KILLARNEY HOTEL:
A PROPOSAL FOR RESTORATION

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"A City without Old Buildings is like a Man without Memory" ***Kenard Suigeilski***

1. INTRODUCTION:

So appropriately the above quotation focuses on the importance of historic buildings in a city's reference. In the context of Karachi, the developments of the Colonial Period signify its progress as an urban center. Thus buildings of this Era hold great importance in the history of this city. Killarney Hotel, located in the Civil Lines Quarter of Karachi is one such example that today needs measures to ensure its survival in the future.

1.1 Historical Background:

Killarney Hotel was constructed as one of the four Railway Hotels in Karachi, during the early part of the twentieth Century. These included the North Western Hotel (1908), the Bristol Hotel (1910), the Carlton Hotel and the Killarney Hotel. Today Killarney Hotel is one of the two surviving examples of the Railway Hotels, other one being the Bristol Hotel located in the nearby street. The other two were demolished in the early 90's, while the process of their being listed as heritage buildings was still underway.

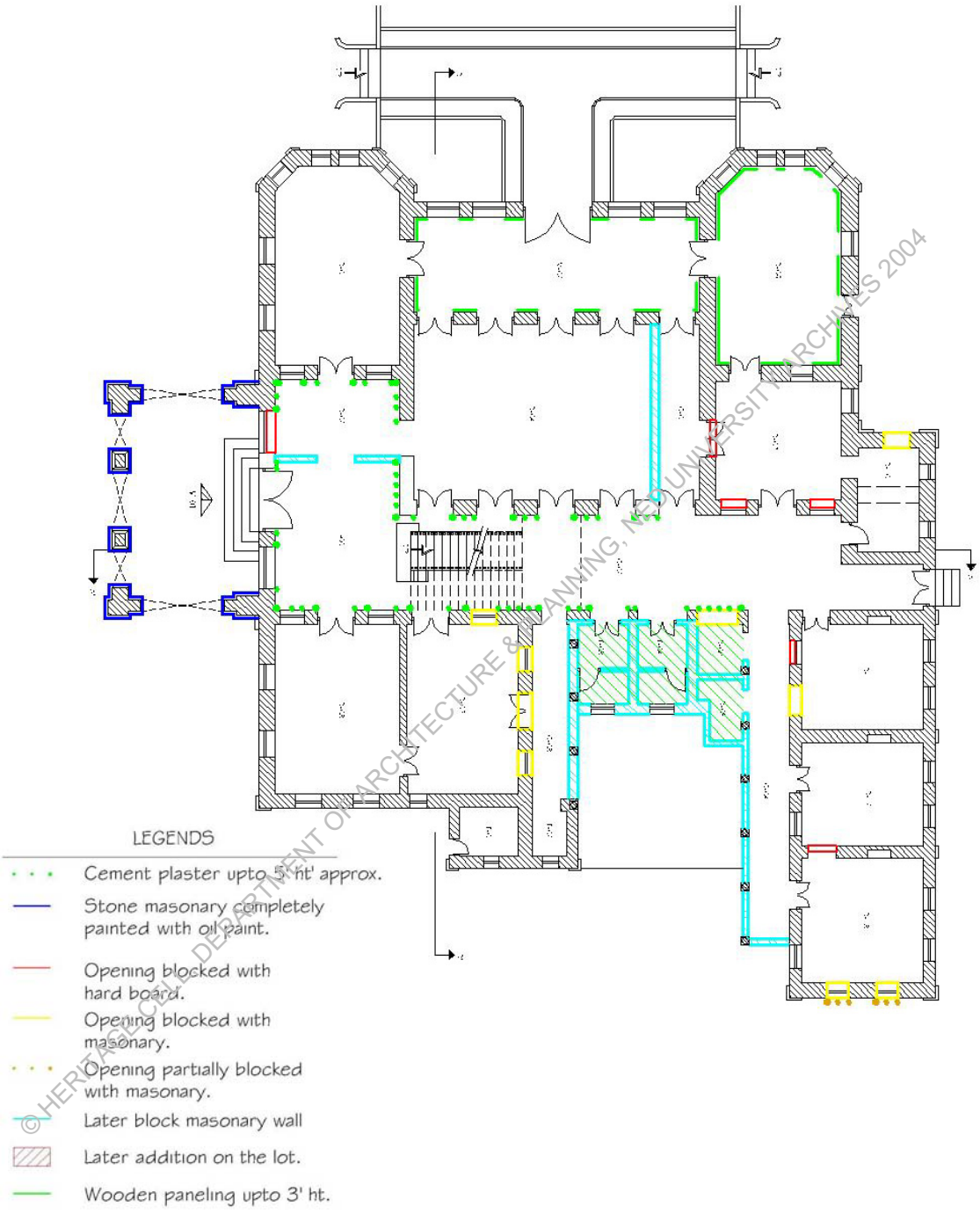
> *"Killarney Hotel, Civil Lines Karachi, A Home from Home where the profusion of foliage was particularly welcome, it could accommodate 50 to 60 persons and was run under the supervision of the Maders. Now the Russian Consulate". Y. Lari (1996)*

1.2 Identified Phases of Change:

The Killarney Hotel building has undergone atleast two major phases of change in its lifespan. According to historic documents and readings on Karachi it was initially constructed as the Railways Hotel building. Later on it was used as the Russian Consulate, atleast till the mid 90's.

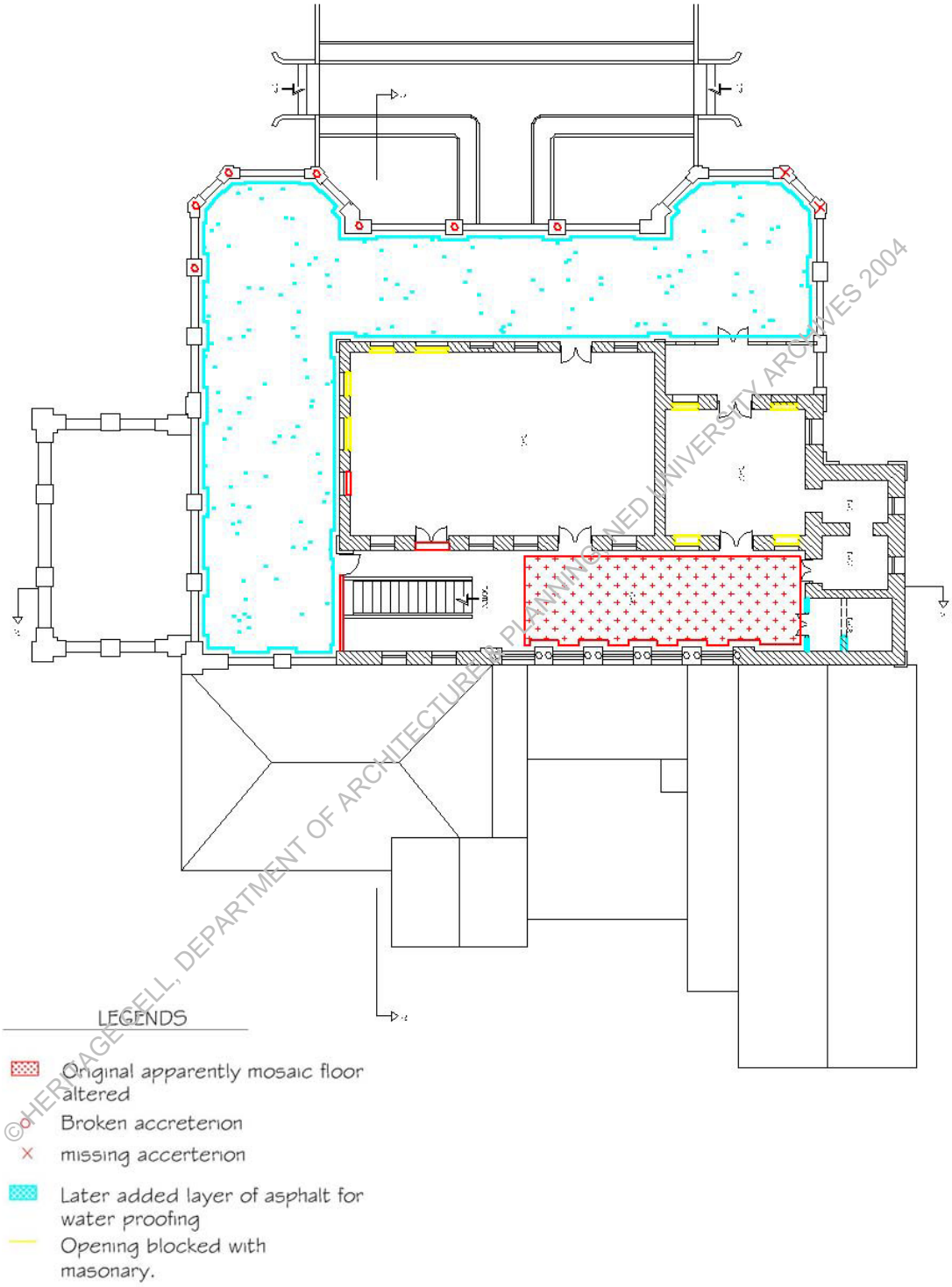
A detailed survey of the building reveals that it has undergone several alterations during its life span. One very clear phase seems to be undertaken during its use as the Russian Consulate as this phase shows alterations done intentionally to create an air of grandiose in the structure. Thus many details in cement concrete are observed that (supposedly) added to the architectural enhancement of its features.

There might have been other phases of change in usage, but these are not known authentically. According to some sources there has been a claim that at some point the Hindu religious groups, for giving religious training to its pupils, used it as a campus. But these claims as yet do not have any authenticated verifications. In order to know the complete history of the building it is necessary that a detailed research based exercise is initiated that would enable to produce a complete documentation on this historic structure as an archival resource for Karachi.



Plan Show on Alteration Ground Floor

Plan Show on Alteration First Floor



Plan Show on Alteration Second Floor

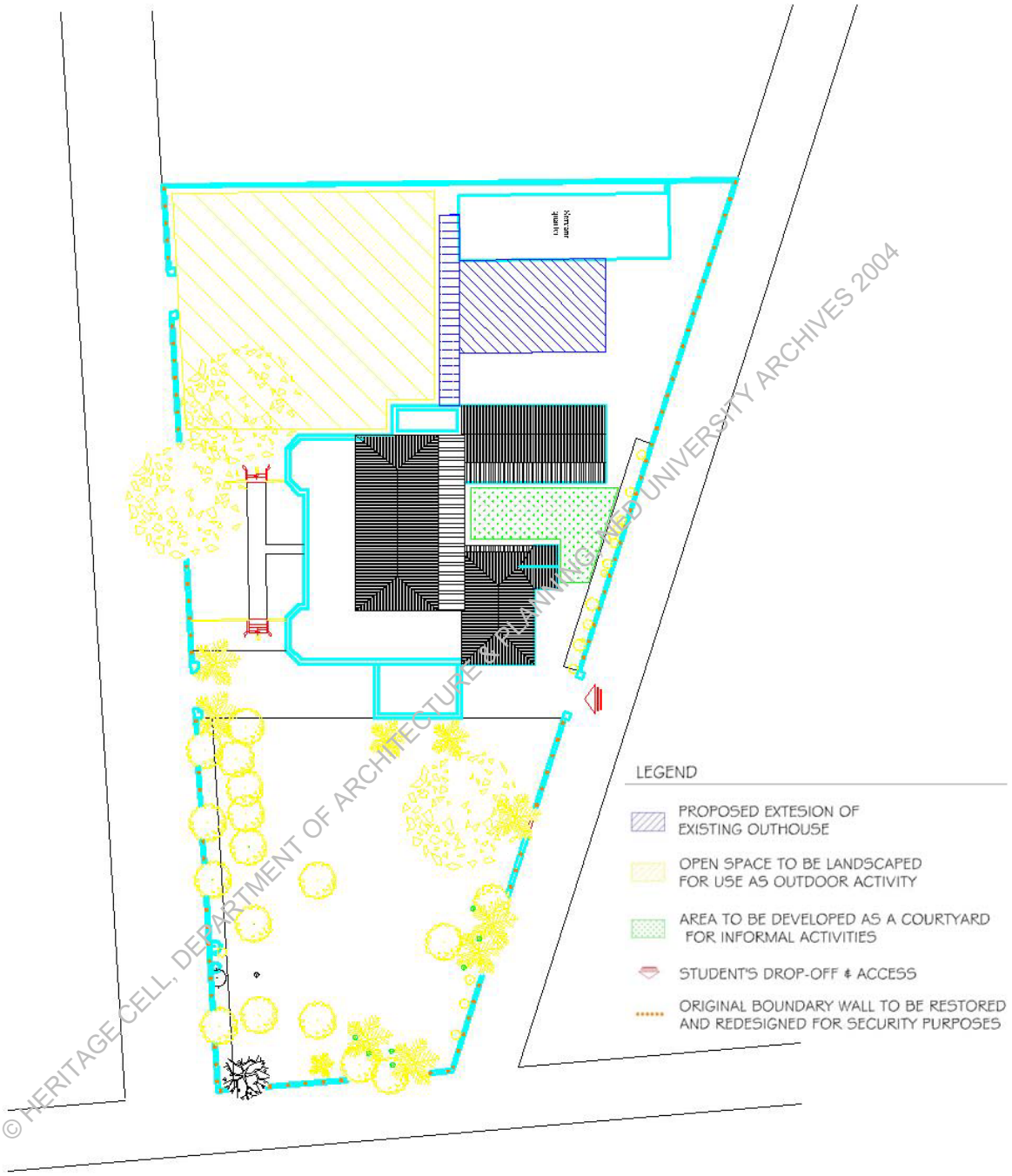
1.3 Present Status

The premises of the Killarney Hotel is at present in a state of disuse, thus vulnerable to rapid decay and deterioration. Hence it is of prime importance that this building is put to suitable use as soon as possible to ensure its regular maintenance and upkeep. As the building is set in a plot with ample open spaces around it and itself is a large structure, the possibility for utilizing the building for public use bears a stronger feasibility.

2. The Site: Its Location and Analysis

The site of Killarney Hotel building is tucked in a remote corner, towards the edge of the Civil Lines quarter. The plot is accessible from roads on both sides. There is just one more building adjacent to it, which has its access from the front road. The two roads that flank the plot serve as access roads only to plots located on them, and culminate as dead ends near the railway tracks. The road on the bridge side provides access only to Killarney Hotel plot. Other than this there are only a few road side car workshops on this side that occupy this road as illegal encroachments.

The entire character of this area is such that the buildings are set in huge plots with large open spaces around them. These open spaces often have dense tree plantation, providing a buffer between each adjacent property. The Killarney Hotel itself has dense foliage around it thus providing a complete buffer zone between the building and its adjoining properties. This setting of the building along with the fact that its access is almost private for only this property gives it a very high feasibility for being used as a commercial or public use building without disturbing the adjacent functions and properties.



Location Map

3. Building of the Killarney Hotel

3.1 Architectural Style

The Killarney Hotel building is a hybrid of the typical Colonial Style of architecture, blended with Indian architectural details and Gothic features. The layout of the building has interlinked rooms, with colonnaded verandahs and balconies on the front facades, and a courtyard in the middle flanked by rooms on its sides. The facades of the building have been treated with rich architectural details and fenestrations, typically belonging to the Colonial Period buildings of the Subcontinent. Although the layout of the building has been tempered over the years, but its original form and character is still clearly visible and intact.

The building is placed on a 39261 sq.ft. 0.9 acres plot with a large garden on its south side. The South Façade of the building acts as the front and main access, thus has a dominant entrance portal. The West Façade has also been given significant importance in detailing as it overlooks the main street that gives access to the plot. The North and East facades are comparatively simpler and treated as of secondary importance. All door and window opening have arched profiles, mainly two centered pointed arches, with voussoirs in alternating technique, that enhance the decorative detailing on the building. However, in the front entrance portal semicircular arches have been used. And segmental arches are used in the second floor colonnaded verandah, looking on to the courtyard.

3.2 Materials of Construction

Materials used in the construction of the Killarney Hotel include stone (yellow limestone, locally identified as Gizri Limestone), lime mortar and plaster, timber (apparently teak wood) for flooring and roofing structural members as well as for door window frames. The flooring is mostly in cement concrete tile of either geometric patterns, or plain pigmented ones. Two spaces, namely the first floor terrace above entrance portal and the second floor verandah, have mosaic flooring done in an elaborate geometric pattern. The sloping roofs are covered with red tiles (*khaprai*l).

The internal walls are plaster with lime plaster, later changed to cement plaster on the ground floor up to a height of approximately 4'-0". The plastered surfaces have several consecutive layers of paint; in some spaces having oil based paint.

3.3 Structural System

The structural system employed in the construction of Killarney Hotel is basically with 'load bearing' walls of stone masonry. The thickness of these walls approximately range between 2'-0" on the external periphery and 1'-6" to 2'-0" for inner walls. The thick load bearing

walls carry the timber trussed roofing system and the first and second level timber flooring system. Both floors have cement floor tiles laid over the timber structural framework.

4. Approach to Conservation & General Recommendations

The restoration proposal formulated for the historic structure is based on the following approach and general principles of conservation adopted in lieu with the internationally accepted standards of conservation;

- The original layout of the building will be retained to its utmost, with minimum alterations or changes. Any changes that are necessary for the proper functioning of the new usage will be done in such a way that they are easily recognized as well as reversible when desired, without damaging the existing fabric.

- Any later additions or phases of development in the life of the monument will be respected as part of its history. Only those alterations that negate or deface the fabric of the building will be removed.

- All materials and finishes as used in the original construction of the building, and still surviving in a good and usable condition will be retained and enhanced as an authentic part of the building's feature.

- All repairs and maintenance interventions required for the existing building fabric will be done with sensitivity towards original materials, using materials similar or compatible with the original materials of construction.

Keeping in view the above mentioned general guidelines and principles a strategy for the restoration of the Killarney Hotel building has been developed in this proposal that gives specific recommendations for the identified problems in the building and also suggests an effective space usage plan that requires minimum changes in the original layout of the building.

5. PROPOSED REFUNCTIONING

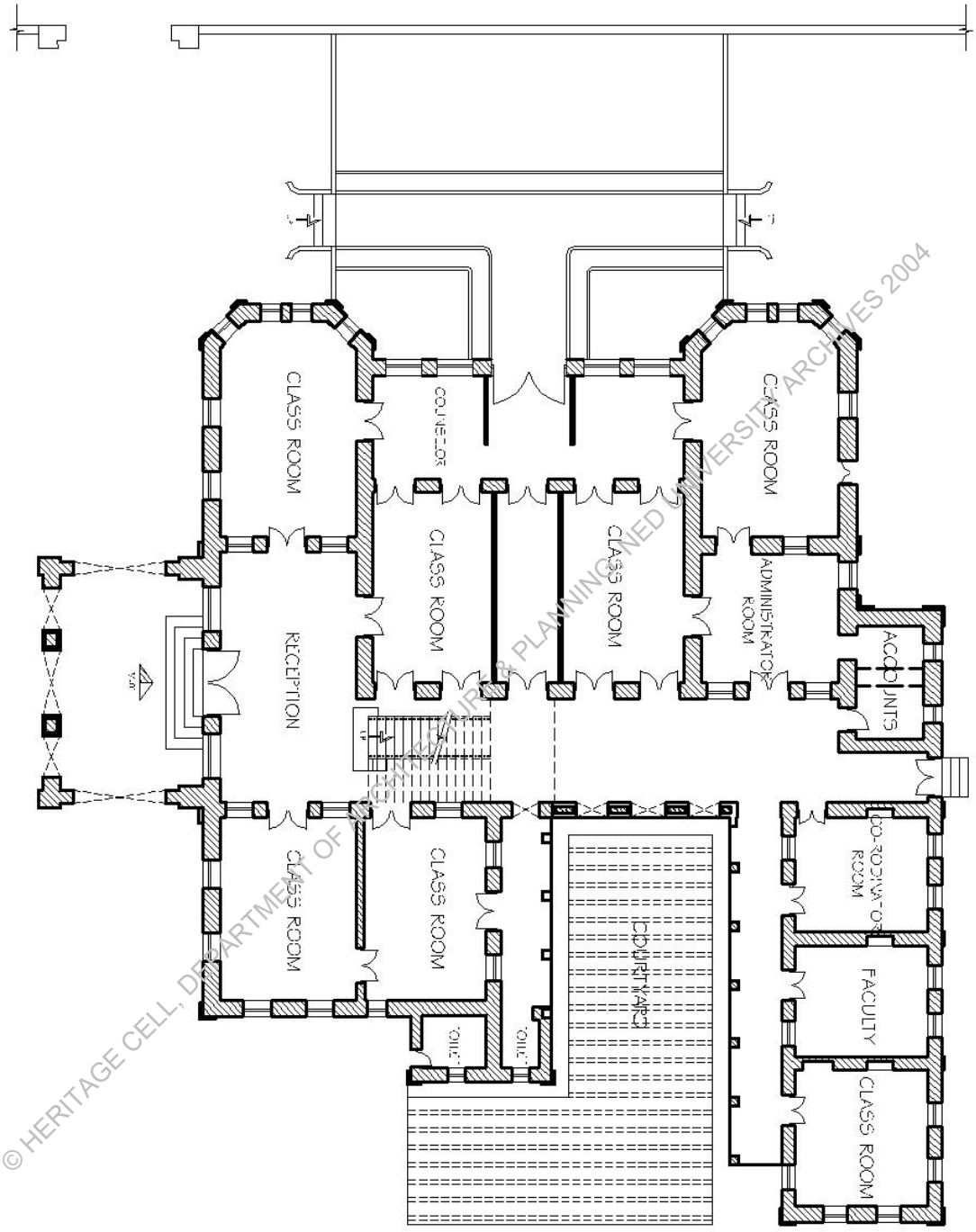
The Killarney Hotel has undergone atleast two or three change of ownerships, thus change in function also. The present owner of the building plans to put it for use as a school building; an addition to their already existing series of prestigious campuses in the city. Keeping in regard the historic importance and architectural character of the building the

owner has very sensitively decided to house the higher secondary and Cambridge section of their schools' chain in this premises.

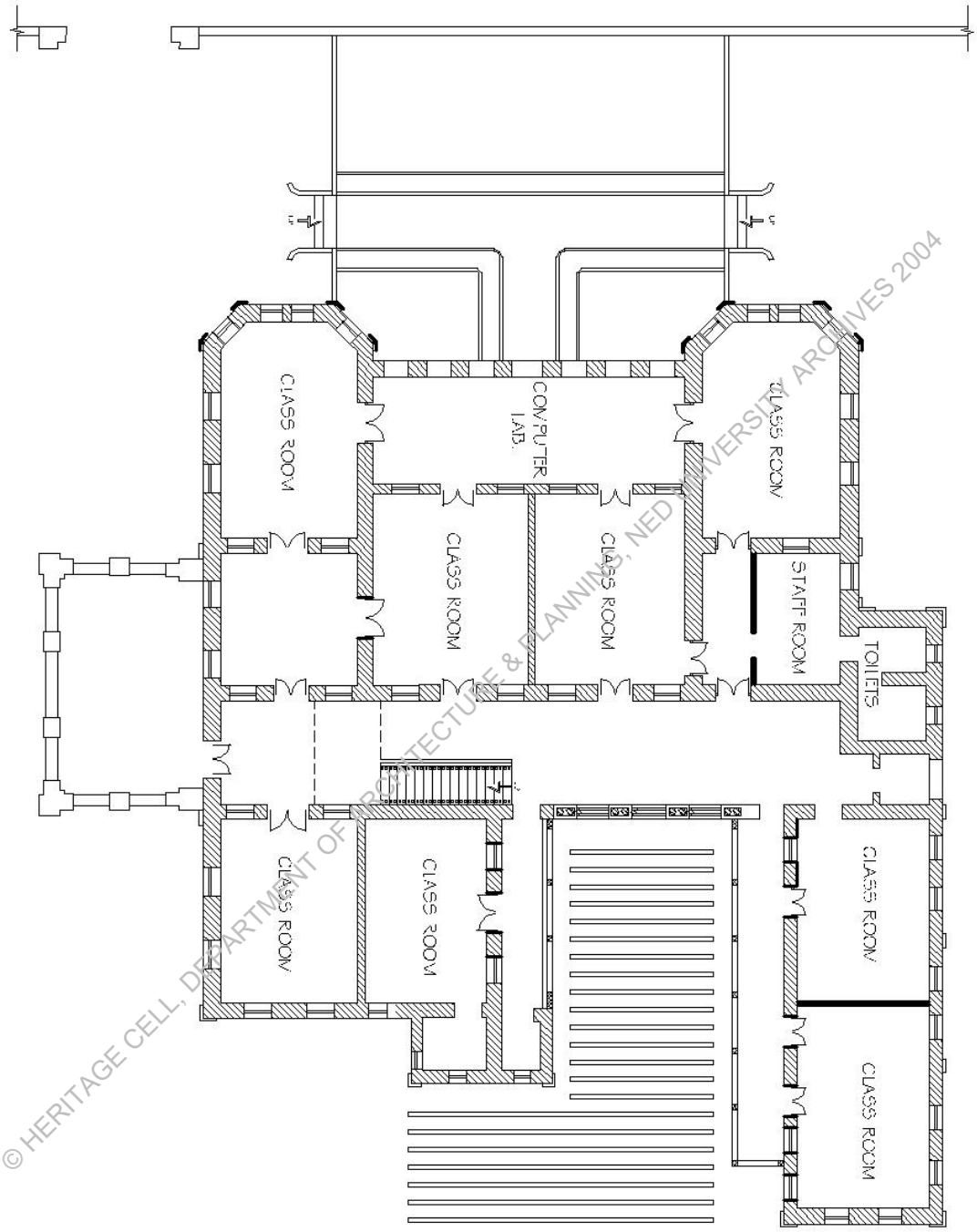
The original use of the building as a hotel required large number of rooms. This makes it possible for proposing its reuse as a school building, since the requirement for this function also calls for a series of rooms that can be used as classrooms. Although the sizes of these rooms are not ideal for accommodating the regular size of class, but the owner consents on keeping the room sizes the same and changing the number of students per class accordingly. This would ensure retaining the original layout of the building to its utmost.

The proposed new use as a high school requires spaces such as labs, auditorium cum multipurpose hall, etc. Since these spaces have special spatial requirements, solutions are sought to accommodate these in an additional, separate new block constructed on one side of the plot. This could be an extension of the already existing outhouse on the premises. Having the wet labs (chemistry, physics, etc.) in the new block would also help in securing the historic structure against any hazards associated with laboratories.

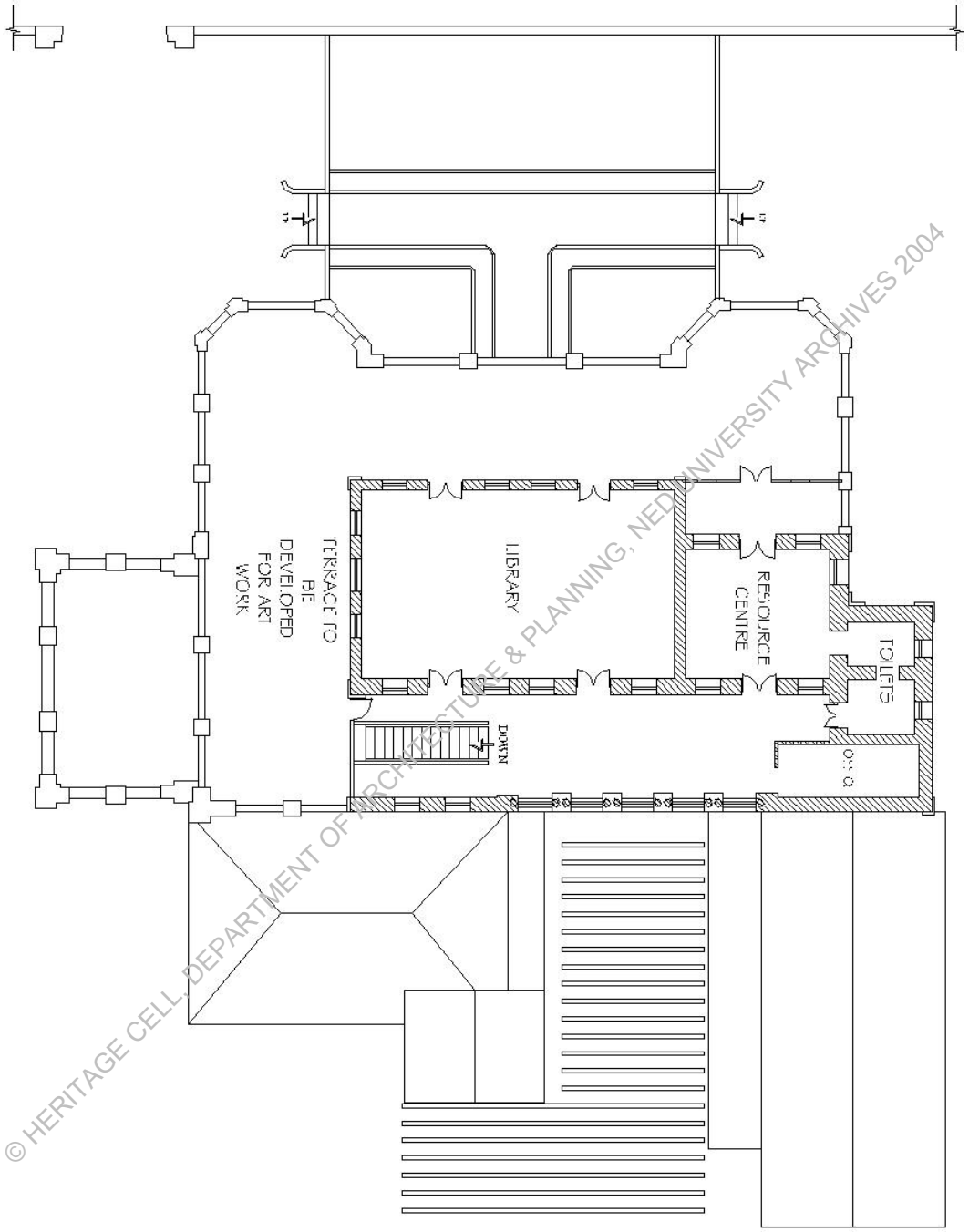
The ample open spaces around the building would provide ideal surroundings for students, in terms of play areas and other outdoor activities.



Space Allocation Plans (Ground Floor)



Space Allocation Plans (First Floor)



Space Allocation Plans (Second Floor)

6. Problems Identified in the Building and their Proposed Restoration Interventions

The purpose of restoration of any building or monument is to ensure its survival into the future with its entirety and authenticity. For this purpose any restoration proposal is always based on a detailed understanding of the building materials and structural systems, the style of construction and the techniques of workmanship. Only after developing a substantial understanding for these, restoration of such properties is approached.

In order to develop an appropriate restoration approach for the Killarney Hotel, an extensive survey of the entire structure and its surrounding was undertaken. This included a complete documentation of the building and a detailed survey of the condition of the structure and its construction materials. Based on this survey the following problems have been identified in the building and their possible remedies are proposed.

The problems identified have been broadly grouped as those related to the site, followed by those related with the exterior of the building and then finally those related with the interior of the building. Problems identified within each of these categories are separately explained and discussed as follows.

6.1 Site Level

These include issues related to the site and its visual impact on the street and immediate surroundings. Since the building in consideration is located on a large plot enclosed with a boundary wall, its surrounding open spaces act as a buffer between the public and the private space. These open spaces also serve as a setting for the building itself and need to be looked as areas that require to be dealt with consciously, to help in accentuating the ambiance and impact of this historic structure on the visitors and the users of the building. In addition to this these spaces also need to be used effectively to cover and compensate for the restraints faced for the proposed reuse due to the non-changeable and fixed layout of the existing structure.

6.1.1 Restoration of the Boundary Wall

The role of a boundary wall in the context of urban centers in Pakistan, especially in Karachi has changed drastically in the present decades. In the past the boundary walls had a low profile and often made in a decorative style. The purpose was to keep away trespassers and define the line of private property, but not create a visual obstruction. In the present decades as the law and order situation in the city has worsened the boundary walls have gradually transformed into a fortifying character. The heights have increased to create complete visual blockade from the street and cut off the private completely from the public. The transitional overlap no longer exists. This has become essential for security reasons.

In the case of Killarney Hotel the original boundary wall was low with a distinct design of the period of its construction. But this wall has now been altered by raising its height with block masonry. This has caused a complete blocking of the view of the building from the street. As this building is an important historic building it is felt that its impact on the street

and visual link with the surrounding should be revived. However, the need for higher boundary for security purposes cannot be denied. Thus an architectural solution will be sought thorough which the original character of the low boundary wall will be retained, but in addition a higher barrier is achieved that allows visual connection but restrains unauthorized access.

6.1.2 Construction of Additional Block

In addition to the main building there is a small structure along the north boundary wall, constructed in RCC. This structure seems to be a later addition that must have replaced the original outhouse of the building. It is a small ground plus one building that in itself is in a state of disuse.

The reuse of the building as a school, requires spaces such as chemistry and physics laboratories, a multipurpose hall that could serve as an auditorium as well as an indoor gym. The space quality required for accommodating these activities cannot fit into any of the existing spaces in the building. In addition to this, placing the laboratories inside the main building is also not advisable due to the nature of the usage which requires wet spaces as well as strict security measures in terms of building materials and finishes etc. Thus it is proposed that the existing outhouse structure will be renovated and an extension added to it to accommodate the functions that cannot be housed inside the main building for practical reasons. This extension will be connected to the main building through an outdoor semi-covered link.

This new block will be designed in a manner that it does not hinder the view of the north façade of the building and follows the proportional relationship of the existing structure. Its architectural quality and character will be integrated with the existing building, but not replicated to ensure that it is identified as a later addition on the lot.

6.1.3 General Landscaping of Outdoor Spaces

The plot has ample outdoor open spaces that could serve useful purpose for the students of the school. These spaces need to be properly landscaped for outdoor activities such as sports, morning assembly, etc.

A detailed landscaping plan will be worked out for the entire site that ensures retaining the existing trees and foliage, but gives the outdoor spaces a more purposeful utility.

(Insert AutoCAD drawings site plan with additions etc)

6.2 Exterior Interventions

The exterior interventions are identified for the building with a focus on the outer look of the structure. The aim of these interventions is to ensure that the building is presented and read in its true form.

6.2.1 Cleaning and Consolidation of Stone Façade

The location of this building is such that the roads around it did not have heavy vehicular traffic especially that of buses and other public transport. Thus the stone of the building is better preserved, in terms of soiling, than many other stone buildings of the city. However, with the construction of Lily Bridge the building has become more prone to pollution from vehicular traffic, in recent years. The stone façades, however, need to be cleaned as they show soiling due to dirt accumulation and bird droppings, especially on horizontal surfaces such as cornices, windowsills, etc.

Besides general soiling due to consolidation of atmospheric dust, various locations of the building façade also show another form of stone deterioration i.e. the black crust formation. This is a combination of run off bio-film, dried pigeon droppings and dust accumulation, seen on vertical surfaces where rainfall striking on damaged horizontal surfaces, produces a run off film down the wall. When dry this film turns into black crust adhering to the stone. The black crust is most likely to cause excessive weathering of the stone during humid climatic conditions, when water content in air is very high. Black crust is seen on the building façade mostly under windowsills, cornices and other shaded areas under projections.

The limestone used in the construction of this building seems to be of a poor quality, as it shows severe weathering in various locations. These weathering forms are termed as alveolar weathering and pitting, where large or small holes appear on the stone surface. These are caused by the rapid de-evaporation of moisture from the surface due to windy weather. In non-homogenous stones this type of weather is more severe.

The stone is of a very porous quality, thus has higher water absorption and retention capacity. Due to trapped moisture inside the stone, macro biological growth is seen on vertical surfaces. To achieve a reduced water absorption a water repellent coat on the surface of stone at the end of cleaning procedure can prove to be effective.

On the North and East facades some areas of stone also have pulverization and disintegration. These areas of stone need to be identified and some consolidation treatment need to be applied to them.

Prior to any cleaning procedure all the different forms of stone deterioration need to be carefully mapped and then each areas treated separately for its specific deterioration type. In the first stage of cleaning all dry and loose dirt particles will have to be brushed off with wire brush, carefully ensuring that no loose particles of the stone itself are lost in the procedure. Such loose or detached pieces of stone should first be consolidated and repaired only then the general cleaning and washing should proceed. General washing of the entire façade will have to be done with mild soap and distilled water. Only after this initial cleaning, the more stubbornly adhering dirt patches, such as black crust formations etc. will be treated. For a detailed, recommended process of stone façade cleaning, please refer to **"Appendix I"** of this report.

6.2.2 Repair of Open Mortar Joints and Decayed Pointing

The lower parts of the masonry where rising damp has caused severe damages the mortar joints have opened up. In some places on the north façade it was observed that the stone masonry joints have been repaired with cement mortar. Generally this mortar is adhering tightly with the masonry, but due to the bad workmanship of these repairs it is advisable to carefully chisel these out and repair these joints with lime mortar.

The entire building facades should be inspected closely for any damaged or open mortar joints, before the cleaning of stone is started. Any loose mortar should be brushed off, and the larger gaps and open joints should be temporarily filled with lime mortar. Later these joints should be finished with fine lime mortar of approved finish color & quality.

This problem is most evident and severe at the base of the stone masonry on the ground floor level. See **"Appendix II"** of this report for preparation of lime mortar.

6.2.3 Repair of Pitched Roofs

The entire roofing of the building has timber trusses made of teak wood. A general inspection shows that it is in a sound and stable condition with no signs of structural collapse. However, at the stage of implementation a detailed inspection will be carried out and each timber section will be closely inspected for any signs of damage, structural failure or termite attack. Based on this inspection decision for any replacement or consolidation will be undertaken.

A detailed inspection of the entire roof will also be done for all damaged and dislodged tiles. The broken tiles will be replaced with new ones. The 'Khaprail tiles used in the roofs of this building are patent marked as " BASLL MISSION ... PATMENT 1865". It can be tried to look for the same tiles in the market of reused building materials, where debris of demolished stone buildings is sold. It might be possible to get the same patent marked tiles for the replacement of the broken or missing pieces.

Installations for the proper drainage of roof slopes, need to be implemented, at the base of the valleys, so that all the rainwater is carried down through these pipes, instead of washing over the facade surfaces. The drained water should be channeled off the site, through drainage system or subsoil drainage trench.

In order to make the trussed roofs waterproof all joints of purlins should be sealed with a water proofing material. In addition an appropriate insulation detail needs to be worked out for the entire roofing.

The timber structural elements are at present soiled with dust accumulation and bird droppings. After a detailed examination of the roofing timber, it would be thoroughly cleaned and treated for termite proofing. Finally these will be polished with clear lacquer polish. (Refer to **"Appendix IV"** of this report for the recommended detailed process for cleaning of timber).

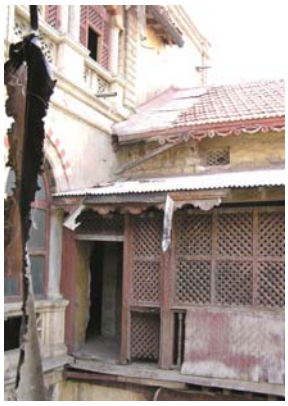
6.2.4 Screeding, Water Poofing and Insulation of Terraces

The parts of building having flat areas such as the terrace on the second floor and the balcony on the first floor, show evidence of improper surface water drainage. Due to this the rainwater stands on these surfaces and seeps through, damaging the structural members underneath.

In order to eliminate the problem of standing water on these surfaces proper slopes need to be worked out to ensure complete draining off of water. The second floor terrace at present has badly laid bitumen flooring which needs to be taken out and proper insulation treatment with properly worked out slopes and surface finish need to be done in this entire area.

Working out slopes for the first floor balcony will however be a bit difficult as it has the original mosaic floor which should not be damaged at any cost during the process.

6.2.5 Re-integration of Missing Architectural Elements



The building of Killarney Hotel has very fine decorative details that enhance the architectural quality of the structure. Luckily these details have survived till date and are present on the building without much damage. These include the carved timber pelvets running along all the edges of the pitched roofs. Close observation shows that these have a different design at different locations. There are some missing parts which have fallen off and are misplaced, due to lack of maintenance. Such missing details need to be reintegrated in the restoration. Since first hand authentic information is available on the building, thus

replicating these missing parts to their exact detail and design will not be a difficult task.

Similarly a few acroterions along the first and second floor parapets have also fallen off. But their exact design and detail is available from the surviving ones thus these can also be reintegrated in the building.

6.2.6 Liberation of the Courtyard

The courtyard is an important feature of the public usage buildings in our region. A courtyard surrounded with a colonnaded verandah flanked by rooms has been a typical layout in most of the large scale public use buildings. In the Killarney hotel this courtyard exists as the basic part of the original plan, but at present it has been closed and blocked by added constructions for toilets and closing of the colonnaded verandah with masonry walls. Since the courtyard itself is an important feature of the building it is being proposed that it should be revived by opening up the colonnaded verandah and demolishing the later added structures in the courtyard. This courtyard can be used by the students for informal activities like art work or group discussions, etc.

6.3 Interior Interventions

The interventions grouped in this category are mostly those which deal with the problems of buildings materials used inside the building. These are general remedies. In addition to these specific interventions for each space, for its usage will be tackled at the design & detailing stages.

6.3.1 Rising Damp

A band of severely damaged and deteriorated stone, along the entire base of the masonry on the exterior surfaces and a similar belt of damaged plaster along the interior wall surfaces on ground floor, endorse the fact that the ground water table is high in the area. The water table level being higher than that of the old stone foundations, is the cause of rising damp, through capillary action, into the building masonry. The problems caused due to high water table are further aggravated by seasonal changes and fluctuations in its level.

Along the interior walls it is seen that at some point in the life of the building an attempt has already been made to repair and prevent further damages caused by rising damp to the stone masonry. This earlier attempt done with a very superficial approach has caused further damage to

the stone masonry. In this earlier attempt the lower portion of the stone masonry inside the building has been re-plastered with cement plaster. Cement plaster being very strong and dense did not allow evaporation of the rising dampness, thus increasing the level of rising damp above the height of the repaired portion and damaging the band of lime mortar above it. Thus at present the damage caused by the rising damp is observed at a level as high as approximately 5'; above the level of the cement plaster band. It is advised that this entire band of cement plaster is chiseled out completely and new lime plaster is applied only after proper treatments for cutting off the rising damp are implemented and substantial time is allowed for the drying of the wet masonry.

On exterior surfaces the portion of masonry damaged by rising damp has loose mortar joints and some dislodged or loosened masonry blocks. These loose mortar joints allow deeper penetration of moisture into masonry, thus should be repaired with lime or gypsum mortar. Before applying the new mortar all loose mortar should be cleaned and scrapped out. Due to successive cycles of dampness and dryness some of the stone masonry blocks have exfoliated and deteriorated. If the exfoliation is very little the blocks can be consolidated by grouting with gypsum or lime mortar of high strength. But if the degree of deterioration is high then this particular block/s should be replaced with a new stone block.

Before doing any repair work on the masonry, first the problem of rising damp should be eradicated. For this purpose the water table around the building has to be stabilized. In order to achieve a stable water table a trench can be dug around the building, which is as deep as the foundation. Along this trench perforated PVC pipes should be laid in such a manner that they maintain a gradient which allows drainage of excess ground water. This drained water can either be collected in a pit and then pumped to the nearest drainage hole or if the site conditions allow, it can be directly drained off into the nearest drainage line utilizing the natural gradient. For details of this treatment refer to **"APPENDIX IV"** of this report.

If the problem of water table cannot be tackled effectively then atleast a DPC layer should be introduced at the base of the masonry wall so that a cut-off line for the rising damp is created.

6.3.2 False Ceiling

The entire building has a false ceiling of 'plaster of paris' panels. This false ceiling apparently was added at a later stage in the building's life. At places where some panels have fallen off, the original timber trusses of the roof become visible. It is at these locations where the timber used for the framework of the false ceiling is also visible. It is quite obvious that the timber used for fixing the false ceiling is of very poor and cheap quality. This

frame has been attached directly to the roofing trusses, thus giving an additional load on them, which they are not designed to cater. Due to the cheap quality of wood used in the

false ceiling framework, it has been attacked by termite. This has also made the teak wood of the trusses vulnerable to termite attack. It is strongly recommended that this entire false ceiling, with its entire framework, is removed at the earliest to avoid further damage to the roof trusses. This would enable exposing the interesting trussed roofing, which is a strong feature of the building fabric, visible from the inside.

6.3.3 Repair of Flooring

Flooring of almost the entire building is done with cement concrete (c.c.) tiles, except for the first floor balcony and the second floor verandah that have mosaic floor. On the ground level the floors have settled at various locations and need to be re-laid evenly. On the first and the second floors also, due to sagging of a few timber beams the floors have uneven levels. At one or two locations, due to damaged timber beams the flooring has collapsed. But this is only at localized spots, and the cause of such failure seems to be water penetration at these specific locations, which has caused decay and rotting of the timber beams leading to collapse of floor only in that location.

Since the flooring material almost all over the building is c.c. tiles it will be easy and cost effective to take out the entire flooring, level out the sub floor or in the upper levels provide

a better sub-floor, and re-lay the same tiles again in the same sequence. This procedure will give possibility for treating the sub-floor on ground level with a water proofing layer also. Special care needs to be taken while taking out the c.c. tiles so that they are not damaged during the process. They would also be carefully numbered to allow their reinstalling at exactly the same location.

6.3.4 Interior Wall Surfaces

All interior walls are plastered with lime plaster. In some locations this lime plaster has disintegrated or detached from the wall due to penetration of moisture inside the building. Throughout the ground floor the plaster has been severely damaged by the rising damp all along the base of the masonry walls.

All the damaged plaster will have to be repaired. Since this is a substantial area, at least on the ground floor, it is more advisable to remove the entire lime plaster and re-plaster the walls with new lime plaster reinforced with a wire mesh. Before re-plastering it should be ensured that the problem of rising damp has been eradicated completely. The repair plaster should have the same composition as the original plaster. For this purpose a sample of the original plaster should be collected from the site and sent for laboratory examination, to determine its composition and material content (chemical and physical properties).

After the plaster has been repaired and reinforced with wire mesh, the entire walls will be painted. In walls where the original plaster is retained, the previous layers of paint accumulated over the years, should be thoroughly scrapped before applying the new coat of paint. (See preparation of lime mortar and plaster in **"Appendix-II"**).

6.3.5 Restoring Altered Door and Window Openings

Some original door or window openings are closed with block masonry or sealed with hard board. In some places the openwork of parapet jalis have also been blocked with mortar filling. All such alterations effect the original layout, and appearance of the building.

Any restoration project should take into consideration the different stages of development of a building. Such developments are part of the history of a building. But any alterations (specially additions) that destroy the authenticity of the original layout or those which are analyzed as harmful to the fabric of the building, should be reverted. On the basis of this principle it is being proposed here that, the original layout should be given importance and all windows and door openings that were part of the original scheme and closed with unsightly block masonry or hard board panels, will be restored.

6.3.6 Cleaning and Repair of Doors and Windows

The existing doors, windows and ventilators of all the buildings, are made of timber, with glass panes. Quite a few glass panes are broken and will have to be replaced.

The frames of doors and windows have been painted and repainted over the years. This accumulated layer of paint should be scraped completely, to the extent that the original color and texture of wood is exposed. This cleaned wood will then be polished with clear lacquer polish.

In addition to this there are a few windows that have wooden louvered panels on the exterior. These will also be restored where missing and repaired where broken, then cleaned and polished.

In some of the doors and windows the broken glass panels have been replaced with plywood which should be removed and new glass panels (either of colored or textured glass) installed in their place.

6.3.7 Electrical Works

All electrical fittings (fans, lights, etc.) will have to be installed. For this purpose concealed electrical wiring will have to be done in the entire spaces. However, where it is aesthetically or structurally not possible, other alternatives may be worked out.

The electrical wiring will be done after the usage and the layout of each space has been decided. On basis of this electrical drawings and layout will be asked from electrical consultants, and then the installation of the wiring and fittings will be done.

7. CONCLUSIONS

Restoration of historic buildings and monuments is a specialized field, in which even the smallest of details, related with the edifice being worked on, have to be taken into consideration. Restoration works should always follow a standard sequence of tasks, approved and advised internationally. It should always start with a complete and thorough documentation of the building, as well its site, in the form of a measured survey. This survey should include all floor, roof and ceilings plans, all elevations, at least two sections and detailed drawings of all architectural elements such as doors, windows, motifs, etc. This should follow a study of the building's materials, structural system and its defects and problems. Necessary research on all these factors should be carried out, after which evaluations and necessary recommendations should be made. If a restoration work does not follow this sequence, it is inevitable that a lot of issues are overlooked, or some important historic data may be lost, or a lot of damage in terms of insensitive and hasty interventions may be carried out on the monument.

It must be understood that natural building stones need to be handled with care, and they should always be treated gently. Unless this complete understanding of the materials is achieved, remedies should not be suggested, as they will only reduce the life of the building. This is not only true for stone, but for all the building materials used in historic buildings. If a detailed investigation of all the climatic, environmental and geological factors is not undertaken, prior to formulating restoration proposals, it is most likely that wrong interventions are proposed which in the long run prove ineffective, or harmful to the original fabric of the building.

Conservation of historic buildings should be seen as a continuous task, where the objective should be to keep the monument intact and surviving for the future generations to witness. This in turn should have its economic viability, which can only be achieved by putting these structures to purposeful usage rather than just trying to maintain them as museum pieces.

APPENDICES

APPENDIX I

Stone Façade Cleaning

The stone facades of the buildings show dirt accumulation as well as black crust formations at various locations. To clean the entire facades, chemical cleaning by the following process is recommended.

Proposed method for cleaning of stone:

Step 1:

- Gently brushing off all loose particles; sand, dust, etc. Mapping of loose fragments as well as dislodged pieces of stone should also be done at this stage. The particles or pieces of detached stone that are of substantial size should be examined for strength and if found in good state are recommended to be fixed to their original location by grouting and joining techniques.

Step 2:

- Temporary filling or repairing of the open mortar joints and decayed pointing is to be done before starting wet cleaning.

Step 3:

- Gently spray distilled water on the surface of masonry (starting from upper parts). Scrub with sponge or nylon brushes and rinse off the surface with spray of distilled water. Let the masonry dry off. If black patches of dirt or black crust are still observed then clean only these parts with an Ammonium Bicarbonate poultice, in the following way.

Step 4:

- Cleaning of soiling and black crust with ammonium bicarbonate solution. Before deciding upon the concentration of the solution to be used, treatment test samples should be done. The selected sample treatment areas should be characteristic of the deterioration or soiling found on the building. Sample areas should ideally be as inconspicuous as possible. It is recommended to adopt a sequential approach, starting with the least aggressive methods first and gradually increasing the applications until an acceptable level of cleaning is achieved.

- If the biofilm is wet, it should be allowed to dry first. Dried bio-film will be brushed and surface applied with the ammonium bicarbonate poultice.

Preparation and Application of the Poultice:

Prepare 10% solution of Ammonium Bicarbonate in water.
Dissolve the particles thoroughly, and sieve the solution through very fine fabric (e.g nylon stockings).
Add paper pulp to the solution till it gives a thick paste.
Brush off and clean the trial surface area.
Take the pulp in hand and squeeze off extra solution, then throw on the surface and gently spread with fingers.
Leave the poultice on surface, for a while, checking at each 10 to 15 minutes interval.
Take off the poultice at a time when the desired level of cleaning is achieved.
Brushes the surface and wash off with water.

It is recommended that the sample cleaning should be started with the least concentration of solution i.e. only 10% with minimum time of application i.e. 15-30 minutes. If the crust does not remove then only the concentration and time is gradually increased. But the concentration of solution should never go beyond 30% as this is the level of saturated solution. In case the higher concentration solutions also do not work then a sample with very small percentage (only 5%) of EDTA (Ethylene-diamine-tetra-acetic acid) can be attempted.

Poultices should be prepared; first those with a solution in water of 10% ammonium bicarbonate then gradually increasing in concentration if the 10% solution does not give effective results. 25% ammonium bicarbonate up to 30% saturated solution of Ammonium Bicarbonate.

If the poultice is required to be left for a longer time span then it should be covered with a sheet of polythene and left for a few hours. It is then cleaned by a sponge, dipped in distilled water.

If algae persist in certain spots, these can be treated with biocide treatment. This is done with a solution of 10% benzyl chloride or 2% zefiran in water. But this should be done after the necessary repair works.

Step 5:

Repair work, where deemed necessary should be undertaken after cleaning with gel and before biocide treatment. The lime mortar used in all repair works must be prepared according to the specifications given in Appendix II.

- Re-pointing and filling of gaps with permanent lime mortar. The mortar is to be applied with metal spatulas, firmly pushed into the gap and further compacted with a hard sponge. The extra mortar on surface should be cleaned with a wet sponge.

- If there are any deeper cracks or fissures these should be filled with mortar using hydraulic lime.

- All horizontal surfaces of windowsills and cornices to be sealed, by covering the whole surface with a layer of lime mortar. Once the surface are sealed the water will drip over the edges of these surfaces. These areas should be regularly monitored and repaired whenever required,

Step 6:

If salts have penetrated inside the building, they will start to appear on surface in the form of efflorescence once the masonry is dry. These can be cleaned by paper pulp technique. This should be done after the problem of dampness penetration has been dealt with. First the building will be aired and allowed to dry completely. Salt deposits/salt crusts or efflorescence that appear on surface after drying, can be simply brushed off. The remaining salts can be cleaned with paper pulp technique. In this method, blotting paper sheets or paper pulp wetted with distilled water, are applied on areas that have crystallized salts. The paper is left to absorb all soluble salts, and then taken off.

APPENDIX II

Specifications for Lime Mortar Treatments

Lime mortar treatments are to be done for damaged or decayed mortar joints, as well as for re-pointing and filling of gaps in masonry. It can also be applied as a protective layer on horizontal surfaces, for prevention against further deterioration. Lime mortar of specified composition should be used for this purpose.

Preparation of lime mortar for repair: The lime mortar to be used for repair works should have higher porosity and water absorption, whereas less density and strength than that of stone. According to a research done on repair plasters of historic buildings in Karachi by Yasmeen Cheema, it was found that these were lime plasters of a high water absorption capacity and porosity, and low density. Their binder-aggregate ratio was also different from the ones normally used. Generally, binder and aggregate ratio in mortar is 1:2 or 1:3. Whereas, laboratory tests of old plaster samples of British period repair lime mortar, show lime (binder) : sand (aggregate) ratio of 3:1. This lime mortar has better cohesive properties, thus recommended for used in all repair works.

The lime mortar prepared for repair of joints, filling of gaps, and protective coating of horizontal surfaces should either have a ratio of 3:1 (lime : sand) or it should be 1:3 (lime : aggregate) in which two parts of the aggregate should be of crushed limestone of the same type as used in the construction of the building. This mortar should have higher porosity and water absorption capacity, whereas less density and strength, than that of stone used in the building.

In addition to this the mortar samples collected form the site should also be sent for an analysis of their composition and properties and the repair mortar prepared in accordance to the findings.

APPENDIX III

Cleaning of Timber

All timber elements including roof trusses as well as window frames or doors, have to be cleaned and polished properly. All these are in a good condition, but due to lack of regular maintenance they need to be properly cleaned and polished. However, for the roof, a close inspection for any damaged or deteriorated portions needs to be done. After repairs of these parts a thorough cleaning of all timber parts could be done by rubbing with cotton, dipped in spirit. If dark colored stains appear after this preliminary cleaning, they can be removed by a very dilute solution of hydrogen peroxide. Care has to be taken while using hydrogen peroxide solution because if used in high concentration, or if left on the timber for a long time, it may discolour the timber.

Cleaning of stains with hydrogen peroxide should be done in three steps. The hydrogen peroxide solution used should be very dilute, i.e. about 1% or 2%. For cleaning prepare three sticks with cotton bud tip, and follow in three steps;

- First dip one stick in hydrogen peroxide solution, quickly wipe across the surface to be cleaned.
- Clean the surface with a water dipped stick.
- In the third step clean water with a dry tipped stick.

If there are small gaps and cavities in the timber surface due to some chipped or deteriorated parts, these can be filled with Alvar-jute Kaolin dough. This is a reversible gap filling material for timber, thus appropriate for restoration purposes.

Preparation of Alvar-jute-kaolin dough:

800 gr. Alvar 770 (polyvinyl acetal)
1260 ml acetone
504 ml industrial methylated spirits
370 ml amyl acetate

Stir and leave for 24 hours in a covered container.

Add:
928 ml xylene (benzene or toulene)
stir well, then add;
480 ml water

Stir till well emulsified, then stir in with a wooden spoon, jute flock and dry kaolin in the proportion of two dry measures of jute to one of kaolin, until too stiff to stir. Turn out into a

large tray or slab and knead in more jute and kaolin in the same proportions, till the mixture does not stick to the hands. Good kneading is essential.

After all the gaps in the timber are filled the floor can be polished with standard floor polishing procedure.

APPENDIX IV

Remedial Measures for Controlling Rising Damp

Due to the presence of high water table at the site and its seasonal fluctuations, moisture content in the building exists at a high degree. With the process of rising damp, the salts from sub-soil enter in to the building stone. Fluctuation in water table causes cycles of rising and falling level of moisture in the building. These cycles of dampness and dryness cause dissolution and crystallization of salts, increasing the pore size of stone. Thus stone starts to disintegrate and weather off. Presence of moisture in the building appears in the form of efflorescence and salt deposits and moisture stains. The presence of rising damp problem, is also apparent from the heavily deteriorated stone and moisture stains at the base of the masonry walls. Change in colour of masonry due to moisture stains, is observed up to a height of 3 to 4 ft. Permanent remedies need to be implemented, which include;

a. Lowering and stabilising the water table of the site: For controlling the water table of the site is by laying a drainage channel around the site (ref. OPP). For this purpose a trench is dug up to a depth at which the water table has to be reduced. The gradient of this trench must be maintained at the same level. Along this trench a PVC pipe is laid. This pipe is of 4" dia, pierced with holes all along its length, and covered with a nylon net (Figure6). The cost for this is approximately Rs. 40/- per running foot. To avoid settlement of the pipe, bedding of crushed stone can be provided specially at locations where there is a joint in the pipe. After the PVC pipe is laid the trench is refilled and compacted with earlier excavated soil. The water that drains off the subsoil through these pipes can be removed from the site in two ways. One is by collecting it in pits at certain junction point/s and pumping the water out in to the nearest manhole. Disposal of water by this method would need more maintenance and its initial cost would also be higher due to the requirement of a pumping room and a pump. (Pump of 5 horsepower may be sufficient). The other method for disposal of water is by directly connecting the drainage channel to the manhole. But for this system, the level of manhole and its sewerage lines should be lower than the level of the trench. This second system is more preferable, as it works on the principle of natural gravity flow, thus costs less and is easy to maintenance.

At the initial phase, the subsoil drainage trench can be installed only along the front side of the site. If after a trial period, of a couple of months, this does not prove sufficient for draining out the site, then similar trenches can be installed along the other two sides of the plot. It is most likely that the water table will be controlled by this method. But for some reason if it does not prove to be effective, the stone foundations of the building can be kept dry by constructing ventilation shafts along them. (Figure 7).

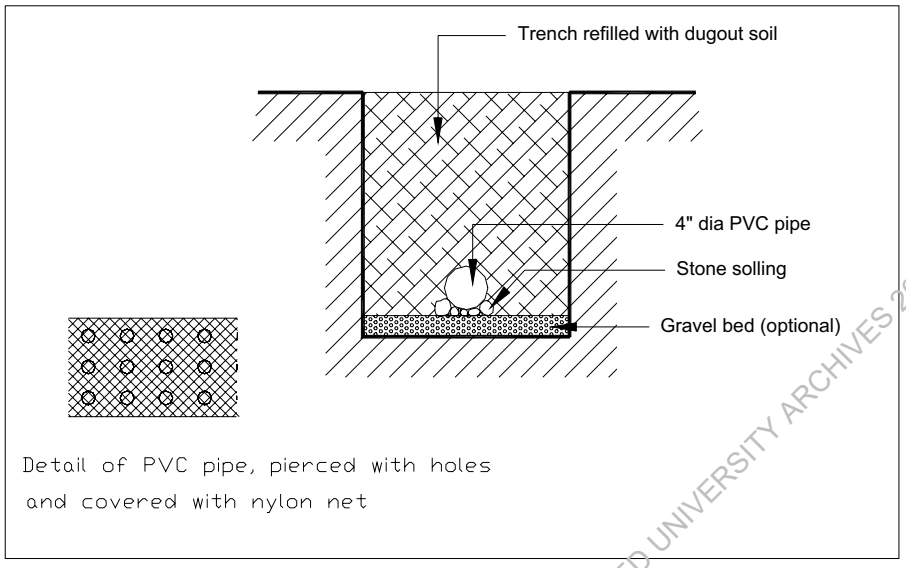


Figure 6: Section of draining trench:

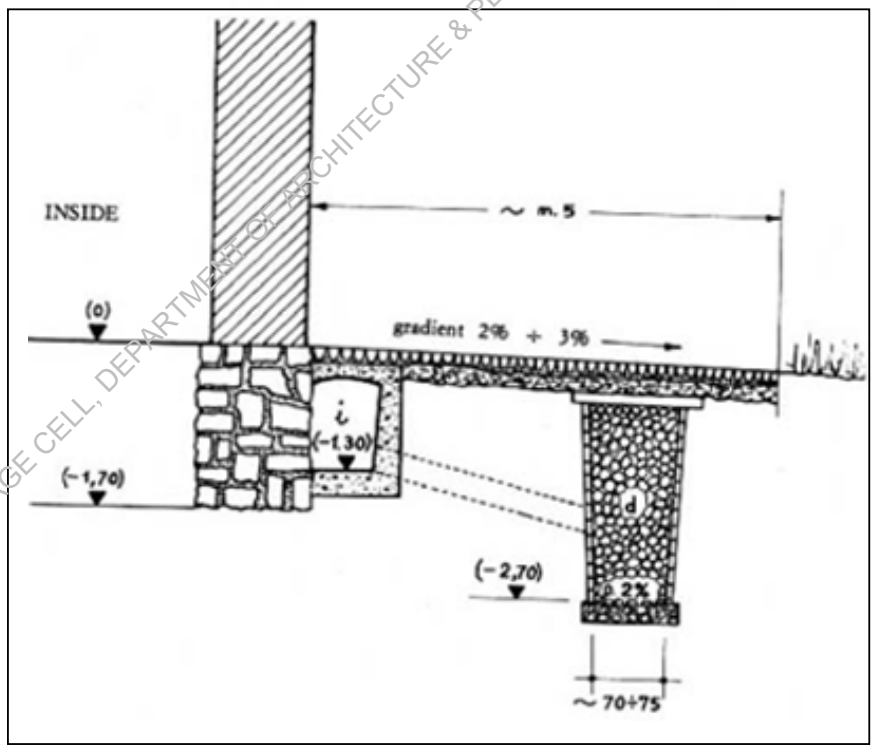


Figure 7: Section of ventilation shaft along foundation

b. Tackling the problem of water table on a macro level: The above mentioned proposal, for lowering the water table of the site, helps in controlling the problem for this specific site, but it does not remove the main cause of its presence. The main cause of this problem is the choked open sewerage trunk (nala) that passes nearby the site. Due to complete lack of maintenance by the municipality, this nala is choked with garbage and other forms of solid waste. This causes blockade in the flow of water. The water thus stands at certain spots for long periods, and seeps into the subsoil, raising the water table level of adjoining areas.

This area is among one of the historic quarters of Karachi, and contains many buildings of historic and architectural significance. Therefore, the municipality should be pressurized to clean the 'nala' and maintain it on a regular basis. The owners of this building and other buildings may organize a campaign, through press or other media, to achieve this.

Location map showing the nearby nala and the adjoining historic buildings of significance

APPENDIX V

Structural Engineers Report