



TOWN OF ACTON PUBLIC WORKS FACILITY

DPW Building Committee Meeting

January 29, 2025



AGENDA

- 01 Building System Comparison
- 02 Fleet Inventory Verification
- 03 General Project Update
- 04 Next Steps

Building System Comparison

1. BUILDING SYSTEM COMPARISON

Life Cycle Cost Analysis (LCCA)

The design team has been working toward a facility using renewable energy per Acton's bylaw "Regulating Fossil Fuel Infrastructure in Buildings".

A comparison of fossil fuels vs renewables was requested.

An LCCA was conducted to compare the following building systems:

1. Natural Gas (fossil fuel)
2. Air Source Heat Pumps
3. Ground Source Heat Pumps (current basis of design)

An LCCA looks at energy consumption & demand, capital costs, operating costs, maintenance and replacement costs, and incentives.

The analysis results in estimated payback periods within a 30 year timeframe.

The exercise also looks at carbon emissions associated with the systems.

Option	System	Gross Capital Investment	Annual Elec. Cons. (kWh)	Annual Gas Cons. (Therms)	Combined Utility Cost	Annual Utility \$/ft ²	Annual kBtu/s.f. (EUI)	Annual Maint. Cost	Annual Expense	GHG Emissions (lb CO2)
1	Base	\$3,276,000	226,000	10,600	\$76,640	\$ 1.67	39.8	\$ 10,000	\$86,640	227,300

Assumptions

- Natural Gas Condensing Boilers and Water Heater
- Utility costs \$0.25/kWh and \$1.90/Therm
- Replacement of DX cooling system at 15 years

The Numbers

- Lower life cycle costs than other options, highest GHG emissions
- GHG emissions based on EPA emissions factors for NPCC New England Region
- Costs amortized over 30 years

Option	System	Gross Capital Investment	MassSave Heat Pump Adder Incentive	Net Investment	Annual Elec. Cons. (kWh)	Utility Cost	Annual Utility \$/s.f.	EUI	Annual Maint. Cost	Annual Expense	Annual Cost Impact	Total Life-Cycle Savings	ROI	GHG Emissions (lb CO2)
2	ASHP	\$ 3,970,000	\$ 100,000	\$3,870,000	323,000	\$ 80,750	\$1.76	24.0	\$ 15,000	\$ 95,750	\$ 9,110	-\$ 3,205,151	-83%	183,984

Assumptions

- System includes Air to Water Heat Pump
- Replacement of ATW system at 20 years

The Numbers

- Highest life cycle cost impact
- Highest annual energy costs
- Worst ROI
- Middle-ground GHG emissions

Option	System	Gross Capital Investment	MassSave Heat Pump Adder Incentive	30% IRA Geothermal Federal Tax Credit	Net Investment
3a	GSHP	\$ 5,580,000	\$ 810,000		\$ 4,770,000
3b	GSHP	\$ 5,580,000	\$ 810,000	\$ 1,431,000	\$ 3,339,000

Annual Elec. Cons. (kWh)	Annual Electric Cost	Combined Utility Cost	Annual Utility \$/s.f.	Annual kBtu/s.f. (EUI)	Annual Maint. Cost	Combined Annual Expense	Combined Annual Cost Impact	Total Life-Cycle Savings	ROI	GHG Emissions (lb CO2)
293,200	\$ 73,300	\$ 73,300	\$ 1.59	21.7	\$ 18,000	\$ 91,300	\$ 4,660	-\$2,463,632	-52%	167,129
293,200	\$ 73,300	\$ 73,300	\$ 1.59	21.7	\$ 18,000	\$ 91,300	\$ 4,660	-\$237,503	-7%	167,129

Assumptions

- System includes Geothermal/ Ground Source Heat Pump, est. 40 wells
- Geothermal system lifespan same as length of loan
- MassSave incentive based on 2024 prescriptive heat pump incentive
- Federal tax credit based on existing IRA direct pay tax credit

The Numbers

- Option 3a does not include the 30% IRA Geothermal Federal Tax Credit in the Net Investment cost, while option 3b does

Acton DPW - Payback Summary
Including Mass Save Incentives & Federal Tax Credit

	Option System	Gross Capital Investment	Net Investment after Incentives	Annual kBTU/s.f. (EUI)	Annual Expense	Annual Cost Impact	Total Life-Cycle Savings	ROI	GHG Emissions (lb CO2)	
1	Base	\$ 3,276,000		39.8	\$ 86,640					227,300

	Option System	Gross Capital Investment	Net Investment after Incentives	Annual kBTU/s.f. (EUI)	Annual Expense	Annual Cost Impact	Total Life-Cycle Savings	ROI	GHG Emissions (lb CO2)	
2	ASHP	\$ 3,970,000	\$ 3,870,000	24.0	\$ 95,750	\$ 9,110	\$ (3,205,151)	-83%	183,984	
3a	GSHP	\$ 5,580,000	\$ 4,770,000	21.7	\$ 91,300	\$ 4,660	\$ (2,463,632)	-52%	167,129	
3b	GSHP	\$ 5,580,000	\$ 3,339,000	21.7	\$ 91,300	\$ 4,660	\$ (237,504)	-7%	167,129	

Notes:

Cost estimates based on similar project costs.

Incentives based on 2024 prescriptive heat pump incentives for GSHP. For ASHP used estimated based on prior custom projects.

Federal tax credit based on existing IRA direct pay tax credit.

Estimated utility costs based on \$0.25/kWh and \$1.90/Therm.

Values based on energy model performed for HVAC System Life Cycle Cost Analysis purposes. A 30% safety factor should be applied for budgeting purposes to account for potential variances to the actual operation of the building. Per ASHRAE Standard 90.1:

Neither the proposed building performance nor the baseline building performance are predictions of actual energy consumption or costs for the proposed design after construction. Actual experience will differ from these calculations due to variations.



Questions?

Fleet Inventory Verification

2. FLEET INVENTORY VERIFICATION

Quantities, Sizes & Storage Provisions

	INDOOR PARKING STALL	INDOOR FLOOR SPACE	OUTSIDE CANOPY
HIGHWAY	(20) LG VEH (5) LG EQUIP (3) SM VEH	(12) SM & M EQUIP (2) T	(8) T
TREES & GROUNDS	(1) LG VEH (2) M VEH (2) SM VEH	(5) M EQUIP (1) T	(3) T
TRANSFER STATION	STORAGE PROVISIONS TBD: (3) LARGE VEHICLES, LOADER, AND SCREENER		

ADDITIONAL ITEMS: 6 MESSAGE BOARDS, 4 LIGHT TOWERS, 2 LARGE SCREENER
PLUS: +/- 100 CONES, 50+ A-FRAME CAUTION SIGNS, CONSTRUCTION SIGNS,
GENERATORS, PUMPS, DEMO SAWS, CHAIN SAWS, ETC. USED DAILY

#	SIZE / TYPE	STORAGE REQ:	DIVISION	DESCRIPTION	TYPE
12	SM VEH	parking lot	Eng	FORD LIGHTNING	TRUCK
83	LG VEH	Highway	CAT	CATERPILLAR	TRUCK
45	LG EQUIP	STALL		CATERPILLAR	LOADER
85	LG EQUIP	STALL	Highway	JD 710K	BACKHOE
80	LG EQUIP	STALL	Highway	CAT M113	EXCAVATOR
83	LG EQUIP	STALL	Highway	CAT VS81	LOADER
81	LG EQUIP	STALL	Highway	CATERPILLAR 980D	SCRAPER
36	LG EQUIP	7	Highway	MCCLOSKEY 512R	SCREENER
43	LG VEH	STALL	Highway	MACK GU712	DUMP
44	LG VEH	STALL	Highway	MACK GU712	DUMP
45	LG VEH	STALL	Highway	FORD F550	TRUCK
47	LG VEH	STALL	Highway	FORD F550	TRUCK
48	LG VEH	STALL	Highway	FORD F550	TRUCK
49	LG VEH	STALL	Highway	MACK RO60P	FLAT BED
50	LG VEH	STALL	Highway	MACK GR42P9 (Catch Basin Truck)	DUMP
52	LG VEH	STALL	Highway	MACK GU70P	DUMP
53	LG VEH	STALL	Highway	MACK GR42P13	TRACTOR
54	LG VEH	STALL	Highway	MACK RO60P	DUMP
55	LG VEH	STALL	Highway	MACK RO60P	DUMP
57	LG VEH	STALL	Highway	MACK GR64P	DUMP
58	LG VEH	STALL	Highway	MACK RO60P	DUMP
59	LG VEH	STALL	Highway	MACK RO60P	DUMP
60	LG VEH	STALL	Highway	MACK GU712	DUMP
61	LG VEH	STALL	Highway	MACK GU70P	DUMP
62	LG VEH	1/2 STALL	Highway	MACK RD60P	DUMP
68	LG VEH	1/2 STALL	Highway	JOHN DEERE 450G	SCRAPER
69	LG VEH	1/2 STALL	Highway	JOHN DEERE 450G PELICAN	SCRAPER
72	M EQUIP	FLOOR	Highway	CAT DP100 CASCADe	FORKLIFT
73	M EQUIP	FLOOR	Highway	BOBCAT 1500	SKID STEER
76	M EQUIP	FLOOR	Highway	WACKER NEUSON WL-32	MINI LOADER
82	M EQUIP	FLOOR	Highway	BOBCAT 1500 PC-25SSU GENERATOR	FORKLIFT
83	M EQUIP	FLOOR	Highway	BE 100 COMP 160	COMPRESSOR
89	M EQUIP	FLOOR	Highway	BOBCAT MODEL F35	EXCAVATOR
90	M EQUIP	FLOOR	Highway	WACKER NEUSON WL-32	MINI LOADER
127	M EQUIP	FLOOR	Highway	WACKER NEUSON TOWABLE GEN. GENERATOR	GENERATOR
130	M EQUIP	FLOOR	Highway	WACKER NEUSON TOWABLE GEN. GENERATOR	GENERATOR
78	SM EQUIP	FLOOR	Highway	BOBCAT AT 5166	SKID STEER
113	SM EQUIP	FLOOR	Highway	BOBCAT AT 7875	SKID STEER
138	SM EQUIP	FLOOR	Highway	SNOJO MP-1D 08284	SNOW BLOWER
1	SM VEH	take home	Highway	FORD F150	TRUCK
10	SM VEH	take home	Highway	FORD F150	TRUCK
11	SM VEH	take home	Highway	FORD F250	TRUCK
14	SM VEH	take home	Highway	FORD RANGER	TRUCK
17	SM VEH	STALL	Highway	FORD F150	TRUCK
71	SM VEH	INSIDE	Highway	JOHN DEERE 450G	SCRAPER
84	T	INSIDE	Highway	ALLMAND LIGHT TOWER	LIGHT
91	T	INSIDE	Highway	SURE-TRAC UTILITY TRAILER	TRAILER
92	T	INSIDE	Highway	HUDSON TRAILER RS-1 (Semi Tr. Trailer)	TRAILER
93	T	INSIDE	Highway	STEICO TRAILER (T4)	TRAILER
94	T	INSIDE	Highway	STEICO TRAILER (T4)	TRAILER
96	T	INSIDE	Highway	LAKI DUMP TRAILER	TRAILER
99	T	INSIDE	Highway	SOMERSET TRL ALP04 (T3)	TRAILER
128	T	INSIDE	Highway	CROSS COUNTRY TRAILER	TRAILER
116	T	INSIDE	Highway	JOHN DEERE 450G	SCRAPER
1	T	floor	Highway	ALLMAND LIGHT TOWER	LIGHT
1	T	floor	Highway	ALLMAND NIGHT LIGHT PRO	LIGHT
1	T	floor	Highway	ALLMAND NIGHT LIGHT PRO	LIGHT
2	T	floor	Highway	PULL MATRIX MESSAGE BOARD	MSG BD
3	T	floor	Highway	PULL MATRIX MESSAGE BOARD	MSG BD
4	T	floor	Highway	PULL MATRIX MESSAGE BOARD	MSG BD
5	T	floor	Highway	PULL MATRIX MESSAGE BOARD	MSG BD
6	T	floor	Highway	PULL MATRIX MESSAGE BOARD	MSG BD
7	T	floor	Highway	PULL MATRIX MESSAGE BOARD	MSG BD
107	LG VEH	STALL	T & G	WRIGHT LINER BUCKET TRUCK	TRUCK
79	M EQUIP	FLOOR	T & G	JD 5420 TRACTOR	TRACTOR
101	M EQUIP	FLOOR	T & G	CARLTON MODEL 2012	CHIPPER
162	M EQUIP	FLOOR	T & G	JD 3720 TRACTOR	TRACTOR
109	M EQUIP	FLOOR	T & G	JD 4620 TRACTOR	TRACTOR
119	M EQUIP	FLOOR	T & G	BANDIT INTIMIDATOR	CHIPPER
108	M VEH	STALL	T & G	FORD F-550 (Green)	TRUCK
115	M VEH	STALL	T & G	FORD F-550	CHIP TRUCK
109	M VEH	STALL	T & G	FORD F-550	TRUCK
116	SM VEH	STALL	T & G	FORD F-150	TRUCK
111	T	INSIDE	T & G	BIG TEX TRAILER (12' BLACK)	TRAILER
1	T	INSIDE	T & G	BIG TEX TRAILER (12' BLACK)	TRAILER
78	LG EQUIP	TBD	Transfer Station	BOB CAT	LOADER
87	LG EQUIP	TBD	Transfer Station	BANDIT ARIES 250 IMPAKTOR	SHREDDER
46	LG VEH	TBD	Transfer Station	MACK CR64	ROLL OFF
51	LG VEH	TBD	Transfer Station	MACK P767	TRACTOR
56	LG VEH	TBD	Transfer Station	KALMAR T1102	YARD TRACTOR

2. FLEET INVENTORY VERIFICATION

Quantities, Sizes & Storage Provisions

STORAGE GARAGE = 24,900 SF



General Project Updates

3. GENERAL PROJECT UPDATES

Recent Activities

- Internal Kick-Off for Design Development
- DPW Open House; Last Saturday 1/25
- Site/Civil Plan Update
- 100% Draft SD Energy Model
 - Per Mass Save Incentives Program
- Industrial Equipment Meeting #2; Wednesday 1/29
 - Follow up #3 meeting to be schedule next week
- Hazardous Building Material Inventory; Friday 1/31
- Upcoming meeting with Fire Marshal & Building Inspector; TBD

3. GENERAL PROJECT UPDATES

Updated Site/Civil Plan



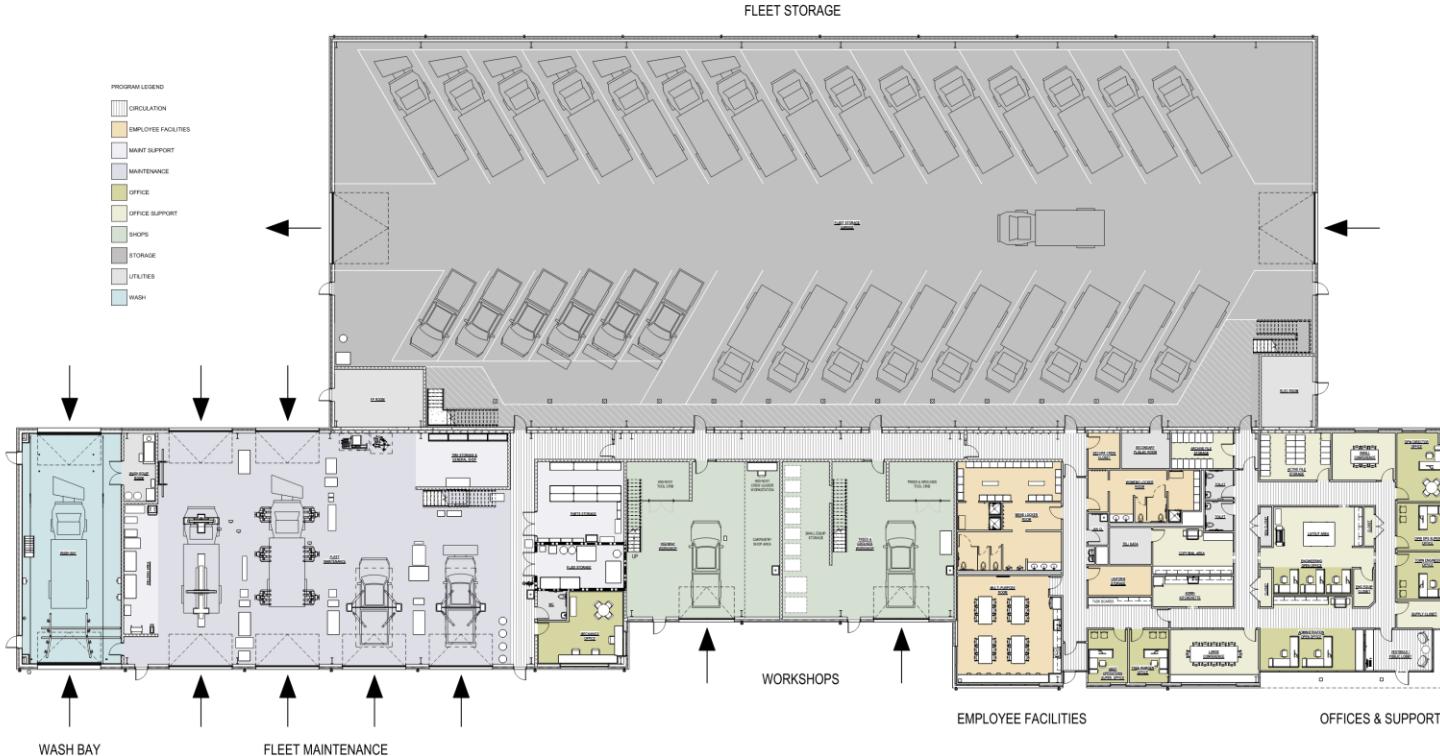
3. GENERAL PROJECT UPDATES

Updated Renderings



3. GENERAL PROJECT UPDATES

Updated Floor Plan



Administration	4,967 gsf
Offices	1,360 nsf
Support	1,750 nsf
Utilities	100 nsf
Circulation	1,000 nsf
Employee Facilities	3,348 gsf
Emp Fac	1,880 nsf
Utilities	280 nsf
Circulation	470 nsf
Workshops	4,045 gsf
Shops	3,270 nsf
Circulation	800 nsf
Fleet Maintenance	7,740 gsf
Maintenance Bays	5,560 nsf
Maintenance Support	1,340 nsf
Office	300 nsf
Utilities	60 nsf
Fleet Storage	24,900 gsf
Fleet Storage	23,890 nsf
Utilities	620 nsf
Wash Bay	1,786 gsf
Wash Bay	1,450 nsf
Utilities	140 nsf

TOTAL GSF = 46,786

Next Steps

4. NEXT STEPS

Future Milestones

- Pricing Set to Cost Estimator April 11, 2025
- Annual Town Meeting for Final Design and Construction Funding: May 5, 2025
- Final Design/Bidding: Summer-Fall 2025
- Construction (1-1/2 Years): Early 2026 – Mid 2027



Thank you! Questions?

westonandsampson.com



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