

Delta Sigma Phi
Houghton, Michigan

Building Condition Assessment
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Prepared By:



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This building condition assessment has been prepared to identify deficiencies in the existing Delta Sigma Phi fraternity house in Houghton, Michigan and to provide recommendations for budgeting for building repairs, maintenance, and improvements. This report is based on our site visit on November 17, 2010 and our review of the original design drawings.

Based on the drawings the building was constructed in 1964. Since that time there have been modifications made to a number of the interior spaces of the building but the basic structure of the building does not appear to have changed. Many of the building systems and finishes are original construction and approximately 46 years old. The building appears to have been well constructed and we did not observe any structural deficiencies in the building. It was noted that the portable fire extinguishers and kitchen hood fire suppression are up to date on service and inspections. A fire alarm system with smoke detectors is also in place in the building.

For the purpose of this report we have categorized our comments into four groups. Number 1 are items that we recommend be addressed as soon as practical. These include potentially hazardous conditions. Number 2 are conditions that should be addressed near term and include deteriorated construction and damaged materials that will continue to deteriorate if not addressed. These conditions are of a nature where the work will generally become more expensive if delayed and further deterioration is allowed to occur. Number 3 are conditions that should be addressed in longer term planning. We would recommend these be addressed in a time frame of five years. Number 4 are recommendations that are optional and would result in improvements to the building. We recommend these be addressed as your budget allows.

Each item in the lists below includes an estimated construction cost. These estimates assume the work is performed by contractors and includes labor costs, material costs, and ordinary allowances for overhead and profit. Some of these items are likely within the abilities of the fraternity to complete (such as installing missing electrical cover plates or maintenance painting), and could be completed at a lower cost. There could also be a significant reduction in costs as the amount of work awarded to a contractor is increased rather than performing each item separately.

The costs listed below are construction costs only and do not include an allowance for design and contract administration. For any work design and administered by an architect we recommend budgeting 8 to 10 percent of the construction cost for architectural fees. Smaller projects would be at the higher end of this range and larger projects at the lower end. Finally, the costs included below are current costs and it is standard practice to include a cost escalation factor of 3% per year for any work budgeted for future years.

Priority 1 – Recommend immediate action.

1. First and second floor bathroom receptacles not GFCI type. Recommend replacing with GFCI receptacles. Estimated cost: \$264.00.

2. Some smoke detectors covered or loose. Recommend removing objects obstructing smoke detectors and securing loose units with screws. No cost, assuming owner performs this work.
3. Bedroom lighting varies; some is improperly installed and dangerous in its current condition including improper wiring and incandescent fixtures too close to combustible materials. Recommend replacing bedroom lighting with consistent and energy efficient light fixtures properly installed and establishing policy that lighting not be modified. Estimated cost: \$6,485.00.
4. Bedroom receptacles inadequate for current needs. Many bedrooms have improperly wired additional receptacles and unsafe extension cords. Recommend removing all improperly extended wiring and installing additional receptacles around all rooms to adequately meet current needs. Estimated cost: \$12,260.00.
5. Wood boards installed at some bedroom ceilings are open on all sides, creating a condition that could lead to rapid fire spread. Recommend removing these. No cost, assuming owner performs this work.
6. Boiler room fire door is missing its door closer. The Michigan Building Code requires a one hour enclosure around the boiler room. Recommend replacing door closer. Estimated cost: \$250.00.
7. Dishroom light fixture is missing a diffuser. Any lighting in food service areas should be equipped with tube covers or a diffuser. Recommend replacement at an estimated cost of \$50.00.
8. In our discussion with the current fraternity members they had no record of a recent chimney cleaning at the wood burning fireplace. This should be performed annually as routine maintenance to reduce the risk of a chimney fire and assure it functions properly.
9. Numerous electrical receptacle and switch cover plates are missing. These should be replaced as a safety item. Estimated cost \$220.00. Could be performed by owner at a minimal expense.
10. The oven fan in the kitchen is powered from an extension cord. Recommend installing an appropriate 120V receptacle behind the oven. Estimated cost \$150.00.
11. Conductors from a previously removed appliance are exposed behind the oven. Recommend properly terminating them in the electrical box in the wall and provide a cover. The conductors could potentially be removed and the box and conduit used to install a new receptacle as noted under item 10. Estimated cost \$75.00.
12. The kitchen hood fan and duct are grease covered. These should be cleaned as regular maintenance to reduce the fire hazard. A possible aid in this would be the addition of a grease filter over the fan to capture some of the grease and be easier to clean.
13. There is not door on the laundry room. The Michigan Building Code requires a one hour rating on a laundry room which would require the addition of a 60 minute door with self latching lockset and closer.
14. There is a significant water leak causing damage and mold growth next to the laundry room door. There appears to be a roof drain pipe in the wall which is a likely source of the water. We were informed that a plumber had previously scoped the pipe and could not identify the source of the water. We recommend removing the drywall and wood framing from the face of this wall to eliminate the water damaged material and find the

source of the water. After the water source is eliminated the wall can be repaired with new furring and gypsum board. Estimated cost \$836.

15. The doors from the stairwells to the living spaces of the building should be 60 minute fire rated doors with self latching locksets and closers to separate the stairs from the remainder of the space in a fire. Estimated cost \$12,000.00.
16. The electrical panel in the second floor utility room has an open space. This should be closed with an appropriate cover for safety. Estimated cost \$35.00.

Priority 2 – Recommend short term action

1. First floor bathroom urinal drains slowly. Should be investigated further to determine cause, may be simple drain maintenance.
2. Significant efflorescence noted on exterior wall at rear of building. This appears to be coming from the area at the floor of the second floor showers. The staining indicates water is migrating through the brick from this area, likely from the failure of the waterproofing under the shower tile. The shower tile and fixtures are in fair to poor condition. Recommend completely removing tile and fixtures and reconstructing with new waterproofing, fixtures, and tile. Estimated cost \$10,864.00.
3. Open pipe under dishroom disposal. Should be capped. Estimated cost \$74.00. Could be easily completed by owner at minimal cost.
4. Mortar is missing at a number of the window sills on the building exterior. Recommend removing failed mortar and replacing with new mortar below sills and backer rod and sealant at joints on top of sills. Estimated cost \$1,283.00.
5. The front porch has standing water against the building wall. This may be contributing to the moisture problems in the laundry room area. We recommend cutting the mortar at the joint between the brick and the porch back 1/2" deep and installing backer rod and sealant to seal this joint. Estimated cost \$121.00.
6. The membrane roof flashing is loose at the boiler chimney. The termination bar at the top of the flashing should be re-attached to the chimney with new fasteners and new sealant applied. Estimated cost \$118.00.
7. There is significant mortar deterioration in the brick boiler chimney and a crack in the chimney cap. The failed mortar should be replaced and the chimney crack cap ground out and sealant installed to prevent water penetration. Estimated cost \$412.00. Note that the fireplace chimney appears to recently have been repaired and is in good condition.
8. The windows appear to be original and are in fair condition. The existing windows are wood windows with double pane glass at the fixed units and single pane glass with single pane storm windows at the casements. A number of the storm window panels at the casements are missing or broken. The exterior of the windows are in immediate need of re-painting and sealant replacement. The expected life of windows is typically 20-50 years. As the windows are at the end of the typical useful life, replacement within the next five years should be considered. An estimate of the cost of replacement is included below under the optional recommendations. The estimated cost to repair the existing windows and extend their life approximately five years before further maintenance would be expected is \$8,533.00.

9. The EPDM membrane appears to be in generally good condition, although there was slush and standing water on the roof that made inspection difficult. We were unable to determine the actual age of the existing roof but estimate it to be in the range of 10 to 15 years. An EPDM membrane typically has a useful life of 20 years. Based on this we recommend budgeting for replacement within five years.

The membrane appears to be in good condition. Some of the seams were observed to be showing some aging. At the present time we recommend retaining a roofing contractor to make a detailed inspection of all seams and flashing and re-seal any areas found to be deteriorating. We estimate a minimal cost of \$330.00 for this work.

We were unable to determine the thickness of the existing roof insulation, but some is present. We recommend that in the roofing replacement budget additional insulation be included to increase the energy efficiency of the roof assembly. We have included this in the estimated replacement cost listed in the list of third priority recommendations. It was also noted that the existing roof is completely flat and there is standing water that does not reach the drains at both the upper roof and the porch roof. We recommend adding tapered insulation as part of the roof replacement to provide proper slope to the roof drains. This is also included in the replacement cost estimate below.

Finally, it was noted that the roof edge on the porch roof is installed over the membrane. This is not a proper roof installation as the membrane should lap over the roof edge. This would not be cost effective to remedy at the present time, but should be addressed in the installation of a replacement roof.

10. The light switch at the walk in cooler is failing and should be replaced. Estimated cost \$75.00.
11. The walk in freezer has significant ice forming on the freezer interior. We noted that the door frame and seal are both damaged, which allows a continuous flow of humid kitchen air into the freezer. We recommend repairing the door frame and seal to obtain a proper seal at the door. The estimated cost of this repair is \$150.00.
12. There is a significant moisture problem in the laundry area. At the time of our visit there was significant moisture condensing on the ceiling of this space, which also is the floor of the exterior porch above. We recommend two changes to address this problem. First, we recommend adding furring strips, insulation, and a new gypsum board ceiling with vapor barrier. The addition of the insulation will raise the temperature of the ceiling (which is currently similar to the exterior temperature on the other side of the concrete slab) and reduce condensation. This will require some relocation of the existing lighting and smoke detector. At the same time we recommend installing an exhaust fan with a humidistat to automatically exhaust air when the humidity is excessive. There is an existing abandoned fan on the exterior of the porch wall that appears to have served this space. Removing this and re-using this location for a new fan should be cost effective. The estimated cost of this work is \$1,418.00.
13. The stairs on both ends of the building have significant paint failure and rust on the bottom of the stairs. We recommend removing the failed paint and rust, repairing the

steel where the deterioration is severe, and providing a new paint finish. The estimated cost of these repairs is \$1,307.00.

14. The existing bedroom spaces have various forms of sleeping lofts constructed in them. Those that we observed have sleeping space below an elevated deck. Many universities have placed strict controls on loft construction in college dormitories over concerns about fire safety. We noted a number of concerns with the lighting and power in the bedrooms above. In conjunction with a loft that may not be easy to quickly get out of and large quantities of readily combustible materials in some of the rooms, we feel there are serious fire safety concerns to be addressed. Some of the lofts also partially cover the operable windows which would provide a second means of egress in a fire. One solution would be to replace the existing loft constructions with a standardized built in unit with a traditional elevated bunk and power and lighting built in to meet the current needs. We estimate the cost of this work at \$19,768.00.

Priority 3 – Recommend long term plan to address these items

1. The boiler appears to be the original oil fire steam boiler from 1964 converted with a gas burner to use natural gas. The boiler appears to be properly maintained and we were told it was recently inspected and serviced. The expected service life of a steam boiler is 30 years and this unit appears to have been in use 46 years. While it is currently functioning properly it would be prudent to plan for the replacement of the boiler and associated condensate pumps and equipment within the next five years before serious problems develop. Unfortunately newer steam boilers do not provide the dramatic increase in efficiency that hot water boilers do. Some small increase in efficiency will be gained from installing a well insulated boiler with a flue damper to close off the flue when the boiler is not running. The estimated cost of a boiler replacement with pump and associated work is \$30,575.00.
2. The existing domestic water heaters are approximately 16 years old based on the 1994 date on the energy rating labels. Water heaters have a 10 to 15 year useful life depending on water quality. These units are relatively inefficient with a labeled EF rating of 0.52. A high quality condensing water heater can have an efficiency rating as high as 95%. We recommend planning to replace the two existing units with a single direct vent condensing unit with a high efficiency rating. This will replace the existing units before they fail and provide a significant decrease in gas usage to heat water. A question was raised about the feasibility of an on-demand water heater. Due to the number of fixtures served this would require a relatively large and expensive unit and probably is not cost effective. A more thorough analysis of the fixture needs would need to be completed to determine the details. The estimated cost to remove the two existing units and provide a high efficiency domestic water heater is \$3,676.00.

We were also asked to comment on an indirect water heater option. Typically indirect water heaters are used on hot water systems with a high efficiency boiler rather than on steam systems. It is possible to install an indirect water heater on a steam boiler, but it would require the indirect water heater tank, connections below the boiler water level, piping and accessories, a circulating pump to circulate the boiler water to the heater, and

controls that will fire the boiler at a low level when hot water is needed but not steam for heat. The cost of those components and the labor for their installation will be at or above the cost described above but will be less cost effective than a high efficiency water heater as the steam boiler operates at a lower efficiency.

3. The exterior of the building is in generally good condition, but some maintenance is necessary due to normal aging. One item that requires attention is minor tuckpointing repairs of the existing brickwork. This would involve cutting out and repainting any cracked and deteriorated mortar. Due to the relatively good condition of the masonry the quantity of tuck pointing is small. We estimate the cost at \$1,468.00. It would be much more cost effective to have this done at the same time as the more significant chimney repair described above than as a standalone project.
4. Another exterior item that needs maintenance are the plywood soffits. The paint on these is in fair condition and needs scraping, sanding, priming and painting. The estimated cost of this work is \$1,832.00.
5. A minor item noted on the exterior is the step from the exterior door to the deck. This is a 10 inch drop and exceeds the building code maximum for a safe step. We recommend constructing a single step on top of the existing deck at this door. We estimate the cost of this work at \$222.00.
6. The existing wood retaining wall at the volleyball court is in poor condition and has largely failed. This should be replaced at an estimated cost of \$2,901.00. To replace with a dry stacked stone wall we estimate a cost of \$6,160.00.
7. As described earlier in this report, replacement of the main and porch roof should be planned within the next five years. We estimate the cost of removing the existing membrane and roof edge, adding tapered insulation, and installing new membrane, flashing, and roof edge at \$15,499.00. A cost to include additional roof insulation is included below under priority 4.
8. The building was originally wired (as was the standard in 1964) with two prong receptacles and no ground wiring. At some point in the buildings history the receptacles were replaced with three prong receptacles, but ground wiring was not installed. This condition is not legal under the electrical code. At a minimum the code requires receptacles without a ground be labeled as 'No equipment ground'. Ideally ground wires would be extended to all receptacles. This should be relatively straightforward as the building is wired with conduit. We estimate the cost of this work at \$4,663.00.
9. We noted that some of the receptacles indicate 'Hot / Ground reverse' on our electrical tester. This indicates there may be some conductors improperly wired to receptacles. We recommend retaining an electrician to investigate the existing receptacle wiring and correct as required. We estimate the cost of this work to be \$849.00.

Priority 4 – Optional suggested improvements

1. One lavatory is missing in the first floor bathroom. The cost to replace this lavatory is estimated at \$530.00.
2. The lighting over the sinks at the second floor lavatory are wired ahead of the light switch and cannot be turned off. We recommend re-wiring these to the rest of the lighting

which is controlled by a switch. This will reduce electricity use when the bathroom is not in use. Estimated cost of this change is \$150.00.

3. It was noted during our survey that some of the floor tile is a 9x9 vinyl tile. These are typically asbestos containing material. We recommend obtaining an asbestos survey to determine whether asbestos containing materials are present before performing any work that may disturb potential ACM.
4. The corridor drinking fountain is damaged. We estimate the cost of replacing it at \$780.00. If it is no longer needed it could also be removed and the piping capped at a much lower cost.
5. There is currently no interior roof access. To access the roof we needed to use a long extension ladder which the fraternity does not presently own. Under the current building code a building of this height would be required to have an interior roof access for safe access to inspect and maintain the roof, chimneys, etc. When the roof is replaced we recommend installing an access ladder in the second floor utility room with a roof hatch to access the roof. The estimated cost of this work is \$1,734.00.
6. As noted above, additional roof insulation could be added at the time of the roof replacement to decrease the energy usage from building heating. We estimate the additional cost of this work at \$3,604.00.
7. It was noted that there are vines growing up the face of the building. Long term, vines can cause deterioration of the masonry. This is often a controversial issue as some people like the appearance of vines and some feel they should not be allowed to grow up the masonry of the building.
8. As noted above the windows require repair or replacement. A cost to repair, seal, and paint the existing windows is included above. The estimated cost to remove the existing windows and install new commercial grade windows is \$30,320.00.
9. The existing building has a functioning smoke detector and fire alarm system but does not have a fire sprinkler system. If this building were built under the current building code it would be required to have a fire sprinkler system. Adding a fire sprinkler system to the building would provide a substantial increase in fire safety. The estimated cost to add this is \$54,964.00 which includes installing the system and upgrading the water service to the building to a 6" service.
10. As an energy saving measure, occupancy sensors could be added to the lighting in the common areas of the building and restrooms. This would turn off lights in rooms that were not occupied after a set period of time. The estimated cost to add these, using good quality infrared and ultrasonic dual technology sensors is \$1,530.00.
11. The typical lighting in the building common areas is fairly low quality fluorescent strip lights. These are near the end of their useful life and we were told a number have been replaced or repaired as they wear out. Replacing these throughout the building with good quality fixtures with electronic ballasts and T-8 tubes would eliminate the maintenance of the older fixtures and provide a reduction in electric consumption. The estimated cost of this work is \$4,500.00.
12. A number of doors are missing their knobs and /or latches. The estimated cost to replace these is \$320.00.
13. We were asked by the current residents whether the bedroom wiring could be modified to have a circuit breaker serve each room. Currently each circuit breaker serves the

receptacles on a wall and a blown breaker in one room cuts the power to the adjacent room as well. The cost of this modification is estimated at \$5,375.00.

14. The flooring in the building is generally vinyl tile and in serviceable condition. The stair treads are also a vinyl tread material and some show significant wear. The cost to replace all of the stair treads with new vinyl material is estimated at \$1,999.00.
15. The existing thermostat is located in the front entrance stairwell and is exposed to cold drafts from the entrance door. We recommend removing this and installing a new programmable thermostat on the opposite side of the wall. Estimated cost is \$70.00.
16. The women's restroom fan is removed. We recommend replacing the fan. The estimated cost is \$146.00.
17. We were asked to review the cost of adding a sloped roof on the existing building. The additional costs would include new roof trusses, sheathing, roofing (asphalt shingles in this estimate), insulation, and extension of vent pipes and the two chimneys. In addition, as new construction, this would require the installation of a dry pipe fire sprinkler system in the attic space. We estimate the total cost of this additional work at \$50,193.00.

Note that this additional work would eliminate the necessity of the re-roofing and insulating described in priority 3 – item 7 and priority 4 – item 6.

We feel this would largely be an aesthetic change to the building. Properly done, repairing the existing flat roof and adding insulation as noted above would have roughly the same performance and life span as adding a sloped roof.

Summary

The total estimated cost of the recommendations above is:

Priority 1	\$33,625.00
Priority 2	\$44,453.00
Priority 3	\$61,685.00
Priority 4	<u>\$156,215.00</u>
Total	\$295,978.00

It should be noted that this total includes a number of items that are optional suggestions and some minor work that could be more economically done by the building owners.