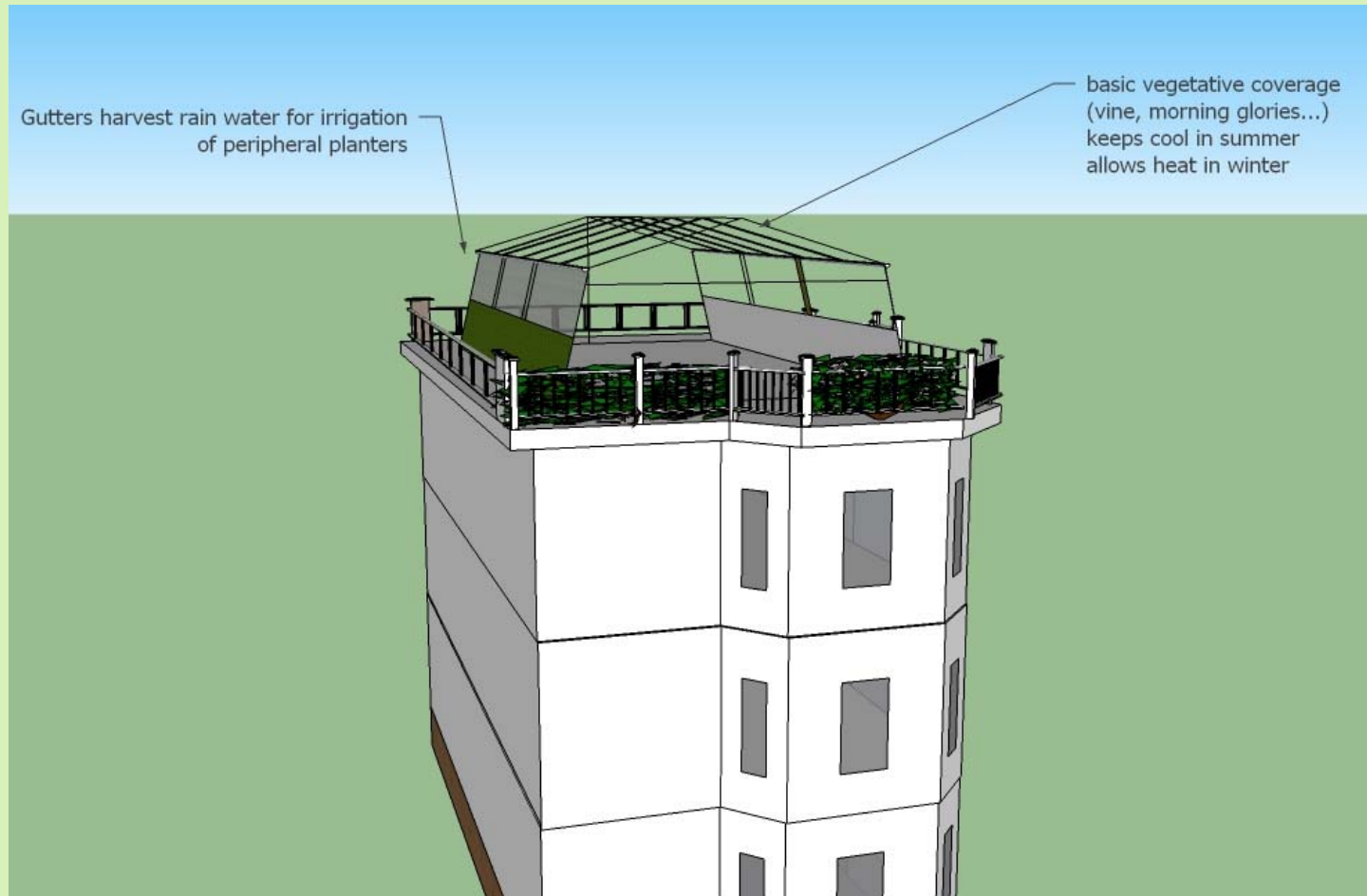
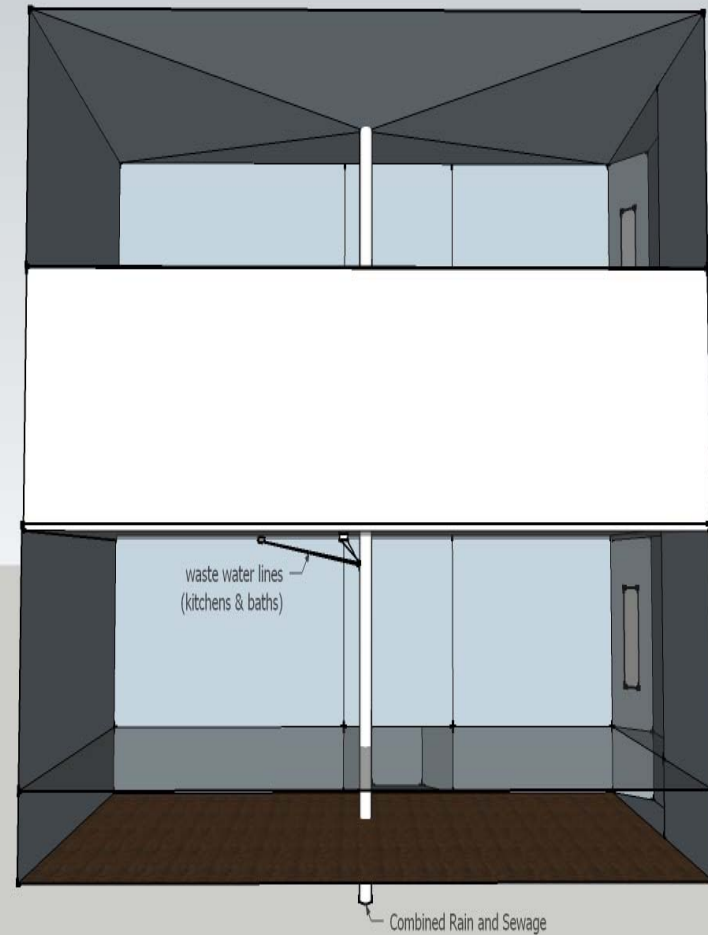
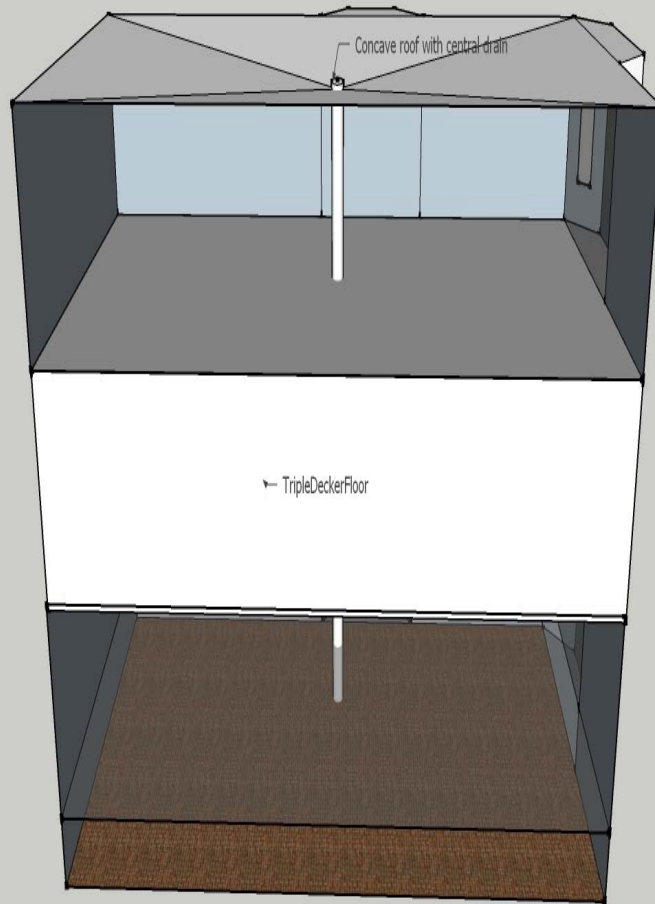


Z.O. 5.55 an opportunity to “update” flat roofs with mutual benefits to the City and owners



Supporting Amendment 5.55 to Cambridge Zoning Ordinance: option for eliminating rainwater dumping into sewer from residential flat roofs (typical triple-deckers) - Nicolai Cauchy HuronGreenHouse@gmail.com

Flat roofs combine rain with sewage = cost to the City



Design

Engineering

Construction

508 413 0035



M.I.T. engineer
Licensed G.C.

For owners, central drains clog and interior pipes crack!

An *inconvenient truth* about insulation

Well insulated flat roof = **clogged drain**, snow load!!!



Poorly insulated flat roof: snow melts into sewer



Cracked pipe inside wall = extensive damage



Design Construction
Engineering

508 413 0035



M.I.T. engineer
Licensed G.C.

Concave roofs are bad!

- Costly sewer input for City and residents
- Liability for homeowner
- Disincentive for ecology
 - Heat islands in summer
 - insulation in attics causes drain to freeze

Purpose of ZO 5.55

- Eliminate rainwater from sewage
- Eliminate homeowner concerns & damage
- Provide innovative ecological opportunities

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HuronGreenHouse@gmail.com

Scope – who to help and avoid

- **PROVIDE** relief for homeowners:
 - Shed snow and eliminate central drain
 - Entice ecological use of roof area
- **AVOID** proliferation / development:
 - Added space is not a separate floor or unit
 - “Lightweight” structure, “translucent”

A single Triple Decker gathers
6,000cf/yr of rain = 60Ccf

- Typical annual water bill is ~130Ccf=\$1500
– 1/3 of sewer input is RAIN!
- Rain in sewage for one triple decker costs
the City
– \$80~\$600/yr (City pays MWRA & bills owners)

Ref.: 1500s.f. area; 4' annual rainfall; 7.5gals/c.f.; sewer tax \$8.3/Ccf (Ccf=100c.f.); Typical Triple Decker consumes 130Ccf/yr (FY2010)

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Cost of rain dumped into sewer increasing!

Cambridge **sewer rates** increasing **5 times** faster than water

FY 09-12 (Block 2, typical triple decker):

- Water: 3.24/3.19 \$/Ccf =>1.5%
- **Sewer: 8.32/7.71 \$/Ccf =>7.9%**

2400 <TpIDkrs in Cambridge=> COSTS

at least \$200K/yr @ “MWRA rate”
but maybe

\$1,4M/yr @ “tax payers rate”

Sources: Cambridge BZA at Variance Appeal 12 Apr., 2008 “Cambridge has over 2400 triple deckers”

City=7.13 sq. mi.; estim. 60% of flat area residential buildings (10% business/univ.; 30% green + streets); 10,000 resdnl.bldgs.; 2% TplDkr

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Climate change: frozen drain = snow overload!



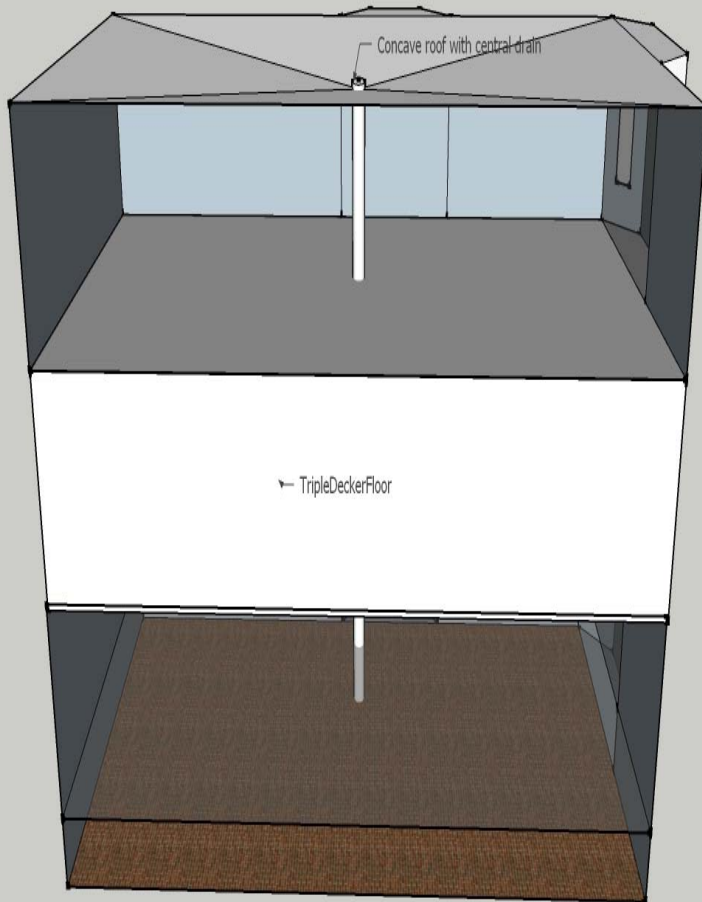
Design Construction
Engineering

508 413 0035



M.I.T. engineer
Licensed G.C.

Liability to homeowners: numerous cases



- Pipes crack inside walls
- Frozen drain
 - Causes overflow and overload on roof
 - “Global warming” => increasing snow loads
- Liability when shoveling snow off edge

Flat roofs are

1. **Cost to the City >\$200K/yr (maybe \$1.5M?)**
2. **Liability to homeowners**
3. **Bad for ecology**

A small relaxation of height limit can solve these problems!

City gains

- Reduced rain water into sewage
- increases property tax revenue?

Owners gain

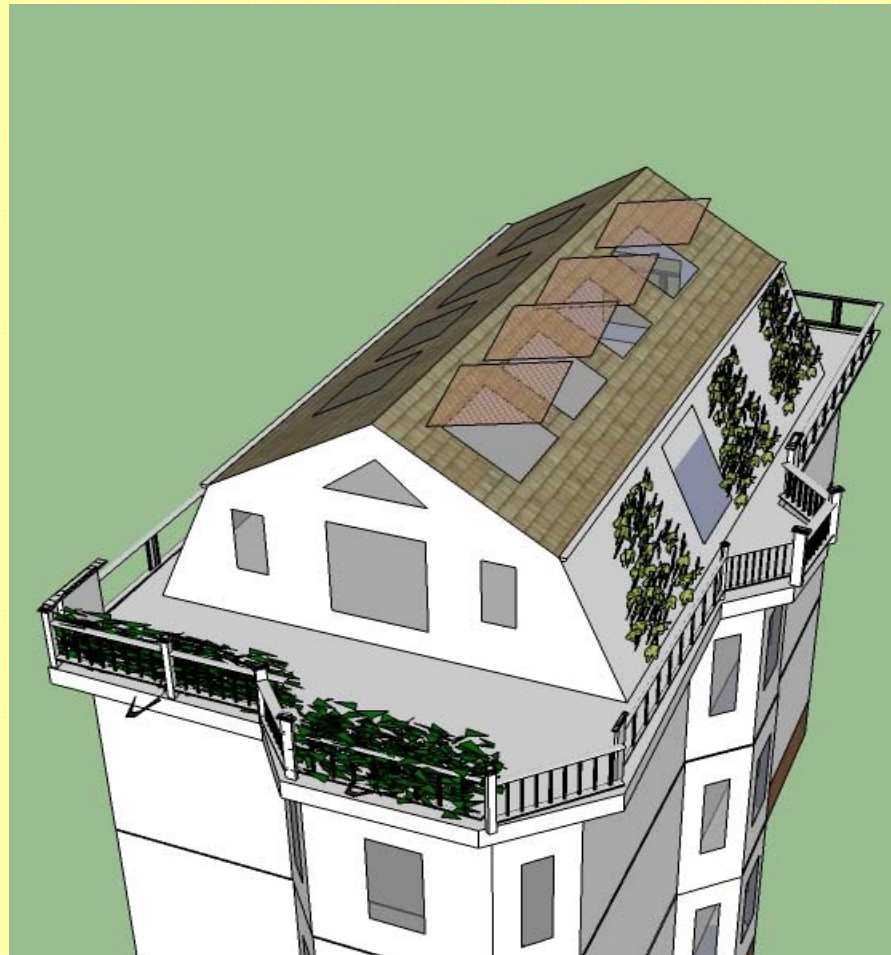
- Peace of mind from risk of failure, snow, etc...
- Improved insulation & ecological temperature control
- Usable roof with many green opportunities

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Illustration of one design option

Central Drain eliminated!

Rainwater recycled for use on roof (gutters at gambrel) or diverted to the ground



Passive solar heating

Convective ventilation and cooling

Vegetative roof cover with seasonal shading

High-level flowering plants enhance pollination



**Design
Engineering**

Construction

508 413 0035



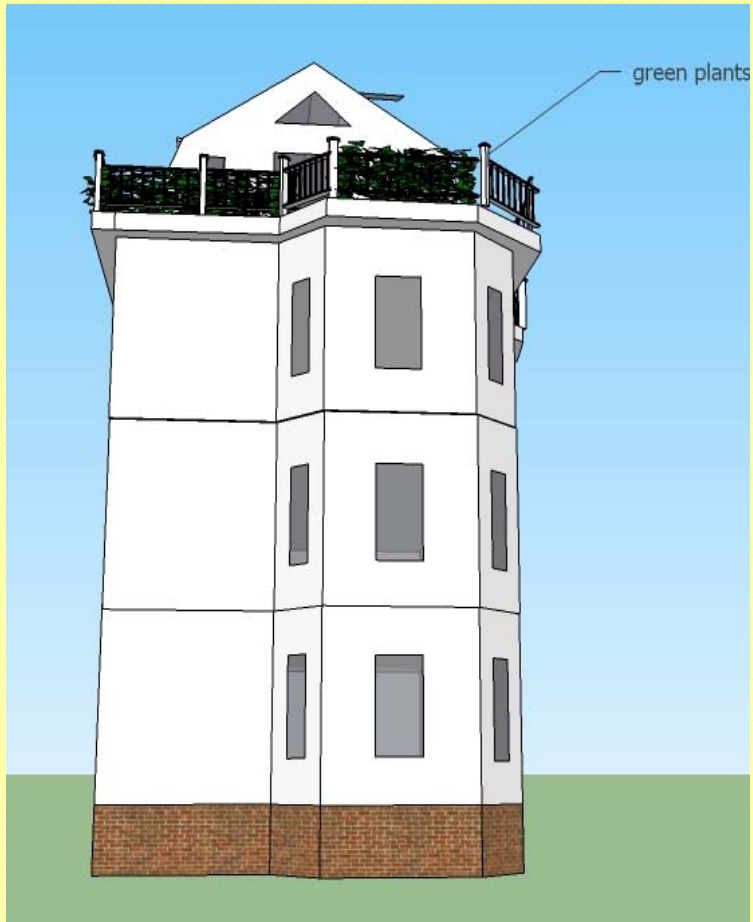
**M.I.T. engineer
Licensed G.C.**

Concerns about relaxing Z.O. limits

1. Impact on neighbors and visual aspect
2. Zoning
 - FAR (floor area ratio \approx living area/lot size)
 - Roof height
3. Increase in population density

Visual representation: minimal impact

Front view from 40ft away

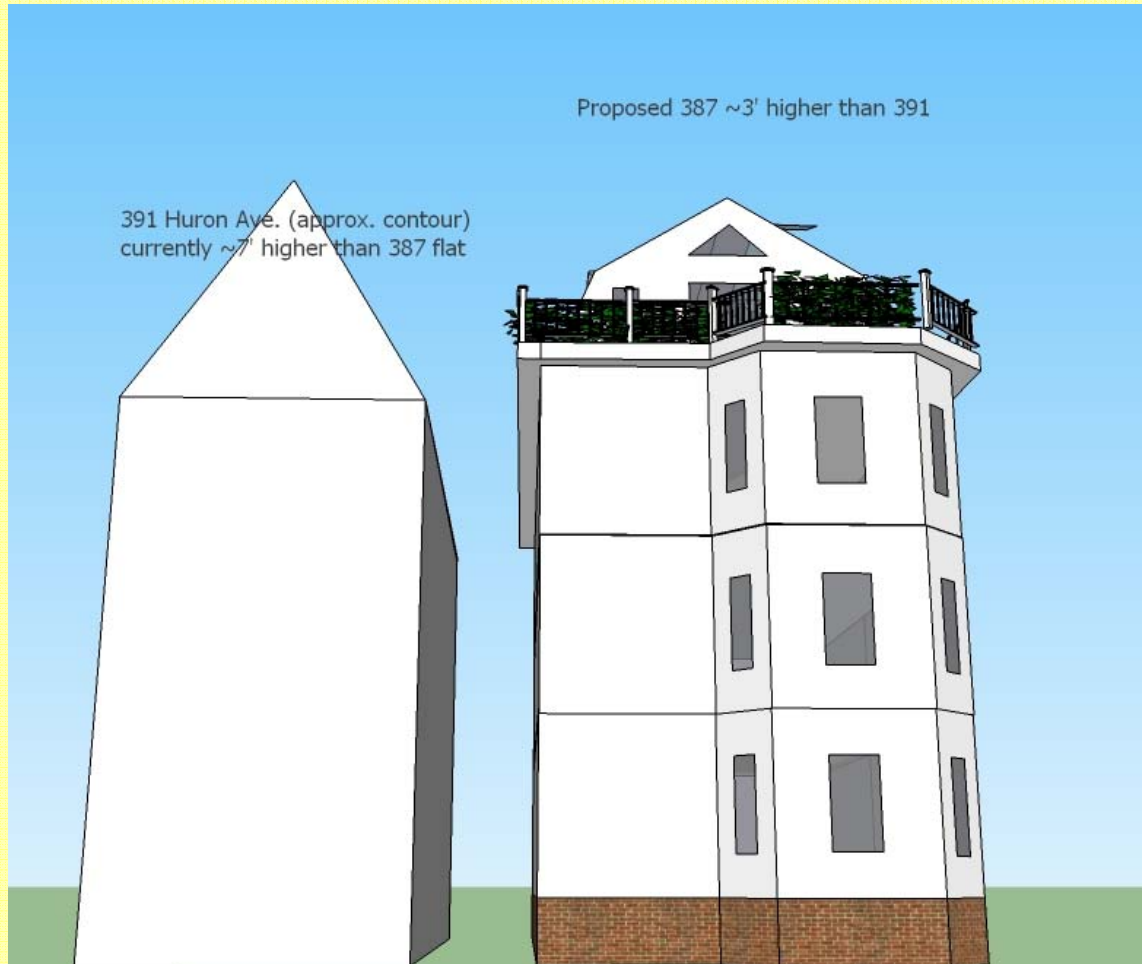


Side view from 15ft away



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387 Huron: Height perspective

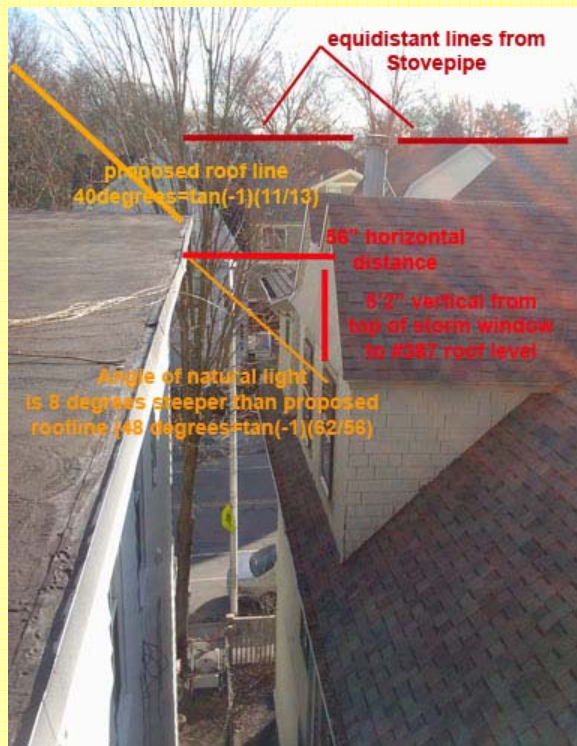


- New roof being set back offsets the height perception
- INVISIBLE from neighbor due to narrow space between buildings & crown overhang
- Pitched roof design brings harmony with neighborhood (all pitched except one)

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No impact on neighbor's natural light or view

Even adjacent to a third floor dormer,
no impact on natural light



In other City areas where triple deckers are concentrated the crown overhang determines angle for light/view



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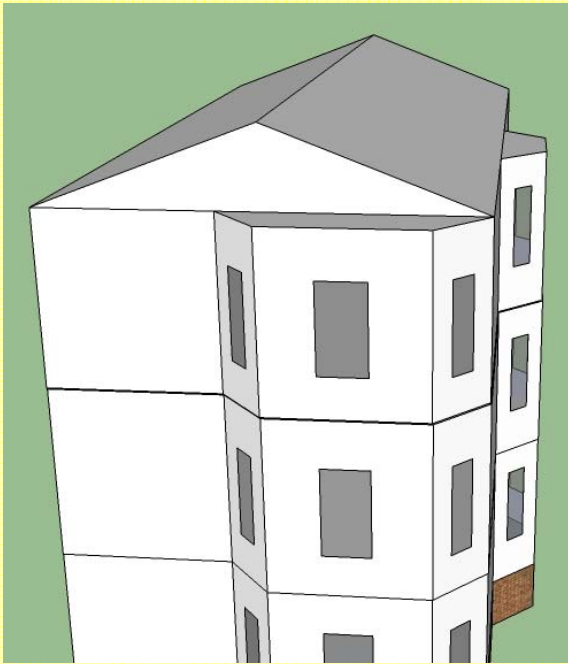
Zoning concerns

- **FAR**
 - ZO 5.55 places a limit as % over existing
 - ZO 5.55 **does not allow a new unit**
- **Maximum roof height**
 - Many TrpIDkrs 3-10ft lower than neighbors
 - ZO 5.55 limits height gain to 10'

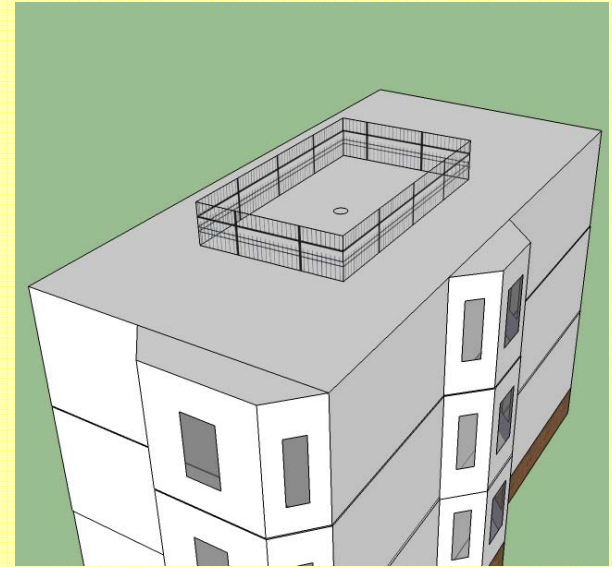
Alternatives that have been suggested

**Expensive and little
incentive for owner**

**Shallow slope, ice dams
+ increased snow load**



**Central drain not eliminated
Snow load still an issue**



Supporting Amendment 5.55 to Cambridge Zoning Ordinance: option for eliminating rainwater dumping into sewer from residential flat roofs (typical triple-deckers) - Nicolai Cauchy HuronGreenHouse@gmail.com

Z.O. §5.55 entices ACTION

- Addition is **costly** for homeowner,
BUT
- Owner gains functional, usable space
- Eliminates rain drain
- Has incentives for grass-roots *green* innovations
(third floor residents don't use street level
gardens)

Z.O. §5.55 Benefits all parties

- Multiple safeguards against abuse
- City saves sewage \$\$
- City earns tax \$\$
- Reduce risk of leaks for homeowner
- No intrusion on neighbors
- Incentive for innovative/green design

Win-win situation!

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“The City should PAY owners willing to do the work for all it would save us!”

(Engineer Dennis Carr, lead Engineer for the City regarding this proposal in the context of Huron Concord area rain/sewer separation survey)

Support from several Cambridge and Huron architects

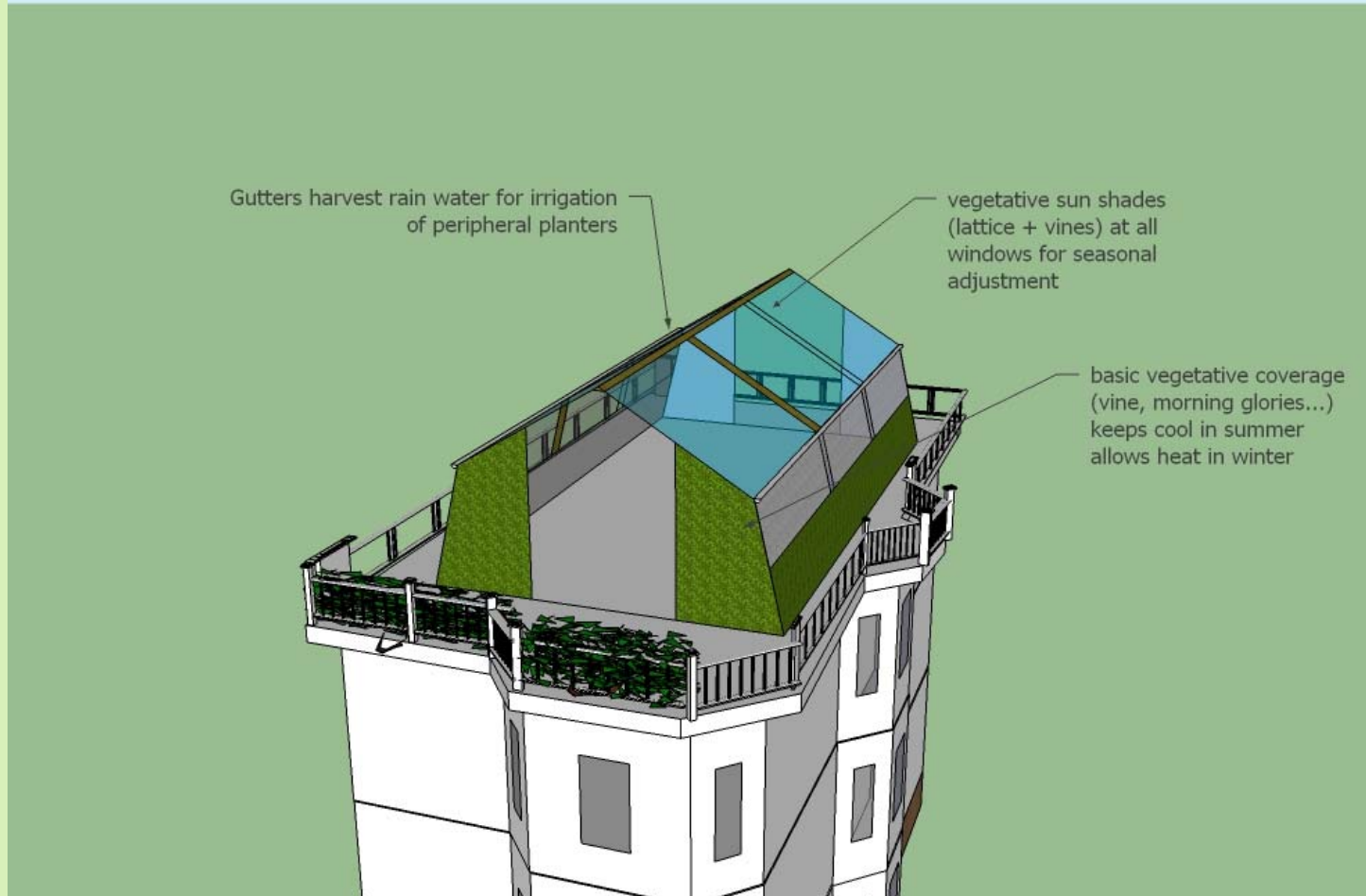
Z.O. §5.55 saves the city \$\$ at zero cost, by inciting homeowners to take on the cost of separating rain/sewage water on their flat roof.

Support Z.O. §5.55!

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Innovation, Ecology, and Economie\$

ZO 5.55 is good common sense



Drawings
not to exact
scale –
primarily for
design
suggestions

Supporting Amendment 5.55 to Cambridge Zoning Ordinance: option for eliminating rainwater dumping into sewer from residential flat roofs (typical triple-deckers) - Nicolai Cauchy HuronGreenHouse@gmail.com

ZO 5.55

In an effort to further the City's storm-water management, and to alleviate hardships resulting from heavy snow loads, modifications to the applicable dimensional requirements of this Article 5.000, in particular regarding FAR and height limitations, may be authorized for eliminating rain-water from sewer lines on **residential buildings** with a flat (concave) roof, on which a drain pipe collects water from the roof and combines it with household wastewater, discharging into a **single outflow pipe** to the municipal sewer line, provided that the resulting construction

- entirely **eliminate rain water entry** from the concerned roof into said sewer line and that
 - said rain water is either recycled or led down to the ground to follow its natural path,
- a Special Permit may allow the construction of a **partial light-weight structure** such as a greenhouse or 3-season enclosed porch within the following limitations
- Additional height not to exceed 10 ft. above the existing roof line of the building
 - Footprint to be no closer than 3 feet from either long edge or rear side of the building, no less than 6 feet from front/street-side of building,
 - Side walls and roof shall be mostly translucent above 4 feet from existing roof, and
 - Additional FAR* not to exceed 20% of the existing FAR of the building

Furthermore, in enhancing sustainable development and alternative energy sources (Article 22), additional positive consideration will be given to "sensibly green" projects that improve the use of passive solar heating, convective cooling, seasonal shading with natural plants, harvesting and/or using rainwater at the roof level or floors below, planting flowering bushes and vegetation attractive to pollinating insects at the roof level, maximizing the use of natural light, and harmonization of the new roof profile with surrounding buildings.

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Annex/Additional material

- **4-level homes in Cambridge**
- **Ice damage & snow load/ice load liability**

Supporting Amendment 5.55 to
Cambridge Zoning Ordinance:
option for eliminating rainwater

A few of many Cambridge residences where 4 levels were authorized (some in 1973 oil crunch)



Supporting Amendment 5.55 to
Cambridge Zoning Ordinance:
option for eliminating rainwater

Neighbors who wrote directly to PB

- **Peter Wilson**, 451 Huron Ave.: “I wanted to express my support amending the height restrictions in Z.O.5.23 to allow building a lightweight structure like a greenhouse on a percentage of the roof area.”
- **Tancredi Botto**, Broadway: ”with this letter I wish to express my support for Policy Order 2016#84, to amend zoning ordinance 5.23 in order to allow exceptions to the maximum height limitations so that owners of flat roof homes can make senseful ecological conversions, including separation of rainwater from sewage, small roof gardens, greenhouses and vegative covering, as well as access to passive solar heating and concentrators. Regards”
- **Brian Thompson**, Appleton St.: “My wife, Marie-Claude, and I have been homeowners at 168-170 Appleton Street since 1969. I would like to add our support to Policy Order 2016#84 in favor of allowing exceptions to the maximum height in Z.O.5.23 as may be decided by the Ordinance Committee, and in particular for erecting light weight structures with an ecological function within the parameters proposed under Z.O.5.55. Thank you in advance for your kind consideration. Best regards”,
-
-

Cambridge Architects in support of ZO 5.55

- **John Altobello**, Reservoir St.: As a Cambridge architect and resident in the Huron Avenue neighborhood, I'm writing to express my support for ZO5.55, which would enable flat roof owners to gain relief from height and FAR in order to build a lightweight structure, such as a greenhouse. I'd appreciate your taking note of my support. Best regards,"
- **Harry Irwin**, Gurney St., member of Cambridge Historical Society – wrote directly to Donna Lopez on 4/2/16
- **Andrew Hartness**, Huron Ave.
- **Peter Wright**, Larch Rd., designer and builder of Larch Rd Playground Condos

Supporting Amendment 5.55 to Cambridge Zoning Ordinance: option for eliminating rainwater dumping into sewer from residential flat roofs (typical triple-deckers) - Nicolai Cauchy HuronGreenHouse@gmail.com

Other triple decker owner with problems supporting ZO 5.55

- James Prescott, 85 Trowbridge St.:

Dear Ms. Lopez, I am a home owner in mid-Cambridge (85 Trowbridge Street, Cambridge, MA 02138). The building, which was built around 1890, is a triple decker with a center-pitch flat roof that drains into the sewer system. I am writing in support of Policy Order 2016#84, which is seeking to ammend zoning ordinance 5.23 in order to allow sensible and rational exceptions to the maximum height limitations, so as to allow owners of flat roof homes to make sensible and rational ecological conversions. The exception options include the possibility of raising a lightweight structure which would eliminate rainwater dumping into sewage lines by building a greenhouse, providing passive solar heating and other grass-roots ecological options.

In our specific case, the rubber membrane roof is black, and **in the summer months the heat on the third floor can be extreme.** (The building does not have air conditioning, and so we rely on window air conditioning units.) And, the drain on the center pitch roof has a grating to prevent leaves and roof debris from entering the sewer lines. The **drain grate is prone to blocking** from leaves and acorns that accumulate on the roof, resulting in water accumulation on the roof, and providing breeding for **mosquitos.** Enabling ecological (i.e. green) roof conversions would minimize heat absorption in the summer months, resulting in cooler temperatures in the building and, possibly, in the elimination of the use of temporary air conditioning units. In addition, roof plantings will provide an efficient consumption of rain water and provide for a healthier and environmentally friendly living arrangement. Thank you for your consideration,

Supporting Amendment 5.55 to Cambridge Zoning Ordinance: option for eliminating rainwater dumping into sewer from residential flat roofs (typical triple-deckers) - Nicolai Cauchy HuronGreenHouse@gmail.com

Neighbors signatures of support

- A scan with over 50 signatures was emailed to Ms. Lopez in anticipation of the Council meeting in March 2016
- A larger number yet had been filed with the original variance application (2008) as well as with hearings in 2011 and the Ordinance Committee in 2013
- **Several wrote directly to City (some of them repeatedly)** including Margaret Desjardins (Lakeview), Lucy Wilhelm (Vassal), Kim Clements (Huron), Maria Rondeau (Royal), Philip Rauh (Lakeview), Roger Theberge (Lakeview), and others.

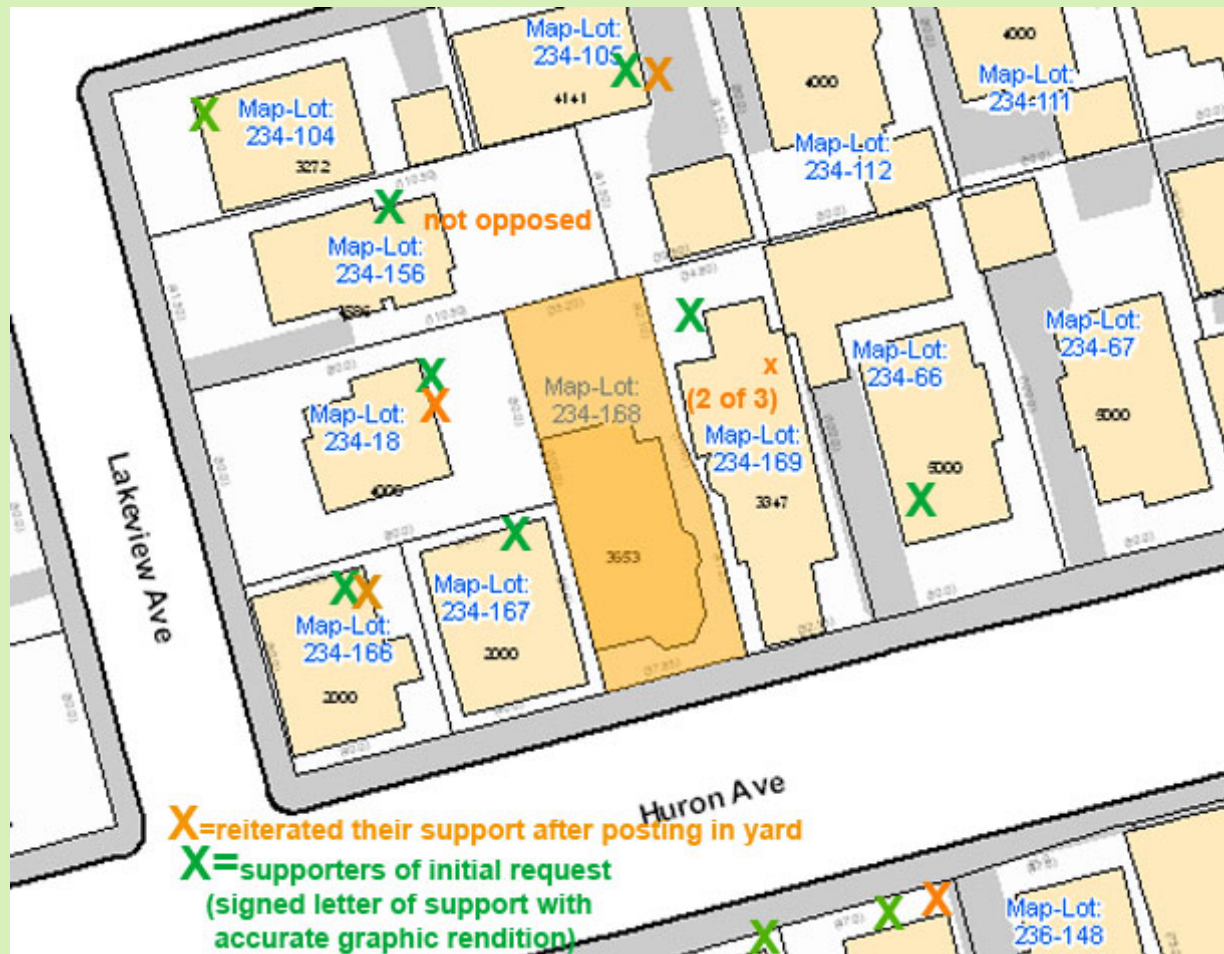
Simplified illustration of relative height increase specific to 387 Huron



- Represents 11ft height increase i.e. greater than ZO 5.55
- Setback from front and sides will largely reduce visibility

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Abutter support for 387 Huron



Supporting Amendment 5.55 to
Cambridge Zoning Ordinance:
option for eliminating rainwater