



VERMONT INTEGRATED  
**ARCHITECTURE, PC**

## **Waterbury Municipal Complex**

# Outline Specifications

1. Architectural Outline Specifications
2. Civil Engineering Narrative
3. Structural Engineering Narrative (Notes on Janes House)
4. Mechanical, Electrical, and Plumbing Basis of Design

May 15, 2014



## **Waterbury Municipal Complex**

# Architectural Outline Specifications

May 15, 2014

The Town of Waterbury, Vermont has engaged Vermont Integrated Architecture, P.C. for the design of the Waterbury Municipal Complex, which includes program area for the municipal offices, the public library, and the historical society. The following preliminary outline specifications provide a guide for understanding the intent and extent of the recommended new buildings, additions, renovations and improvements.

The approved project layout accommodates the municipal offices program in additions and renovations to both levels of the existing historic buildings (Dr. Jane's House), and constructs a larger two-story attached building to house the library and historical society, connected by a single-story entry and community meeting room. The renovations to the Jane's House will affect approximately 3,655 GSF; the new construction, including: additions to the Jane's house, the connector, and the new two-story library are 12,295 GSF. The total gross area of the building will be 15,950 square feet.

On the following pages, please find a preliminary outline specification describing the essential systems and materials we expect to include in the project. The initial Total Project Budget reflects this outline. Please note that some things will change slightly as the design progresses.

## **Outline Specification Narrative**

### **Division 01 — General Requirements**

- General clean-up and construction waste management. Dedicated dumpsters for all construction debris shall be provided by the contractor.
- Recycling of applicable waste materials is required.
- Safety requirements and inspections.
- Temporary Electrical power during construction.
- Temporary lighting, if required during construction.
- Access to water for construction activities shall be provided by the owner.
- Temporary toilet facilities for construction personnel.
- Material Storage shall be provided by contractor outside the confines of the building.
- Payment applications
- Job photos
- Schedules
- Insurance
- Job sign
- Submittals
- Final Cleaning
- Temporary heat if required
- Historical character to be respected where existing.

### **Division 02 —Existing Conditions/Demolition**

The project includes selective demolition in portions of the Jane's house as well as the removal of the back, single-story portion of the Janes House, to allow for renovations and improvements. The single-story, western portion of the Janes house will be removed down to foundation and replaced with additions. Note that this section includes a 9' x 17' vault on a slab-on-grade, to be demolished as well. The central portion of the Jane's House will be gutted to wood framing on the interior. The front or eastern portion of the Jane's House will include minimal demolition and disturbance, with the intent to preserve the historic character of the building. The exterior portions of the remaining Janes House shall either be restore to its original splendor or remain as undisturbed as possible as necessary.

Selective demolition inside the section of the Jane's House to remain will include:

- Heating System
- Plumbing fixtures
- Electrical wiring and devices, except for fixtures contributing to historic character
- Obvious non-historic additions: door frame in entry, VCT flooring, applied ceiling tile.
- Windows, to be replaced
- Removal of furnishings, library contents and shelving assumed to be by the Town

## **Division 02 — Site Construction**

Includes all sitework to achieve renovations, additions and new buildings, including:

- Paved Parking and Drives.
- Concrete paved walks and entry areas.
- Landscaping to screen new project from south neighbors and to enhance entrances.
- New utility connections – water line sized for fire protection, new sewer connection, new electrical service, new tel-data connection.
- New stormwater treatment, including rain gardens along parking areas and at other designated areas around the building.
- Excavations for new concrete foundations.
- Perimeter drainage at new additions and or new buildings.

## **Division 03 — Concrete**

### New Construction:

New footings and frost walls around building perimeter on south and east sides

New footings with tall foundation walls at north and west side, to deal with grades that fall away from building

New footings and piers at interior bearing columns

New slabs on grade

### Vault

The design includes a new vault for storage of town records, which will require stronger foundations, be constructed of concrete block (as noted in Division 4 - Masonry), and having a spanning slab to cap it.

## **Division 04 — Masonry**

### Vault

4 hour rated CMU vault walls, including reinforcing and full grouting of CMU cores.

### Janes House Repairs

There may be some minor, cosmetic repairs to the brick and stone foundation of the Janes House.

## **Division 05 — Metals**

Structural steel columns at interior locations of attached two –story building to support second floor framing.

Structural steel hoist beam for elevator.

Galvanized equipment frames for any MEP equipment in basement areas.

All new stairs located outside of the Jane’s House shall be concrete-filled, steel-pan stairs.

Handrails at interior stairs.

Steel wall brackets for work countertops.

Galvanized grating for elevator sump in pit.

Miscellaneous fasteners, connectors, plates, etc.

## **Division 06 — Wood and Plastics**

The framing for all renovations, additions and new buildings would be wood unless otherwise noted. Pressure treated should be used wherever the wood framing comes into contact with concrete, masonry or other damp areas.

### Wall Framing

New exterior walls would be double 2x4 stud walls to accommodate a 12" cavity for increased thermal performance.

New interior walls would be 2x4 or 2x6 wood-framed walls.

Wood blocking will be included as required for millwork, fixtures, and other specialties.

### Floor Framing

Floor framing at new floors over basement level (Section C of Jane's Addition) to be wood-framed with TJI or dimensional lumber.

Floor framing at upper level of additions to Jane's House to be wood-framed with TJI, open-web wood trusses, or dimensional lumber.

New interior bearing beam lines in attached building (new construction) would be exposed glulam beams, on steel columns. Floor framing spanning between beam line to be wood-framed with TJI, open-web wood trusses, or dimensional lumber.

### Roof Framing

New main roof framing of attached new construction would be light wood trusses with a high heel height to accommodate loose fill insulation.

New south shed roof framing would be glulam rafters, with wood-framed roof cavity above for insulation.

New north shed roof framing would be light wood trusses with a high heel height) to accommodate loose fill insulation.

New roof framing of Jane's house additions would be dimensional lumber or TJIs.

### Exterior Siding & Finish Carpentry

Painted wood clapboards w/ 4 1/2" reveal for exterior cladding. There may be two types of siding used on new portions of the building.

Painted wood 5/4x6 trim at windows.

Painted wood trim bands - water table at ground, string course at middle of building and frieze board at roof level.

Painted wood soffits and eave trim.

Clear finish wood soffits at main entry canopy.

### Interior finish carpentry

Stained or clear finished hardwood window casings and sills in public meeting room. All other window and door trim painted.

Stained or clear finished wainscot and cap to 42" AFF in public meeting room.

Stained or clear finished ceiling in main entry lobby and public meeting room.

### Interior Millwork

Clear finished wood base cabinets at kitchenettes. PLAM countertops at kitchenettes. Clear finished custom wood circulation desk at library.

Clear finished custom wood reception desk municipal offices.

PLAM wall-hung countertops at work stations in municipal offices.

Custom fabricated circulation desk in library – clear finish wood and PLAM top.

### **Division 07 — Thermal and Moisture Protection**

We are seeking the following insulating values for new construction:

Exterior Walls: Typically R ~ 40

Roof: R ~ 60

Foundation Walls: R~20

The wall cavities and rafter-framed roofs will be insulated with dense-pack cellulose.

Attics and truss framed roofs will be insulated with 20” of loose-filled cellulose.

All penetrations will be properly air-sealed with sprayed foam.

All sills and top plates should also be air-sealed.

2” of Rigid foam will be used under all Floor slabs-on-grade.

15 mil Vapor Barrier to be provided under all slabs, extending out of slab and taped to wall vapor control layers.

4” of rigid insulation at exposed foundation walls and the top 4’ below grade of exterior foundation walls, with 2” of rigid continuing down to the footing.

Crushed stone shall be placed under the slab.

Membrane flashing such as Grace Ice and Water Shield shall be used where adjacent roofs and walls meet, existing structure meets new structure, and at all eaves extending a minimum of 24” up the slope.

Membrane flashing and tape shall be used at the perimeter of all window and door openings. ROs of windows shall be filled with low-expanding spray foam.

Interior Vapor Retarder shall be Intello membrane.

Exterior Weather Resistant Barrier at new wood-framed walls – Mento or approved equal

Interior Vapor Barrier at interior of side of exterior walls – Intello or approved equal.

Use of specialized tapes for both Intello and Mento barriers.

The wood-framed walls of the Jane’s house shall be cored and dense-packed with cellulose.

The perimeter of the first floor and second floor framing (rim joist area) shall be spray foamed (exterior wall perimeter x 2).

Air sealing for both the Janes House and new construction at all openings and penetrations.

### Roofing

Jane’s House renovation – include allowance slate roof repair. Assume 20% replacement.

All new roof shall be painted standing seam roofing – 24 gauge.

Provide 200 LF of snow guards – final locations to be determined.

### **Division 08 — Doors and Windows**

### Exterior Doors

Exterior doors of Jane's House Additions shall be clad wood Marvin wood doors with full weather-stripping, ADA thresholds, and commercial grade door hardware.

Exterior doors at Library Entry and Shared Entry (connector between Janes Addition and attached building) shall be thermally-broken aluminum storefront including sidelights/storefront.

Provide automatic ADA door opener at one main door location.

### Windows

New windows to be double-pane, low-e coated aluminum clad wood windows by Marvin or equal. U-value minimum to be 0.27. Assume 50% of windows shall be operable, either double hung or casement.

Replacement windows to be double-pane, low-e coated aluminum clad wood windows by Marvin or equal. U-value minimum to be 0.27. Assume 100% of windows shall be operable.

### Interior Doors

New interior doors to be flush hardwood. Assume 50% of doors will have a half-light.

New Interior door frames to be 75% hollow metal and 25% hardwood frames.

### Interior Windows

Provide four 4' x 6' interior glazed windows in hollow metals frames. Assume sills above 18" will not require tempered glazing.

Vault Door – provide 4 hour rated vault door, with combination lock.

## **Division 09 — Finishes**

### Interior Walls

New walls shall be gypsum board with painted finish.

Walls in Janes House renovation shall be patched and repainted.

### Ceilings

Patch and repaint tin ceiling at Jane's House as necessary.

Ceilings in Additions to Jane's House shall be gypsum board with painted finish.

Ceiling at main entry/lobby shall be clear finished wood beaded board.

Ceilings at Library will be 50% 2x2 ACT ceiling in 9/16 grid and 50% gypsum board with painted finish.

### Flooring

Flooring in entries, vestibules and lobby shall be ceramic tile with ceramic tile base.

Flooring in all toilet rooms shall be ceramic tile.

Flooring in Janes House shall be patched and refinished existing wood floor.

Flooring in Jane's house Additions shall be 50% new hardwood flooring and 50% carpet.

Flooring in new additions (library and meeting room) building shall be 65% broadloom carpet and 35% marmoleum.

Flooring at stairs in Janes House shall be carpet runner.

Flooring at all other new stairs shall be Rubber Stair treads and landings.

Baseboard in Jane's House additions to be painted wood base.

Baseboard in all other new spaces to be rubber base.

### Interior Painting

No-VOC paint for all interior GWB walls (Mystic recommended).

Clear oil-based finish on interior hardwood trim.

**Division 10 — Specialties**

Specialties package for each toilet room to include two grab bars, one toilet paper dispenser, one paper towel dispenser, one coat hook, and one ADA mirror.

Provide one Baby changing station

Provide ten 10 LB ABC Fire extinguishers in cabinets

Provide two 25' flagpoles and bases.

**Division 11 — Equipment**

N/A

**Division 12 — Furnishings**

Provide one 6' x 8' entrance floor grill at one main entrance.

All other furnishings by Owner.

**Division 13 — Special Construction**

N/A

**Division 14 — Conveying Systems**

Provide one 3500 LB full elevator, for two stops, located in library program area.

Provide platform lift, for two stops, located in the Janes House Additions.

**Division 23 — Mechanical (and Plumbing)**

(See separate Mechanical, Electrical and Plumbing Basis of Design)

Provide allowance for Mechanical – heat and ventilation.

Dual flush toilets for new bathroom – suggest Toto Brand.

Use low-flow fixtures & fittings where possible.

Wall-mount ADA sinks.

Commissioning of building systems to be included.

**Division 26 — Electrical**

(See separate Mechanical, Electrical and Plumbing Basis of Design)

Electrical to code, incorporate LED light fixtures wherever possible.

Install conduit for future solar photovoltaic panels in attic/roof of new construction/library space.



Note: the Town has received a grant for an Electric Car Charging Station in the parking lot. This will need to be accommodated.



## PHELPS ENGINEERING, INC.

79 Court Street, P.O. Box 367  
Middlebury, VT 05753  
[www.phelpseng.com](http://www.phelpseng.com)

201411

January 7, 2014

Mr. Ashar Nelson  
Vermont Integrated Architecture  
P.O. Box 862  
Middlebury, VT 05753

Subject: Preliminary Narrative of Waterbury Municipal Complex Site Work

Dear Ashar:

Per our discussions, we offer the following narrative which outlines the anticipated site work components for the Waterbury Municipal Complex per the Preliminary Conceptual Plans sent to us on January 3, 2014, which are depicted as Schemes A and B.

### **Water Service**

We understand the project building(s) are to receive a fire suppression line for sprinklers and domestic water from the municipal water main located along North Main Street. The water service quantities and related costs are likely more for Scheme A than B due to the longer pipe runs and the additional building penetration and appurtenances. This water service scope is listed as Option No. 1 below.

We have included a second option for water service to the Municipal Complex (Option No. 2), which would upgrade the water line to an 8-inch water main so a fire hydrant can be added within the Municipal Complex for increased fire protection at the facility. This option would add project cost for the upsized water line and appurtenances as well as the addition of a fire hydrant assembly. The scope for Option No. 2 is also listed below.

#### *Option No. 1 - Fire Suppression Line(s)*

Option No. 1 would include the installation of a 4- or 6-inch water service (size to be determined) from North Main Street to the project building(s) and would include the following components:

- 250 to 300 feet of 4- or 6-inch water service piping;
- 4- or 6-inch interconnection to the existing water main (wet tap); and
- 1 or 2 gate valves and building penetrations.

*Option No. 2 - Water Main Extension with Fire Hydrant*

Option No. 2 would include the installation of an 8-inch water main with 4- or 6-inch branch lines for fire suppression to the building(s). This option would include installation of the following components:

- 250 feet of water main piping;
- 25 to 50 feet of water service piping;
- 8-inch interconnection to the existing water main (wet tap);
- hydrant assembly; and
- 1 or 2 gate valves and building penetrations.

The water system upgrade with Option No. 2, which includes a water main with fire hydrant, would likely add approximately \$7,500 to \$10,000 in project cost.

**Wastewater Service**

The proposed wastewater service will utilize a gravity connection to the municipal sewer system located along North Main Street. The wastewater service quantities and related costs are likely more for Scheme A than B due to the longer pipe runs and additional building penetration and appurtenances. The proposed wastewater service would include the following items:

- 250 to 300 feet of 4- and 6-inch gravity sewer piping;
- sewer manhole near the end of the sewer service run;
- interconnection to the existing sewer main; and
- 1 or 2 cleanouts and building penetrations.

**Stormwater Collection, Conveyance, and Treatment**

*Stormwater Discharge Permit (3-9015)*

Based on a cursory review of the current Municipal Complex Schemes A and B, the project will need to seek coverage under the Stormwater Discharge General Permit 3-9015 for stormwater treatment of the newly proposed impervious areas. Both project Schemes A and B propose approximately 0.70 acres of new impervious area. With the addition of existing impervious area on the Town parcel, the total impervious area is well over one acre, which triggers the stormwater treatment and permitting requirement.

Since the receiving water at the site discharge point will have greater than ten square miles of drainage area upstream of the project site, we will not be required to provide storage and treatment for the Channel Protection Volume (Cpv) or for Overbank Flood Protection (Qp10). This will allow for smaller decentralized treatment systems, such as rain gardens, to treat the required Water Quality Volume (WQv) and Groundwater Recharge Volume (Rev) for the new impervious surfaces created as part of this project. The collection of rooftop runoff will likely be

needed for both schemes due to the large amount of contributing rooftop and the limited amount of grassed areas for disconnection credits (sheet flow runoff treatment).

To reduce infrastructure costs, we will recommend the site grading utilize sheet flow and open channel runoff without curbing where feasible to the stormwater treatment areas. With careful site grading and the use of grass-lined channels and culverts, we may be able to reduce the amount of storm drain piping and catch basins needed. Though we are unable to provide an accurate takeoff of stormwater infrastructure at this time due to the conceptual nature of the site plan schemes, for preliminary planning purposes, we would assume the following improvements:

- 2,000 to 3,000 square feet of rain garden space;
- 3 to 6 inlet structures/catch basins; and
- 300 to 500 linear feet of conveyance piping (storm drains and culverts).

*Construction General Permit (3-9020)*

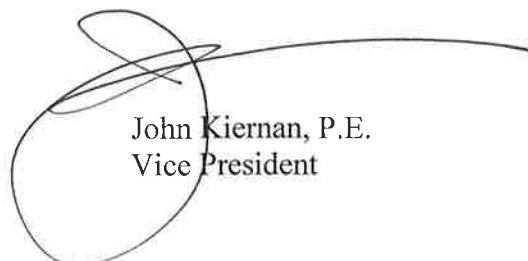
In reviewing the amount of impervious and likely disturbed area for the proposed site improvements for both schemes, it is likely a Construction General Permit will be needed for the project. This permit is triggered if more than one acre of disturbed area is proposed for a project. A site specific erosion prevention and sediment control plan will be needed for earth disturbing activities at the project site to describe the necessary permitting requirements. This would require some additional site controls and monitoring during construction, but is fairly typical of large construction projects and is usually accounted for in a contractor's general conditions. There are more stringent requirements for winter conditions (between October 15 and April 15).

**Site Grading/Flood-Proofing**

Based on the existing site plan provided, it appears most of the site is above the 100-year floodplain elevation of 423 feet. It is anticipated any flood-proofing necessary for below grade uses (such as the basement of the existing structure) will not be achieved using site modifications. No major cuts or fills are anticipated.

Please note that the above narrative is based on our conceptual site work design of the preliminary Municipal Complex layout Schemes A and B. Please let me know if you have any questions.

Very truly yours,



John Kiernan, P.E.  
Vice President

JK:kb  
Enclosures

**Subject:** Waterbury Municipal- Janes Building Structural Preliminary

Ashar and Bert:

A few comments on the existing building structural renovations:

Plan on a series of new posts and footings at the First Floor Framing/Basement:

- New beam line under the posts between the Small Meeting Space and Admin Area
- New beam under wall north of stair
- New beam shortening the span below small meeting and Bookkeeper
- New beam shortening span of joists under Manager and Public Works Office
- New beam shortening span under Zoning/Community Planning

Rough Estimate of 110 linear feet. Assume 4- 2x12 with posts and footings at 8 foot spacing.

Second Floor Framing:

Framing was not visible, so we are making some assumptions. Plan on:

- A new beam shortening the joists spanning over the Zoning and Planning Area. If we can have posts, that would help keep the beam size down.
- Reinforce the beam between Admin Assist and Municipal/Public Works Office. If no posts, assume 2-8" steel channels.
- Investigate beam between Small Meeting and Bookkeeper- possibly reinforce.
- Floor joists in north section are not known. Assume these stay as-is with no change of use/layout.

The roof framing appears to be in good condition. No overview has been done. Include an allowance to reinforce isolated areas (hips valleys, possibly some rafters).

Foundation/Flood proofing:

- The south wall of the office area has some concrete added. This has not been looked at carefully. Assume some foundation work will be needed here.
- I do not recall that we got confirmation of the flood elevation, but it is assumed that the 100 year flood elevation (plus 2 feet as per FEMA) will be a few feet into the basement. All structural columns should be steel with a high quality paint system and all mechanical will need to be kept up high.
- I suggest that the door and window openings be made flood resistant up to about 2 or 3 feet. Since water will get into the building through the walls and floor, a sump pumping system should be installed to remove seeping water. Two flood vents (could be the windows) above 2 or 3 feet will be needed to let water in and out above that elevation.

Let me know if you have questions. This is pretty preliminary but should get us through for this level of estimating.

Bob

January 10, 2014

Ashar Nelson  
 Vermont Integrated Architecture  
 P.O. Box 862  
 Middlebury, VT 05753

Re: Waterbury Town Office Building - Mechanical, Plumbing, Electrical, and Fire Protection Basis of Design

L.N. Consulting, Inc. has been retained to provide a basis of design regarding the proposed Waterbury Town Office building located in Waterbury, Vermont. The proposed new structure(s) will be located on the site of the existing Library building, which is located at 28 N. Main St. The current project is reviewing two options for the Municipal Offices and Library. Option A will consist of detached buildings: one building, which includes the existing library structure, will house the municipal offices and one new building will house the library. Option C will consist of one large building that incorporates the existing library structure. In Option C, the library will be housed on the first floor and the municipal offices will be housed on the second floor. In both options due to the existing infrastructure within the existing library building being beyond its useful life, the existing mechanical, electrical and plumbing systems will not be reused as part of the renovation and expansion project.

**Outdoor Design Conditions**

Elevation	620	ft.
Winter		
Dry bulb	-11	F
Summer		
Dry bulb	84	F
Wet bulb	69	F
Relative Humidity	48	RH
Dew Point	63	F
Moisture	82	grains/lb

**Indoor Conditions:** Thermostat/Sensor set points. Note that while there is no individual humidity control for each zone (except for file storage, and vault), building humidity will be monitored via return air relative humidity sensor and controlled during the cooling season via cooling coil dehumidification sequence to improve comfort. When the return



air relative humidity rises above set point (60% RH) the ventilation air handlers will be sequenced into a dehumidification mode.

Occupied Space Temperature/RH Control Schedules

	Winter Occupied	Winter Unoccupied	Summer Occupied	Summer Unoccupied
Temperature	70 F	68 F	76 F	82 F
RH %	Uncontrolled	Uncontrolled	<60%	<60%

**Proposed Mechanical Systems Option A:**

We recommend utilizing multiple variable refrigerant volume (VRV) air-to-air heat pump systems with multiple high-efficiency propane-fired hot water boilers and hot water heating coils and baseboard radiation for peak heating loads. In Option A, each building will be supported via an independent high-efficiency propane-fired hot water boiler and hot water distribution system. Ventilation will be provided via multiple enthalpy-type energy recovery unit(s). Our basis assumes that the building hot water heating system will be supported via a new underground propane storage tank.

Each air to air heat pump systems shall be equivalent to Daikin-McQuay REYQ.

The VRV heat pump zones are recommended as follows:

Library Building:

1. 1<sup>st</sup> Floor Main Library Space (multiple units)
2. Large Meeting Room
3. 2<sup>nd</sup> Floor Main Library Space (multiple units)
4. Staff Work Room
5. Library Director’s Office
6. Multipurpose Room

Waterbury Offices Building:

1. Municipal Manager & Financial Director
2. Historical Society Museum
3. Main Entry Area
4. Small Meeting Room
5. Public Works & Book Keeper
6. Document Review Area & Water Sewer
7. Clerk/Asst. Clerk
8. Reception/Admin & Lobby
9. Vault
10. Planning & Zoning
11. Assessor & Rec. Department
12. Historical Society Office





- 13. Public Meeting Room
- 14. Staff Break Area
- 15. Files/Workroom

**Ventilation Design:** The ventilation rates supplied to each zone were calculated based on the procedures outlined in ASHRAE 62.1-2007 for dedicated outdoor air systems. We recommend fitting the proposed building with a central ventilation air system that will support all spaces. We are recommending that the each program be zoned with supply and exhaust air using variable air volume terminals for each zone. The variable air volume terminals would be controlled via carbon dioxide sensors located in key places. We recommend using a total of (10) carbon dioxide sensors for good demand control response. A majority of the exhaust would be removed from bathrooms and other spaces where exhaust air will support removal of airborne environmental contaminants. We also recommend programming a minimum ventilation air flow during occupied hours. The ventilation air system flows are as follows:

Library Program Spaces:	2,400 CFM
Municipal Offices Program Spaces:	1,400 CFM

We would recommend using an attic mounted energy recovery ventilators to support the second floor municipal office program ventilation air requirements and a basement mounted energy recovery ventilator to support the first floor municipal office program ventilation air requirements. We recommend using an attic mounted energy recovery ventilators to support the library program. We recommend that the ERV units be fitted with a direct expansion cooling coils and hot water heating coils for ventilation air conditioning. Each ERV will require two outdoor air louvers; one louver for the outdoor air and one louver for the exhaust air.

We recommend providing a humidity control system for the vault and office file storage area. This will require an architectural boundary around each space.

We recommend fitting the library vestibule and stairwells, and municipal office vestibule and stairwells with hot water cabinet unit heaters or fan coils to provide additional heat during cold winter days.

**Controls:**

We recommend utilizing a digital controls system for all mechanical systems. This system will be capable of managing energy savings functions of the mechanical systems design and also provide alarms to building manager/service team.

**Proposed Mechanical Systems Option C:**

We recommend utilizing multiple variable refrigerant volume (VRV) air-to-air heat pump systems with multiple high-efficiency propane-fired hot water boiler and hot water heating coils and baseboard radiation for peak heating loads. In Option C, the building will be supported via multiple high-efficiency propane-fired hot water boilers (for redundancy), and one hot water distribution system. Ventilation will be provided via



multiple enthalpy-type energy recovery unit(s). Our basis assumes that the building hot water heating system will be supported via a new underground propane storage tank.

Each air to air heat pump systems shall be equivalent to Daikin-McQuay REYQ.

The VRV heat pump zones are recommended as follows:

First Floor:

1. Historical Society Museum
2. Historical Society Office
3. Communication Equipment/AV Equipment Storage
4. Shared Break Room
5. Multi-Purpose Library Program Space
6. Shared Entry Lobby
7. Main Library Space (multiple units)
8. Public Access Computer Room
9. Staff Work Room
10. Library Director's Office
11. Study Room

Second Floor:

1. Work Area
2. Small Meeting Room
3. Small Meeting Space/Files/Other
4. Town Board Room
5. Lobby
6. Public Works & Book Keeper
7. Document Review Area & Water Sewer
8. Reception & Tax Utility Admin & Lobby
9. Zoning, Planning, Lister & Rec. Department
10. Clerk/Asst. Clerk & Document Review Area
11. Vault
12. Town Manager, Public Works & Book Keeper
13. Small Meeting Room

**Ventilation Design:** The ventilation rates supplied to each zone were calculated based on the procedures outlined in ASHRAE 62.1-2007 for dedicated outdoor air systems. We recommend fitting the proposed building with a central ventilation air system that will support all spaces. We are recommending that the each program be zoned with supply and exhaust air using variable air volume terminals for each zone. The variable air volume terminals would be controlled via carbon dioxide sensors located in key places. We recommend using a total of (10) carbon dioxide sensors for good demand control response. A majority of the exhaust would be removed from bathrooms and other spaces where exhaust air will support removal of airborne environmental contaminants. We also recommend programming a minimum ventilation air flow during occupied hours. The ventilation air system flows are as follows:



Library Program Spaces:	2,500 CFM
Municipal Offices Program Spaces:	1,400 CFM

We would recommend using an attic mounted energy recovery ventilators to support the municipal office program ventilation air requirements and a basement mounted energy recovery ventilator to support the library program ventilation air requirements. We recommend that the ERV units be fitted with a direct expansion cooling coils and hot water heating coils for ventilation air conditioning. Each ERV will require two outdoor air louvers; one louver for the outdoor air and one louver for the exhaust air.

We recommend providing a humidity control system for the vault and office file storage area. This will require an architectural boundary around each space.

We recommend fitting the library vestibule and stairwells, and municipal office vestibule and stairwells with hot water cabinet unit heaters or fan coils to provide additional heat during cold winter days.

**Controls:**

We recommend utilizing a digital controls system for all mechanical systems. This system will be capable of managing energy savings functions of the mechanical systems design and also provide alarms to building manager/service team.

**Proposed Plumbing Systems**

**Sanitary Waste and Vent System:** We are recommending that a new 4” sanitary waste main be utilized to support the building plumbing fixtures (Option A would include two waste exits). We are recommending the use of schedule 40 PVC piping for the entire waste and vent system.

**Fixtures:** We recommend using low flow or dual flush water closets for water conservation purposes. The lavatories should be based upon low flow, automatically controlled faucets for water conservation and infection control purposes. The janitors closets should be fitted with floor mounted 36”x24” basins with utility faucet, mop holder, wall guards, and bucket hose. The kitchen/kitchenette sinks should be based upon stainless steel lay-in sinks with pull out spray faucet. The water fountain should be based upon a standard ADA wall mounted unit that is fitted with a carbon filter system and water bottle filler.

**Water Supply Systems and Domestic Water System:** We are recommending the central water main be split within the building with a 1-1/2” domestic water branch fitted with isolation control valve, pressure gauge, water meter and backflow preventer with floor drain (Option A would include two water entrances). The water main should be constructed with Type L copper. We recommend fitting the building with a copper pipe distribution system with PEX branches to each fixture.



**Domestic Hot Water System:** We recommend installing an electric hybrid domestic water heater to support the building (Option A would include two domestic hot water heaters). The domestic hot water system should be fitted with a domestic hot water recirculation system that is controlled by a temperature sensor and building occupancy sensor (Option A would include two domestic hot water recirculation systems).

## **Proposed Electrical System**

### **Proposed Electric Utility Work:**

For each option, a new 208 volt 3 phase electrical service is required to accommodate the new heat pump systems. It is proposed to locate a pad mounted utility transformer at some location behind the new or renovated buildings, with new services run to the new or renovated buildings. The electric utility will require a new utility-installed pole along the street to run its new primary voltage underground circuit from the existing overhead 3 phase primary voltage system to the transformer. The transformer will be set on an Owner-provided concrete transformer pad (K30 type) installed per GMP standards. New underground conduit will be installed from the new pole to the transformer by Owner. If a meter is installed next to the transformer, a single meter can accommodate separate buildings.

### **Proposed Power Scheme A:**

Based upon the conceptual design documents for the building, we are proposing the installation of a new 200 amp 208 volt 3 phase electrical service for the new building and the replacement of the existing 100 amp, single phase service to the existing building with a 200 amp 208 volt 3 phase electrical service. It is anticipated each main panel will serve a subpanel for mechanical equipment. Each service will be fed from the new pad mounted transformer noted earlier.

### **Proposed Power Scheme B:**

Based upon the conceptual design documents for the building, we are proposing the installation of a new 400 amp 208 volt 3 phase electrical service for the new building. It is anticipated each main panel will serve a subpanel for mechanical equipment and a subpanel for the existing/renovated building. The service will be fed from the new pad mounted transformer noted earlier.

### **Telecommunications:**

Propose a single telecommunications service entrance to a main telecom room in the new building. This new entrance will be via underground conduit(s) from the new utility pole at the street. It will reduce system installation cost, as sharing of equipment reduces the expense associated with electronic equipment and racking. For the scheme with multiple buildings, a telecommunications circuit from the main telecom room will run to a data closet with patch panel in the other building.

Cabling for the all buildings will be 4 pair, Cat 6 cable. Telecom outlets will be limited to one cable, capable of two 100MPS data jacks, per office. All other data provided via



wireless routers so that a majority of network users can use the wireless technology. This can greatly reduce system installation cost.

Additional conduits from street will be run for use by alternate telecom utilities such as Comcast or Level3. It is not expected cable TV is required, however if needed TV coax jacks and RG-11 cables will be provided where needed. For all telecom utilities, it is expected that they will run cable via the Owner-installed conduits to the main telecom room.

Design of a main switch/server for the office building and library, assumed to be located within the main telecom room, is understood to be by the Owner's IT consultant.

The community room and library spaces would be fitted with projector rough-in utilities to allow installation of projectors in preferred locations.

**Lighting:**

Propose high efficiency LED lighting fixtures for the entire building. LED fixtures will be fully dimmable for all normally occupied spaces. All lighting fixtures will be compatible with the new digital lighting control systems. An add-alternate design for bidding can be provided which will include a networked lighting control system. This will assist in determining if additional cost has good value for the project.

Daylight and occupancy control will be provided where required by energy code. It is expected daylight control to provide savings due to number of large exterior windows.

Emergency lighting to be provided via battery/inverter power system. Lighting control will allow for single point control of all normal and emergency powered lighting. When there is a loss of power or fire alarm, all available dimmed lighting to go to full output to allow safe egress from building.

Propose installing LED building mounted lighting to meet emergency egress needs and highlight building entrances. Propose LED pole mounted parking lot lighting. These exterior lighting fixtures would be controlled via either a digital lighting control system or the HVAC direct digital controls system and programmed to operate during building use schedules and ambient light conditions to maximize energy efficiency. A exterior lighting design would be performed for permitting purposes.

**Fire Alarm:**

Propose a new addressable fire alarm system for each building. It may be desirable to combine fire alarm and security into one system. The fire alarm system is not expected to require voice evacuation, however this will be determined via correspondence with local authority having jurisdiction. The fire alarm system shall meet all relevant code requirements.

**Proposed Fire Protection System**



We are recommending the installation of a 4” municipal water main to support the fire protection and domestic water entrance. The 4” service size would support a 4” dry type alarm valve which would support a complete building sprinkler system. The system is to be fitted with a 4” Storz fitting on the outside of the building for fire department connection. The basis of the system design will be based upon using ceiling mounted concealed sprinkler heads throughout.

If you have any questions or require additional information, please contact our office.

Sincerely,

**L.N. Consulting, Inc.**

Paul Lekstutis

John Askew