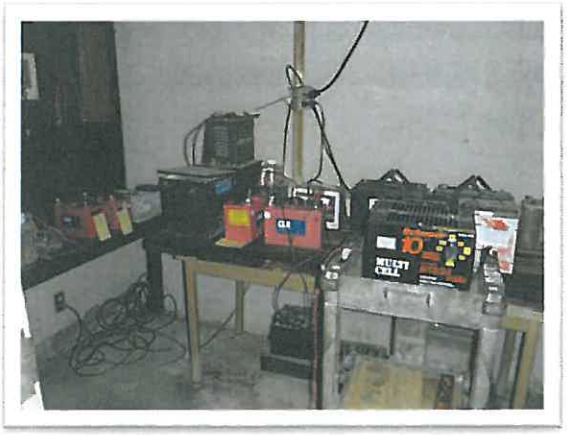
Electrical panels are located throughout the building to serve the needs of the facility. Many of the existing electrical panels, located in areas that have not been upgraded, were manufactured by Zinsco. Zinsco went out of business in the mid-1970s, and new replacement parts are no longer available. Refurbished circuit breakers are available, but are costly and difficult to obtain.

Typical Zinsco electrical panel

Electrical Power

Standard duplex receptacles, specialty receptacles, and equipment connections are provided throughout the building to serve the end user needs. The wiring methods appear appropriate to the area classification. For instance, in the hazardous storage house it appears appropriately rated light fixtures, switches, etc and seal offs are provided. In the automotive shop, conduit is brought from the ceiling down and receptacles are kept 18" above the floor to meet code requirements.

In a few locations, it appeared additional 120V, 20 amp duplex receptacles are needed to meet the needs of the end users. In these locations, the school should consider adding additional receptacles. See picture below.



Additional receptacles needed.

In general, the wiring appears acceptable.

Lighting

In general lighting is utilitarian and appropriate for the use of the space. One item to note, many of the areas do not have internally lit or self-illuminescent exit signs. In the event of a power loss, the signs will not be seen. The existing non-lit exit signs should be replaced with either internally lit or self-illuminescent exist signs.

Exit sign should be replaced

Fire Alarm

The current fire alarm system was installed in approximately 2000. Adequate ADA horn/strobes and manual pull stations appeared present. The system appeared adequate, and should be suitable as long as standard maintenance and testing are done.

Plumbing Systems

A field investigation of the existing plumbing systems serving the building was undertaken and the systems were analyzed with respect to their age, condition, functionality, safety, code compliance, efficiency and capacity. Our assessment is based entirely on information gathered from field observations and limited record drawings dating back to 1963. The report provides a summary of our findings and identifies safety issues that may impact the daily operation of the building, safety issues relating to occupant use, and any other plumbing issues that may affect the surrounding environment. It will also identify code compliance issues.

The plumbing systems evaluated in the Tech Building and Shop Building are as follows:

- Domestic Water System
- Sanitary Waste and Vent System
- Indirect/Condensate Drain System
- Safety/Emergency Equipment
- Fire Protection
- Plumbing Fixtures

Domestic Water System

Record drawings indicate the water service entered the Tech Building from College Drive. It was noted as a 3" service. The size of the service appears adequate in supplying the demand of the fixtures within the building. The pipe material used in the building appear to be painted galvanized piping for the most part with a combination of copper piping in areas that showed signs of alteration (Refer to Fig. 1 & 2). It may have been a part of the original construction which dates back to 1964. The average life expectancy of galvanized pipe is typically anywhere from 40 to 50 years and can be less depending on the characteristics of the water in the area. The pipes could presumably be at the end of its expected life. Further evaluation can be performed by taking a sample of the pipe and examining the interior surface for corrosion and/or sediment build-up.

Fig 1 - Galvanized water pipe

Fig 2 - Galvanized water pipe to electric water cooler.

There was an existing gas-fired tank type water heater located in a mechanical room of the mezzanine level (refer to Fig. 3 & 4). It is not seismically secured per 2010 CPC, Section 508.2. Strapping shall be at points within the upper 1/3 and lower 1/3 of its vertical dimensions. The system has a hot water return loop and possibly supplying the existing stainless steel wash fountains in the Aeronautics Lab (114) and Auto Shop (116). There were no available record drawings to confirm the extent of hot water distribution. The water heater may have to be replaced with a bigger unit to accommodate the tepid water requirement for the emergency equipment. The hot water for the lavatories in the restrooms are provided by a point-of-use instantaneous water heater (refer to Fig. 5 & 6). The heaters are in good working condition.

Figure 3 - Water heater at mezzanine level

Figure 4 - Improper strapping of water heater

Fig 5 - Insta-hot water heater

Fig 6 - Insta-hot water heater

The existing hose bibs throughout the buildings are in fair condition but were not equipped with any form of backflow prevention devices. A number of them are used to supply the water inlets of equipment, i.e. the transmission washer and the boil out tank in the Steam Clean Area, and the transmission washer in the Auto Shop (116). (Refer to Fig. 7, 8, & 9). There were several hose bibs without a backflow device that had garden hose connections exposed to possible back siphonage (refer to Fig. 10). These conditions are in violation of Section 602 and 603 of the CPC. The water supply for the safety/emergency equipment were also not provided with a backflow device. It is good engineering practice to install a check valve upstream of the supply connection to prevent possible back siphonage of contaminated water (refer to Fig. 11 & 12).

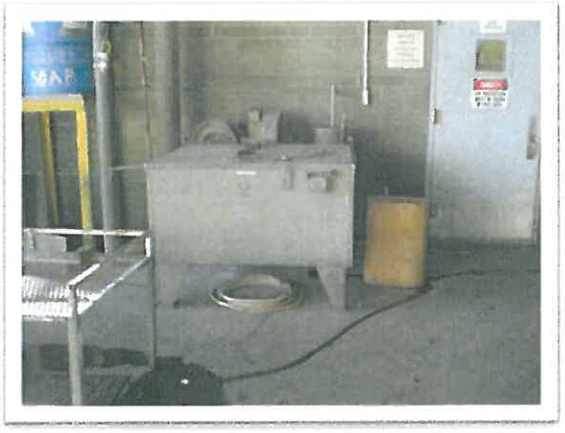


Fig 7 - Boil out tank for washing parts.

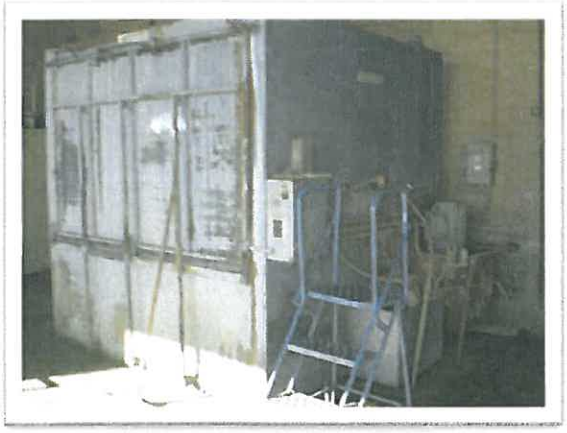


Fig 8 - Transmission washer in Steam Clean area

Fig 9 - Transmission washer in Auto Shop

Fig 10 - Hose bib without vacuum breaker with hose laying on wetted pavement.

Fig 11 - No backflow or check valve on water supply of eyewash.

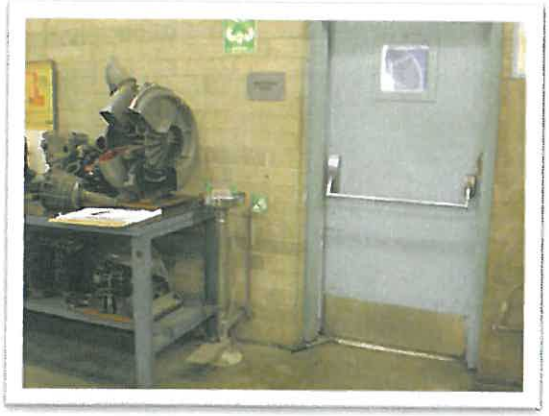


Fig 12 - Galvanized pipe supply with no backflow or check valve.

Sanitary Sewer, Waste and Vent System

The existing sewer lateral entered the property from West Esperanza steet. Record drawings noted a 4" sewer line with three branch connections coming from the Tech Building and one connection from the Shop Building. Lack of record/as-built drawings made it impossible to trace the existing sanitary building drain system below the building slab. There were floor drains in the Auto Shop (116) but we did not find the presence of any form of interceptor during our survey. Because of the nature of activities performed in the shop we recommend isolating the waste piping of the floor drains from the building drain system and provide a dedicated sand/oil/sediment interceptor to be located in the

Service yard prior to connecting to the existing 4" sewer lateral. Companies/contractors who specialize in locating/tracing and identifying size and invert elevations of the building drain system will be required to determine the exact locations, extent and condition of the piping below slab and/or grade.

A sump drain and a sediment interceptor was seen in the Steam Clean area between the Auto Shop and Aeronautics Lab (refer to Fig. 13 & 14). The sump drain receives the drain run-offs from the transmission washer, boil out tank, and the steam generator. There are no record drawings to determine the manner in how the sump drain and sediment interceptor is connected to the building drain system. The underground piping would need to be located and traced. Both the sump drain and interceptor would need to be maintained periodically. Efficiency of operation is directly related to the level of maintenance.

Fig 13 - Sump drain in Steam Clean area.

Fig 14 - Sediment Interceptor

Indirect/Condensate Drain System

The drain discharge from the equipment (transmission washer and boil out tank) in the Steam Clean area sheet flows into the existing sump drain. A faculty member said the quality of the waste discharged from the equipment was non-hazardous. We were also informed the transmission washer has not been used for the past 2 to 3 years. However, the boil out tank is used regularly to wash parts. Wastewater sheet flowing on the surface will produce mildew in due time if not cleaned and dried. It will create an unsafe condition for students and staff working in the area. We recommend providing a dedicated floor receptor for each equipment and be located adjacent to the equipment or extend the drain pipe of the equipment and terminate with an air gap above the sump drain.

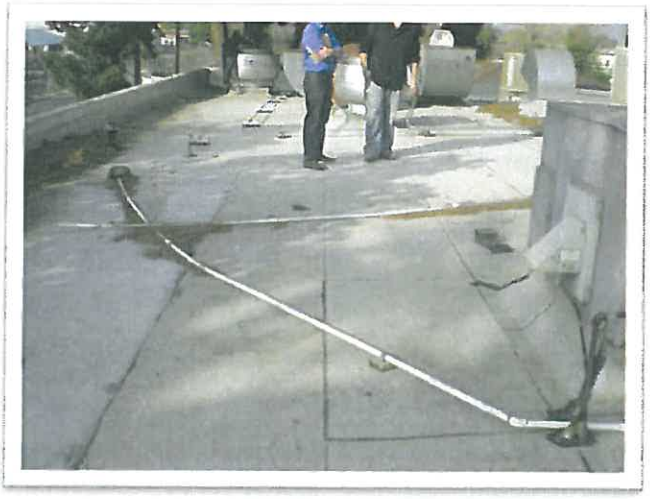


Fig 15 - PVC condensate drain pipe without adequate supports.

A combination of copper and PVC tubing were used for the condensate drain piping of the existing rooftop air conditioning units. They are in poor condition and installed without pipe supports (refer to Fig. 15). For condensate pipes with supports, wood blockings with pipe straps were used but none of which were secured to the roof. There were several drains without a p-trap assembly (refer to Fig. 16). Condensate drains were also terminating into a roof drain (refer to Fig. 17). We recommend replacing all the condensate piping with new copper tubing and install per current codes and standards

Fig 16 - Condensate drain without p-trap assembly.

Fig 17 - Condensate drains terminating at a roof drain.

Safety/Emergency Equipment

A total of 5 emergency eye/face wash and 1 combination eye wash/drench shower were found in the building. Emergency eye/face wash stations were located in rooms 110 (Front Welding), T111A (Machine Shop), 116 (Auto Shop), 114 (Aeronautics Lab), and at the exterior of the Shop Building adjacent to room 119 (Welding Classroom). A combination eye/face wash and drench shower was located in the Steam Clean area by the service yard. They were all examined and found to be in operating condition. However, all the stations were in fair to poor physical condition. Some of the components are showing signs of damage, i.e. the retainer straps that keeps the dust covers in place on the eyewash heads are missing, the foot control assembly on some of the stations show wear and tear. There were obstructions around the location of the emergency equipment that could possibly hinder the path of travel and its use. The water supply line for the combination eyewash drench shower appears to be undersized. Refer to figs. 18, 19, 20, 21, 22, & 23.

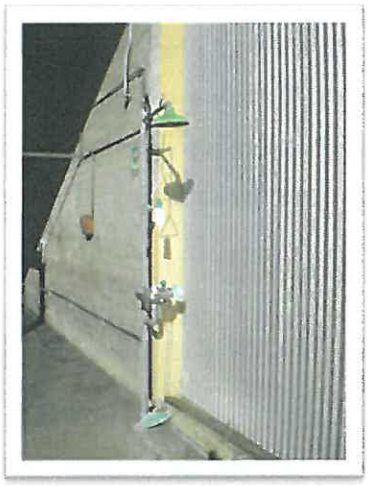


Fig 18 - Steam Clean Area – undersized water supply line.

Fig 19 - Shop Building – obstruction around emergency equipment.

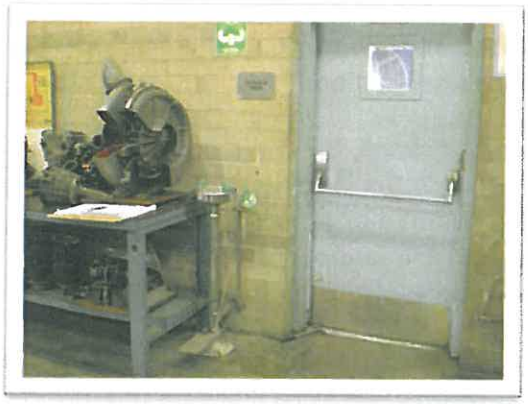


Fig 20 - Aeronautics Lab – obstruction around emergency equipment.

Fig 21 - Machine Shop – obstruction around emergency equipment and near electrical receptacle.

Fig 22 - Front Welding Room – poor location of emergency equipment.

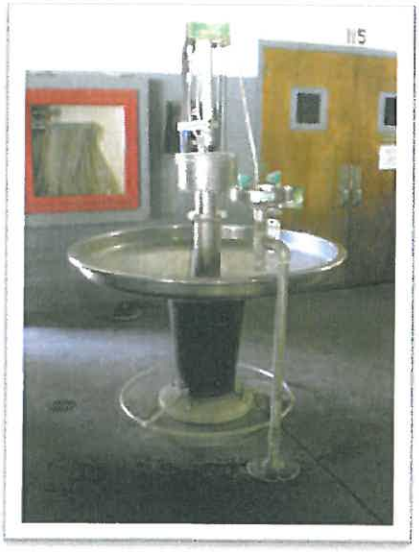


Fig 23 - Auto Shop – poor configuration of emergency equipment.

We recommend replacing the existing emergency equipment with new in kind. Locations of stations and installation shall be re-assessed to meet ADA, ANSI and Cal OSHA standards.

- All safety/emergency equipment installed must be clearly identified with a highly visible safety sign.
- Proposed locations shall have an unobstructed path of travel and within 10 seconds (approximately 55 feet) of hazards.

- All water supply lines must be provided to meet the ANSI minimum flow requirements at 30-90 psi. The recommended incoming pipe sizes are as follows:
  a. ½" IPS for eyewash stations and eye/face wash stations
  b. 1" IPS for drench showers
  c. 1 ¼" IPS for combination eyewash drench showers
- A "tepid water" temperature shall be delivered to the flushing stations. ANSI defines "tepid water" as a flushing fluid temperature of conducive to promoting a minimum of 15 minute irrigation period. A suitable range is 60-100 deg. F. Tepid water can be delivered by installing a thermostatic mixing valve to blend the hot and cold water service.
- Proper maintenance and weekly testing per ANSI standard shall be implemented by the facility to ensure flushing stations are functioning safely and properly.

Fire Protection

The Tech Building is protected by an automatic wet-pipe fire sprinkler system. There are two (2) fire sprinkler risers (a 6" and an 8" respectively) located in the south end of room 114 (Aeronautics Lab). Refer to Fig. 24 & 25. Record drawings indicated the total building area is 57,531 sq.ft. The maximum system protection area for a single sprinkler system riser is 52,000 sq. ft. thereby requiring two risers. The 6" riser provided the sprinkler system for the typical classrooms, corridors, and restrooms which are located within the west half of the building. The 8" riser supplied the sprinkler system for the east half of the building (Aeronautics Lab and Auto Shop). The sprinkler risers and distribution piping appear to be in good condition. However the system shall be periodically inspected, tested, and maintained per frequency noted in NFPA 25. Fire extinguishers were also provided throughout the building. Inspection tags are all current. Upright sprinkler heads were provided in areas without ceiling; pendent sprinkler heads with escutcheons in areas with ceiling (refer to Fig. 26). They are of the fusible link type and appear to be in good condition without signs of damage. Auto Shop (117) and the Shop Building east of the service yard did not have any fire sprinkler coverage. However, fire extinguishers were provided in each room and their inspection tags are all current. We recommend extending the sprinkler coverage of the 8" fire riser to include Auto Shop (117).

The Shop Building east of the service yard did not have a fire sprinkler system. Record drawings noted a 4" fire service to the building however field observations noted no sign of fire service. The rooms in the building were equipped with fire extinguishers. Inspection tags were all current. We recommend a dedicated fire sprinkler riser (minimum of 4") be provided with sprinkler coverage for the Shop Building which houses the Welding Shop/classrooms (101, 100, 120, 119), and Auto Body Shop (118).

Fig 24 - Aeronautics Lab - 6" fire riser

Fig 25 - Aeronautics Lab – 8" fire riser

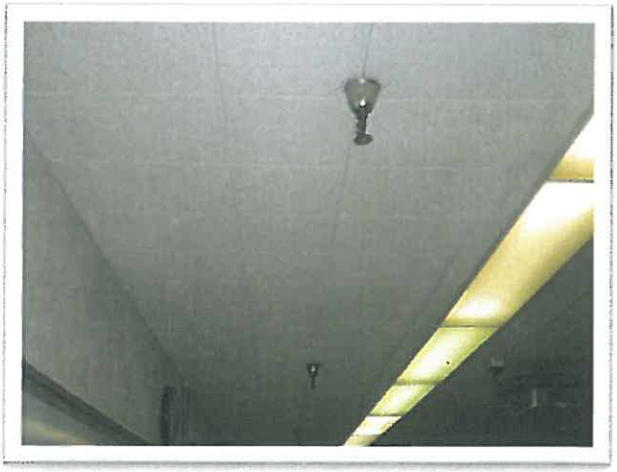


Fig 26 - Typical pendent sprinkler head

Plumbing Fixtures

The condition of the existing plumbing fixtures ranges from good to fair and exhibited acceptable water flow and pressure. Water closets in the restrooms were either floor or wall mounted with exposed flushometer valves. The urinals were both pedestal and wall mounted type with battery powered sensor operated, exposed flush valves (refer to Fig. 29) the lavatories were porcelain, wall mounted, with manual lever handle faucets. The lavatories in the women's restroom had dual temperature faucets. Hot water was supplied via an electrical instantaneous water heater installed underneath the lavatory. The men's restroom had a wash

fountain with hot and cold water supply (refer to Fig. 27) and a wall mounted lavatory with a single temp (cold water only) faucet (refer to Fig. 28).

In general the plumbing fixtures throughout the building (Tech and Shop building) are in working but fair condition. However, we recommend replacing them with new high-efficiency, low-flow fixtures to reduce energy and water consumption and to comply with codes and standards.

Fig 27 - Wash fountain in Men's restroom

Fig 28 - Single temp lavatory at Men's restroom

Fig 29 - Urinals at Men's restroom

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Conceptual Cost Estimate

Tech Building - ADA, FLS, MEP Systems Assessment
San Bernardino Valley College
San Bernardino, California

March 15, 2013
Job #: 5007002-102 Phase 1002

Conceptual Cost Estimate

Tech Building - ADA, FLS, MEP Systems Assessment — **March 15, 2013**
San Bernardino Valley College — **HMC Job No. 5007002-102 Phase 1002**
San Bernardino, California

Overall Component Summary	*Total $*
WM1- Welding Shops 112B & 121 Down Draft Hood Exhaust system	488,004
WM2 - Welding Shops 121 Make-up Air	17,250
AU1 - Auto Shop Ventilation	36,043
AU2 - Rooms 115A/B/C Ventilation	10,000
AU3 - Transmission Washer and Boil Out Tank	11,520
AU4 - Fire Sprinkler Additions	136,456
AU5 - Replace Water Heater	34,001
GE1 - Replace Swamp Coolers	58,000
GE2 - Hose Bibbs	10,922
GE3 - Emergency Eye Wash	95,000
GE4 - New Interceptor	105,998
GE5 - Condensate Piping	28,007
GE6 - Remove & Replace Existing Plumbing Fixtures	187,996
GE7 - Accessibility Upgrades	672,367
GE8 - FLS Upgrade / Install New Fire Extinguishers	34,789
GE8 - FLS Upgrade Main Corridor For Fire Rating	299,587
GE8 - Upgrade Interior Walls For Fire Rating - Welding Room 112B	16,566
AR1 - Fuel Storage Continuous Ventilation	3,599
AR2 - Aeronautics Shop Ventilation	17,250
Direct Construction Cost	***2,263,355***
Gen Conditions	Included
Gen Contractor OH&P	Included
Bonds and Insurance	Included
Design Contingency	Included
Cost Escalation to Midpoint of Construction*	Included
Total Construction Cost	***$2,263,355***

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Conceptual Cost Estimate

Tech Building - ADA, FLS, MEP Systems Assessment — **March 15, 2013**
San Bernardino Valley College — **5007002-102 Phase 1002**
San Bernardino, California

Alternates

Component Detail	*Quantity*	*Unit*	*Rate*	*Subtotal $*	*Total $*
WM1- Welding Shops 112B & 121 Down Draft Hood Exhaust system					**$488,004**
Replace updraft system with new downdraft welding tables					357,258
Disconnect piping & remove existing tables	24	ea	1,000.00	24,000	
Disconnect / remove existing ductwork & fans	2	ea	3,000.00	6,000	
Provide (N) down draft table, 36" h x 53" w x 39"	24	ea	9,777.75	234,666	
Install new tables and connect to oxy/acetylene	24	ea	1,500.00	36,000	
Provide new exhaust fans	2	ea	5,912.00	11,824	
Provide new ducting from table to exhaust fans	24	ea	1,532.00	36,768	
Structural modifications	1	ea	5,000.00	5,000	
Electrical	1	ea	3,000.00	3,000	
*				0	
Mark-Ups					130,746
Gen Conditions		10.0%		35,726	
Gen Contractor OH&P		6.5%		25,544	
Bonds and Insurance		6.0%		25,112	
Design Contingency		10.0%		44,364	
Cost Escalation to Midpoint of Construction		0.0%		0	
WM2 - Welding Shops 121 Make-up Air					**$17,250**
Add exhaust fan					12,628
Exhaust fan, 1,600 CFM, 3-1/2" utility	1	ea	4,027.50	4,028	
Roof mounted curb	1	ea	1,500.00	1,500	
Roof demo and repair	1	ls	2,600.00	2,600	
Structural modifications	1	ls	2,000.00	2,000	
Electrical	1	ls	2,500.00	2,500	
*				0	
Mark-Ups					4,622
Gen Conditions		10.0%		1,263	
Gen Contractor OH&P		6.5%		903	
Bonds and Insurance		6.0%		888	
Design Contingency		10.0%		1,568	
Cost Escalation to Midpoint of Construction		0.0%		0	

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Alternates

Component Detail	*Quantity*	*Unit*	*Rate*	*Subtotal $*	*Total $*
AU1 - Auto Shop Ventilation					**$36,043**
Install exhaust fan					26,385
Exhaust fan, 17,000 CFM	1	ea	9,985.45	9,985	
Ducting, fire dampers, registers	4	ea	1,600.00	6,400	
Roof mounted curb	1	ea	2,000.00	2,000	
Roof demo and repair	1	ls	2,000.00	2,000	
Structural modifications	1	ls	4,000.00	4,000	
Electrical	1	ls	2,000.00	2,000	
*				0	
Mark-Ups					9,658
Gen Conditions		10.0%		2,639	
Gen Contractor OH&P		6.5%		1,887	
Bonds and Insurance		6.0%		1,855	
Design Contingency		10.0%		3,277	
Cost Escalation to Midpoint of Construction		0.0%		0	
AU2 - Rooms 115A/B/C Ventilation					**$10,000**
Add exhaust fan					7,321
Inline transfer fan	1	ea	3,570.90	3,571	
Ducting, registers	1	ea	1,250.00	1,250	
Arch demo and repair	1	ls	1,500.00	1,500	
Electrical	1	ls	1,000.00	1,000	
*				0	
Mark-Ups					2,679
Gen Conditions		10.0%		732	
Gen Contractor OH&P		6.5%		523	
Bonds and Insurance		6.0%		515	
Design Contingency		10.0%		909	
Cost Escalation to Midpoint of Construction		0.0%		0	

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Alternates

Component Detail	*Quantity*	*Unit*	*Rate*	*Subtotal $*	*Total $*
AU3 - Transmission Washer and Boil Out Tank					**$11,520**
Transmission washer/boil out tank - connect to drain					8,434
Sawcutting, concrete	80	lf	8.75	700	
Remove concrete slab	80	sf	1.90	152	
*			0.00	0	
Concrete patch	80	sf	14.70	1,176	
Doweling	80	ea	50.00	4,000	
Floor drain with piping	2	ea	1,202.85	2,406	
*				0	
Mark-Ups					3,086
Gen Conditions		10.0%		843	
Gen Contractor OH&P		6.5%		603	
Bonds and Insurance		6.0%		593	
Design Contingency		10.0%		1,047	
Cost Escalation to Midpoint of Construction		0.0%		0	
AU4 - Fire Sprinkler Additions					**$136,456**
Add fire sprinklers					99,896
Sawcutting, concrete	50	lf	8.75	438	
Remove concrete slab	50	sf	1.90	95	
Disposal	1	ls	500.00	500	
*			0.00	0	
Concrete patch	50	sf	22.00	1,100	
Doweling	50	ea	50.00	2,500	
Point of connection	1	ea	775.60	776	
Piping, 4"	25	lf	40.60	1,015	
Fire riser and alarm, 4"	1	ea	4,782.45	4,782	
Fire sprinklers - 100, 101	1,752	sf	6.80	11,914	
Fire sprinklers - 117	3,072	sf	6.80	20,890	
Fire sprinklers - 118, 119, 120	4,608	sf	6.80	31,334	
*			0.00	0	
Testing of existing system	24,552	sf	1.00	24,552	
*				0	
Mark-Ups					36,560
Gen Conditions		10.0%		9,990	
Gen Contractor OH&P		6.5%		7,143	
Bonds and Insurance		6.0%		7,022	
Design Contingency		10.0%		12,405	
Cost Escalation to Midpoint of Construction		0.0%		0	

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Alternates

Component Detail	*Quantity*	*Unit*	*Rate*	*Subtotal $*	*Total $*
AU5 - Replace Water Heater					**$34,001**
Water Heater					24,891
Remove existing water heater, 40 gal	1	ea	168.30	168	
Water heater, 50 gal, gas	1	ea	1,801.10	1,801	
Seismic straps	1	set	250.00	250	
Shutoff valve	1	ea	118.85	119	
Replace existing flue with 4" dia	1	ea	1,000.00	1,000	
Replace / provide HW piping with insulation	1	allow	21,052.50	21,053	
Drain pan with associated piping	1	allow	500.00	500	
*				0	
Mark-Ups					9,110
Gen Conditions		10.0%		2,489	
Gen Contractor OH&P		6.5%		1,780	
Bonds and Insurance		6.0%		1,750	
Design Contingency		10.0%		3,091	
Cost Escalation to Midpoint of Construction		0.0%		0	
GE1 - Replace Swamp Coolers					**$58,000**
Replace all roof mounted swamp coolers					42,460
Remove & dispose 4300 DD swamp coolers	11	ea	250.00	2,750	
Modify existing roof mounted curb	11	ea	500.00	5,500	
Roof patch	11	ea	400.00	4,400	
Install new coolers	11	ea	1,500.00	16,500	
Structural modifications	11	ea	400.00	4,400	
New condensate lines	11	ea	310.00	3,410	
Electrical	11	ea	500.00	5,500	
*				0	
Mark-Ups					15,540
Gen Conditions		10.0%		4,246	
Gen Contractor OH&P		6.5%		3,036	
Bonds and Insurance		6.0%		2,985	
Design Contingency		10.0%		5,273	
Cost Escalation to Midpoint of Construction		0.0%		0	

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Alternates

Component Detail	*Quantity*	*Unit*	*Rate*	*Subtotal $*	*Total $*
GE2 - Hose Bibbs					**$10,922**
Replace existing wall mounted hose bibbs					7,995
Remove wall hydrant / hose bibb and piping	20	ea	100.00	2,000	
Hose bibb and piping	20	ea	299.75	5,995	
*				0	
Mark-Ups					2,927
Gen Conditions		10.0%		800	
Gen Contractor OH&P		6.5%		572	
Bonds and Insurance		6.0%		562	
Design Contingency		10.0%		993	
Cost Escalation to Midpoint of Construction		0.0%		0	
GE3 - Emergency Eye Wash					**$95,000**
Emergency eye wash replacement					69,547
Sawcutting, concrete	250	lf	8.75	2,188	
Remove concrete slab	250	sf	1.90	475	
Remove existing fixture and piping	6	ea	208.80	1,253	
Remove existing gas water heater	1	ea	500.00	500	
Disposal	1	ls	500.00	500	
*			0.00	0	
Concrete patch	216	sf	14.70	3,175	
Doweling	216	ea	50.00	10,800	
Floor drain with piping	6	ea	1,804.30	10,826	
Emergency eye wash / shower with piping	6	ea	4,918.35	29,510	
Provide water prrof wall skin @ eye wash	6	ea	500.00	3,000	
Establish safety zone around eye wash with signage and floor striping	6	ea	600.00	3,600	
Install new gas water heater, piping & flue	1	ea	3,720.00	3,720	
*				0	
Mark-Ups					25,453
Gen Conditions		10.0%		6,955	
Gen Contractor OH&P		6.5%		4,973	
Bonds and Insurance		6.0%		4,889	
Design Contingency		10.0%		8,636	

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Alternates

Component Detail	*Quantity*	*Unit*	*Rate*	*Subtotal $*	*Total $*
GE4 - New Interceptor					**$105,998**
Add interceptor					77,600
Sawcutting, concrete	540	lf	8.75	4,725	
Remove concrete slab	540	sf	1.90	1,026	
Disposal	1	ls	500.00	500	
Concrete patch	540	sf	14.70	7,938	
Doweling	540	ea	50.00	27,000	
Piping	250	lf	32.85	8,213	
Interceptor, 500 gal	1	ea	8,653.45	8,653	
Reroute piping from existing drains (qty allow)	20	ea	977.25	19,545	
*				0	
Mark-Ups					28,398
Gen Conditions		10.0%		7,760	
Gen Contractor OH&P		6.5%		5,548	
Bonds and Insurance		6.0%		5,454	
Design Contingency		10.0%		9,636	
Cost Escalation to Midpoint of Construction		0.0%		0	
GE5 - Condensate Piping					**$28,007**
Condensate piping					20,504
Replace existing condensate piping	11	units	498.75	5,486	
Add for roof supports	11	units	150.00	1,650	
Roof patch @ supports	11	units	160.00	1,760	
Shutoff valve	11	ea	55.25	608	
Sump drain with piping	11	ea	1,000.00	11,000	
*				0	
Mark-Ups					7,503
Gen Conditions		10.0%		2,050	
Gen Contractor OH&P		6.5%		1,466	
Bonds and Insurance		6.0%		1,441	
Design Contingency		10.0%		2,546	
Cost Escalation to Midpoint of Construction		0.0%		0	
GE6 - Remove & Replace Existing Plumbing Fixtures					**$187,996**
Plumbing fixtures					137,628
Remove existing fixture and rough-in	24	fix	250.00	6,000	
Plumbing fixture with piping rough-in	24	fix	5,484.50	131,628	
*				0	
Mark-Ups					50,368
Gen Conditions		10.0%		13,763	
Gen Contractor OH&P		6.5%		9,840	
Bonds and Insurance		6.0%		9,674	
Design Contingency		10.0%		17,091	
Cost Escalation to Midpoint of Construction		0.0%		0	

Conceptual Cost Estimate

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Alternates

Component Detail	*Quantity*	*Unit*	*Rate*	*Subtotal $*	*Total $*
GE7 - Accessibility Upgrades					**$672,367**
Accessibility upgrades					492,227
Demolition					
Demolish ext. double doors.	16	lvs	496.10	7,938	
Demolish ext. singles doors	19	lvs	382.05	7,259	
Demolish int. double doors	12	lvs	477.25	5,727	
Demolish int. single doors.	29	lvs	363.20	10,533	
Demolish ext. double frames.	8	ea	122.85	983	
Demolish ext. singles frames	9	ea	79.85	719	
Demolish int. double frames	6	ea	122.85	737	
Demolish int. single frames.	29	ea	79.85	2,316	
Cut back plaster	335	sf	1.10	369	
Chip back CMU	672	sf	9.75	6,552	
Cut back drywall	335	sf	0.75	251	
Provide new					
Install ext. double doors, 6070, H.M.	16	lvs	387.75	6,204	
Install ext. singles doors, 3070, H.M.	19	lvs	387.75	7,367	
Install int. double doors, 6070, S.C.	12	lvs	387.75	4,653	
Install int. single doors, 3070, S.C.	29	lvs	387.75	11,245	
Install ext. double frames, 6070, 14 ga	8	ea	319.95	2,560	
Install ext. singles frames, 3070, 14 ga	9	ea	239.75	2,158	
Install int. double frames, 6070, 16 ga	6	ea	227.50	1,365	
Install int. single frames, 3070, 16 ga.	29	ea	185.90	5,391	
Hardware			0.00	0	
Standard hardware, double	28	lvs	785.00	21,980	
Standard hardware, single	48	lvs	650.00	31,200	
Panic hardware, double	14	set	2,413.80	33,793	
Panic hardware, single	48	ea	1,224.55	58,778	
Thresholds, double	14	ea	96.25	1,348	
Thresholds, single	48	ea	48.15	2,311	
Fire ratings, per leaf	76	lvs	30.05	2,284	
Smoke seal, per leaf	68	lvs	17.35	1,180	
Closer, smoke activated, per leaf	68	lvs	1,027.20	69,850	
Fire rating, double frame	14	ea	48.95	685	
Fire rating, single frame	48	ea	24.50	1,176	
Kick plates, per leaf, each side	136	ea	96.50	13,124	
Patch back plaster	335	sf	12.00	4,020	
Patch back CMU	672	sf	16.00	10,752	
Patch back drywall	335	sf	7.00	2,345	
Stained door, per leaf	41	lvs	100.00	4,100	
Painted door, per leaf	35	lvs	85.00	2,975	
Painted double frame	14	ea	70.00	980	
Painted single frame	38	ea	55.00	2,090	
*					
Remove coiling door	1	ea	644.85	645	
Infill former door location, frame for man door	100	sf	23.00	2,300	
New 8080 HM door, frame, hardware including panic, closer (smoke activiated), kick panels, fire rating, smoke seal, painted	1	ea	7,796.15	7,796	
*				0	
Remove existing door signage, including specialty signage	91	ea	25.00	2,280	

Conceptual Cost Estimate

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Alternates

Component Detail	*Quantity*	*Unit*	*Rate*	*Subtotal $*	*Total $*
Door signage, including allowance for specialty signage	91	ea	125.00	11,400	
*				0	
Fire alarm strobe light	1	ls	4,500.20	4,500	
*				0	
Truncated domes, sawcut and set into existing asphalt / concrete, yellow	1,380	sf	54.00	74,520	
Safety bollards, concrete filled w/footings, painted	6	ea	425.00	2,550	
*				0	
Minor upgrades in toilet room	1	ls	15,750.00	15,750	
*				0	
Sawcut AC	200	lf	8.00	1,600	
Remove exisitng asphalt & disposal (small qty)	300	sf	4.20	1,260	
Install new asphalt to create compliant POT in asphalt (small qty)	300	sf	7.50	2,250	
Wall saw CMU wall	13	lf	30.00	390	
Remove CMU and grind down base	40	ea	10.00	400	
CMU disposal	1	ls	250.00	250	
Install bracing to remaining wall	1	ls	1,600.00	1,600	
Construct new POT slab on grade through planter, dowel to existing	250	sf	8.00	2,000	
Modify existing sloped walkway to meet ADA	1	ls	3,000.00	3,000	
Modify existing sloped walkway to meet ADA	1	ls	3,000.00	3,000	
Lockable gate	1	ea	750.00	750	
Striping & signage	1	ls	450.00	450	
Miscellaneous labor & materials	25%	pct	16,950.00	4,238	
*				0	
Mark-Ups					180,140
Gen Conditions		10.0%		49,223	
Gen Contractor OH&P		6.5%		35,194	
Bonds and Insurance		6.0%		34,599	
Design Contingency		10.0%		61,124	
Cost Escalation to Midpoint of Construction		0.0%		0	
GE8 - FLS Upgrade / Install New Fire Extinguishers					**$34,789**
Fire extinguishers					25,468
Wall mounted fire extinguishers	76	ea	335.10	25,468	
*				0	
Mark-Ups					9,321
Gen Conditions		10.0%		2,547	
Gen Contractor OH&P		6.5%		1,821	
Bonds and Insurance		6.0%		1,790	
Design Contingency		10.0%		3,163	
Cost Escalation to Midpoint of Construction		0.0%		0	

HMC Architects

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Alternates

Component Detail	*Quantity*	*Unit*	*Rate*	*Subtotal $*	*Total $*
GE8 - FLS Upgrade Main Corridor For Fire Rating					**$299,587**
Fire rating at main building corridor					219,322
Demo existing ceilings, including suspension systen	9,224	sf	1.80	16,603	
Demo exisitng light fixtures	9,224	sf	1.65	15,220	
Demo existing wall plaster & lath	9,224	sf	1.10	10,146	
Install new T-bar ACT ceiling	9,224	sf	4.10	37,818	
Install new R-11 batt, sound insulation	9,224	sf	0.75	6,918	
New 1 hour finish on existing studs	7,920	sf	4.65	36,828	
Install new R-11 batt, sound insulation	7,920	sf	0.75	5,940	
Adjust HVAC registers to (N) ceiling height	61	ea	134.20	8,252	
Adjust fire sprinkler heads to (N) ceiling height	75	ea	125.00	9,375	
Install new light fixtures	9,224	sf	6.00	55,344	
Paint new ceiling	9,224	sf	1.10	10,146	
Paint new walls	7,920	sf	0.85	6,732	
*				0	
Mark-Ups					80,265
Gen Conditions		10.0%		21,932	
Gen Contractor OH&P		6.5%		15,682	
Bonds and Insurance		6.0%		15,416	
Design Contingency		10.0%		27,235	
Cost Escalation to Midpoint of Construction		0.0%		0	
GE8 - Upgrade Interior Walls For Fire Rating - Welding Room 112B					**$16,566**
Fire rating at exterior walls					12,128
Demo existing wall plaster & lath	1,320	sf	1.10	1,452	
Install new R-11 batt, sound insulation	1,320	sf	0.75	990	
New 1 hour finish on existing studs	1,320	sf	4.65	6,138	
Paint new walls	1,320	sf	0.85	1,122	
Miscellaneous labor and materials, to dealing with piping and apertenances	25%	sf	9,702.00	2,426	
*				0	
Mark-Ups					4,438
Gen Conditions		10.0%		1,213	
Gen Contractor OH&P		6.5%		867	
Bonds and Insurance		6.0%		852	
Design Contingency		10.0%		1,506	
Cost Escalation to Midpoint of Construction		0.0%		0	

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Alternates

Component Detail	*Quantity*	*Unit*	*Rate*	*Subtotal $*	*Total $*
AR1 - Fuel Storage Continuous Ventilation					**$3,599**
Change fans to 24/7 operation					2,635
Remove wall switch	3	ea	75.00	225	
Install disconnect	3	ea	500.00	1,500	
Rewire	1	ea	910.00	910	
*				0	
Mark-Ups					964
Gen Conditions		10.0%		264	
Gen Contractor OH&P		6.5%		188	
Bonds and Insurance		6.0%		185	
Design Contingency		10.0%		327	
Cost Escalation to Midpoint of Construction		0.0%		0	
AR2 - Aeronautics Shop Ventilation					**$17,250**
Add exhaust fan					12,628
Exhaust fan, 2,000 CFM, 3-1/2" utility	1	ea	4,027.50	4,028	
Roof mounted curb	1	ea	1,500.00	1,500	
Roof demo and repair	1	ls	2,600.00	2,600	
Structural modifications	1	ls	2,000.00	2,000	
Electrical	1	ls	2,500.00	2,500	
*				0	
Mark-Ups					4,622
Gen Conditions		10.0%		1,263	
Gen Contractor OH&P		6.5%		903	
Bonds and Insurance		6.0%		888	
Design Contingency		10.0%		1,568	
Cost Escalation to Midpoint of Construction		0.0%		0	