



CITY OF CAMBRIDGE
COMMUNITY DEVELOPMENT DEPARTMENT

IRAM FAROOQ
Assistant City Manager for
Community Development

SANDRA CLARKE
Deputy Director
Chief of Administration

To: Planning Board
From: CDD Staff
Date: August 3, 2018
Re: **Zoning Petition on Converting Flat Concave Roofs**

This City Council zoning petition would allow the Board of Zoning Appeal (BZA) to grant relief from certain dimensional zoning requirements for existing buildings with flat (concave) roofs and existing central drain lines connecting directly into the City sewer. The relief would allow a partial new story to be built above the existing roof of the building in exchange for disconnecting the central drain line and meeting other criteria.

Past Zoning Proposals

The Planning Board has considered versions of this zoning proposal in the past, first in 2013 and most recently in 2016. In either case, the Planning Board did not recommend adoption and the petitions expired with no action by the City Council.

Attached to this memo are documents provided for these past petitions, including Planning Board recommendations and staff documents, which contain relevant background information related to the proposal and issues raised in past discussions.

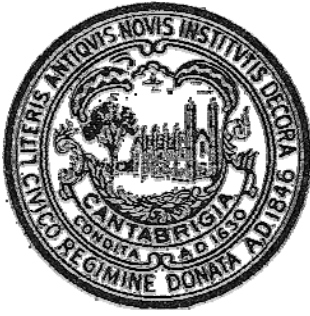
Current Petition

There are a few substantive differences between the current petition and past proposals, including the following:

- The current petition notes that buildings “may have poor upper-level thermal insulation and/or contribute to important heat island effects, or may suffer from the secondary effects of overinsulation,” and includes as a criterion that projects “significantly increase the thermal efficiency of the building.”
- Prior and current petitions require rainwater to be “dispersed at the ground to follow its natural path,” while the current petition also requires rainwater to be “harvested on the property at the rate of 1/8 gallon per square foot of roof area.”
- The current petition includes “installation of solar panels (impractical on residential flat roofs)” as a review consideration; it is not explained why solar panels would be considered impractical.

The relief that may be granted is the same as in prior proposals: an additional 10 feet in height above the existing roof line and up to a 20% increase in floor area ratio (FAR), but additions must be set back at least 6 feet from the existing roof parapet on the front side and 3 feet from the existing roof parapet on other sides. The title of the petition references “a kind of greenhouse/glass porch,” but no other standards are specified.

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CITY OF CAMBRIDGE, MASSACHUSETTS

PLANNING BOARD

CITY HALL ANNEX, 344 BROADWAY, CAMBRIDGE, MA 02139

Date: June 7, 2016

Subject: Rainwater Separation from Flat Roofs Zoning Petition

Recommendation: The Planning Board does NOT RECOMMEND adoption.

To the Honorable, the City Council,

On May 24, 2016, the Board held a hearing on this City Council zoning petition, which would create a new Section 5.55 in the Zoning Ordinance to allow limited modifications to dimensional requirements (including FAR and height) by special permit from the Board of Zoning Appeal for improvements to buildings with flat or concave roofs that would result in disconnecting rooftop drainage connections from the public combined sewer system.

The Board heard a presentation from Councillor Craig Kelley and discussed the proposal. No other members of the public appeared to testify. The Board also received material in support of the proposal by Nicolai Cauchy. The Board had heard a version of this proposal, with slight differences, in 2013, and received materials from the Community Development Department (CDD) and Department of Public Works (DPW) that were prepared at that time along with the Planning Board's prior negative recommendation on that proposal.

At this time, the Board finds merit in some aspects of the proposal. Given the age of the housing stock and the desire among families in Cambridge to make use of existing homes, there is some benefit to providing a mechanism by which people can make better use of available space, including, in some cases, rooftop space. It is also true that there is some environmental benefit to disconnecting drain connections from the combined sewer, although the material previously provided by DPW indicates that such benefit is modest in comparison to certain other infrastructure improvements that are required of the City. Councillor Kelley noted that the improvements envisioned in this proposal can also allow for better removal of snow and ice from roofs.

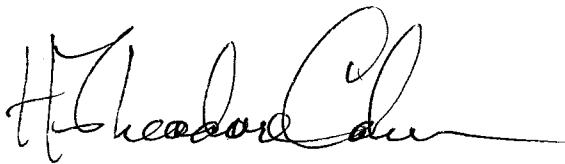
However, the Board has several concerns about this proposal. The primary concern is that allowing the addition of a partial story to a building would create significant value for one group of property owners, that is not necessarily balanced by the benefit to the public. The Board also questioned whether the City should prefer and essentially reward this one group of property owners over other property owners who might propose different environmentally beneficial renovations to their properties. If the Council wished to consider allowing homeowners more flexibility to add space to existing buildings in return for environmentally beneficial renovations, there should be a broader consideration of the types of public benefits that could be achieved

through such allowances. If environmental sustainability is a focus, consideration should be given to the objectives of the Net Zero Action Plan and Climate Change Vulnerability Assessment, which aim to address the causes and expected impacts of climate change. Housing affordability is also a major City goal that might be taken into account when considering where greater zoning flexibility might be justified.

In addition, Board members have some concerns about allowing additional height to these particular buildings, as the three-decker is a pervasive and iconic development form in many neighborhoods, and the allowance of an additional story may disrupt that prevailing character. The change to the petition from the 2013 version, which now requires a step-back of the partial story from existing roof edges, helps to address this concern somewhat. However, it is difficult to determine where such additions would or would not be appropriate, and where they might be objectionable to neighbors who would not be entitled to the same benefit if their homes do not have flat roofs and central drain lines.

In conclusion, while the Board is generally supportive of approaches that might allow greater zoning flexibility for homeowners in exchange for making their homes more environmentally sensitive, Board members believe that more consideration is needed to determine what specific public objectives would be best served by allowing property owners to increase the usability and value of their homes, and to determine a fair way to balance the expected private benefit with those public objectives.

Respectfully submitted for the Planning Board,

A handwritten signature in black ink, appearing to read "H Theodore Cohen". The signature is fluid and cursive, with a long horizontal flourish extending to the right.

H Theodore Cohen, Chair.



CITY OF CAMBRIDGE
COMMUNITY DEVELOPMENT DEPARTMENT

IRAM FAROOQ
Assistant City Manager for
Community Development

To: Planning Board
From: Jeff Roberts, Land Use and Zoning Planner
Date: May 17, 2016
Re: **Rainwater Separation from Flat Roofs Zoning Petition**

On May 24, the Board will hear a City Council zoning petition that is a refiled and slightly revised version of a zoning petition heard by the Board in 2013. Attached to this cover memo are the Board's recommendation on that prior petition, along with past materials provided by staff. An explanatory package from Nicolai Cauchy, an advocate for the petition, is also provided.

Overview

The proposed zoning petition would allow the Board of Zoning Appeal (BZA) to grant a special permit to authorize, within limitations, the construction of a partial top story on an existing residential building with a flat or concave roof, if such construction would enable the disconnection of an existing storm drain line from the City's sewer system. This allowance would be available in any district for any residential building with the existing condition described above. The concept is that such a change would reduce stress on public infrastructure, but would not be economically advantageous for a property owner to undertake without some other improvement to the property.

The current petition maintains the previously proposed limitations that any addition can be no more than 10 feet above the existing roof line, cannot increase the FAR on the property by more than 20%, and cannot constitute a new dwelling unit. In addition, the current petition proposes a new requirement that the added top story be stepped back at least 6 feet from the front roof edge and at least 3 feet from all other roof edges.

Comments

As noted in the attached Planning Board recommendation, the key consideration is the balance between the environmental benefits of removing drain connections and the potential impact of adding stories to buildings in residential neighborhoods that may have a fairly consistent established height. The added requirement for step-backs might help to mitigate this impact. It is difficult to determine exactly how many buildings would be eligible for additions under this proposal, but the information previously provided by the Department of Public Works shows that within neighborhoods, there are highly varied existing conditions, and therefore some buildings would be eligible for the proposed special permit while many others would not.

Also, the attached 2013 report from the City Engineer notes that there would be some public benefit to separating storm drains, but the benefit is modest in relation to other priority improvements that are being undertaken by the City.



CITY OF CAMBRIDGE, MASSACHUSETTS

PLANNING BOARD

CITY HALL ANNEX, 344 BROADWAY, CAMBRIDGE, MA 02139

Date:	September 3, 2013
Subject:	Craig Kelley Petition (Flat Roofs / Rainwater Separation)
Recommendation:	The Planning Board DOES NOT RECOMMEND adoption of the proposed zoning amendment, but suggests alternative approaches.

To the Honorable, the City Council,

The Planning Board considered this proposed zoning amendment at a public hearing on June 18, 2013 and continued deliberation on September 3, 2013. The proposal would create a new Section 5.55, which would allow increases in the Gross Floor Area and height of existing residential buildings by special permit as an incentive for property owners to remove internal drainage connections to the City sewer from buildings with flat roofs. The Planning Board heard testimony from Nicolai Cauchy, a resident who supports the petition, and from Owen O’Riordan, the City Engineer and Acting Commissioner of Public Works.

The Planning Board recognizes the environmental benefit of removing these direct central drain connections, which would reduce rainwater intake into the combined sewer system and help to mitigate the impacts on water quality that result from sewer system overflows. In addition, allowing rainwater to collect into the ground rather than being directed into the sewer system would promote groundwater recharge, which would benefit watershed protection. However, the Board also acknowledges that the environmental benefits would be modest, given that only a fraction of rainwater is collected on rooftops, and that most rainwater runoff from rooftops would continue to enter the sewer system eventually.

It is not typical in Cambridge to allow buildings to add an extra story above the height limit, particularly in close-knit neighborhoods where buildings with flat roofs are most common and the prevailing height tends to be three stories. Allowing those buildings to add a story would significantly increase property values for some owners, by providing greater floor area and views, while other owners in the same neighborhood would not be able to enjoy those benefits and would be impacted by the increased size and height of nearby buildings.

Therefore, the Planning Board believes that the public benefit to be gained by the removal of central storm drains would not justify the impact of allowing the construction of an extra story on residential buildings.

On the other hand, the Board believes that there is merit in allowing some modest zoning flexibility to facilitate the removal of central storm drains where the property owner wishes to do

so. Allowing property owners a few feet of height relief by special permit, rather than a variance, could facilitate the alteration of a concave roof that collects rainwater into a pitched roof that allows water to run off onto the property. As a modest incentive, additional Gross Floor Area could be allowed by special permit for the creation of a small roof deck, so that the owner could increase the value of the property by adding some usable open space and views in the process of making the necessary roof alterations. This incentive would be better scaled to the resulting public benefit, and would avoid some of the impacts of adding significant height and mass to an existing building in an established neighborhood. Potential concerns around privacy, noise and other impacts would still need to be considered in the special permit review process.

The Board suggests that the Council consider this strategy as an alternative to the proposed zoning amendment.

Respectfully submitted for the Planning Board,

A handwritten signature in black ink, appearing to read "H Russell", with a stylized flourish at the end.

Hugh Russell, Chair.



CITY OF CAMBRIDGE
COMMUNITY DEVELOPMENT DEPARTMENT

BRIAN MURPHY
Assistant City Manager for
Community Development

To: Planning Board
From: CDD Staff
Date: August 28, 2013
Re: **Craig Kelley Zoning Petition (Stormwater Separation)**

In response to the Planning Board's discussion at the June 18 meeting, we have prepared information on the following topics:

- The range of properties affected by the proposed zoning
- Possible alternatives to increased FAR and height as an incentive to eliminate central drain lines

Affected Properties

The properties that might take advantage of the proposed zoning include existing buildings with flat roofs and drain pipes that collect water runoff from the roof and discharge it directly into the City sewer line.

Data sources maintained by the City with information on existing buildings are not detailed enough to make an accurate accounting of the number of buildings that fall into these categories. In the memo to the Planning Board dated June 18, 2013, the Department of Public Works (DPW) provided some analysis of a small area in the vicinity of Concord and Huron Avenues that was performed as part of the City's Alewife Sewer Separation Program. DPW inspected 690 properties in the area and found 67 residential buildings (approximately 10% of the total) with flat roofs and internal drain systems connecting to the City sewer.

There are approximately 11,000 residential buildings across all of Cambridge. If the overall building stock is assumed to be comparable in its mix of building types, the number of buildings with flat roofs and direct drain connections would be approximately 1,000.

However, briefly scanning an aerial view of Cambridge reveals that the Concord/Huron area has a smaller proportion of flat-roofed buildings than neighborhoods in the eastern portion of the city, such as East Cambridge and Cambridgeport. While there are some neighborhoods that have a similar building stock to the Concord/Huron area, there are others where the proportion of flat-roofed buildings is likely around half or more.

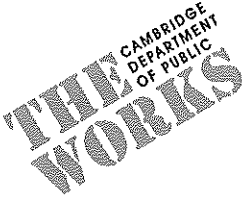
Therefore, the actual number of affected properties throughout the city is likely to be greater than 1,000, possibly numbering between 2,000 and 3,000.

Alternative Incentives

Allowing an increase in allowed height and floor area to build an additional story on existing residential buildings would be a substantial benefit to property owners. The cost and disruption that would be required to modify an existing drain line would also be substantial, but many property owners may be enticed to make those improvements given the increase in value that would result. However, as the Planning Board noted in its discussion, allowing ten-foot increases in height would potentially have negative impacts not just on abutters, but on the character of entire neighborhoods where there is currently a uniform prevailing height.

One possibility that was raised is the allowance of usable decks or green spaces on rooftops. Such spaces are currently allowed under zoning. However, usable open spaces that are located above the second floor of buildings are counted as Gross Floor Area (GFA) on the lot, and therefore owners typically do not provide such spaces in favor of maximizing the GFA provided within the building. Also, roof decks usually require a stairway and headhouse for users to access them, which are not exempt from height limitations and therefore can be an impediment to building a roof deck. In situations where owners have sought zoning relief to build roof decks, neighbors have often opposed the request because of concerns about noise and privacy impacts.

Aside from relief on height, floor area or rooftop open space, it is difficult to conceive of a zoning incentive that would be appropriate to the type of modification that is desired. Possibly, a few feet of additional height could be granted to facilitate the improvement of roof drainage systems while providing more spacious top floors and possibilities for skylighting without having to seek a variance. This would provide some modest benefit to property owners while minimizing potential impacts on direct neighbors and avoiding the overall impacts of increased floor area within neighborhoods. However, it is possible that the increased value of additional height without additional floor area would not be sufficient to offset the cost of the improvements.



June 18, 2013

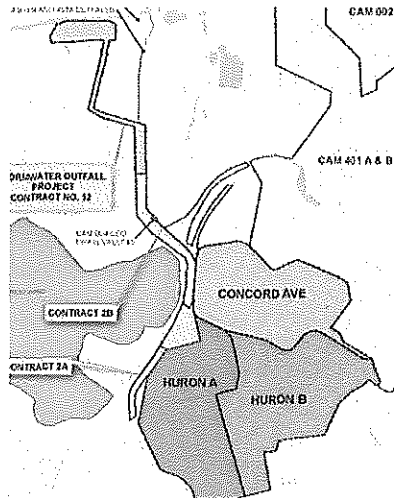
To: Brian Murphy,
Assistant City Manager for Community Development

From: Owen O' Riordan
City Engineer

Re: Flat Roof Zoning Petition

I have been asked to provide comments on the zoning change proposed vis-à-vis flat roofs that contribute extraneous stormwater discharge to the City sewer systems. At the outset it should be stated that the Department of Public Works is broadly supportive and wants to encourage, to the extent that it is reasonable, the elimination of all sources of extraneous flow to our municipal sewer system. Extraneous flow, be it from rainfall or groundwater, contributes to combined sewer overflows polluting our rivers and streams. It is also causative of sanitary sewer overflows and back-ups into homes and basements causing public health issues for homeowners and businesses. Finally, every drop of additional water discharging to our sewer systems has to be paid for, as the Massachusetts Water Resources Authority wholesale charges are partially based on flow received from contributing communities.

The municipal drainage system in Cambridge was originally constructed as a combined sewer system. The City has a well established program to separate sewer and drainage lines throughout the City. At this time approximately 65% of the municipal system continues to function as a combined sewer system. The Department of Public Works is presently in the middle of a large program in the Alewife watershed to separate the combined sewer system. After the work in this neighborhood is completed the number of times combined sewerage discharges (CSOs) to the Alewife and volume associated with these occurrences will be reduced from 60 times a year to 7 times per year and from 50 million gallons per year to 7.8m gallons per year respectively. The reductions achieved as a result of this effort will meet the Environmental Protection Agency (EPA) goals for combined sewer overflow control for the Alewife Brook. The analysis completed in designing the new separate systems in this watershed provides some details that assist in illuminating the issues that are the subject of this petition, but given the different goals associated with the sewer separation project and the zoning petition the data may be insufficiently detailed to answer all questions that may be asked.



Alewife Sewer Separation Program

A twin goal for the City in completing this work is to improve sewer and stormwater service levels in these areas. As a result of an incremental analysis the City determined that in order to achieve the CSO standards demanded and to eliminate sewer system back-ups except in the most extreme circumstances it will be necessary to eliminate 75% of the private sources on inflow to the municipal sewer system. After completing a house to house inspection of 90% of the 690 properties in the watershed area associated with this program we have identified those properties where inflow removal is both cost effective and minimally disruptive to residents. To that end 176 properties have been targeted for inflow removal, none include properties where stormwater and sanitary waste combine in one pipe stack constructed through the center of the property.

The attached maps illustrate the extent of the investigations completed by DPW as part of this effort. We have identified sixty seven (67) flat roof buildings within the overall area. Of those buildings forty eight (48) have two internal pipe systems, one for sanitary waste and one for rainfall conveyance. Of the forty eight buildings identified with two pipe systems, thirty one (31) have been selected for inflow removal. Of the nineteen (19) buildings with a single stack conveying stormwater and sanitary waste in one pipe down through the building, none of these have been selected for sewer separation. These buildings were not selected due to the significant work required to either internally separate these pipes or reconstruct the pitch of the roofs.

In summary, The Department of Public Works is not opposed to this petition; removing stormwater from sewer systems is an important goal of the City. However, we recognize that there are complexities associated with this proposal. The City expects to achieve a level of inflow removal in the Alewife watershed to meet the requirements of our EPA permit for CSO control. This will be achieved by completing a sewer separation program throughout the neighborhood which will include eliminating approximately 75% of the private sources of stormwater and groundwater inflow to our sewer systems. None of the private properties identified for inflow removal are of the type which is the subject of this petition. The primary reasons for not including these properties are that the work required to internally separate the systems is too expensive and the work would be too disruptive to those living in these buildings.

cc: Lisa Peterson; Commissioner of Public Works

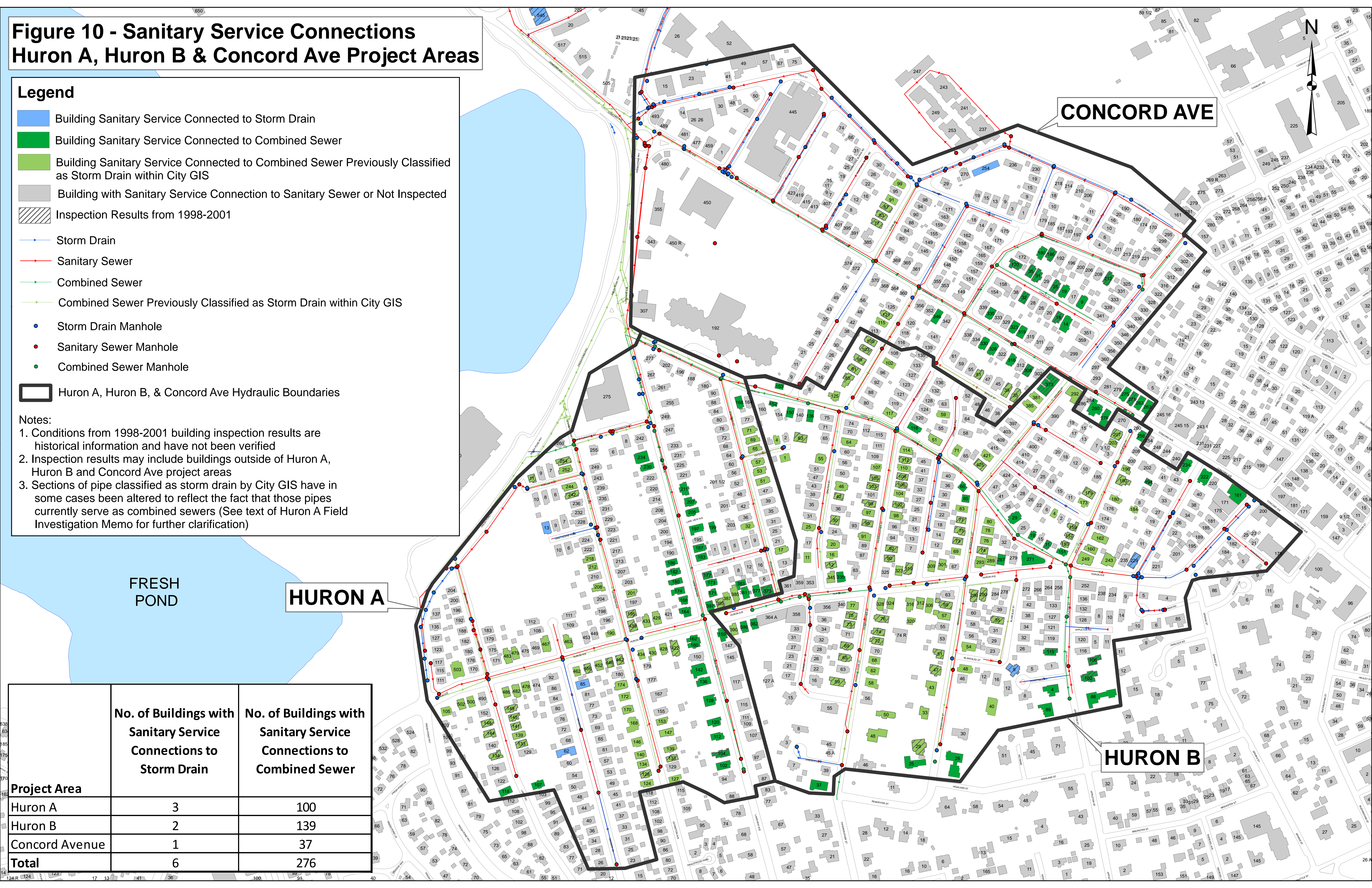
Figure 10 - Sanitary Service Connections Huron A, Huron B & Concord Ave Project Areas

Legend

- Building Sanitary Service Connected to Storm Drain
- Building Sanitary Service Connected to Combined Sewer
- Building Sanitary Service Connected to Combined Sewer Previously Classified as Storm Drain within City GIS
- Building with Sanitary Service Connection to Sanitary Sewer or Not Inspected
- Inspection Results from 1998-2001
- Storm Drain
- Sanitary Sewer
- Combined Sewer
- Combined Sewer Previously Classified as Storm Drain within City GIS
- Storm Drain Manhole
- Sanitary Sewer Manhole
- Combined Sewer Manhole
- Huron A, Huron B, & Concord Ave Hydraulic Boundaries

Notes:

1. Conditions from 1998-2001 building inspection results are historical information and have not been verified
2. Inspection results may include buildings outside of Huron A, Huron B and Concord Ave project areas
3. Sections of pipe classified as storm drain by City GIS have in some cases been altered to reflect the fact that those pipes currently serve as combined sewers (See text of Huron A Field Investigation Memo for further clarification)



Project Area	No. of Buildings with Sanitary Service Connections to Storm Drain	No. of Buildings with Sanitary Service Connections to Combined Sewer
Huron A	3	100
Huron B	2	139
Concord Avenue	1	37
Total	6	276

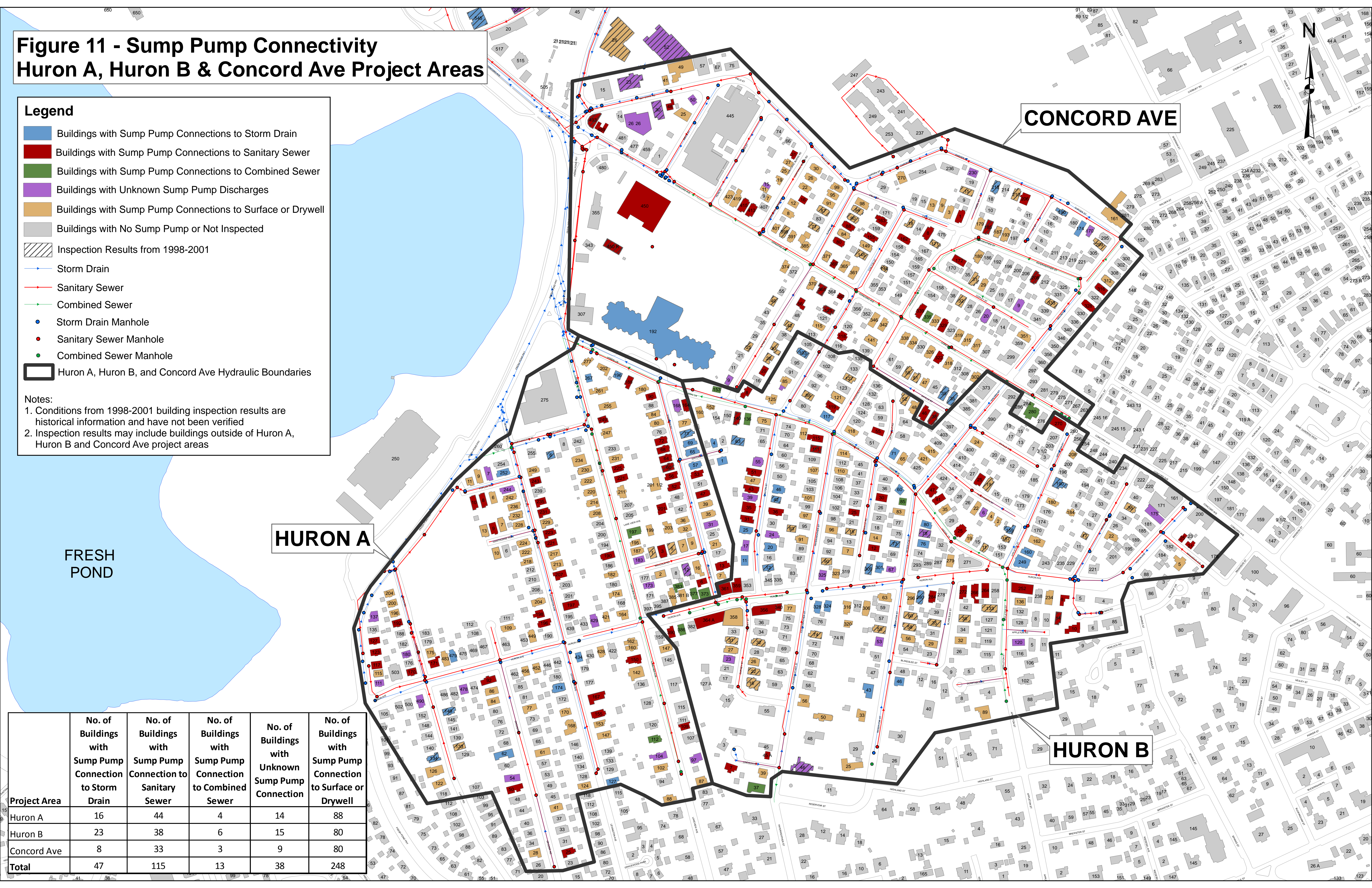
**Figure 11 - Sump Pump Connectivity
Huron A, Huron B & Concord Ave Project Areas**

Legend

- Buildings with Sump Pump Connections to Storm Drain
- Buildings with Sump Pump Connections to Sanitary Sewer
- Buildings with Sump Pump Connections to Combined Sewer
- Buildings with Unknown Sump Pump Discharges
- Buildings with Sump Pump Connections to Surface or Drywell
- Buildings with No Sump Pump or Not Inspected
- Inspection Results from 1998-2001
- Storm Drain
- Sanitary Sewer
- Combined Sewer
- Storm Drain Manhole
- Sanitary Sewer Manhole
- Combined Sewer Manhole
- Huron A, Huron B, and Concord Ave Hydraulic Boundaries

Notes:

1. Conditions from 1998-2001 building inspection results are historical information and have not been verified
2. Inspection results may include buildings outside of Huron A, Huron B and Concord Ave project areas



Project Area	No. of Buildings with Sump Pump Connection to Storm Drain	No. of Buildings with Sump Pump Connection to Sanitary Sewer	No. of Buildings with Sump Pump Connection to Combined Sewer	No. of Buildings with Unknown Sump Pump Connection	No. of Buildings with Sump Pump Connection to Surface or Drywell
Huron A	16	44	4	14	88
Huron B	23	38	6	15	80
Concord Ave	8	33	3	9	80
Total	47	115	13	38	248

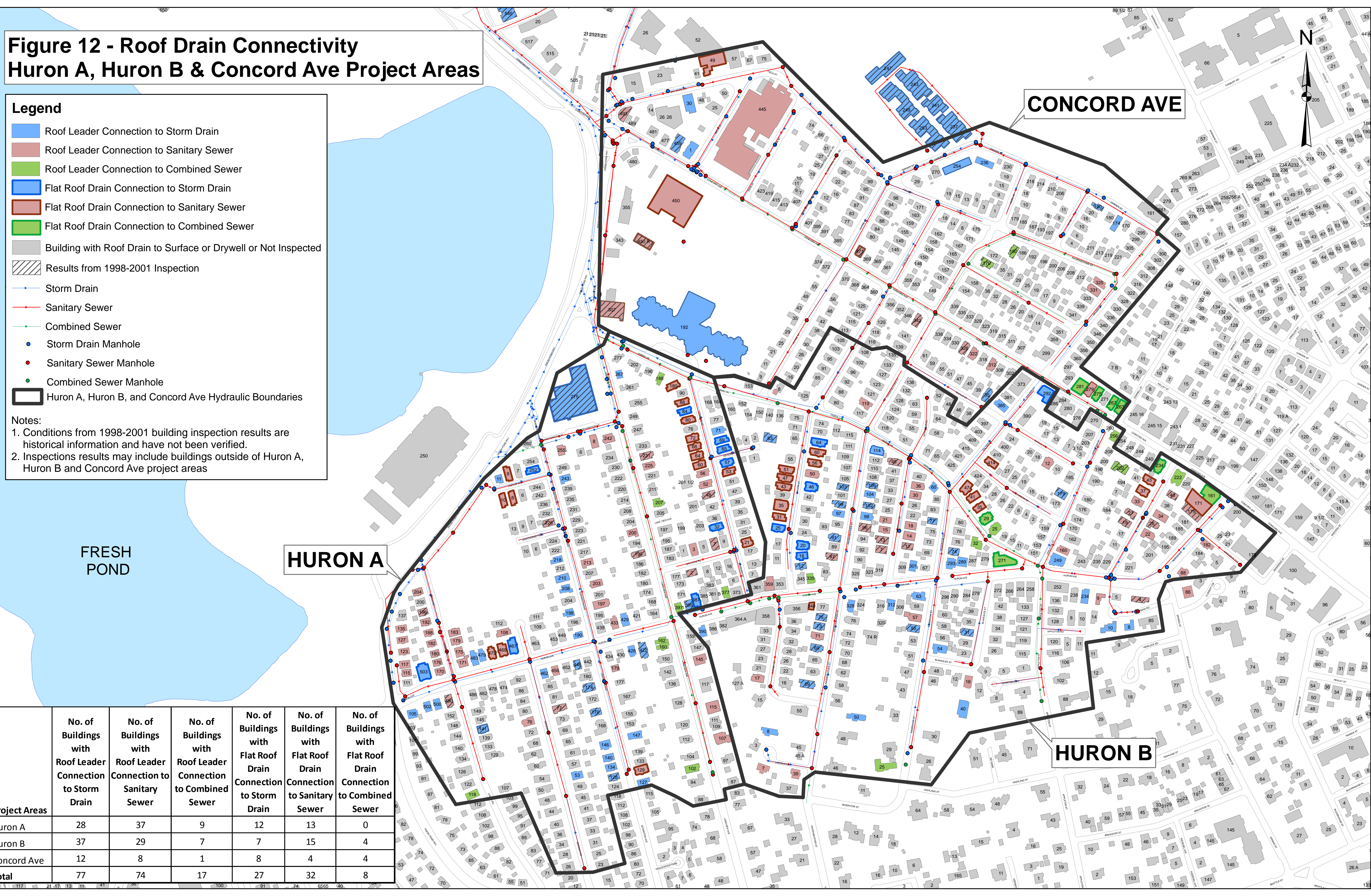
**Figure 12 - Roof Drain Connectivity
Huron A, Huron B & Concord Ave Project Areas**

Legend

- Roof Leader Connection to Storm Drain
- Roof Leader Connection to Sanitary Sewer
- Roof Leader Connection to Combined Sewer
- Flat Roof Drain Connection to Storm Drain
- Flat Roof Drain Connection to Sanitary Sewer
- Flat Roof Drain Connection to Combined Sewer
- Building with Roof Drain to Surface or Drywell or Not Inspected
- Results from 1998-2001 Inspection
- Storm Drain
- Sanitary Sewer
- Combined Sewer
- Storm Drain Manhole
- Sanitary Sewer Manhole
- Combined Sewer Manhole
- Huron A, Huron B, and Concord Ave Hydraulic Boundaries

Notes:

1. Conditions from 1998-2001 building inspection results are historical information and have not been verified.
2. Inspections results may include buildings outside of Huron A, Huron B and Concord Ave project areas



Project Areas	No. of Buildings with Roof Leader Connection to Storm Drain	No. of Buildings with Roof Leader Connection to Sanitary Sewer	No. of Buildings with Roof Leader Connection to Combined Sewer	No. of Buildings with Flat Roof Drain Connection to Storm Drain	No. of Buildings with Flat Roof Drain Connection to Sanitary Sewer	No. of Buildings with Flat Roof Drain Connection to Combined Sewer
Huron A	28	37	9	12	13	0
Huron B	37	29	7	7	15	4
Concord Ave	12	8	1	8	4	4
Total	77	74	17	27	32	8