



City of Richmond

Report to Committee  
TO Planning - Jul 22, 2008

To: Planning Committee  
From: Brian J. Jackson, MCIP  
Director of Development  
Re: Green Roofs

Date: July 3, 2008  
File: 08-4040-07-01  
Xr: 12-8360-03-02-01

Staff Recommendations

1. That the "Point System Option With No Specified Variance Process" approach, as outlined in the report dated July 3, 2008 from the Director of Development, be endorsed by Council for industrial and office building permit applications outside the City Centre having a building area of over 2,000 m<sup>2</sup> (21,529 ft<sup>2</sup>) received after January 1, 2009.
2. That a bylaw formalizing option 3 be brought forward for consideration in September 2008.
3. That staff continue to consult with the National Association of Industrial and Office Properties (NAIOP) and the Urban Development Institute (UDI) regarding the draft bylaw in July and August 2008.

Brian J. Jackson, MCIP  
Director of Development

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| ROUTED TO:                          | CONCURRENCE   | CONCURRENCE OF GENERAL MANAGER |   |
| Law .....                           | Y <input checked="" type="checkbox"/> N <input type="checkbox"/>    |                                |   |
| Building Approvals .....            | Y <input checked="" type="checkbox"/> N <input type="checkbox"/>    |                                |   |
| Policy Planning .....               | Y <input checked="" type="checkbox"/> N <input type="checkbox"/>    |                                |   |
| Environmental Programs .....        | Y <input checked="" type="checkbox"/> N <input type="checkbox"/>    |                                |   |
| Engineering .....                   | Y <input checked="" type="checkbox"/> N <input type="checkbox"/>    |                                |   |
| Fire Rescue .....                   | Y <input checked="" type="checkbox"/> N <input type="checkbox"/>    |                                |   |
| REVIEWED BY TAG                     | YES <input checked="" type="checkbox"/> NO <input type="checkbox"/> | REVIEWED BY CAO                | YES <input checked="" type="checkbox"/> NO <input type="checkbox"/> |

## Staff Report

### Origin

#### Planning Committee Referral

At its April 3, 2007 meeting, Planning Committee passed the following referral motion:

*"That staff study what projects are already being undertaken in the City with regard to functional green roofs, and that the study include investigation as to whether construction costs differ for a roof capable of holding a thick layer of soil rather than a thin layer of soil."*

#### Purpose of this Report

The purpose of this report is to:

- 1) Respond to the referral motion of Planning Committee;
- 2) Provide a comprehensive report on all aspects of green roofs;
- 3) Present three different options with regard to green roofs; and
- 4) Recommend an option that has been discussed with the National Association of Industrial and Office Properties (NAIOP) and the Urban Development Institute (UDI).

#### Report by IBI Group/Busby Perkins + Will

In order to assist with the investigation into green roofs, staff utilized the services of the IBI Group and Busby Perkins + Will. Their report, completed in November 2007, examined the opportunities, benefits, challenges and best practices associated with mandating green roofs as well as the LEED (Leadership in Energy and Environmental Design) Green Building Rating System and a minimum site permeability for development within the City Centre Area Plan (CCAP).

### Findings Of Fact

#### What is a "green roof"?

"Green roof" means an engineered roofing system that allows for the propagation of rooftop vegetation and the retention of storm water while maintaining the integrity of the underlying roof structure and membrane.

Green roofs can generally be categorized as being either "extensive" or "intensive".

Extensive green roofs typically having a growing media (or soil) depth of 1 to 6 inches, can be thought of extensively covering the roof's surface, are often planted with sedums and grasses because of their ability to withstand drought and excess water, and are suitable on commercial, industrial and office buildings because the roof does not need to be as well maintained.

Intensive green roofs usually have a growing media (or soil) depth greater than 6 inches, can be thought of needing more intensive maintenance, are typically planted with trees and other substantial planting that will require greater maintenance and irrigation, and are reported to function well in health care scenarios such as healing centres or as residential community gardens.

### What are the objectives of a "green roof"?

Green roofs can provide a variety of socio-environmental and economic benefits. The type of benefit and extent to which is achieved, however, varies depending on a number of considerations, including the green roof design, long-term maintenance practices, nature of the building, site-specific conditions of the area and city-wide extent of coverage.

Key potential benefits include:

1) Storm Water Management

A green roof can mitigate storm water runoff and overall peak water quantity during a storm event and reduce the amount of storm water entering a municipality's storm drainage system.

2) Energy Savings

A green roof can lead to energy savings if a building has a traditional heating and cooling system. This in turn can reduce greenhouse gas emissions.

3) Urban Heat Island Effect

A green roof can help to minimize the impact on the microclimate. Most cities contain a high percentage of dark, heat absorbing surfaces that result in higher temperatures within urban centres (i.e., urban heat island effect).

4) Local Food Production and other Community Amenities

A green roof can be used as an outdoor amenity area, public open space and potential urban agriculture (e.g., garden plots).

5) Aesthetics and other Values

A green roof can enhance views where dwelling units and offices overlook the roofs. It could also be an attractive feature for travellers on bridges, rapid transit and aircraft. Green roofs last up to twice as long as regular roofs, reducing operational costs, resource consumption and waste generation.

Of these benefits, it is staff's assessment that stormwater management is a primary objective given the level of performance that well-designed and maintained green roofs are able to achieve in mitigating peak flows and reducing runoff flows. This assessment is supported by NAIOP and UDI.

### What projects have already undertaken functional green roofs in Richmond?

There are a number of examples of green roofs in Richmond or roofs that function similar to a green roof.

Public buildings: Both the Sea Island and Hamilton Fire Halls have successfully incorporated green roofs into their design.

Private buildings: Two commercial projects in Richmond include green roofs. A portion of the BMW dealership on Cambie Road has green roof plantings on it. The lower roof on the hotel being built as part of the residential development by Wall Financial on Corvette Way will incorporate a green roof. (The proposed addition to the La Quinta Inn on Alexandra Road will include a green roof if it proceeds).

Most concrete, high rise residential buildings contain a roof over the parking podium that functions like a green roof (i.e., they are landscaped and provide common, outdoor amenity space to the residents). Excellent examples of this are the new mixed use, residential buildings currently being constructed near the corner of No. 3 Road and Westminster Highway. The common outdoor space is a garden terrace with soil depths between 1½ to 2 inches and includes a perennial garden adjacent to the five (5) seniors' units. Furthermore, the roof above the seniors' units, the amenity rooms and the residential units along Westminster Highway are proposed to be treated with a layered roofing system that includes waterproof and root-resistant membranes, a drainage system and a soil depth between 3 to 6 inches.

To date, there have been no green roofs built on industrial or office buildings in Richmond.

What are the construction costs of a "green roof"?

Staff did pursue the notion of a green roof on a small industrial building at the corner of No. 5 Road and Rice Mill Road. On this development variance permit, the applicant advised that the green roof would cost an extra \$13.45 per square foot over and above the typical cost for a standard roof, which translated into an extra \$100,000 to the cost of the project. The owner could not absorb the anticipated cost of the green roof, plus the insurance required.

The Beedie Group, a major industrial developer in the lower mainland, has estimated the costs associated with installation of a green roof in a Port Coquitlam project to be approximately \$10 per square foot more than a conventional roof (i.e., approximately \$5.6 million more). This high cost relates to the extremely large size of the building.

Representatives from NAIOP and UDI have advised that a green roof could add up to 25% to the total cost of an industrial building and have warned the City that this could make industrial development in Richmond cost prohibitive.

What are the benefits of a "green roof" to the developer, future owners and the City?

When enacting its Green Roof Bylaw, the City of Port Coquitlam estimated that the higher cost of installing a green roof would be approximately 10% and that this could be recovered within the first two (2) years of the building operation with energy savings (i.e., the green roof reduces the heating and cooling costs – e.g., in the summer the green roof protects the building from direct solar heat and in the winter the green roof minimizes heat loss through added insulation to the roof).

Based on discussions with NAIOP and UDI, staff believe that this cost savings may be the case with multiple storey office buildings but not with single storey industrial and big box commercial buildings. Specifically, the energy savings would not offset the cost of a green roof if the building does not have normal heating or air conditioning systems.

Another benefit of a green roof to the future owners is that it typically lasts twice as long as a traditional roof because the temperature is regulated. So the roof will not have to be replaced or repaired as frequently, and thus its lifecycle cost is considered to be competitive by most analyses. However, NAIOP and UDI have indicated that this will not be a critical feature when marketing small industrial units to potential rental tenants or future owners.

One of the major benefits of a green roof to the City is that the storm water reductions would continue for the life of the building. It should be noted that according to research conducted

at the Green Roof Research Facility at the British Columbia Institute of Technology, a green roof with a media depth of 3 inches will retain more storm water than a green roof with a media depth of 6 inches. This is in a large part due to the frequency of storm events in the Lower Mainland, which make a thin layer of soil dry more quickly between storm events causing it to be more adept at retaining water. This is an important research finding as it reveals that an extensive green roof (1-6 inches) is sufficient to manage storm water in the Metro Vancouver area.

One of the concerns expressed by NAIOP and UDI is that the storm water reductions should be reflected in the off-site storm drainage requirements. It is recommended that the Engineering Department review these requirements within 2 years once the City has had the opportunity to monitor and review the success of the green roof or other chosen alternatives.

What has Port Coquitlam's experience been with regard to its Green Roof Bylaw?

The City of Port Coquitlam is the only municipality in Canada that has enacted a green roof bylaw. Richmond staff have met with staff from Port Coquitlam to discuss their experience.

Port Coquitlam's bylaw applies to commercial and industrial buildings having a building area of 5,000 m<sup>2</sup> (53,821 ft<sup>2</sup>) or more. It does not apply to multiple-family residential buildings. The type of green roof Port Coquitlam envisions being installed on commercial and industrial buildings is an extensive green roof, which does not allow for public use and is less costly.

Port Coquitlam's bylaw includes a "meet or beat" variance that may be approved by Council when a business case demonstrates that the green roof may not work for a particular development (e.g., large, unheated industrial storage building). This enables their Council to consider the environmental and social benefits while still meeting economic viability (i.e., a "win-win" variance process allowing for sustainable site design, new jobs and tax revenue).

Port Coquitlam Council recently approved a variance for the Beedie Group, which would have been the first industrial building that would have required a green roof. The applicant agreed to "meet or beat" the green roof requirements through a variety of alternative means (e.g., installing a subsurface dispersion field and a rain garden; increasing the standard of insulation; using natural daylighting; installing a geoexchange heating and cooling system for the office area; using a non-standard, light color gravel ballast roof; providing a more intense and biodiverse habitat within small landscaped areas; planting additional trees to aid in screening).

To-date, no green roofs have been established as a result of Port Coquitlam's Green Roof Bylaw.

Are there insurance concerns with regard to green roofs?

Insurance concerns have been expressed regarding green roofs on residential buildings.

In April 2007, Canada Mortgage Housing Corporation (CMHC) sent a letter to municipalities in B.C. warning them of insurance issues with regards to green roofs on condo developments and municipalities mandating them on residential projects.

In September 2007, the Homeowner Protection Office (HPO) Green Roof Task Force advised local governments against mandating extensive green roofs in residential construction. Of major concern was whether or not the warranty providers would cover the roofs and whether the developer would get HPO sign off.

Currently, 3 of the 4 insurance providers will offer insurance for strata market residential buildings with green roofs. They will assess on a case-by-case basis whether the roof and envelope are approved by the insurance provider's engineering team. The insurer may or may not require that the developer's envelope consultant be one "approved" by the insurer.

To date, staff have not received any evidence or heard from the insurance industry to verify that there are insurance concerns for commercial, industrial and office buildings who install green roofs. Staff have also contacted the HPO and been advised that their position only relates to residential construction (and may change in the future depending on the insurance providers).

It is not known whether the insurance for a green roof may be higher, the same or lower than for standard industrial roofs.

How does the new Building Code affect "green roofs" and their objectives?

The Province has recently enacted new "green" requirements in the BC Building Code. Specifically, there are new energy efficiency requirements (e.g., insulation standards) for single-family houses and smaller multiple-family residential, commercial and industrial buildings. Similarly, there are new energy efficiency requirements (e.g., heating, refrigeration and air conditioning standards) for high rise multiple-family residential buildings and larger industrial, commercial and institutional buildings. Finally, there are also new water efficiency requirements (e.g., ultra low-flow toilets and other water-saving plumbing fixtures and fittings) in new construction and renovations. All of these new requirements are effective September 5, 2008.

It has been estimated that the energy cost savings of these new requirements will be between 12% to 30% depending on the type of construction. Furthermore, the greenhouse gas emission reductions have been estimated to be between 15% to 22% from the current Building Code. As a result of these benefits, staff do not believe that energy savings should be a primary objective for green roofs in Richmond.

What other initiatives is the Province pursuing that affect "green roofs" and their objectives?

The Province has also enacted "green communities" legislation (Bill 27) which helps local governments contribute to the Provincial goal of reducing greenhouse gas emissions 33% below current levels by 2020. This new legislation requires local governments to include greenhouse gas emission targets, policies and actions in their Official Community Plan (OCP) and Regional Growth Strategy (RGS). It also enables municipalities to use a development permit (DP) to promote energy and water conservation and the reduction of greenhouse gases.

Richmond has signed the British Columbia Climate Action Charter. This Charter is a non-legally binding statement which seeks a voluntary commitment from the City for the following three goals: (1) becoming carbon neutral in respect to the City's operations by 2012; (2) measuring and reporting Richmond's greenhouse gas emissions profile; and, (3) creating a complete, compact, more energy efficient community. Council has also adopted a comprehensive Climate Change Response Agenda. At this time, staff are not recommending that green roofs be used to meet the energy savings and greenhouse gas emission reductions envisioned by the Province.

## Analysis

### What type of buildings should the City consider "green roofs"?

Planning staff recommend that green roofs apply to industrial and commercial buildings outside of the City Centre which are larger than 2,000 m<sup>2</sup> (21,529 ft<sup>2</sup>). This is based on the following considerations:

- City Centre buildings are being addressed by LEED silver requirements, inclusive of stormwater management and urban heat island requirements;
- green roofs should not be applied to wood-frame residential developments due to insurance and liability issues;
- concrete-based residential and mixed use developments can be effectively managed under the City's existing DP process which provides a management tool for addressing roof use and landscape treatment; and
- the City's DP process does not cover all industrial and office developments.

Council has adopted a Sustainable High Performance Building Policy for new City buildings. According to this Policy, a building size threshold of 2,000 m<sup>2</sup> (21,529 ft<sup>2</sup>) is used to determine which City buildings have to meet the LEED Green Building Rating System. It is recommended that this same threshold be used for private developments when determining whether or not a green roof should be required.

In recognition of the CMHC and HPO concerns, staff are not proposing that green roofs be installed on wood frame apartments and townhouses (it is also difficult to put a green roof on a pitched roof). So, as far as residential development is concerned, staff believe green roofs should only be considered on multiple-family residential buildings involving concrete construction (e.g., buildings over 4 – 6 storeys, that is, the typical concrete high rise built in Richmond). This being the case, the green roof would be located on the parking podium - not on the roof of the residential tower in order to avoid insurance and liability concerns.

Green roofs should be considered on all non-residential buildings – i.e., commercial, office, industrial and institutional buildings (and mixed use buildings containing any of these uses).

### How are "green roofs" being addressed in the City Centre?

As part of the update of the CCAP, policies are proposed to require that rezoning applications involving private developments over 2,000 m<sup>2</sup> (21,529 ft<sup>2</sup>) received after January 1, 2009 meet LEED Silver. Furthermore, to specifically address the storm water management and urban heat island effect objectives of green roofs, these rezoning applications are also required to meet the LEED Storm Water Management Credit and the LEED Urban Heat Island Effect: Roof Credit.

Staff are bringing forward new Development Permit (DP) Guidelines for the CCAP. These guidelines address the aesthetics objective of green roofs (e.g., overlook issues; the appearance of roofs from bridges, rapid transit and aircraft). Similarly, the proposed new CCAP will address both in policy and DP guidelines other values and objectives of green roofs (e.g., reinforces the use of parking podiums as green outdoor amenity areas and

encourages the additional provision of this space as urban agriculture such as garden plots and similar activities).

Therefore, staff believe that the concept of green roofs and their objectives are adequately addressed in the proposed new CCAP.

How are “green roofs” addressed outside the City Centre?

According to the existing OCP, all multiple-family residential, commercial and mixed use (where residential and non-residential uses are combined on a site) developments throughout the City have to go through the DP process. As such, they are reviewed with regard to their roof treatment and landscaping provisions.

Similarly, projects that require rezoning are reviewed by staff and Council. In doing so, the City can determine the land use, density, site coverage, landscaping, parking and other aspects of the development. Included in this determination is the ability to consider the design of the building and conditions under which to rezone a property.

Under the Local Government Act, Council cannot require a DP for institutional developments (e.g., churches, schools, government buildings). This being the case, it would appear that the Province does not want municipalities to control the “form and character” of these types of developments. Although the City could review the need for a green roof at the time of rezoning, it is not proposed to consider this as a requirement for institutional building permits. This could be reviewed in the future.

The one area that does need to be addressed outside the City Centre is industrial and office developments (e.g., buildings that contain offices or a combination of industrial/office space). At present, the OCP only requires a DP for these developments if the industrial site is adjoining or within 30 m to another site which is zoned or designated residential, community institutional, public and open space, school or park use or to the edge of the Agricultural Land Reserve.

So, it is recommended that the consideration of green roofs be focussed on industrial and office buildings. This is the one area which is not being addressed through the rezoning or development permit processes. In order to provide the development and design community some time to adjust to any new requirements, an implementation date of January 1, 2009 is proposed.

Are “green roofs” being pursued on Federal lands?

One of the concerns that NAIOP and UDI have pointed out is that industrial and office buildings on the lands owned by the Vancouver Fraser Port Authority and Vancouver International Airport Authority (VIAA) do not have to go through the City’s building permit process. To them, this does not create a “level field” with regard to all proposed new green roofs (i.e., the cost of building an industrial or office building will be higher in the rest of Richmond).

This may be true – but it equally applies to all development on the Federal lands (e.g., they do not have to go through the City’s approval process nor pay the same fees as elsewhere in Richmond). Because the City cannot impose its requirements on Federal lands this is a legislative reality in Richmond.



This is not to say that the Vancouver Fraser Port Authority and VIAA do not institute their own environmental or sustainability objectives on developments on their lands. City staff could certainly advise both Federal organizations of our green roof objectives and seek to include them in any protocol agreements we may jointly have. In summary the private sector will be required to assist in addressing the green roof issue.

What objectives should be pursued for “green roofs” on industrial and office buildings outside the City Centre?

As noted previously, the storm water management objective is generally agreed to be the primary reason for a green roof. This is especially the case in Richmond because of our floodplain location, low elevation and since most industrial areas are occupied primarily by buildings and hard surfaces such as parking, loading bays and, where permitted, outside storage.

The energy savings (greenhouse gas emission reduction) objective appears to be adequately addressed at this time by the new BC Building Code and should await further analysis arising from the green communities legislation.

The urban heat island effect is not a big issue outside the City Centre. The industrial and office buildings are built at lower densities which will not impact the microclimate or create higher temperatures.

Similarly, the aesthetics of a green roof is not a major issue outside the City Centre. There is little opportunity for dwelling units or offices to overlook roofs because the area generally has lower building heights. Furthermore, the only area outside the City Centre where travellers overlook industrial and office buildings is the Knight Street Bridge (e.g., Mitchell Island and Bridgeport Road). It is suggested that this be a specific area where aesthetics be an objective rather than applying it everywhere in Richmond.

**Options**

Staff have identified three options for Council’s consideration. Each one has been discussed with the NAIOP and UDI. They appear most likely to accept Option 3 “Point System Option With No Specified Variance Process”. With all three options, we would like to pursue cash in lieu that could be considered where instead of doing on-site improvements the developer could pay towards off-site works and land acquisitions. Discussions between now and the final report with legal staff would be required with respect to this component of the strategy.

**Option 1: Prescriptive Option With Specified Variance Process**

Under this option, green roofs would be required on at least 75% of the area of the roof that is not occupied by mechanical equipment. It is called the “prescriptive” option because it stipulates that green roofs be the required means to meet the objectives of storm water management. This option would be added to the Zoning and Development Bylaw in order to consolidate these requirements into a single bylaw and would be subject to a Public Hearing.

As requested by UDI a variance process is proposed, and because the requirements for the variance are specified in the proposed bylaw amendment, a DP would be required. Essentially, Council could vary the requirement for a green roof where the applicant can demonstrate that an alternative storm water management system will “meet or beat” the storm water runoff from a green roof, and if the local food production and other community amenities

of a green roof are provided elsewhere on the property. Provision would also be made for Council to be able to vary the 75% requirement where the building contains more than one (1) storey, the roof is stepped back in order to promote sunlight access or other architectural benefits, and the roof does not have a building area of 2,000 m<sup>2</sup> (21,529 ft<sup>2</sup>).

If this option is accepted, the variance process would require changes to the Development Permit sections of the OCP.

#### Pros

- Prescribes the solution (green roofs)
- Gives the authority to Council to consider variances
- Provides certainty and discretion for the City
- Should result in the provision of more green roofs
- Included in the Zoning and Development Bylaw and subject to a Public Hearing

#### Cons

- The prescribed solution (green roofs) is costly
- Adds a new process (DP) for industrial developers
- Creates uncertainty to the development and investment community (due to discretion)
- May cause industrial and office development to look elsewhere
- Does not stimulate other objectives and solutions
- Changes can not be made as easily to the Zoning and Development Bylaw

#### **Option 2: Target Option With No Specified Variance Process**

Under this option, targets would be set by the City for the storm water management objective and the local food production and other community amenity values objective. Specifically, a target of decreasing the quantity of storm water runoff by at least 25% would be established based on the LEED Storm Water Management Credit. Similarly, based on the OCP DP Guideline that 25% of a site be landscaped, and assuming that approximately 5% of a typical industrial site is landscaped, a target of increasing the amount of green building and/or site area by at least 20% is proposed in order to meet the local food production and other community amenities objective. Again, it is proposed to include this option in the Zoning and Development Bylaw.

This option would establish the targets but leaves it up to the developer as to how that target will be met. One way to meet the target is to install a green roof. How much of a green roof will vary depending on the site, but probably will range between 20% to 75% of the roof surface. Other options could include collecting the roof runoff and using it for on-site irrigation or other purposes, installing a rain garden to manage surface runoff or increasing the amount of permeable paved areas. Staff would decide whether the applicant has adequately met the targets that have been put into the Zoning & Development Bylaw. There is no specified variance process because it is assumed that the target would be met. Should the applicant not be able to meet the target, a Development Variance Permit (DVP) application would be required, which Council would have to approve.

**Pros**

- Establishes targets for storm water management and local food production and other community amenities
- Provides flexibility as to how those targets will be met
- Provides certainty and discretion to the development community
- Consistent with the approach used by the Building Code (prescribe the standard but allow it to met with equivalencies)
- Included in the Zoning and Development Bylaw and subject to a Public Hearing

**Cons**

- Council does not decide whether or not a green roof will be provided
- Staff will have to rely on the applicant's consultants to verify that the proposed means to meet the targets are adequate
- May not result in the construction of very many green roofs
- There is no specified variance process in the proposed bylaw
- Changes cannot be made as easily to the Zoning and Development Bylaw

**Option 3: Point System Option With No Specified Variance Process*****RECOMMENDED***

Under this option, targets would be enacted in a separate bylaw (not the Zoning and Development Bylaw in order to provide more flexibility for future improvements and to avoid having to go to a Public Hearing each time.). In order to meet these targets, industrial and office building permits would have to come up with 100 points. This point system would be described in the bylaw.

In drafting the point system, staff have identified a number of sustainability measures from which the developer may choose. Applicants would submit a letter by an environmental consultant to the Building Department indicating their score and how they arrived at 100 points. If an applicant can not reach 100 points or if they want to pay cash in lieu of the points, a Development Variance Permit (DVP) would be required. However, the bylaw does not specify the conditions under which Council would consider a variance. This is why this option is called the "point system option with no specified variance process".

The measures most desired by the City, such as methods to reduce storm water runoff, would score the most points. For example, a building would score 100 points if it has a green roof on 75% of the roof, if it was LEED Silver certified or if 100% of the parking was provided on the roof and additional landscaping was located on the ground. Fewer points would be awarded for other measures, with the weight of each being decided by the City based on its priorities or preferences.

Staff are still working on the details of the point system with NAIOP and UDI. A great deal of rigour will be required in defining the point system and its implementation. If Council supports this option, the final bylaw will be presented to Council in September 2008 for consideration. Since a Public Hearing is not required, the bylaw could be adopted within two regular Council meetings.

With time and experience, other criteria could be added to the point system. For example, perhaps points should be awarded to an industrial or office building that provides car pool and other incentives to its employees in order to reduce the parking requirements and increase the amount of on-site landscaping. For this reason, it is recommended that Transportation staff review off-street parking requirements outside the City Centre within the next 2 years, possibly as part of the OCP review process.

#### Pros

- Identifies the City's priorities including the reduction of storm run-off and encourages green roofs, LEED Silver and rooftop parking along with increased landscaping on the ground as preferred outcomes
- Provides certainty, tailoring and discretion to both the development community and City
- Enables other objectives (alternative, renewable energy sources; roof water harvesting) to be pursued in addition to the storm water management
- Allows other items to be added to the bylaw without a Public Hearing

#### Cons

- City is somewhat arbitrarily prescribing and weighing the solutions
- Could result in a number of small solutions rather than a single, larger measure that has a bigger impact (e.g., four 25 point solutions vs one 100 point item)
- Not included in the Zoning and Development Bylaw nor subject to a Public Hearing

#### Cash In Lieu Considerations

Staff have identified the merits of incorporating a cash in lieu provision but the option needs to be discussed further with legal staff prior to bringing forward the recommended option. Funds generated would then be directed at acquiring and developing off site public green infrastructure (e.g., stormwater absorption/cleansing wetlands; detention ponds, etc). This approach offers benefits of economies of scale (i.e., fewer larger areas) and the opportunity to achieve a wider range of benefits (e.g., more accessible green space; multi-purpose amenities; etc.).

NAIOP and UDI, indicated support for this approach. The amount could be based on:

- the additional cost of the green roof over a standard roof (prescriptive option with specified variance process)
- the cost of meeting the target on-site or off-site (target option with no specified variance process)
- the cost of complying with the point system (point system option with no specified variance process).

#### Future/Continual Reviews

In order to monitor the success of whichever option is chosen, it is proposed that the City monitor and report back to Planning Committee and Council after the bylaw is adopted. It is proposed that this occur within 2 years in order to give the chosen option some time to be tested and measured. This assessment would look at what environmental, economic and social benefits have been obtained and their relative costs. This assessment will also evaluate how the green roof tool fits into the City's sustainability strategy, how it compares with other

tools and strategies, and what opportunities exist for program improvements (e.g., DCC cost reductions). The assessment would be undertaken with input by City staff, NAIOP, UDI and other stakeholders.

In the meantime, the City will monitor whether or not the new CCAP and existing rezoning/development permit processes outside the City Centre adequately achieve the objectives served by green roofs on multiple-family residential, commercial and institutional developments.

**Financial Impact**

None to the City of Richmond.

**Conclusion**

Planning Committee has requested that staff investigate the potential for green roofs in Richmond. With the assistance of consultants, staff have completed this investigation. Three different options have been prepared that address the objectives of a green roof. In consultation with NAIOP and UDI, staff are recommending that Option 3 - Point System Option With No Specified Variance Process be brought forward in September 2008 for approval.

Based on the Council policy for new City buildings, it is proposed that a building threshold of 2,000 m<sup>2</sup> (21,529 ft<sup>2</sup>) be used and that this apply to industrial and office buildings outside the City Centre if approved by City Council. In order to give the development and design community time to prepare for any new requirements, it is proposed that the chosen option have an effective date of January 1, 2009.



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