

## MACDONALD STREET | PROJECT SUMMARY

**CLIENT:** Hart + Tipton Construction Inc.  
165 East 1st Avenue  
North Vancouver, BC V7L 1B2

**PROJECT:** MacDonald Street - Vancouver, BC  
**BUILDING TYPE:** Custom Single-Family Home  
**BUILDING SIZE:** 8,000 sq. ft.

“Working with Ecolighten on this project was a very collaborative and rewarding experience from start to finish. The level of professionalism, knowledge and expertise that Ecolighten brought to this project was exceptional and we look forward to utilizing their mechanical design services again in the future!”

**Jason Hart / Owner – Hart + Tipton Construction Inc.**

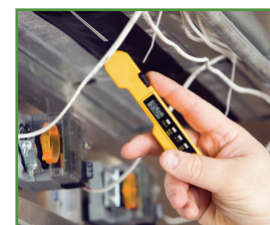
### HIGHLIGHTS:

- ✓ Full project consultation
- ✓ Load Calculations
- ✓ 2-Line AutoCAD design with mechanical room layout
- ✓ Full equipment schedule and quotation review
- ✓ Geothermal system with radiant in-floor heating
- ✓ Heat recovery ventilation (HRV) and integrated controls
- ✓ Solar heating system for outdoor pool

### BACKGROUND:

- Custom home project that was very sensitive to architectural and interior design aesthetics.
- Original considerations from client included a high-efficient boiler for radiant heat and air-source heat pump for cooling with integrated ventilation. Client received conflicting recommendations from multiple mechanical contractors.
- Homeowner alternatively considering whether to utilize geothermal for space heating / cooling plus pool heating.
- Ecolighten initially engaged to design forced air cooling and integrating criteria from interior designer, architect, structural engineer and homeowner.

### SOLUTIONS & OUTCOMES:



### CONSULTATION

- Comprehensive consultative services throughout each phase of project.
- Advised on the relative cost/benefits of geothermal versus conventional systems which contributed to the decision to proceed with geothermal as the primary energy source.
- Analyzed and made recommendations of all options for outdoor pool heating including geothermal, solar (poly, plate and evacuated tube), dedicated pool boiler, air-source heat pump or integrating main house boiler.
- Provided alternative zoning options for cooling and integrated ducting into architectural design with minimal impact.
- Reviewed and advised client on quotations submitted by various mechanical contractors.

### CALCULATION

- Developed detailed Load Calculations for client.
- Summary report used to analyze ducting distribution for cooling and overall energy requirements.

### SOLUTION

- Primary energy source for heating and cooling is an eight (8) ton geothermal system with vertical drilled bore holes.
- Geothermal heat pumps are two (2) x four (4) ton water to water units with two (2) x 120 gallon buffer tanks (chilled water and hot water).
- Secondary stage and auxiliary heat through a modulating gas boiler.
- Heat distribution is in-floor radiant throughout the home with fourteen (14) individual zones.
- Cooling through three (3) independent fan coils with fully distributed ducting and high quality MERV11 filters.
- Ventilation requirements met with two (2) integrated Heat Recovery Ventilators (HRVs) with independent exhaust fans in every bathroom.
- All grilles are a custom linear style with placements at ceiling level or hidden in blind pockets and millwork.
- Domestic hot water (DHW) 80 gallon indirect tank off gas boiler.
- Outdoor pool primary heat is dedicated solar panels with the house boiler integrated for seasonal start-up and back-up heating.
- All mechanical systems are controlled with a DDC ‘Climate Control System’ and will be integrated with Whole House System.

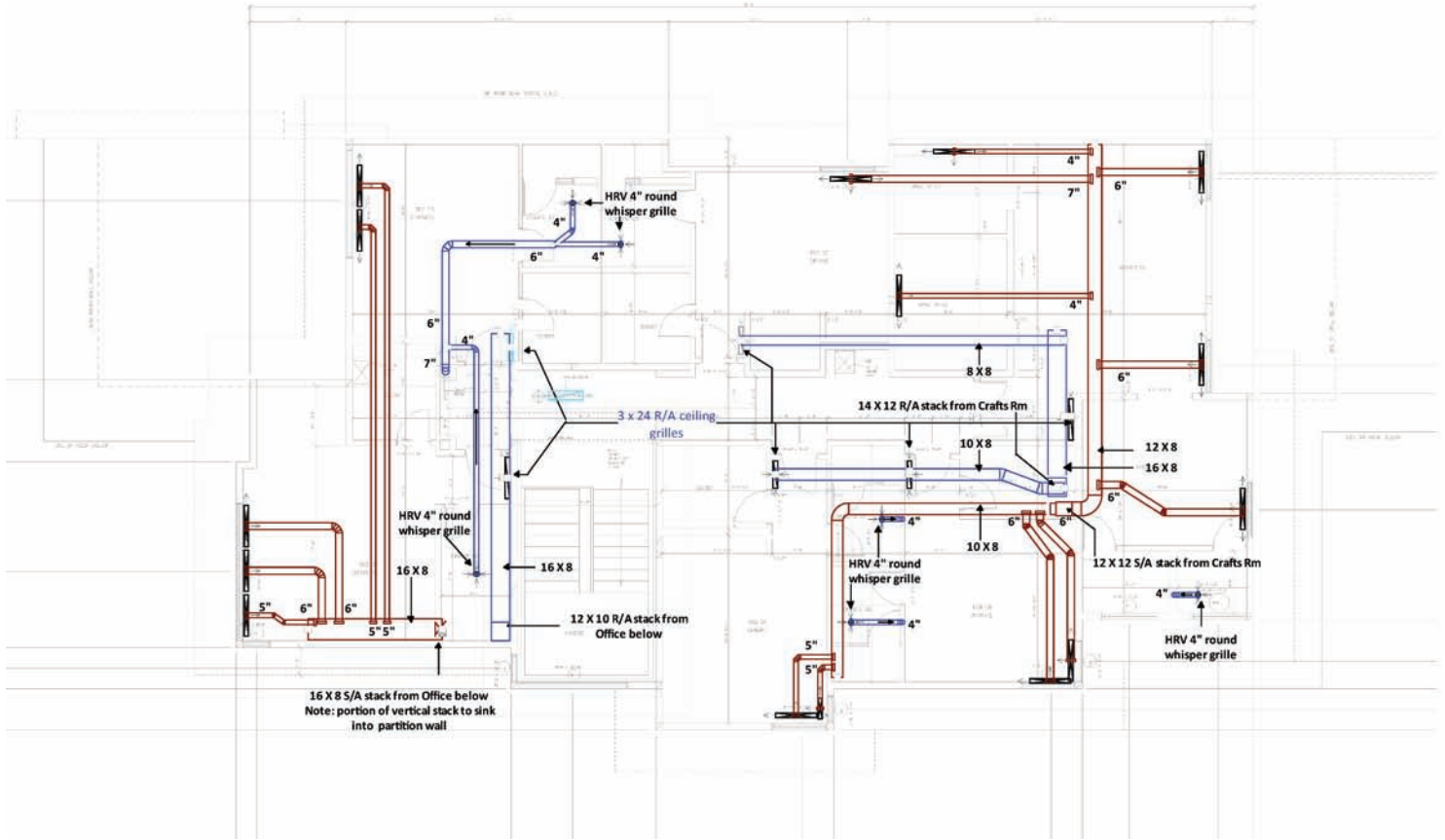
### DESIGN

- Articulated ducting and ventilation design complete with 2-Line AutoCAD drawing (*see illustration table below*).
- Provided scaled drawings of both mechanical rooms detailing equipment placement (*see illustration table below*).

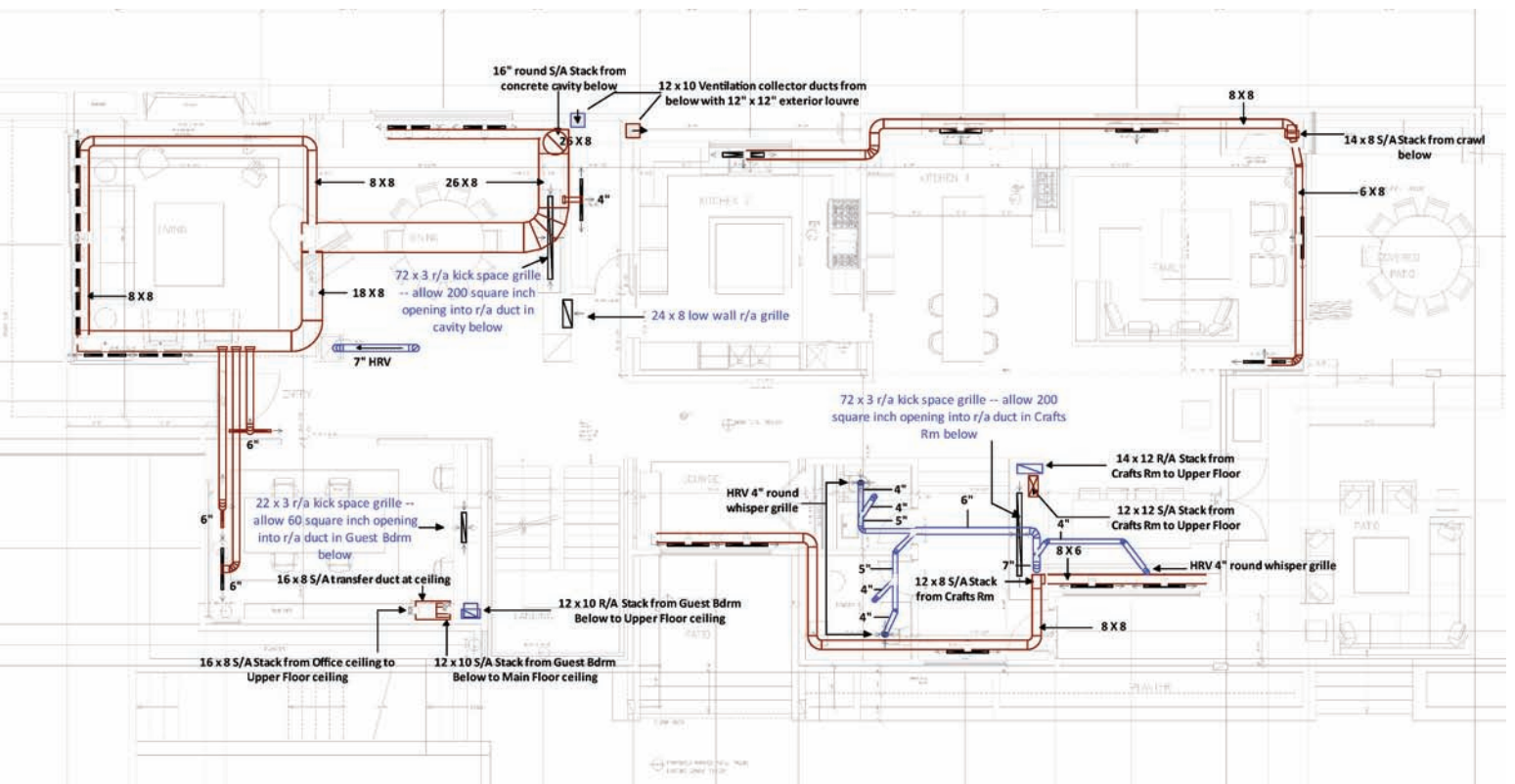
### QUALITY

- Available Quality Assurance (QA) services on this project include site visits to report on percentage of completion and inspections to ensure the installation meets all design targets.

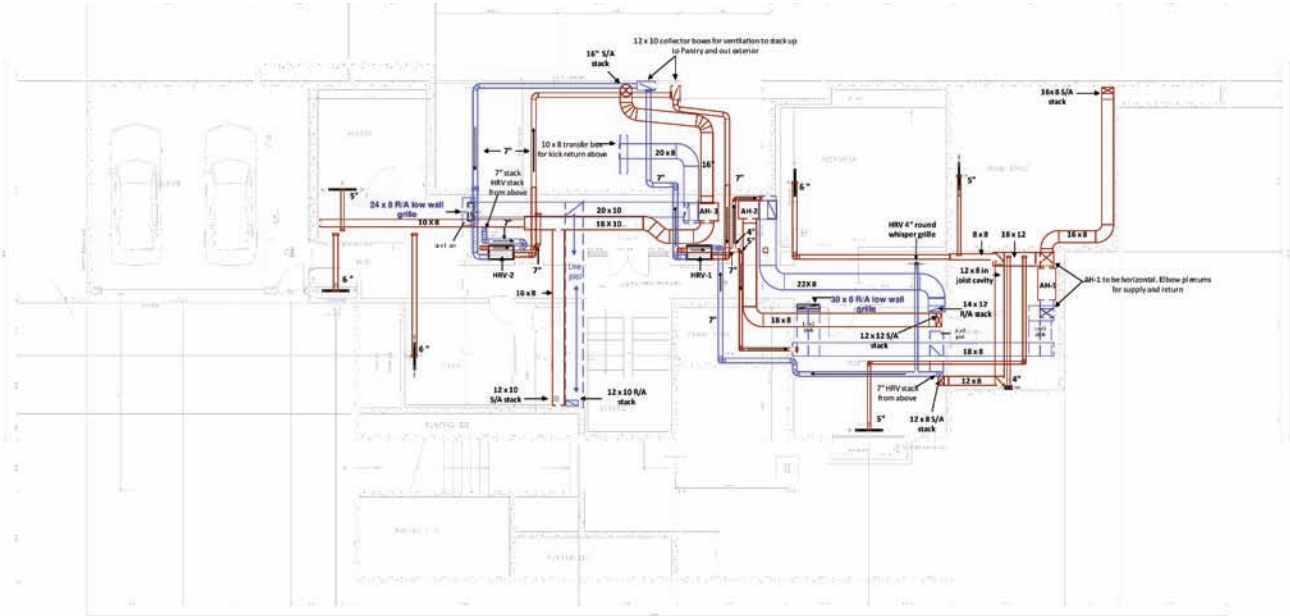
UPSTAIRS DESIGN:



MAIN FLOOR DESIGN:



## BASEMENT DESIGN WITH EQUIPMENT SCHEDULE:



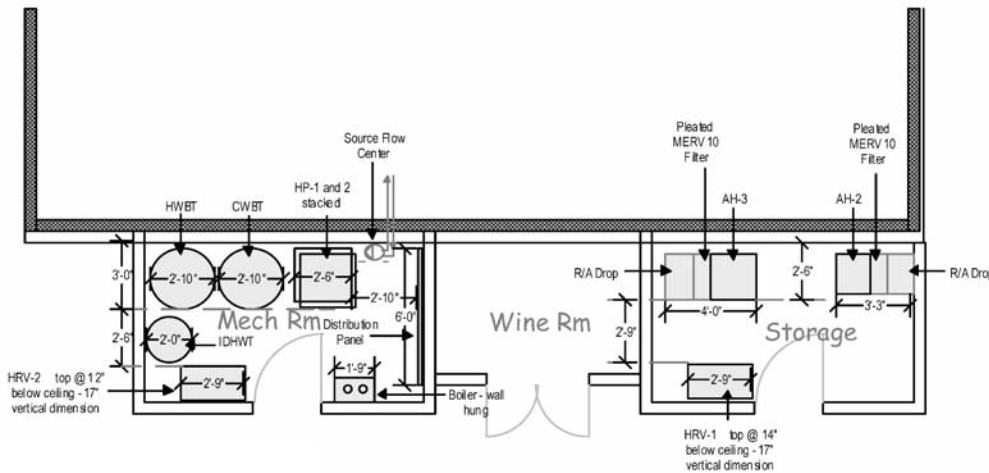
EQUIPMENT SCHEDULE

Air Handler	Fan Coil Description	Model
AH-1	Enertech Geocomfort	MPH024A9MM15G
AH-2	Enertech Geocomfort	MPH024A9MM15G
AH-3	Enertech Geocomfort	MPH048A9MM15G
HRV-1	Eneready	2000 c/w 8" collar
HRV-2	Eneready	2000 c/w 6" collar

Notes:

- 1) This design is a calculated guideline for planning and installation purposes. Any changes from this design may negatively affect performance.
- 2) All forced-air cooling sheet metal to be sealed with duct mastic at every joint and connection, and shall be insulated with standard foil-back duct wrap.
- 3) All HRV piping to be sealed with duct mastic at every joint, connection, longitudinal and transverse seams.
- 4) Volume dampers shall be installed at each trunk duct and branch run, and be accessible for balancing purposes.
- 5) Specific grille types are not yet determined but are assumed to be typical linear bar EH Price LBP series at visible ceiling locations. Where grilles are concealed from view in the vertical wall of motorized blind pockets, grilles will require a 30 degree deflection down and toward exterior, and recommend simple 1" type-A flange at minimum 4" X 10" at each branch run.

## MECHANICAL ROOM LAYOUT:



- 1) Ground source geothermal to provide cooling and first stage heating. Condensing boiler to provide second stage heating and domestic hot water through indirect tank.
- 2) Geothermal loop field and source-side piping to building penetration by Drilling Contractor. Mechanical Contractor to provide source-side piping from penetration, including flow center.
- 3) Provide for 14 zones of in-floor radiant heat piping with appropriate permits and all required documentation for the Authority having Jurisdiction.
- 4) Air handling units and HRV units will be integrated through the return air ducting upstream of any filters, and will be set to lowest continuous fan speed.
- 5) Include separate provision for Make-up Air assuming 120cfm of range hood exhaust. Requirement for this provision to be determined at future date.
- 6) Provide bathroom fans for each bathroom at 50cfm minimum and 110cfm minimum for Master Ensuite. Bath fans to have maximum sound rating of 1.0.
- 7) All hydronic mains, including mechanical room piping to be insulated.
- 8) All forced-air cooling sheet metal to be sealed with duct mastic at every joint and connection, and shall be insulated with standard foil-back duct wrap.
- 9) All HRV piping to be sealed with duct mastic at every joint, connection, longitudinal and transverse seams.
- 10) Volume dampers shall be installed at every trunk duct and branch run, and be accessible for balancing purposes.
- 11) Specific grille types are not yet determined but are assumed to be typical linear bar EH Price LBP series at visible ceiling locations. Where grilles are concealed from view in the vertical wall of motorized blind pockets, grilles will require a 30 degree deflection down and toward exterior and contain 1" type-A flange at minimum 4" X 10" at each branch run.

### ALL SERVICES ABOVE PROVIDED BY:

**Ecolighten Energy Solutions**  
 2304 - 1199 Seymour Street  
 Vancouver, BC  
 V6B 1K3  
 (P) 604.565.5952 (E) info@ecolighten.com



EQUIPMENT SCHEDULE

Tag	Manufacturer	Model
HP-1 & 2	Waterfurnace	NSW040A10RCC
HWBT	Rheem/Rudd	ST120
CWBT	Rheem/Rudd	ST120
Boiler	IBC	VFC 15-150
IDHWT	Bradford White	RTV 75-L
AH-1 & 2	Enertech Geocomfort	MPH024A9MM15G
AH-3	Enertech Geocomfort	MPH048A9MM15G
HRV-1	Eneready	2000 c/w 8" collar
HRV-2	Eneready	2000 c/w 6" collar

NOTE: Equipment equivalents acceptable