Village of Croton-on-Hudson
Feasibility Study for the Space Analysis, Renovation and Energy Improvements for the Stanley H. Kellerhouse Municipal Building

Appendix

1. Anastos Engineering Associates: Structural Report (revised 12/19/10).

2. O'Dea Lynch Abbattista Draft Report: Analysis and Recommendations for Mechanical, Electrical Plumbing and Fire Protection (1/12/11).

3. O'Dea Lynch Abbattista: Geothermal System Analysis (2/14/11).

4. Daniel O'Connor, P.E.: Hydrant Flow Test Report (10/25/10).

5. Peter Gisolfi Associates: Summary of Thyssen Krupp Elevator Options (memo 2/16/11).

6. Peter Gisolfi Associates: Summary of Space Needs and Improvements (revised 10/5/10).

87. Proposed Parking Lot Expansion Plan Alternate "B" (9/10/10) as prepared for the Village by Site Design Consultants.

98. 2008 Rebanks Pepper Littlewood Architects Inc.
Section 3.2.3 Requirements for Functional Units.
Section 3.4.2 Staff and Space Schedules (with 2010 modifications).

Reference document (not included)

2008 Police Department and Village Court Needs Assessment and Facilities Master Plan prepared jointly by Rebanks Pepper Littlewood, Police Facility Consultants, and the VCA Group, Architects.

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DRAFT REPORT

RE: STUDY FOR
RENOVATION OF CROTON-ON-HUDSON MUNICIPAL BUILDING
CROTON-ON-HUDSON, NY 10520

PREPARED FOR: VILLAGE OF CROTON-ON-HUDSON
THROUGH PETER GISOLFI ASSOCIATES, ARCHITECTS

PREPARED BY: CHRIS ANASTOS P.E.
ANASTOS ENGINEERING ASSOCIATES

DATE: OCTOBER 14, 2010
DECEMBER 9, 2010 (REVISED)

1.0 Introduction

The above building in Croton-on-Hudson is presently used by the Village as their Municipal Building for various functions, including the Police Department, the Village Offices, Court Functions, and for the Historical Society. The building was originally designed as a school, with a combination gym/auditorium located on a portion of the Second Floor. The main focus of this study is to investigate the building to determine options for expanding the Police Department within the building.

The issues we considered for this study, which affect the structure, include the following:

1) Feasibility of adding a mezzanine above the original gymnasium space between the Second Floor and the existing vaulted ceiling of the original gym;

2) Using the existing attic space for storage, and modifying/replacing the stairs to the attic;

3) Extending the elevator to the attic;

4) Reviewing the overall conditions of the exterior façade.

We inspected the building on October 7, 2010 along with Peter Gisolfi Architects and members of the Village staff. Our walk through was a visual inspection which included a look at some easily accessible existing probes in the building finishes. Based on this, we have determined that the existing attic structure is most likely adequate for storage loads, and the elevator can be extended to the attic with some local structural reframing in the attic around the elevator. We also determined that the

one new stair run being considered to the attic from the second floor (within west stair well) can be installed with minor structural work. The existing stair run to the attic from the second floor (within the east stair well), would need to be reconfigured for code reasons. This replacement stair can also be installed with some local minor structural modifications to the areas around the stair.

We also believe that a suggested mezzanine level can be added over the space occupied by the Village offices. Some further investigation of the existing bearing walls, which this new mezzanine would bear on, would need to be done in the next phase of the work in order to verify our assumptions on the strength of the existing construction.

Finally, we observed that some building components on the outside of the exterior walls have deteriorated and require repairs.

All the above is detailed below in our report.

2.0 Description of Building Structure

The building is two stories with a full basement and a partial attic and was built around 1908. It contains approximately 40,000 square feet of useable area on three floors, not including the attic space.

The building's floors and the attic are framed mainly using heavy timber joists and wood floor decks. The joists bear on the interior and exterior brick bearing walls. The roof is framed using heavy timber trusses, incorporating some steel tension elements, with timber rafters spanning between the trusses. There is a wood roof deck. The exterior walls are built using solid brick with what appears to be cast stone lintels and sills.

There is some steel in the building, particularly several steel columns and beams in the basement, at both the east and west ends of the building. These members support interior brick bearing walls above in these areas. This steel appears original to the building. The stairs are steel construction as well. Over the years, some miscellaneous floor framing modifications have been made to the building and they appear to have been done with steel framing.

The foundations could not be determined, but I would anticipate that they are spread concrete footings bearing on sound soil or rock. Some areas of the basement floor (ie. the current boiler room) appear to have been reconstructed at a lower level from their original location.

3.0 Finding and Recommendations

3.1 General Structural Conditions of Building

The building's structure is generally in good condition for the age of the building. There is no visible evidence of structural distress, bowing or excessive deflections of the walls and floors, or settlement of the building. There is no significant deterioration or cracks in the structural members, walls and floors, except as outlined below for the exterior walls. Also no such problems were reported to us by the Village's staff.

The above is based on our limited visual inspection of all the accessible spaces in the building, including the attic. The roof framing, including the trusses, were exposed to view. However, most of the floor framing, as well as most of the interior bearing walls and the inside of the exterior bearing walls, were covered with finishes and we could not inspect them.

3.2 Exterior Walls

The exterior walls are generally in acceptable condition, but there are a few problems with the exterior surfaces of these walls. Some of the exterior brick, especially near the base of the walls, has been damaged by the elements, particularly rainwater, over the years. The outside face of some of these bricks has softened and cracked. This occurs on all four of the exterior walls. In some locations, the mortar has cracked, or softened, and fallen out for an inch or so from the front of the walls. These conditions occur generally at the lower 6' or so of the wall, all around the building, and are worse at the very base of the wall at grade. We suspect that this deterioration will only be in the outer 4" wythe of the wall. This wall is probably a minimum 12" thick and constructed as a solid masonry wall.

We recommend that repairs be made to the affected wall areas, by replacing the damaged brick and mortar. We also recommend doing a test pit to inspect the condition of the bricks below grade as the deterioration may be worse than above grade. These test pits should be done in the next phase of investigation.

Wood cornices exist around the building at the top of the exterior walls. Based on a visual inspection from grade level, there appears to be some deterioration and water damage to these cornices, and probably to the wood framing supporting them. These cornices should also be investigated further by doing probes and exposing the framing inside the cornices, during the next phase of investigation.

3.3 Proposed Mezzanine

Based on our investigation, we believe that, from a structural point of view, a new mezzanine can most likely be added over the old gymnasium space (the current Village Offices) and below the old vaulted ceiling. There is sufficient height in this area to add the mezzanine.

The dead and live loads of the proposed mezzanine would add would add about 30% to the present load on the existing bearing walls. These masonry walls need to be investigated further to confirm that they have adequate strength to carry this additional load. The thickness of the brick walls would need to be verified, and the mortar and brick strength determined by tests. Calculations would need to be done to check that the masonry walls can carry the load of the proposed mezzanine as well as the proposed storage load on the attic floor. (See 3.4 below). Based on my preliminary review, these walls should have adequate strength for this, but it must be verified in the next phase of investigation.

In addition, the existing bearing wall foundations, and the soil they bear on, must be exposed, measured and tested to make sure that they have the capacity to carry the added mezzanine load as well as the added attic load (see 3.4). Not being able to examine these foundations as of yet, I cannot speculate as to whether they will be adequate or not. If they prove not to be adequate, some reinforcing of the foundations may be necessary. This foundation analysis should also be done in the next phase of the investigation.

One option for the framing the proposed mezzanine would be the use of steel beam construction, with cold-formed metal joists between the beams and a wood or non-combustible cement board floor deck. The beams would have a clear span of approximately 38 feet between the exterior brick bearing wall and the main interior brick bearing wall in this area. The required fire rating, if any, will determine the construction options for the mezzanine; however, the mezzanine floor should be as lightweight as possible in order to minimize the loads on the existing bearing walls and their foundations.

3.4 Existing Attic Space

The main area of the existing attic space, located on the south side of the building and between the two stairwells, is framed using 2 ½" X 14" deep wood joists spanning 22'-10" between two brick bearing walls (the south exterior wall and the corridor wall at the Second Floor Meeting Room). Joists of this size can safely carry a load of 75 pounds per square foot and they are therefore adequate for storage use. The 75 psf capacity can carry significant storage load, but this would be the limit. The walls supporting this attic floor structure,

and their foundations, would need to be evaluated for this load, as per 3.3 above. The other areas of the attic, at the east and west ends of the building, would need to be investigated further to see if they can carry storage loads. We were not able to measure the wood framing in these locations; however, they most likely can carry some storage loading as well.

3.5 Extension of Elevator to Attic

If the elevator were to be extended to the attic, an opening in the attic framing would need to be created for the shaft. This would require some local reframing of the attic floor and the new elevator shaft walls in the attic would need to be supported on the reframed attic area. It is our understanding that a new elevator, and new elevator equipment, would be required in order to reach the attic level. This will require some structural work at each floor.

3.6 Stairs to Attic

At the east stairway, the present run of stairs to the attic is very steep and it does not meet code. The architect's recommendation is to replace this run of stairs. There is no stair run to the attic at the west stairway. The architect's recommendation is to add a run of stairs to provide a second means of egress from the attic. In both cases, the work would require some local reframing of the attic area and at the Second Floor and new framing at the new intermediate landings. We would propose the use of steel members for this framing. This is feasible and not extensive structural work.

4.0 Summary

Our study indicates that the proposed modifications to the building, as they affect structure, can most likely be done without extensive additional structural work. The next required step is to investigate in more detail the size and construction of the existing structural elements affected by the proposed modifications. This would require exposing these elements for inspection, measurement, and testing. This would be accomplished through probes, test pits, and a geotechnical investigation of the soil under the foundations. After obtaining the necessary information about the existing structural elements, calculations would be performed in order to determine if these elements are capable of taking the added load in their present state or if they would need to be reinforced.

With regards to the local deterioration problems on the exterior of the building, as described in 3.2 above, we recommend that the repair work be done, regardless of whether any other new work in the building is done. Otherwise the affected brick and mortar, and the affected wood cornices, will continue to deteriorate and significant reductions in the strength of the walls and cornices could eventually occur as a result

of this deterioration. In order to determine the details for the repairs, further field investigation and analysis of these conditions is required.

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Existing Conditions

Plumbing

The building is served by a municipal water service and a municipal gravity sanitary sewer. Both services enter the building in a utility room on the north side of the basement. According to available site information, the sewer line extends to a main on Brook Street. The Water Service emanates from Old Post Road. The water service is a 1½" copper/brass line. It is provided with a pressure reducing valve. A meter is provided just upstream of the PRV, with a valved bypass. The sewer line is under the slab, provided with a pit for access to the house trap. Its size could not be determined however we estimate it to be either a 4" or 6" line.

An electric hot water heater serves the building. The heater is approximately 40 gallons storage capacity and is located in the boiler room. There is a connection to provide domestic hot water via an indirect coil in the boiler, however we are uncertain if it this heating method is utilized.

Hot and cold water are distributed throughout the building. It appears the distribution piping is copper pipe.

HVAC

Heating

The building is heated by an oil fired boiler located in a basement boiler room. The boiler is a Weil McLain 1278 model rated for 1674 MBH capacity. It is approximately 16 years old and is in fair condition. #2 Fuel Oil is stored in an underground steel tank located outside the east side of the building. The tank dates back to 1970. We understand that the tank is routinely checked for integrity.

Two base mounted pumps (one standby) in the boiler room circulate hot water throughout the building via a piping loop and riser distribution system. Fin tube radiation elements along the perimeter walls provide heat to the space. Each perimeter exposure is provided with 2 to 3 radiation control valves coupled to wall thermostats.

Air Conditioning

Air Conditioning for the building is provided by 14 split air cooled systems ranging from 2 to 5 tons in capacity and window AC units in discrete areas. The outdoor condensing units are located at grade around the perimeter of the building. The units are provided as follows:

UNIT #	UNIT LOCATION	AREA SERVED	TONNAGE
AC-1	Above Ceiling of Clerk's Office	1st Fl Court Clerk Office, Judge's Office	4 Tons
AC-2	East Attic	2nd Floor Meeting Room	5 Tons
AC-3	Above Ceiling	1st Fl Jury Room	2 Tons

AC-4	Above Ceiling	1st Fl Courtroom	4 Tons
AC-5	Basement Garage	1st Fl Police Dept (Main Desk/Chief's Office)	4 Tons
AC-6	Exposed in Locker Room	1st Fl Police Dept. Locker Room	3 Tons
AC-7	Above Ceiling of Youth Officer's Room	1st Fl Police Dept. Officer;'s Rm, Computer Rm, Youth Officer Rm, Lieutenant's Office	3 Tons
AC-8	South Attic	2nd Fl Engineering Dept., Village Manager's Office	5 Tons
AC-9	Ceiling (Old Gym area)	2nd Fl Computer Room/Treasurer's Office	3 Tons
AC-10	Ceiling (Old Gym area)	2nd Fl Perimeter Offices, Deputy Treasurer, Break Rm.	5 Tons
AC-11	Basement MER	Basement Community Room	5 Tons
AC-12	Above Ceiling	1st Fl Police Gym	3 Tons
AC-13	North Attic	2nd Fl Rec Department, Multi-Purpose Rm.	5 Tons
AC-14	Above Ceiling	1st Fl Historical Society	3 Tons

With the exception of the community room AC-11 unit, outside air is not provided for any systems. It is unclear if the intent of the systems is to rely on natural ventilation sources (windows) to satisfy Code required ventilation, since some areas are located internal to the building. Local programmable thermostats control unit operation. The units are not provided with a source for heat, except for the units serving the Police Department areas AC-5, AC-6, and AC-7. These units are provided with electric heating coils, and AC-6 is a heat pump unit, to satisfy the 24/7 operation of those areas.

Electrical

In general the electrical systems are in fair condition and functional.

The electrical service at 120/208Volts enters the main electrical room of the building underground on the south side from Van Wyck Street. There are currently 3 service switches in the building. A 1200 Amp Main switch for the building, a 200 Amp switch for Nextel and a 200 Amp switch for T-Mobil all are off of the main service conductors. The building service is then distributed to the various panels throughout the building via a 1200 Amp main distribution panel "MDB" located in the main electrical room. There is also emergency generator power that enters the building from the north side via a 200 kW generator located across the parking lot towards Brook Street. The generator is in very good condition and less than five years old. The generator distributes power to a 600 Amp 120/208 Volt automatic transfer switch which intercepts the main service for the building and then powers the main distribution panel "MDB". Therefore the entire Municipal building systems are backed by emergency power.

From the MDB power is distributed to a 100 Amp panel in the Boiler Room in the basement; a 225 Amp panel in the Historical Society area, a 100 Amp panel in Police Interview Room, a 100 Amp panel in the

Police Department Area, and a 125 Amp Load center in the Sergeant's Office all on the first floor; a 225 Amp panel in the Recreation Department and a 100 Amp panel in the Corridor on the second floor. Power is also distributed directly to the Attic Area to a 400 Amp panel which also feeds a 100 amp sub-panel. The various AC units throughout the building are powered from the larger panels in the building and directly from the main distribution panel "MDB". The various AC units are identified in the HVAC section above. The boiler equipment is powered from the panel in the boiler room.

The existing current maximum demand of 95 kW recorded in the last three years occurred in June 2008 which is approximately one-third the capacity of the 1200 Amp Service Switch capacity. The generator is only about 50 percent loaded, according to the demand readings from the Utility Company.

The existing fire alarm system is a Notifier system which is about 6-7 years old. The panel is located in a dedicated fire alarm closet in the basement by the Village Record Storage Room. The system covers the entire building and is in fair condition.

The building has a dedicated telephone room located next to the main electric room. The room houses all the main telephone equipment racks and terminal boards for the building. The companies being used are currently Cable Vision Light Path and Verizon for the 911 system.

Observations and Recommendations

Plumbing

In general most of the plumbing system is in fair condition and functional. We understand there has been no reported problems with the sanitary drainage. The water service is not provided with a backflow prevention device.

The addition of bathroom and locker facilities for the planned renovations would require the need for a water service upgrade. At minimum a 2" service is required. This service would be provided with a reduced pressure zone (RPZ) backflow prevention device.

A new domestic hot water heating system will be provided to adequately serve the additional showers and fixtures. It is suggested a high efficiency gas fired storage heater be provided with hot water recirculation. The unit may be sidewall vented. New water distribution and waste and vent piping will be provided to the new fixtures.

Fire Protection

The building does not have a sprinkler system. We understand it is desired to provide an automatic sprinkler system to serve the entire building. The system will consist of a wet pipe hydraulically designed system. The need for a dry pipe system for the unconditioned attic space will be further investigated and would ultimately depend upon the final planned usage of the space. The use of a

preaction sprinkler system or a dry agent FM-200 type system for valuable records storage areas can be considered.

A hydrant flow test was requested and performed by the Village. We determined from the data collected that there is adequate pressure under flow conditions to serve a sprinkler system in the building without the need for a fire pump. A new fire water service, anticipated to be 4" in size, would need to be provided for the building. It would run parallel to the new domestic water service. A double check backflow prevention device will be provided for this service. The piping will extend to a sprinkler riser up the building. Each floor will be provided with a floor control assembly connected to the riser consisting of a flow switch, tamper monitored valve, and a inspector's test port, to serve the sprinklers on that level. A Siamese fire department connection will also be provided on the front façade of the building.

HVAC

Heating

We understand that most comfort issues are associated with heating the spaces. The fin tube radiation zones are not zoned adequately to serve the room layouts. Some rooms have thermostats which control valves serving fin tube primarily in adjacent areas, and some areas have 2 zones partially serving it with 2 thermostats, compromising the effectiveness in the adjacent areas. Similarly, perimeter offices were constructed without providing for heating of interior spaces with roof loads, which is resulting in overheating of the perimeter offices to have tenable interior spaces. Other open office type of areas are not as affected.

The boiler plant appears to be in fair condition. The boiler is approximately 17 years old. The hot water pumps and piping appeared to be in fair condition and date back to the heating system upgrade circa 1970. Combustion air is provided via ductwork to a louver on the north façade. Flue gases are exhausted via a chimney to the roof, located behind the elevator shaft. The boiler is provided with a domestic hot water heating coil to generate domestic hot water when the boiler is operational. A 30 gallon electric heater is used during the summer season for domestic hot water generation.

Air Conditioning

Most of the split systems are residential/light commercial type standard efficiency units. Control for each unit is typically provided via a wall thermostats. In general the units are in fair condition. Similar to the heating zoning, some units serve both interior and perimeter rooms, with comfort issues arising.

Proposed HVAC Systems

The intent of the HVAC renovation is to improve upon the system comfort conditions, controls, reliability, serviceability, and efficiency. Given that this may be a phased renovation of an existing structure, certain limitations present themselves as to which systems would be most practical to implement. Based on the programming plans developed by PGA dated October 13, 2010, we believe the systems most suited for the planned renovated spaces would consist of a combination of central station variable air volume air handling units and smaller, constant volume fan coil air handling units. The central station units would serve the contiguous spaces of the police department, administration areas, and court areas. The fan coil air handlers would serve smaller, discrete areas, including the various meeting rooms, gallery area, and offices.

We have developed three schemes, two of which we feel can be implemented successfully and have been further elaborated. Each scheme offers its own distinct advantages and disadvantages.

Scheme 1 – Air Cooled split systems, High Efficiency Gas Boiler

- Replace existing split systems with high efficiency air cooled split systems. Consolidate systems where appropriate. Provide hot water heating coils and introduce ventilation air into the systems. Utilize variable air volume distribution for central station air handling units and fan coil air conditioning units for smaller zones. The cumulative tonnage of the systems would be approximately 65-70 tons.

- Provide a high efficiency gas fired boiler system for the building. The system would consist of three boilers approximately 700 mbh each and a primary-secondary hot water piping system. Re-zone and reconfigure the perimeter fin tube radiation to accommodate the planned architecture and to accommodate a lower heating water temperature to improve system efficiency.

Scheme 2 – Geothermal Heat Pump System

- Replace existing split systems with high efficiency water to air and water to water heat pumps. Consolidate systems where appropriate. Introduce ventilation air into the systems. Utilize variable air volume distribution for central station air handling units and constant volume heat pump air conditioning units for smaller zones.

- Provide a vertical closed loop ground source geothermal well field, consisting of 24-28 wells approximately 490' deep, in an area approximately 7000 square feet. This well field would be sized for a load of approximately 60-65 tons. The well field can be located in either the west parking lot area or the east parking area to accommodate the phasing and logistical installation challenges associated with the wells. Run the loop piping underground to headers in a basement mechanical room. Provide a condenser water distribution system throughout the building to serve the heat pump units.

- Provide a water to water heat pump unit to generate low temperature hot water to serve the perimeter fin tube radiation. Re-zone and reconfigure the perimeter fin tube radiation to

accommodate the planned architecture and to accommodate the lower heating water temperature. This will allow for setback operations without using fan energy.

Scheme 3 – Four pipe fan coil system

- Replace existing split systems with chilled water/hot water fan coil or air handling units. Consolidate systems where appropriate. Introduce ventilation air into the systems. Utilize central station air handling units with variable air volume distribution for larger zones and fan coil air conditioning units for smaller zones. The cumulative tonnage of the systems would be approximately 65-70 tons.

- Provide a high efficiency gas fired boiler system for the building. The system would consist of three boilers approximately 700 mbh each and a primary-secondary hot water piping system. Re-zone and reconfigure the perimeter fin tube radiation to accommodate the planned architecture and to accommodate a lower heating water temperature to improve system efficiency.

- Provide an air cooled chiller and chilled water piping distribution system to the air handling units. The chilled water system would consist of a glycol solution for freeze protection. The estimated capacity of the chiller is 60 tons.

Each proposed system would account for the need of a phased installation and maintaining the functions of critical areas such as the police department and courts. Each would also permit the police department to operate independently and 24/7. For each scheme, dedicated hot water lines can be provided for this zone from either the boiler plant or water to water heat pump to accomplish this.

Based on prior experience with construction costs and energy efficiency, we would not recommend the implementation of Scheme 3. The capital costs of a chilled water system would be significantly higher than that of Scheme 1, with minimal energy savings realized. Additionally, operation of the 24/7 police areas after hours would not be as effective utilizing a central chiller as it would be using individual smaller equipment sized for that load, such as the case for schemes 1 and 3.

Comparing Schemes 1 and 2, several distinctions arise between the systems including the capital costs, efficiencies, maintenance, and system expected useful life. The geothermal system has higher capital costs because of the well field and condenser water distribution piping installation. The geothermal system will have higher energy efficiencies and lower energy costs inherent to the use of a "free" heat source and sink in the earth and the use of water cooled equipment. The maintenance of the geothermal system would be less than an air cooled split system scheme since the equipment is one piece and in general the closed loop geothermal loop requires little maintenance other than water treatment. Additionally no combustion equipment is needed to be maintained. The service life of the geothermal system components is generally longer than the air cooled system components. The well field piping is expected to last 50+ years. Air cooled equipment service life is typically 15 years.

Electrical

The existing electrical service and power distribution capacity appears to be adequate for the proposed HVAC systems and renovations. The proposed HVAC systems identified above in both schemes will be more efficient than the existing systems. Although there may be a slight increase in the capacity of the units the overall electrical consumption should not increase. What will be required is new power distribution to the new units, with the capacity of the electrical systems being sufficient. Many of the smaller units will be consolidated with larger units requiring new feeders and disconnect switches. The circuit breakers in the existing distribution board will need to be replaced or an additional distribution board may need to be added. A majority of the new HVAC new electrical feeder runs could be run done via the attic space. The new boiler systems or heat pumps will be powered by the existing boiler panels or additional sub-panels.

For powering the renovated spaces the existing panels will be reused where feasible. The spaces will be reconfigured for the new functions requiring new receptacles and circuits for those functions. Additional panels will be provided if required but in very limited circumstances. The circuiting will be reorganized for each of the different groups in the building. New energy efficient lighting will be provided in the renovated spaces with new lighting controls to meet NYS Energy Code requirements.

The fire alarm system devices will be added and modified for the renovated spaces and new HVAC systems and connected to the existing Fire Alarm Control Panels. New sprinkler system tamper and flow switch devices will also be connected to the existing system. Additional modules and device may be required in the existing Fire Alarm Control Panel to accept the new devices. The system will need to be programmed for the new systems and devices in the renovated spaces.

The telephone and data systems will be coordinated for the renovated spaces and connected to the existing telephone room equipment. Coordination will be done with the various groups to determine where the runs need to be terminated.

Geothermal System Analysis for the Village of Croton-On-Hudson Municipal Building

PREPARED FOR:

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PRESENTED BY:

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February 14, 2011

O'DEA
LYNCH
ABBATTISTA
CONSULTING ENGINEERS

1.0 PURPOSE

OLA Consulting Engineers has been commissioned by Peter Gisolfi Architects to perform a preliminary investigation into the feasibility of installing a geothermal (ground coupled) water source heat pump system for the heating and cooling of the Village of Croton-on-Hudson Municipal Building.

This analysis includes a comparison of a geothermal heat pump system to a split type air conditioning system with a gas fired hot water boiler.

2.0 INTRODUCTION

The existing building is a 3 story masonry building with an attic. The useable floor area of the building is approximately 30,000 square feet. The future occupancies of the spaces are still under consideration. We have assumed the following uses:

Lower Level: Storage areas, service areas, Historical Society, Community & Teen Rooms
First Floor: Police Department, Multi-Purpose Room, Recreation Department
Second Floor: Village Court, Administration Offices
Attic: Storage

The tonnage for cooling is estimated to be approximately 60 tons of cooling. The peak-heating load estimated for this analysis is approximately 900,000 Btu/hr.

We have assumed for this study operating hours for Monday thru Friday to be 7 am to 9 pm, Saturday 9 am to 6 pm and Sunday to be 10 am to 6 pm, year round. The Police Department area is operated continuously, seven days a week, all year. We understand there are certain areas that can operate after hours for the community use, but the impact of this on the analysis is minimal.

3.0 BASE DESIGN

Our comparative approach against the proposed geothermal system consists of split type high efficiency direct expansion (DX) air conditioning units and a gas-fired condensing hot water boiler. The split systems shall each have an indoor unit with a DX coil for cooling and a hot water coil for heating. The outdoor units shall be condensing units located at grade. We anticipate ten 3 to 5 ton units throughout the building and a 15 ton unit to serve the Police Department area. Expected service life for the split type units are 20 years and for the boilers it is approximately 25 years.

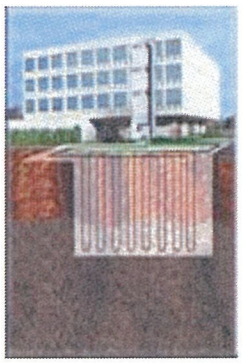
4.0 PROPOSED GEOTHERMAL SYSTEM

4.01 We reviewed a vertical loop geothermal piping system. Twenty eight (28) approximately 490 feet (ft) deep bores would be required and they would be spaced approximately 16 ft apart. The 28 wells can be accommodated within an area of approximately 8,500 sf. Two possible locations for the field are the north parking area and the south and east parking areas. The north area appears to be the most favorable to facilitate the phasing and construction. Refer to SKM-1 for the two different options for the well field.

4.02 The heat pumps themselves would be located inside the buildings. We anticipate ten 3 to 5 ton units throughout the building and a 15 ton unit for the renovated police area, with an estimated design load of 60 tons in total. Two water to water heat pumps will provide 500 MBH of heating to the perimeter via fin tube radiation.

4.03 The following general description of a ground source or closed loop coupled heat pump system is from *Waterfurnace®* a provider of ground source heat pumps.

Closed Loop Earth Coupled
Earth coupled systems can be either horizontal or vertical, depending on available space and soil conditions. Horizontal ground loops are installed with polyethylene pipes placed in trenches four to six feet below the surface. Vertical loops are installed in boreholes 150 to 500 feet deep. When installed properly, ground loops are considered by some to be virtually indestructible.



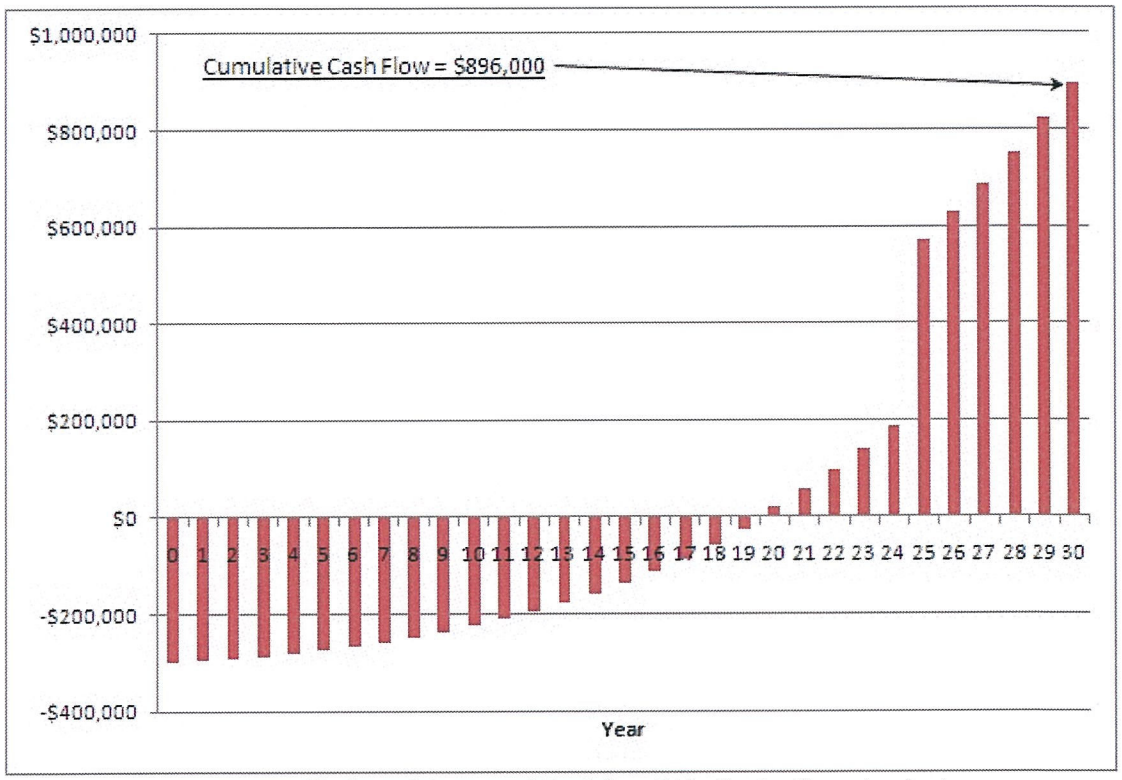
4.04 It should be noted that prior to installation of a system of this type it is recommended to perform a test bore to determine exact properties of soil and performance of each bore. This detailed geological site survey can eliminate some uncertainty in the performance of the wells. Another advantage of performing this analysis is that an actual cross section of the earth to be bored is determined. The advantage of this test well data is that the effort required to install a loop would be less uncertain and more accurate pricing and construction scheduling could be obtained. In this type of testing, an electric water heater and electric meter are used to verify the ability of the loop to reject heat. This test would be performed if the decision to move forward with a heat pump system was made. This decision often is based on the results of a preliminary energy analysis. We performed this preliminary analysis and the findings are in the following section.

4.05 We have estimated the incremental construction cost for the geothermal system to be approximately $300,000 as compared to the base case system. This includes the additional cost of a well field (28 wells, each 450-490 feet deep). Expected service life for the indoor heat pump units is approximately 20 years and for the geothermal piping it is approximately 50 years.

5.0 ENERGY ANALYSIS

5.01 We performed a comparison of the energy requirements and resulting operational costs of the base case design and the geothermal design. This analysis is preliminary and various assumptions were made, for example average price per kWh and fuel costs as well as building total full load cooling and heating hours. Today's energy costs were used and full load operating hours were based on accepted standards. The method used to calculate the savings utilized bin weather data for New York. This information enabled us to generate a load profile for the building to compare the systems.

5.02 We have completed a rough Life Cycle Cost Analysis (LCCA) as part of this study. The overall life cycle for the heat of rejection component of the heat pump systems is longer than the split system. We anticipate that with a service life of 30 years (the well field is typically considered to last over 50 years) the geothermal system will have a reasonable economic case. If the replacement cost of the condensing units in 20 years and the boilers in 25 years is included, the LCCA would indicate that the geothermal system is favorable. The cumulative cash flow from energy savings and the avoided replacement of the outdoor condensing units and boilers over the 30 years would be in the range of $800,000 to $900,000 with an assumed 7% utility escalation rate. The figure below shows the life cycle cost analysis of this project.



Croton-on-Hudson Municipal Building Life Cycle Cost Analysis

5.03 The magnitude of the calculated annual energy savings is approximately $11,041. This is a small order of magnitude of savings when compared to the installation cost of the geothermal system. This indicates a simple payback of approximately 27 years. The appendix includes the simple payback calculation based on calculated energy savings and estimated installation costs.

6.0 SUMMARY

6.01 Based on our order of magnitude cost estimate, the incremental cost to heat, air condition, and ventilate the building with the geothermal system as compared to a split type air conditioning system with a gas fired hot water boiler plant is approximately $300,000 with an annual energy savings of $11,041.

6.02 The geothermal heat pump system will not require a significant amount of maintenance as compared to that required for the boilers and split systems. The majority of the components requiring maintenance in the geothermal system are familiar to most HVAC maintenance personnel (compressors, filter changes, pumps).

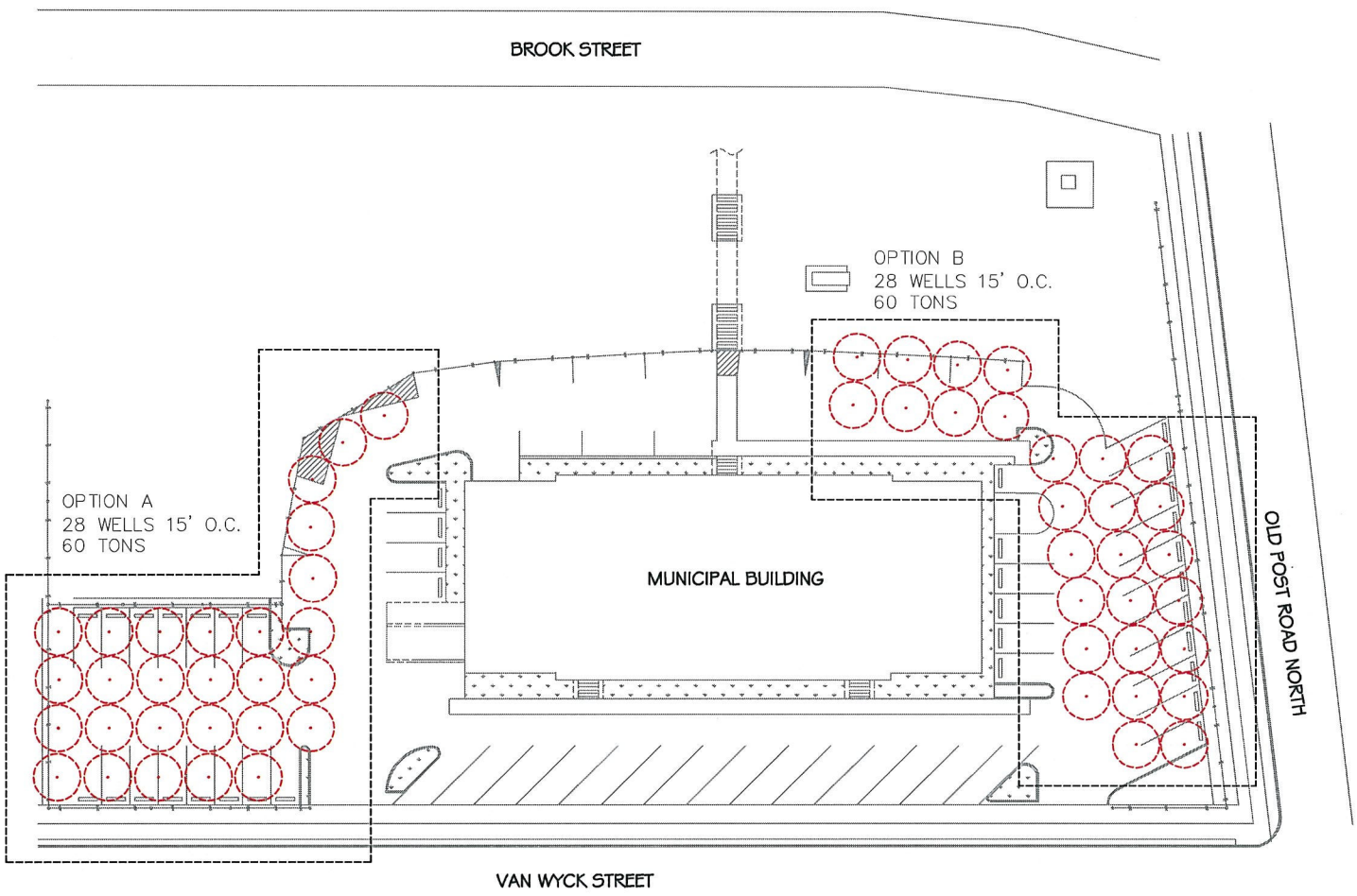
6.03 Aesthetics, noise and site configuration are a consideration when comparing a geothermal system to another cooling and heating system. The geothermal system would negate the outdoor equipment required for the base scheme and currently installed serving the building.

6.04 It should be noted that construction coordination of a well field can be cumbersome. As the geotechnical information currently available is limited, more risk is added to the decision making process.

6.05 From the items above, we summarize that a geothermal heat pump system for this project can be of benefit, but the ultimate conclusion will be determined from a weighing of these benefits versus the increased first cost.

6.06 Should the geothermal system be pursued for this project, OLA recommends a detailed discussion on envelope characteristics, internal loads, and ventilation strategies be undertaken by the project team. This may assist in reducing the size of the HVAC system, resulting in a reduced incremental cost and improved simple payback period.

Croton Municipal Building - Simple Payback Analysis Estimated Energy Use and Operational Costs Comparison			Annual $	Annual Energy Consumption	Units
Proposed Design	Split System Cooling	annual cost	$9,229	65,923	kWh
	Hot Water Heating	annual cost	$20,938	13,252	Therms
		Total $	$30,167		
High Eff Option	Heat Pump System Cooling	annual cost	$6,265	44,752	kWh
	Heat Pump System Heating	annual cost	$12,862	91,868	kWh
		Total $	$19,127		
Total Annual Savings For Heat Pump System over Split System		Cooling	$2,964		
		Heating	$8,077		
		Annual Savings Total	$11,041		
	Total incremental Cost for Geo over Proposed system proposed		$300,000		
		Incremental Cost	$300,000		
		Annual Savings	$11,041		
	Simple Payback Analysis		27	years	



1 GEOTHERMAL SITE PLAN
SCALE: 1/16" = 1'-0"

NORTH

O'DEA LYNCH ABBATTISTA
CONSULTING ENGINEERS
50 Broadway Hawthorne, NY 10532
tel 914.747.2800 fax 914.747.0453
www.olaca.com

CLIENT

No.	ISSUE OR REVISION	DATE

PROJECT TITLE
Croton-on-Hudson
Municipal Building Study
1 Van Wyck Street
Croton-on-Hudson, NY 10520

DRAWING TITLE
GEOTHERMAL WELL FIELD OPTIONS

SEAL

SCALE	AS NOTED
PROJECT NO.	NP08009.00
DRAWN BY	
DRAWING NO.	SKM-1
CHECKED BY	
DATE	02/14/11

FLOW TEST REPORT

Location Old Post Road North (at Van Wyck Street intersection) Date 10/25/10

Test Made by Daniel O'Connor, P.E./Tom Brann Time 1:30 PM .M.

Representative of Village of Croton-on-Hudson

Witness Bernie Campana

State Purpose of Test Municipal Building Sprinkler System Design

Consumption Rate During Test Normal Conditions, approximately 1MGD (which is the yearly average flow)

If Pumps Affect Test, Indicate Pumps Operating N/A

Flow Hydrants (A_1) ~~(A_2)~~ ~~(A_3)~~

Size Nozzle 2.5"

Pitot Reading 55 psi Total gpm 1250

gpm

Static *B* 111 psi Residual *B* 93 psi

(~16% drop in pressure from static to residual)

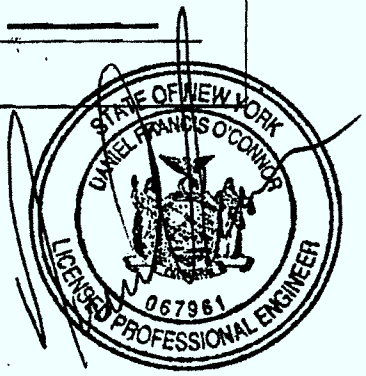
Projected Results: at 20 psi Residual 3000 gpm; or at ____ psi Residual ____ gpm

Remarks Hydrant was fully open to achieve the 93 psi residual pressure reading

See attached map for hydrant locations, both hydrants are at approximately the same elevation

Location Map: Show line sizes and distance to next cross connected line. Show valves and hydrant branch size. Indicate North. Show flowing hydrants—label A_1, A_2, A_3. Show location of Static and Residual—label *B*

Indicate *B* Hydrant X Sprinkler ____ Other (identify) ____



Hydrant Flow Test, 10/25/10

Location of flow and residual hydrants

Residual hydrant: static pressure reading

Residual hydrant: residual pressure reading

Flow hydrant being opened up (reading was taken at fully open condition)

Flow hydrant nozzle measurement (2.5")

ATTACHED FOR INFORMATION PURPOSES, CLOSEST HYDRANT TO ONE TESTED ON 10/25/10 IS TEST NO. 1

HYDRANT FLOW DATA SUMMARY

City: Croton on Hudson State: New York Witnessed By: Insurance Services Office, Inc. Date: 04/14/97 & *07/30/97

(West Chester County)

TEST NO.	TYPE DIST. *	TEST LOCATION	SERVICE	FLOW - GPM				PRESSURE PSI		FLOW AT 20 PSI		REMARKS
				INDIVIDUAL HYDRANTS			TOTAL	STATIC	RESID.	NEEDED **	AVAIL.	
1	Res	Terrace Place & Brook St.	LS	920			920	134	125	1000	3600	
*2a	Comm	Albany Post Road n/o Old Post Road	LS	760			760	82	22	2500	775	
3	Res	Lounsbury Road & Jasper Road	HS	795			795	153	50	750	900	
4	Comm	Glen Gary Road & Hessian Hills Road	HS	970			970	55	50	3000	2800	
5	Res	Memory Lane & Brook Trail	HS	610			610	98	75	750	1200	
6	Comm	Hughes St. & Cleveland Dr.	LS	938			938	75	49	2500	1400	
7	Comm	Old Post Road s/o Maple St.	LS	766			766	90	43	3000	950	
8	Res	Lexington Dr. & Sunset Dr.	LS	610			610	70	30	750	700	
9	Res	Franklin Ave. & Hill St.	LS	550			550	105	80	750	1100	
10	Comm	S. Riverside Ave. s/o Croton Point Ave.	LS	610			610	130	29	3500	650	
11	Comm	Croton Point Ave. w/o S. Riverside Ave.	LS	690			690	128	35	2500	750	
12	Comm	S. Riverside Ave. & Maple Ave.	LS	1353			1353	125	40	3500	1500	
13	Comm	N. Riverside Ave. & High St.	LS	1353			1353	155	120	1750	2800	

THE ABOVE LISTED NEEDED FIRE FLOWS ARE FOR PROPERTY INSURANCE PREMIUM CALCULATIONS ONLY AND ARE NOT INTENDED TO PREDICT THE MAXIMUM AMOUNT OF WATER REQUIRED FOR A LARGE SCALE FIRE CONDITION. THE AVAILABLE FLOWS ONLY INDICATE THE CONDITIONS THAT EXISTED AT THE TIME AND AT THE LOCATION WHERE TESTS WERE WITNESSED.

*** Comm = Commercial; Res = Residential**

**** Needed is the rate of flow for a specific duration for a full credit condition. Needed Fire Flows greater than 3,500 gpm are not considered in determining the classification of the city when using the Fire Suppression Rating Schedule**

HYDRANT FLOW DATA SUMMARY

City: Croton on Hudson State: New York Witnessed By: Insurance Services Office, Inc. Date: 04/14/97 & 07/30/97

(West Chester County)

TEST NO.	TYPE DIST. *	TEST LOCATION	SERVICE	FLOW - GPM				PRESSURE PSI		FLOW AT 20 PSI		REMARKS
				INDIVIDUAL HYDRANTS			TOTAL	STATIC	RESID.	NEEDED **	AVAIL.	
14	Comm	Olcott Ave. & Larkin Pl.	LS	1101			1101	110	40	4500 1750	1300	
15	Comm	Grand St. & Old Post Rd. No.	LS	1353			1353	110	97	2000	3800	
16	Res	Scenic West e/o Rte. 9A	LS	1168			1168	125	25	1000	1200	

THE ABOVE LISTED NEEDED FIRE FLOWS ARE FOR PROPERTY INSURANCE PREMIUM CALCULATIONS ONLY AND ARE NOT INTENDED TO PREDICT THE MAXIMUM AMOUNT OF WATER REQUIRED FOR A LARGE SCALE FIRE CONDITION. THE AVAILABLE FLOWS ONLY INDICATE THE CONDITIONS THAT EXISTED AT THE TIME AND AT THE LOCATION WHERE TESTS WERE WITNESSED.

*** Comm = Commercial ; Res = Residential**

**** Needed is the rate of flow for a specific duration for a full credit condition. Needed Fire Flows greater than 3,500 gpm are not considered in determining the classification of the city when using the Fire Suppression Rating Schedule**

Croton Municipal Building

Summary of Space Needs and Improvements
Revised 10/5/10

Objectives

a. Improve the functionality of the Police Department spaces.
b. Incorporate energy saving features which will ultimately lower the operating cost of the building.
c. Create a Master Plan for the building.
d. Investigate the feasibility of LEED certification

Space Requirements

Expand the Police Department: John Pepper's program to serve as a guide

The Police Department will need a dedicated data server room with an interconnection to the Village's system.

Additional storage space for village and police records

Eliminate the Police Exercise room and use the space for other required police functions

Possibly relocate the main public entry to the Police Department to the Handicapped Accessible entry near the elevator and handicapped lift.

Relocate the Recreation Department to accommodate the spaces related to the Court function

Relocate the Court Room to the Second Floor and combine with the Meeting Room

Provide a Jury Room, a waiting area and a small meeting room close to the Court Room

Investigate the feasibility of adding or reclaiming space in the attic

Add public and staff handicapped accessible restrooms

The Recreation Department uses the following spaces for their programs: Community Room, adjacent Kitchen, Teen Room and the Second Floor Conference Room

The Court Clerk's Office and the Judge's Chamber must be near the Court Room.

The Community Room and the Historical Society spaces must be maintained.

566 Warburton Avenue
Hastings-on-Hudson NY 10706
Phone: 914-478-3677 • Fax: 914-478-1600

Architects
Landscape Architects
Interior Architects

Provide a walk in fireproof safe for archival storage for the Village Clerk's documents

The Treasury Department requires a small safe for cash deposits and a secure storage room

Provide additional storage for the Building Department offices.

The Court function requires the following spaces: Court Clerk General Office, Court Clerk's Office, Judge's Chambers, Holding Cell, Court Room, Jury Room and an Attorney/Client/Prosecutor Conference Room.

Provide additional storage for the Community Room

Building System and Infrastructure Improvements

Consider extending the elevator to the attic space.

Modify the elevator to transport prisoners

Extend the two staircases to the attic if "new" Attic space is created

Toilet rooms to meet ADA requirements

ADA requirements must be addressed in all aspects of this project.

Possibly add a fire sprinkler system: this may require an increase in the size of the incoming water service line.

Upgrade the fire alarm system

Upgrade the electric power distribution system

Security provisions will be required throughout including cameras, electric latching and an access system.

Presently there are no occupancy sensors for lighting or HVAC controls

Add a building management system

Replace/ improve mechanical systems

Possibly add gas service for dual fuel boilers

Possibly relocate the Emergency Command Center function to the proposed First Floor Multi-purpose Room

Possibly add teleconferencing equipment in the new Court Room

Renovate the Community Room, the adjacent Kitchen and the adjacent Toilet Rooms

The Community Room divider is rarely used and could be removed

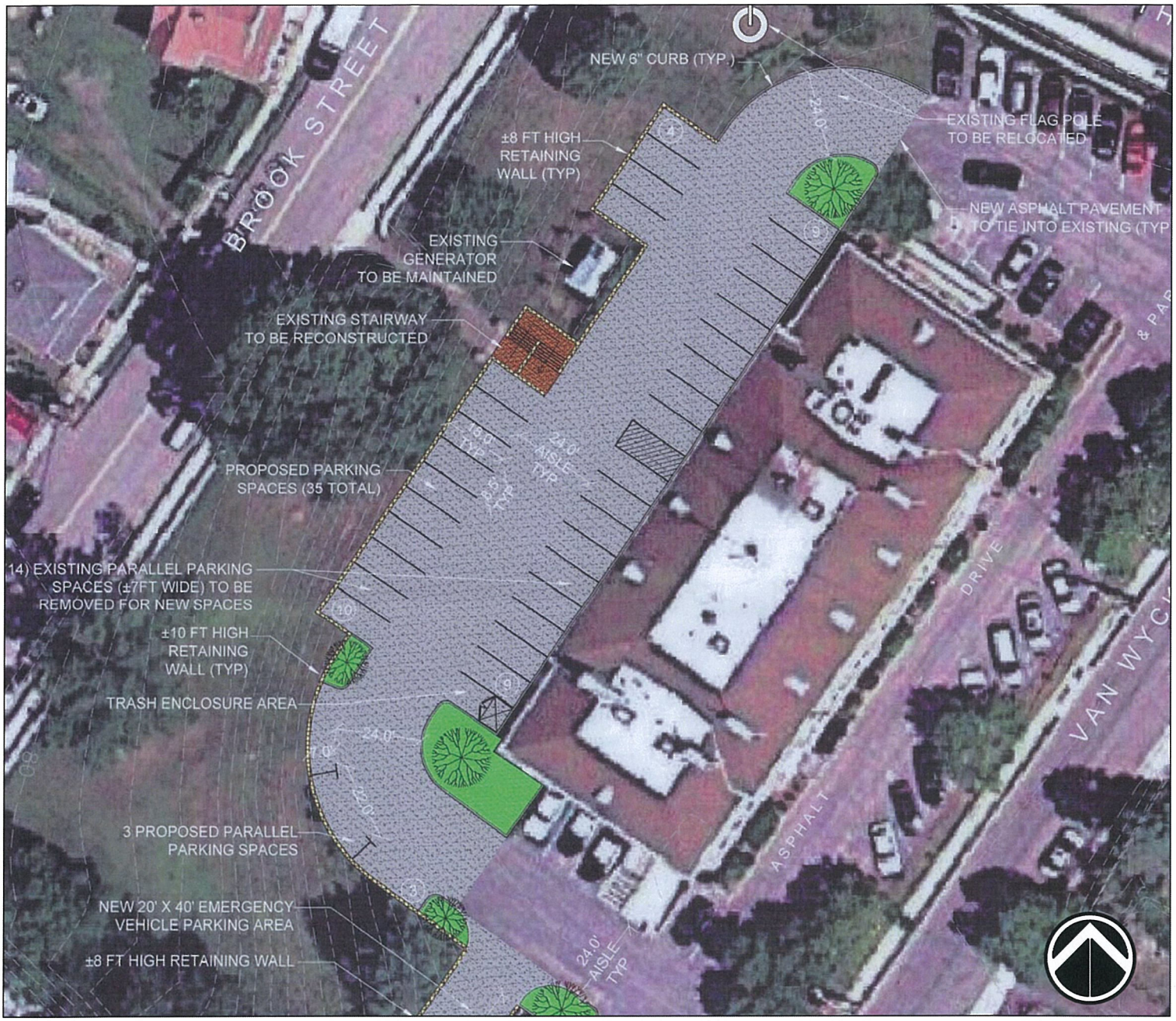
Environmental evaluation (ie. asbestos)

Building Exterior and Site Improvements

Fascias/soffits, gutters reconditioning

Brick repointing

PGA to review site conditions



PROPOSED PARKING SCHEME

- COST ESTIMATE : $352,000
- 21 ADDITIONAL PARKING SPACES
  68 EXISTING, 14 ELIMINATED,
  35 PROPOSED, TOTAL 89 SPACES
- TOTAL LENGTH OF WALL : ± 450 LF
- HEIGHT OF RETAINING WALL : ± 8-10"
- INCREASED PARKING AREA : ± 8,400 SF
- FILL REQUIRED : ± 1,200 CY

PREPARED BY SITE DESIGN CONSULTANTS - YORKTOWN HEIGHTS, NY

3.2.3 – Requirements for Functional Units

100 – Senior Administration

Commander	Dennis Coxen, Chief of Police
Responsibilities	Overall department administration/command, records.
Staffing	Chief of Police, Patrol & Detective Division commanders (2 Lts), future dedicated Admin Sergeant, future admin support, future dedicated Records clerk
Current Facilities	Office for Chief, (Lts. offices located close to units) separate area for records/files
Space Requirements	101 – Senior Administration: offices for Chief, Lieutenants, future dedicated Admin Sgt., workstation for admin assistant, waiting area, confidential files (secure), access to common conference room, resource area. 102 – Records: Workstation form future clerk & temporary staff, central file/records storage, printer/copier, computer/server room, supplies storage.
Planning Considerations	Area should be secured after business hours. The copier area should be planned to be accessible to other divisions after hours. Only screened/controlled visitors.

200 – Patrol Services Division

Commander	Lieut. Russ Harper (office located in 101 above)
Responsibilities	Patrol operations, station command and front desk/communications, traffic enforcement, support units (parking enforcement, crossing guards, seasonal park rangers, auxiliary), detention, fleet & equipment.
Staffing	Patrol Sergeants (5), patrol officers (growth from 12 to 16), dispatchers (growth from 1 to 2), support units (9 plus aux.).
Current Facilities	Sergeants' office (shared), inadequate briefing & report-writing area, combined dispatch/front desk counter (insecure), one interview room, workroom for Auxiliary.
Space Requirements	201 – Patrol Units: Shared Sergeant's office, briefing/reports area, interview room, resource area. 202 – Front Desk/Dispatch: front desk counter, dispatch console, dedicated washroom. 203 – Support Units: workstations and storage for support units.
Planning Considerations	Locate on main floor, in reasonable proximity to parking lot, front desk, Records and Detective Bureau. Locate in reasonable proximity to the booking area and evidence drop lockers.

300 – Investigative Services Division

Commander	Lieut. Tramaglini (office located in 101 above).
Responsibilities	Investigations (Detective Bureau, Youth Bureau), Ident & Property.
Staffing	1 Detective (growth to 2, plus Det/Sgt), one future dedicated YB detective.
Current Facilities	Office for youth bureau, small evidence storage room, small photo lab.
Space Requirements	301 – Detective Bureau: Office for future D/Sgt, shared office for detectives, interview room with recording equipment, file/storage area. 302 – Youth Bureau: Office, 'soft' interview room, secure files. 303 – Ident & Property: Secure exhibit intake area, small ident lab (fingerprints, chemical work), drying cabinets, secure exhibit storage (restricted access) with separate firearms & drug vaults.
Planning Considerations	Locate in reasonable proximity to Patrol Services. 302 – Youth Bureau: Separate YB from remainder of police operations, with separate entrance (NY certified space).

400 – Booking/Holding

Function	Prisoner processing (breath/sobriety tests, fingerprinting, photography), booking and short-term detention.
Staffing	None
Current Facilities	Small booking area, 1 holding room.
Space Requirements	Sallyport (prisoner transfer), booking area/holding cage, secure processing and interrogation/interview rooms, segregated detention cells (male, female, juvenile), washroom.
Planning Considerations	Locate away from public areas. Locate sallyport out of public view if possible. Restricted area (sworn officers and authorized monitoring staff only), controlled egress.

500 – Common Areas

Function	501 – Multipurpose Room
Current Facilities	Existing 'classroom' used for different activities (briefing, training, lunch, public meetings)
Space Requirements	Large room for community meetings, training, press conferences and emergency operations.
Planning Considerations	Locate off public lobby for direct (controlled/supervised) access. Provide secondary access from the police zone.

Function	502 – Lockers, Washrooms, Fitness
Current Facilities	Undersized locker rooms, fitness room
Space Requirements	Washrooms, shower, locker rooms (24/30" wide lockers for officers, day-use lockers for civilian staff), staff lounge and first-aid room.
Planning Considerations	Direct access from locker to fitness room.

Function	503 – Public-Access Areas – Primary public reception point
Current Facilities	Public Lobby (front desk and records counters), public washrooms.
Space Requirements	Public lobby and washrooms
Planning Considerations	Direct access to records counter (secure) and front desk.

600 – Police Garage

Function	Vehicle storage, limited maintenance, secure impound, large-item storage, bicycles, etc.
Current Facilities	None
Space Requirements	Garage bays, maintenance bays, large evidence storage, bicycle storage, impound garage, bicycle team area, equipment storage.
Planning Considerations	Vehicle access

700 – Village Court

Function	Municipal court (presided over by Hon. Sam R. Watkins Jr.) Criminal, Civil and VTL courts.
Current Facilities	Courtroom, jury room, small holding area for prisoners, open office for court clerk and administrative staff, an adjacent break room that doubles as the judge's chamber, and a small area in the basement for archived files and records.
Space Requirements	As above, plus additional/larger spaces, proper prisoner holding area, separate public lobby and bathrooms (not shared with other functions/uses), attorney/prisoner conference room, proper private office for judge.
Planning Considerations	Separate public entrance & hallway with screening area, separate secure prisoner transfer/holding area, properly planned and secure area per NY Dept. of Public Safety and industry standards.

REVISIONS 10/7/10

100 - Administration

101 - Senior Administration

	Current	Future	Space Type	Number of Spaces Exist	Req'd	Future	Space Size Exist	Req'd	Future	Area Allocated Exist	Req'd 2007	Req'd 2032
Chief of Police	1	1	Office	1	1	1		250	250	-	250	250
			Change/Washroom		1	1		50	50	-	50	50
~~Future Admin. Assistant~~		~~1~~	~~Workstation~~			~~1~~			~~80~~	-	-	~~80~~
			Confidential Files		1	1	incl.	20	20		20	20
Patrol Division Commander	1	1	Office	1	1	1		150	150	-	150	150
Detective Div. Commander	1	1	Office	1	1	1		150	150	-	150	150
~~Admin Sergeant~~		~~1~~	~~Office~~			~~1~~		~~120~~	~~120~~	-	-	~~120~~
			Resource Area		1	1	incl.	20	20		20	20
	3	5	67%				Subtotal - Net Area			-	640	840
			Growth				Internal Circulation*			#DIV/0!	1.25	1.25
							Subtotal - Usable Area				800	1,050

102 - Records and Information Services

	Current	Future	Space Type	Number of Spaces Exist	Req'd	Future	Space Size Exist	Req'd	Future	Area Allocated Exist	Req'd 2007	Req'd 2032
Records Clerk		~~1~~	~~Workstation~~		~~1~~	~~1~~		~~80~~	~~80~~	-	~~80~~	~~80~~
			Temp Workstation			1			60	-	-	60
			Central Files	1	1	1		100	100	-	100	100
			Resource Area	1	1	1		10	10	-	10	10
			Copy Stn. (common)	1	1	1		100	100	-	100	100
			Supplies Storage	1	1	1		25	25	-	25	25
			Computer/Server Rm		1	1		120	120	-	120	120
			~~Public Counter~~	~~1~~	~~1~~	~~1~~		~~25~~	~~25~~	-	~~25~~	~~25~~
	0	1	#DIV/0!				Subtotal - Net Area			-	460	520
			Growth				Internal Circulation*			#DIV/0!	1.15	1.15
							Subtotal - Usable Area				530	600

200 - Patrol Services

201 - Patrol & Operational Units

	Current	Future	Space Type	Number of Spaces Exist	Req'd	Future	Space Size Exist	Req'd	Future	Area Allocated Exist	Req'd 2007	Req'd 2032
Patrol Sergeants	5	5	Shared Office	1	1	1		180	180	-	180	180
Patrol Officers	12	16	Reports/Briefing	1	1	1		400	400	-	400	400
			Interview Room	1	1	1		80	80	-	80	80
			Resource Workstation	1	1	2		50	50	-	50	100
			Resource Counter		1	1		20	20	-	20	20
			Equipment Storage	1	1	1		80	80	-	80	80
	17	21	24%				Subtotal - Net Area			-	810	860
			Growth				Internal Circulation*			#DIV/0!	1.15	1.15
							Subtotal - Usable Area				930	990

202 - Front Desk/Dispatch

			Space Type	Number of Spaces Exist	Req'd	Future	Space Size Exist	Req'd	Future	Area Allocated Exist	Req'd 2007	Req'd 2032
			Front Desk	1	1	1		120	120	-	120	120
Dispatchers	1	2	Dispatch Console	1	1	1		120	120	-	120	120
			Washroom		1	1		70	70	-	70	70
	1	2	100%				Subtotal - Net Area			-	310	310
			Growth				Internal Circulation*			#DIV/0!	1.15	1.15
							Subtotal - Usable Area				360	360

203 - Support Units

			Space Type	Number of Spaces Exist	Req'd	Future	Space Size Exist	Req'd	Future	Area Allocated Exist	Req'd 2007	Req'd 2032
Parking Enforcement	2	2	Workstation	1	1	1		80	80	-	80	80
Crossing Guards	5	5	Use above							-	-	-
Seasonal Park Rangers	2	2	Use above									
Auxillary Police			Office/Workroom	1	1	1		120	120	-	120	120
			Resource/Storage		1	1		15	15	-	15	15
Excl. Auxillary Police	9	9	0%				Subtotal - Net Area			-	215	215
			Growth				Internal Circulation*			#DIV/0!	1.15	1.15
							Subtotal - Usable Area				250	250

REVISIONS 10/7/10

300 - Investigative Services

301 - Detective Bureau

	Current	Future	Space Type	Number of Spaces Exist	Req'd	Future	Space Size Exist	Req'd	Future	Area Allocated Exist	Req'd 2007	Req'd 2032
Detective Sergeant	1	1	Office	1	1	1		120	120	-	120	120
Detectives	1	2	Shared Office	1	1	1		150	225	-	150	225
			Interview Room		1	1		100	100	-	100	100
			Files/Storage		1	1		40	40	-	40	40
			Resource Area		1	1		10	10	-	10	10
	1	3	200%				Subtotal - Net Area			-	420	495
			Growth				Internal Circulation*			#DIV/0!	1.15	1.15
							Subtotal - Usable Area				480	570

SHARED SPACE

302 - Youth Bureau

	Current	Future	Space Type	Number of Spaces Exist	Req'd	Future	Space Size Exist	Req'd	Future	Area Allocated Exist	Req'd 2007	Req'd 2032
Youth Bureau Detective	1	1	Office/Files	1	1	1		150	150	-	150	150
			Soft Interview		1	1		100	100	-	100	100
	0	1	#DIV/0!				Subtotal - Net Area			-	250	250
			Growth				Internal Circulation*			#DIV/0!	1.00	1.00
							Subtotal - Usable Area				250	250

303 - Ident & Property

			Space Type	Number of Spaces Exist	Req'd	Future	Space Size Exist	Req'd	Future	Area Allocated Exist	Req'd 2007	Req'd 2032
Evidence Officer			Evidence Intake		1	1		40	40	-	40	40
(incl. in above units)			Drying Cabinets (3)		1	1		50	50	-	50	50
			Evidence Storage	1	1	1		250	300	-	250	300
			Identification Lab.	1	1	1		120	120	-	120	120
			Photo Lab	1						-	-	-
	0	0					Subtotal - Net Area			-	460	510
							Internal Circulation*			#DIV/0!	1.10	1.10
							Subtotal - Usable Area				510	560

REVISIONS 10/7/10

400 - Booking/Holding

401 - Detention Area

Space Type	Number of Spaces Exist	Req'd	Future	Space Size Exist	Req'd	Future	Area Allocated Exist	Req'd 2007	Req'd 2032
Booking/Monitoring	1	1	1		160	160	-	160	160
Holding Room		1	1		150	150	-	150	150
Breath/Photo		1	1		120	120	-	120	120
Pris. Property/Storage		1	1		10	10	-	10	10
Adult Cells		2	2		70	70	-	140	140
Interrogation Room		1	1		80	80	-	80	80
Washroom		1	1		60	60	-	60	60
				Subtotal - Net Area			-	720	720
				Internal Circulation*			#DIV/0!	1.35	1.35
				Subtotal - Usable Area				970	970

402 - Prisoner Sallyport

Space Type	Number of Spaces Exist	Req'd	Future	Space Size Exist	Req'd	Future	Area Allocated Exist	Req'd 2007	Req'd 2032
~~Sallyport (1 car)~~		~~1~~	~~1~~		~~450~~	~~450~~	~~-~~	~~450~~	~~450~~
				Subtotal - Net Area			-	450	450
				Internal Circulation				1.00	1.00
				Subtotal - Usable Area				~~450~~	~~450~~ 0

500 - Common Areas

501 - Common/Shared Areas

Space Type	Number of Spaces Exist	Req'd	Future	Space Size Exist	Req'd	Future	Area Allocated Exist	Req'd 2007	Req'd 2032
Multipurpose Room		1	1		450	450	-	450	450
Break Room		1	1		160	160	-	160	160
				Subtotal - Net Area			-	610	610
				Internal Circulation				1.10	1.10
				Subtotal - Usable Area				670	670

502 - Lockers and Washrooms

	Current	Future	Space Type	Number of Spaces Exist	Req'd	Future	Space Size Exist	Req'd	Future	Area Allocated Exist	Req'd 2007	Req'd 2032
Male Officers	20	25	Male Officer Lockers	1	1	1		240	300	-	240	300
	7	10	Civilian/Aux. Lockers		1	1		20	25		20	25
			Men's Washroom A	1	1	1		180	180	-	180	180
			Men's Showers	1	1	1		100	100		100	100
			~~Men's Washroom B~~	~~1~~	~~1~~	~~1~~		~~80~~	~~80~~	~~-~~	~~80~~	~~80~~
Female Officers	1	5	Female Officer Lockers	1	1	1		12	60	-	12	60
	3	6	Civilian/Aux. Lockers		1	1		20	40		20	40
			Women's W'room A	1	1	1		120	120	-	120	120
			Women's Showers	1	1	1		60	60		60	60
			~~Women's W'room B~~	~~1~~	~~1~~	~~1~~		~~80~~	~~80~~	~~-~~	~~80~~	~~80~~
			~~Fitness Room~~	~~1~~	~~1~~	~~1~~		~~400~~	~~400~~	~~-~~	~~400~~	~~400~~
			(total for lockers, not staff)				Subtotal - Net Area			-	1,312	1,445
			(staff included in units above)				Internal Circulation*			#DIV/0!	1.10	1.10
							Subtotal - Usable Area				1,440	1,590

503 - Public Access Areas

Space Type	Number of Spaces Exist	Req'd	Future	Space Size Exist	Req'd	Future	Area Allocated Exist	Req'd 2007	Req'd 2032
Vestibule	~~1~~	1	1		60	60	-	60	60
Public Lobby	1	1	1		240	240	-	240	240
Public Washroom		2	2		60	60	-	120	120
Meeting Room		1	1		100	100	-	100	100
				Subtotal - Net Area			-	520	520
				Internal Circulation*			#DIV/0!	1.00	1.00
				Subtotal - Usable Area				520	520

1 - Meeting room accessible from Public side and Police side. Include F/P station, camera.

SPACE NOT COUNTED FOR POLICE DEPARTMENT PROGRAM

REVISIONS 10/7/10

504 - Common Service & Storage Areas

	Current	Future	Space Type	Number of Spaces Exist	Req'd	Future	Space Size Exist	Req'd	Future	Area Allocated Exist	Req'd 2007	Req'd 2032
			~~Generator~~	~~1~~	~~1~~	~~1~~		~~(outside)~~				
			~~Elec/Tel/Mech~~	~~1~~	~~1~~	~~1~~		~~(in grossing factor)~~				
			General Storage (PD)		1	1		100	100	-	100	100
			Police Archives		1	1		150	200	-	150	200
			Court Archives		1	1		150	200	-	150	200
Custodian			~~Bldg. Maintenance~~		~~1~~	~~1~~		~~100~~	~~100~~	-	~~100~~	~~100~~
			~~Janitor~~	~~1~~	~~2~~	~~2~~		~~60~~	~~60~~	-	~~120~~	~~120~~
	0	0					Subtotal - Net Area			-	620	720
							Internal Circulation*			#DIV/0!	1.00	1.00
							Subtotal - Usable Area				620	720

600 - Indoor Vehicle & Storage

601 - Police Garage

	Current	Future	Space Type	Number of Spaces Exist	Req'd	Future	Space Size Exist	Req'd	Future	Area Allocated Exist	Req'd 2007	Req'd 2032
			Police Garage (EXISTING)		1	1		~~900~~	~~900~~	-	~~900~~	~~900~~
			~~Impound Garage~~		~~1~~	~~1~~		~~240~~	~~240~~	-	~~240~~	~~240~~
			Large Evidence		1	1		150	150	-	150	150
			Bicycle Storage		1	1		150	150	-	150	150
							Subtotal - Net Area			-	1,440	1,440
							Internal Circulation				1.00	1.00
							Subtotal - Usable Area				1,440	1,440

540SF

DIVE EQUIPMENT STORAGE ROOM 260 SF

700 - Municipal Court

701 - Municipal Court

Current	Future	Space Type	Number of Spaces Exist	Req'd	Future	Space Size Exist	Req'd	Future	Area Allocated Exist	Req'd 2007	Req'd 2032
		Courtroom	1	1	1		900	900	-	900	900
		Jury Room/Meeting	1	1	1		180	180	-	180	180
1	1	Judges Chamber	1	1	1		150	150	-	150	150
		Holding Area (M/F)	1	1	1		~~240~~	~~240~~	- 160	~~240~~	~~240~~
		Attorney/Prisoner		1	1		80	80		80	80
		Security Screening		1	1		50	50		50	50
		Hallway		1	1		400	400	-	400	400
1	1					Subtotal - Net Area			-	2,000	2,000
						Internal Circulation				1.10	1.10
						Subtotal - Usable Area				2,200	2,200

702 - Court Office

Current	Future	Space Type	Number of Spaces Exist	Req'd	Future	Space Size Exist	Req'd	Future	Area Allocated Exist	Req'd 2007	Req'd 2032
1	1	Office		1	1		150	150	-	150	150
3	5	Open office	1	1	1		450	600	-	450	600
		Break room	1	1	1		100	100	-	100	100
		File storage (note #)	1	1	1		100	100	-	100	100
		Copy Station/Room	1	1	1		80	80	-	80	80
		Resource area		1	1		20	20		20	20
		Public Counter		1	1		30	30	-	30	30
4	6					Subtotal - Net Area			-	930	1,080
						Internal Circulation				1.15	1.15
						Subtotal - Usable Area				1,070	1,240

Notes:
Internal Circulation, Existing Space - some existing areas include internal circulation, therefore comparison of net/usable ratios is not possible between existing and proposed space.

MEMO

To:	Jessica Via, ThyssenKrupp Elevator		
From:	Ken Pojman	Date:	February 16, 2011
Subject:	Elevator Options		
Project:	Croton-on-Hudson Municipal Building	Job No.:	1017

Jessica: we met with the Village Board on Monday 2/14/11. At the moment, they are still interested in budget pricing for all of the options which we discussed during our 1/31/11 site visit. The following is a summary of these options:

1. Upgrade the Current Elevator

   Option 1A: This is the "minimum cost" option. We would simply add a lock out feature to allow the police to take control of the elevator when transporting prisoners from the Police Department located on the First Floor to the Court Room located on the Second Floor. The number of openings and stops would not change. The work would also include any code required upgrades to the present controls and equipment.

   Option 1B: David was going to confirm if this option was possible. It would involve creating a two sided entrance at the First Floor and a two sided entrance at the Second Floor, but not extending the service to the Attic. The total travel distance would remain 26' – 0 1/2" (11'-4" from Floors B to 1 and 14'- 8 ½" from Floors 1 to 2). It would have the lock out feature described in Option 1A. The Basement would remain as a single sided entrance and the shaft size would remain the same. We understand that this upgraded elevator may not meet some of currently required ADA dimensions and would therefore require a variance. The car openings would be as follows:

   B: Front
   1: Front & Rear (secure)
   2: Front & Rear (secure)

2. New Elevator

   Option 2A: This would involve installing a new elevator within the existing shaft. The elevator would have two sided entrances on the First Floor and on the Second Floor and service would be extended to the Attic level. The total travel distance would be approximately 40' – 8 ½" (travel distance from Floor 2 to the Attic is about 14'-8"). It would have the lock out feature described for Option 1A. The elevator would be changed from a holeless hydraulic (telescoping piston) to a conventional (drilled piston) elevator. This would require the use of a skid rig drill. It is our understanding that this would be an "engineered" cab and would require a variance (for the size of the elevator serving four floors and for currently required ADA clearances). The car openings would be as follows:

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Landscape Architects
Interior Architects

B: Front
1: Front & rear (secure)
2: Front & Rear (secure)
A: Front

Option 2B: This would involve installing a fully code compliant elevator in a new and larger elevator shaft. It would be similar to Option 2A but it would have the code required 3500 lb. cab.

Finally, we are interested in obtaining information about the installation of an equipment lift which could possibly be installed between the Second Floor and the Attic. This lift might be considered in conjunction with Options 1A or 1B. You had indicated that you would forward contact information for a company that deals with this type of equipment.

KP:es W:\1017 Croton Kellerhouse Evaluation\1017 Admin\Memo\110216JVmemo.doc

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