

City of Methuen  
Engineering Department  
Stephen J. Gagnon  
41 Pleasant Street  
Methuen MA 01844

September 7, 2021

Exordium Opco LLC  
Robert Christy  
44 Merrimac Street  
Newburyport, MA 01950

RE: 5 Pleasant St & 275 Broadway Plan Approval – Response to Comments Dated August 8, 2021.

Dear Mr. Gagnon:

Please accept this document as official responses to the comments provide on August 8, 2021 regarding the 5 Pleasant St & 275 Broadway Plan approval. Our responses are noted in Blue.

1. The documentation provided does not depict the existing utilities. The plan should be revised accordingly.

**Response:** The current site plan shows the proposed upgraded utility locations for the 275 Broadway building, which is the same as the current location of utilities. For the 5 Pleasant Street utilities, based on the calculation that have been provided, the existing services will not need to be upgrade as they meet the code requirement. The water service is 1.5", the sewer is 4" and the fire protection system is 4". The fire service and water service is located in the front of the building near the entrance and sewer is located in the back by the dumpster location.

2. City records indicate each building is services by a 1" diameter water service, one installed in 1907 the other in 1946. The water services are not acceptable for residential use and must be replaced with properly sized services and meters.

**Response:** As shown on the site plan dated August 17, 2021, we are proposing the and upgrade on all utility services. The water service for 275 Broadway to be upgraded to a 2" per recommendation from our licensed contractor and based on the calculation attached. Based on visual inspection, we believe the 5 Pleasant St building has a 1.5" water service, so the existing water service is adequate. See calculation sheet for justification.

3. The city does not have records for the sanitary sewer connections. The sewer connections should be investigated and their suitability for reuse determined by an appropriate professional.

**Response:** As shown on the site plan dated August 17, 2021, for the 275 Broadway building we are proposing the sewer connection be upgraded to a 6" per recommendation from our licensed contractor. Based on a visual inspection of the current 4" sewer at 5 Pleasant St and the calculations that we have

included, the existing system is adequate to support the 3 residential units. In its existing state, there are multiple bathrooms and a shower/tub on the 2<sup>nd</sup> level, so we are not adding a lot more demand to the existing system. See calculation sheet for justification.

4. The documentation provided does not address fire protection. Documentation should be provided stating if fire protection is or is not required.

**Response:** We are planning to outfit 275 Broadway with a wet type fire protection sprinkler system per NFPA 13. The 5 Pleasant St building has an existing wet type fire protection sprinkler system has a 4" line that will be adequate for the residential units added on the 2<sup>nd</sup> floor, but we will need to adjust and add a number of sprinkler heads on the 2<sup>nd</sup> floor per NFPA 13.

## SEWER PIPE SIZING CALCULATIONS

### 275 BROADWAY, METHUEN MA

	QTY		FUV	TOTAL
TOILETS	16	x	6	96
LAVATORY	16	x	1	16
TUB/SHOWER	15	x	2	30
KITCHEN SINK	15	x	2	30
DISH WASH	15	x	1	15
CLOTHES WASH	15	x	2	30
	TOTAL			217

A FACTOR UNIT VALUE OF 217 WOULD REQUIRE A 6" SEWER  
ACCORDING TO THE MASS PLUMBING CODE CMR 248

# Masonic Temple Draining

248 CMR: BOARD OF STATE EXAMINERS  
OF PLUMBERS AND GAS FITTERS

10.15: continued

TABLE I  
FIXTURE UNIT VALUES FOR VARIOUS PLUMBING FIXTURES

Type of fixture or group of fixtures	Fixture Unit Value
Automatic clothes washer (1½-inch standpipe)	2
Automatic clothes washer (2-inch standpipe)	3
<i>Bathroom group consisting of a toilet, lavatory and bathtub or shower stall:</i>	
Flushometer valve closet	8
Tank type closet	6
Bathtub <sup>1</sup> (with or without overhead shower)	2
Bidet	3
Combination sink and drain board with food waste grinder	4
Combination sink and drain board with one 1½-inch trap	2
Combination sink and drain board with separate 1½-inch traps	3
Vegetable prep sink (residential or commercial)	2
Dental chair unit or cuspidor	1
Dental lavatory	1
Drinking fountain	½
Dishwasher, commercial	6
Dishwasher, domestic	1
Trough or trench drain 3-inch	5
Trough or trench drain 4-inch	6
Floor drains <sup>2</sup> with 2-inch waste	3
Kitchen sink, domestic, with one 1½-inch waste	2
Kitchen sink, domestic, with food waste grinder	2
Lavatory with 1¼-inch waste	1
Laundry Utility sink (1, 2 or 3 compartments)	2
Shower stall, domestic	2
Showers (group) per head	2
<i>Sinks:</i>	
Surgeons	3
Flushing rim (with valve)	6
Service (trap standard)	3
Service (P trap)	2
Commercial Pot, scullery, etc. (each section)	4
Shampoo	2
Toilet, tank operated	4
Toilet, valve operated	6
Urinal, pedestal, siphon jet blowout	6
Urinal, wall lip	4
Wash sink (circular or multiple) each 20 inches of usable length	1
<i>Unlisted fixture drains or trap size:</i>	
1¼ inch or less	1
1½ inches	2
2 inches	3
2½ inches	4
3 inches	5
4 inches	6

→  $2 \times 15 = 30$

→  $6 \times 16 = 96$

→  $2 \times 15 = 30$

→  $1 \times 15 = 15$

→  $2 \times 15 = 30$

→  $1 \times 16 = 16$

Total = 217  
FUV

Note 1: A showerhead over a bathtub does not increase the fixture value.

Note 2: See 248 CMR 10.15(2)(b) for method of computing fixture unit values of devices with continuous or semi-continuous flows.

Note 3: The size of floor drains shall be determined by the area of the floor surface to be drained in accordance with 248 CMR 10.10(10)(a).

248 CMR: BOARD OF STATE EXAMINERS  
OF PLUMBERS AND GAS FITTERS

10.15: continued

TABLE 2  
MAXIMUM LOADS IN FIXTURE UNITS FOR HORIZONTAL DRAINS (F.U.)

Diameter of drain (inches)	Horizontal fixture branch <sup>1</sup> (F.U.)	Building drain or building sewer <sup>2</sup>		
		1/8 in./ft. (F.U.)	1/4 in./ft. (F.U.)	1/2 in./ft. (F.U.)
1½	3	---	---	---
2	6	---	---	---
2½	12	---	---	---
3	34 <sup>3-4</sup>	---	40 <sup>3-4</sup>	48 <sup>3-4</sup>
4	160	180	216	250
5	360	390	480	575
6	620	700	840	1,000
8	1,400	1,600	1,920	2,300
10	2,500	2,900	3,500	4,200
12	3,900	4,600	5,600	6,700
15	7,000	8,300	10,000	12,000

Note 1: Does NOT include fixture branches to the building drain.

Note 2: DOES include fixture branches to the building drain.

Note 3: No more than two toilets or bathroom groups on a horizontal fixture branch nor more than three toilets or bathroom groups on a fixture branch of the building drain.

Note 4: No more than three toilets or three bathroom groups on a three inch building drain.

TABLE 3  
MAXIMUM LOADS IN FIXTURE UNITS FOR SOIL AND WASTE STACKS  
HAVING ONE OR TWO BRANCH INTERVALS

Diameter of Stack (inches)	Maximum Load on Stack (F.U.)
1½	4
2	8
2½	20
3	48 **
4	240
5	540
6	930
8	2,100
10	3,750
12	5,850
15	10,500

\*\*Note 1: Not more than two toilets or bathroom groups within each branch interval nor more than three toilets or bathroom groups on the stack.

6" into Building

## WATER PIPE SIZING CALCULATIONS

### 275 BROADWAY, METHUEN MA

	QTY		FV		HOT		COLD		
TOILETS	16	x	1		NA		16		
LAVATORY	16	x	1		16		16		
TUB/SHOWER	15	x	2		30		30		
KITCHEN SINK	15	x	2		30		30		
DISH WASH	15	x	2		30		na		
CLOTHES WASH	15	x	2		30		30		
			TOTAL		136	+	122	=	258

TOTAL FV 258 X .35 DEMAND FACTOR = 90.3 CAPACITY VALUE

90.3 CAPACITY VALUE = 2" WATER MAIN PER MA PLUMBING CODE 248 CMR SECTION 2.14



# Musaraic Temple Building

248 CMR: BOARD OF STATE EXAMINERS  
OF PLUMBERS AND GAS FITTERS

10.14: continued

$$258 \text{ FV} \times .35 = 90.3$$

TABLE 2

OCCUPANCY USE	DEMAND FACTORS
RESIDENTIAL	
One or Two Family Dwelling	0.50
Multi-residential	0.35
Hotel	0.70
SCHOOL	
General	0.75
Shower Room	1.00
INSTITUTIONAL	
General	0.45
ASSEMBLY	
General	0.25
Restaurant, Café	0.70
Club House	0.60
BUSINESS AND MERCANTILE	
General	0.25
Laundry	1.00
INDUSTRIAL	
General, Exclusive of Process Piping	0.90

← .35

TABLE 3  
CAPACITY VALUES FOR SERVICE, MAINS, RISERS AND/OR BRANCHES

Nominal Pipe or Tubing Sizes (inches)	Capacity Value
3/8	1
1/2	1.1 to 4
3/4	4.1 to 9
1	9.1 to 16.5
1 1/4	16.6 to 28
1 1/2	28.1 to 55
2	55.1 to 107.5
2 1/2	107.6 to 182.5
3	182.6 to 287.5
3 1/2	287.6 to 425
4	425.1 to 700
5	700.1 to 1100
6	1100.1 to 1300

← 90.3 = 2" main

248 CMR: BOARD OF STATE EXAMINERS  
OF PLUMBERS AND GAS FITTERS

10.14: continued

3. All other toilets not covered in 248 CMR 10.14(3)(b)1. and 2. shall be low consumption toilets that use a maximum of 1.6 gallons (six liters) per flush.

(4) Designing and Sizing the Building Water Distribution System.

(a) Methods to Be Used.

1. The design of the building's hot and cold-water distribution system shall conform to good engineering practices.
2. The methods used to determine pipe sizes shall be the procedure outlined in Appendix "D" of the United States Public Health Service publication #1038, or a system designed by a registered professional engineer, using the computation outlined in 248 CMR 10.14(4): *Tables 1, 2, and 3*. (An example of the use of these tables is shown following 248 CMR 10.14(4): *Table 3*).
3. The minimum size of a fixture supply pipe shall be in accordance with 248 CMR 10.14(4): *Table 1*.
4. The size of fixture supplies, the building main and branch distribution piping may be determined from 248 CMR 10.14(4): *Tables 1, 2, and 3*.
5. To size the hot and cold water main or distribution branches for a building, they shall be computed on an individual basis.
6. A demand factor, as recognized in 248 CMR 10.14(4): *Table 2* shall be applied to determine the minimum diameter pipe size for the building main and water distribution system piping.

7. Size of Fixture Supplies.

- a. The minimum sizes of a fixture water supply pipe shall be as shown in 248 CMR 10.14(4): *Table 1*.
- b. The fixture water supply pipe shall be extended to within at least 30 inches of the point of connection to the fixture.

TABLE 1  
MINIMUM SIZES OF FIXTURE WATER SUPPLY LINES AND FACTOR VALUES

TYPE OF FIXTURE OR DEVICE	Nominal Pipe Size (inches)	Factor Value
Bathtub (with or without single shower head)	½	2
Bidet	¾	1
Drinking fountain	¾	1
Dishwasher (Domestic)	½	2
Dishwasher (Commercial)	¾	6
Kitchen sink, Residential	½	2
Kitchen sink, Commercial (Pot and Scullery)	¾	6
Vegetable Prep or Bar Sink (Residential)	½	2
Hand Wash Sinks	¾	1
Shampoo Sinks	¾	1
Lavatory	¾	1
Utility Laundry Sinks 1, 2, or 3 compartments	½	2
Shower Valve (single head)	½	2
Shower Valve (Multiple heads)	¾	6
Sinks (service, slop)	½	2
Sinks flushing rim	¾	6
Laundry Valve	½	2
Urinal (flush valve type)	¾	6
Toilet (tank type)	¾	1
Toilet (flush valve type)	1	12
Hose Connections/Sillcocks/Wall Hydrants	½	2



## SEWER PIPE SIZING CALCULATIONS

### 5 PLEASANT ST, METHUEN MA

	QTY		FUV	TOTAL
TOILETS	19	x	6	114
LAVATORY	9	x	1	9
TUB/SHOWER	5	x	2	10
KITCHEN SINK	6	x	2	12
DISH WASH	6	x	1	6
CLOTHES WASH	5	x	2	10
	TOTAL			161

A FACTOR UNIT VALUE OF 161 WOULD REQUIRE A 4" SEWER  
ACCORDING TO THE MASS PLUMBING CODE CMR 248

248 CMR: BOARD OF STATE EXAMINERS  
OF PLUMBERS AND GAS FITTERS

10.15: continued

TABLE 1  
FIXTURE UNIT VALUES FOR VARIOUS PLUMBING FIXTURES

Type of fixture or group of fixtures	Fixture Unit Value
Automatic clothes washer (1½-inch standpipe)	2
Automatic clothes washer (2-inch standpipe)	3
<i>Bathroom group consisting of a toilet, lavatory and bathtub or shower stall:</i>	
Flushometer valve closet	8
19 — Tank type closet	6 — 114
5 — Bathtub <sup>1</sup> (with or without overhead shower)	2 — 10
Bidet	3
Combination sink and drain board with food waste grinder	4
Combination sink and drain board with one 1½-inch trap	2
Combination sink and drain board with separate 1½-inch traps	3
Vegetable prep sink (residential or commercial)	2
Dental chair unit or cuspidor	1
Dental lavatory	1
Drinking fountain	½
Dishwasher, commercial	6
6 — Dishwasher, domestic	1 — 6
Trough or trench drain 3-inch	5
Trough or trench drain 4-inch	6
Floor drains <sup>2</sup> with 2-inch waste	3
6 — Kitchen sink, domestic, with one 1½-inch waste	2 — 12
Kitchen sink, domestic, with food waste grinder	2
9 — Lavatory with 1¼-inch waste	1 — 9
5 — Laundry Utility sink (1, 2 or 3 compartments)	2 — 10
Shower stall, domestic	2
Showers (group) per head	2
<i>Sinks:</i>	
Surgeons	3
Flushing rim (with valve)	6
Service (trap standard)	3
Service (P trap)	2
Commercial Pot, scullery, etc. (each section)	4
Shampoo	2
Toilet, tank operated	4
Toilet, valve operated	6
Urinal, pedestal, siphon jet blowout	6
Urinal, wall lip	4
Wash sink (circular or multiple) each 20 inches of usable length	1
<i>Unlisted fixture drains or trap size:</i>	
1¼ inch or less	1
1½ inches	2
2 inches	3
2½ inches	4
3 inches	5
4 inches	6

(Total) 161  
FUV

Note 1: A showerhead over a bathtub does not increase the fixture value.

Note 2: See 248 CMR 10.15(2)(b) for method of computing fixture unit values of devices with continuous or semi-continuous flows.

Note 3: The size of floor drains shall be determined by the area of the floor surface to be drained in accordance with 248 CMR 10.10(10)(a).

248 CMR: BOARD OF STATE EXAMINERS  
OF PLUMBERS AND GAS FITTERS

10.15: continued

TABLE 2  
MAXIMUM LOADS IN FIXTURE UNITS FOR HORIZONTAL DRAINS (F.U.)

Diameter of drain (inches)	Horizontal fixture branch <sup>1</sup> (F.U.)	Building drain or building sewer <sup>2</sup>		
		1/8 in./ft. (F.U.)	1/4 in./ft. (F.U.)	1/2 in./ft. (F.U.)
1 1/2	3	---	---	---
2	6	---	---	---
2 1/2	12	---	---	---
3	34 <sup>3-4</sup>	---	40 <sup>3-4</sup>	48 <sup>3-4</sup>
4	160	180	216	250
5	360	390	480	575
6	620	700	840	1,000
8	1,400	1,600	1,920	2,300
10	2,500	2,900	3,500	4,200
12	3,900	4,600	5,600	6,700
15	7,000	8,300	10,000	12,000

Note 1: Does NOT include fixture branches to the building drain.

Note 2: DOES include fixture branches to the building drain.

Note 3: No more than two toilets or bathroom groups on a horizontal fixture branch nor more than three toilets or bathroom groups on a fixture branch of the building drain.

Note 4: No more than three toilets or three bathroom groups on a three inch building drain.

TABLE 3  
MAXIMUM LOADS IN FIXTURE UNITS FOR SOIL AND WASTE STACKS  
HAVING ONE OR TWO BRANCH INTERVALS

Diameter of Stack (inches)	Maximum Load on Stack (F.U.)
1 1/2	4
2	8
2 1/2	20
3	48 **
4	240
5	540
6	930
8	2,100
10	3,750
12	5,850
15	10,500

\*\*Note 1: Not more than two toilets or bathroom groups within each branch interval nor more than three toilets or bathroom groups on the stack.

4"

## WATER PIPE SIZING CALCULATIONS

### 5 PLEASANT ST, METHUEN MA

	QTY		FV	HOT	COLD			
WC	19	x	1	NA	19			
TUB/SHOWER	5	x	2	10	10			
CLOTHES WASH	5	x	2	10	10			
DISH WASH	6	x	2	12	NA			
KITCHEN SINK	6	x	2	12	12			
LAV SINK	9	x	1	9	9			
SILLCOCK	2	x	2	NA	4			
	TOTAL			53	+	64	=	117

TOTAL FV 117 X .35 DEMAND FACTOR = 40.95 CAPACITY VALUE

40.95 CAPACITY VALUE = 1-1/2" WATER MAIN PER MA PLUMBING CODE 248 CMR  
SECTION 2.14

248 CMR: BOARD OF STATE EXAMINERS  
OF PLUMBERS AND GAS FITTERS

10.14: continued

TABLE 2

OCCUPANCY USE	DEMAND FACTORS
RESIDENTIAL	
One or Two Family Dwelling	0.50
Multi-residential	0.35
Hotel	0.70
SCHOOL	
General	0.75
Shower Room	1.00
INSTITUTIONAL	
General	0.45
ASSEMBLY	
General	0.25
Restaurant, Café	0.70
Club House	0.60
BUSINESS AND MERCANTILE	
General	0.25
Laundry	1.00
INDUSTRIAL	
General, Exclusive of Process Piping	0.90

← 0.35

TABLE 3  
CAPACITY VALUES FOR SERVICE, MAINS, RISERS AND/OR BRANCHES

Nominal Pipe or Tubing Sizes (inches)	Capacity Value
3/8	1
1/2	1.1 to 4
3/4	4.1 to 9
1	9.1 to 16.5
1 1/4	16.6 to 28
1 1/2	28.1 to 55
2	55.1 to 107.5
2 1/2	107.6 to 182.5
3	182.6 to 287.5
3 1/2	287.6 to 425
4	425.1 to 700
5	700.1 to 1100
6	1100.1 to 1300

←



248 CMR: BOARD OF STATE EXAMINERS  
OF PLUMBERS AND GAS FITTERS

10.14: continued

3. All other toilets not covered in 248 CMR 10.14(3)(b)1. and 2. shall be low consumption toilets that use a maximum of 1.6 gallons (six liters) per flush.

(4) Designing and Sizing the Building Water Distribution System.

(a) Methods to Be Used.

1. The design of the building's hot and cold-water distribution system shall conform to good engineering practices.

2. The methods used to determine pipe sizes shall be the procedure outlined in Appendix "D" of the United States Public Health Service publication #1038, or a system designed by a registered professional engineer, using the computation outlined in 248 CMR 10.14(4): *Tables 1, 2, and 3*. (An example of the use of these tables is shown following 248 CMR 10.14(4): *Table 3*).

3. The minimum size of a fixture supply pipe shall be in accordance with 248 CMR 10.14(4): *Table 1*.

4. The size of fixture supplies, the building main and branch distribution piping may be determined from 248 CMR 10.14(4): *Tables 1, 2, and 3*.

5. To size the hot and cold water main or distribution branches for a building, they shall be computed on an individual basis.

6. A demand factor, as recognized in 248 CMR 10.14(4): *Table 2* shall be applied to determine the minimum diameter pipe size for the building main and water distribution system piping.

7. Size of Fixture Supplies.

a. The minimum sizes of a fixture water supply pipe shall be as shown in 248 CMR 10.14(4): *Table 1*.

b. The fixture water supply pipe shall be extended to within at least 30 inches of the point of connection to the fixture.

TABLE 1  
MINIMUM SIZES OF FIXTURE WATER SUPPLY LINES AND FACTOR VALUES

TYPE OF FIXTURE OR DEVICE	Nominal Pipe Size (inches)	Factor Value
Bathtub (with or without single shower head)	1/2	2
Bidet	3/8	1
Drinking fountain	3/8	1
Dishwasher (Domestic)	1/2	2
Dishwasher (Commercial)	3/4	6
Kitchen sink, Residential	1/2	2
Kitchen sink, Commercial (Pot and Scullery)	3/4	6
Vegetable Prep or Bar Sink (Residential)	1/2	2
Hand Wash Sinks	3/8	1
Shampoo Sinks	3/8	1
Lavatory	3/8	1
Utility Laundry Sinks 1, 2, or 3 compartments	1/2	2
Shower Valve (single head)	1/2	2
Shower Valve (Multiple heads)	3/4	6
Sinks (service, slop)	1/2	2
Sinks flushing rim	3/4	6
Laundry Valve	1/2	2
Urinal (flush valve type)	3/4	6
Toilet (tank type)	3/8	1
Toilet (flush valve type)	1	12
Hose Connections/Sillcocks/Wall Hydrants	1/2	2