



## STAFF REPORT ACTION REQUIRED

### Undertaking Shade Audits at Parks, Forestry & Recreation Playgrounds and Waterplay Facilities

<b>Date:</b>	June 19, 2008
<b>To:</b>	Parks and Environment Committee
<b>From:</b>	Brenda Librecz, General, Manager, Parks, Forestry and Recreation
<b>Wards:</b>	All
<b>Reference Number:</b>	

#### SUMMARY

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The purpose of this report is to outline the proposed process for conducting pilot project shade audits at a number of Parks, Forestry and Recreation playgrounds and waterplay facilities (wading pools and splash pads). The report will identify the process to be carried out, how standards for shade provision will be applied and criteria to be used in selecting project sites across the City.

Shade audits will assess existing shade provision and patterns of use at these facilities and make recommendations for the provision of adequate shade and Ultraviolet Radiation (UVR) protection. Pilot projects will allow staff to develop a consistent set of standards and guidelines to apply to future projects, confirm a shade audit process and anticipate capital and operating costs required to plan, implement and maintain additional plantings and shade structures.

Playgrounds, splash pads, and wading pools are areas that can be of high risk for UVR exposure to vulnerable segments of the population such as children. The provision of shade, either natural (trees) or constructed (structures), should be an essential element in the planning of new and retrofitted playground and waterplay facilities. These facilities are primarily used during summer when UVR levels are at their highest, users typically wear minimal clothing and there may be high levels of indirect UVR reflected from surfaces.

A preliminary assessment of Parks, Forestry and Recreation playgrounds and waterplay facilities conducted in 2008 indicated that most of the facilities need significant improvements in the level of shade provided.

## RECOMMENDATIONS

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### **The General Manager of Parks, Forestry and Recreation recommends that:**

1. the approach to conducting shade audits, developing standards for shade provision and the criteria for selecting pilot project sites, as outlined in this report be adopted;
2. staff proceed with the selection of pilot project sites and report back on any additional resources that may be required to complete the shade audits; and
3. staff continue to work with the Shade Policy Committee led by Toronto Public Health and build on knowledge gained from the pilot projects to confirm standards for shade provision, to be used on future shade projects.

### **Financial Impact**

There are no financial impacts resulting from the adoption of this report. Future financial implications may result from consultant or staff resources needed to conduct shade audits and future Capital work required to implement improvements to facilities.

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## DECISION HISTORY

On January 23, 2007, the Parks and Environment Committee requested that the General Manager of Parks, Forestry and Recreation report on:

- Efforts being made by the Division to address the provision of shade at Parks, Forestry and Recreation sites;
- Provide information outlining the City playgrounds that have sufficient shade and those that are deficient in this area; and
- To develop a strategy for shade coverage.

<http://www.toronto.ca/legdocs/mmis/2007/pe/decisions/2007-01-23-pe01-dd.pdf>

In response to the direction from Parks and Environment Committee, an information report on the Division's shade policy guidelines was submitted to the April 10, 2007 Parks and Environment Committee. The report identified that Parks, Forestry and Recreation Division had policy guidelines in place to address shade provision wherever feasible. The report also indicated that staff were in the process of developing a strategy for conducting shade audits to assess the deficiencies that may exist at Parks, Forestry and Recreation playground facilities and would be reporting back to the Parks and

Environment Committee on the implications of undertaking this work. The report was received by the Committee.

<http://www.toronto.ca/legdocs/mmis/2007/pe/bgrd/backgroundfile-2372.pdf>

Staff prepared a report to the February 19, 2008 Parks and Environment Committee meeting. City Council of March 3, 4, and 5, 2008 adopted recommendations from Parks and Environment Committee that:

- staff work with Toronto Public Health and the Shade Policy Committee to adopt standards for shade provision and confirm a Shade Audit process; and
- pilot shade audits and shade plans be developed for priority playgrounds and waterplay facilities and that staff report back on the plans, including their capital and operating costs.

<http://www.toronto.ca/legdocs/mmis/2008/cc/decisions/2008-03-03-cc17-dd.pdf>

Parks and Environment Committee also requested under Decision Advice that:

- staff incorporate Parks, Forestry and Recreation's Policy for the Provision of Shade into existing playground and waterplay projects, where possible;
- staff report back to the Parks and Environment Committee with proposed standards for shade provision; on adding shade provision to any requests for proposal for park design and redesign; and on the criteria for the selection of pilot projects to undertake shade audits.

<http://www.toronto.ca/legdocs/mmis/2008/pe/decisions/2008-02-19-pe14-dd.pdf>

## **ISSUE BACKGROUND**

Since 2002, Parks, Forestry and Recreation staff have been working with the Shade Policy Committee of the Ultraviolet Radiation Working Group of the Toronto Cancer Prevention Coalition, led by Toronto Public Health to develop comprehensive shade policy and guidelines for the City of Toronto.

In February 2007, Parks, Forestry and Recreation Division adopted a divisional operational policy to guide the design and development activities of its parks and facilities: "Policy for the Provision of Shade at Parks, Forestry and Recreation Sites." The policy states that the Parks, Forestry and Recreation Division recognizes that shade (both natural and constructed) can be an effective way to reduce exposure to UVR and shade provision will be increased, wherever feasible, as part of the Division's approach to designing and retrofitting its assets.

Staff will continue to work with Toronto Public Health and the Shade Policy Committee to develop guidelines for shade provision and UVR protection. Results from the pilot shade audit projects for Parks, Forestry and Recreation playgrounds will help the Shade Policy Committee develop city-wide shade provision guidelines, including standards for shade provision, and a shade audit process for all divisions, boards, commissions and agencies.

According to the Canadian Dermatology Association, one in seven children born today will develop skin cancer due to over-exposure to UVR. Playground and waterplay facilities are a priority for shade because they are primarily used by children, the age group most vulnerable to the long-term effects of solar ultraviolet radiation (UVR). These facilities are primarily used in the summer months and during critical UVR exposure times (between 10 am- 4 pm).

## **COMMENTS**

### **The Shade Audit Process**

The undertaking of a shade audit is a technical and analytical process that requires expertise to: predict solar angles at different times of the year and different times of day; understand, growth patterns and amount of shade provided by different tree species; assess the patterns of use at a specific site; and understand the risk to health from UVR exposure for the users at each site.

As there is not one shade plan appropriate to all situations, it is necessary to assess sites individually. A confirmed Shade Audit Process will provide a detailed checklist of steps and ensure a consistent approach (see Attachment A). A shade audit consists of four components:

- 1) Interviews: with Park Supervisors and users to determine site usage patterns, number and age of people using site, time of day site is used, activities being carried out at site, comments from users about shade / lack of shade at the site, etc.
- 2) Site Examination/Fieldwork: collection of site data such as location, species and height of trees, documenting reflective surfaces, location of buildings/structures, and observation of how available shade at the site is used site, etc.
- 3) Assessment: assessing the quantity and usability of existing shade and the need for additional shade by analyzing sun angles, impact of indirect (reflected) UVR, future tree growth, location of existing shade, where additional shade is required, etc.
- 4) Recommendations: developing a strategy for achieving desired shade/UVR protection goals for the site, including a proposed timeframe, project management approach and financial considerations.

Conducting shade audits requires a project team skilled in site surveying and measurement, with an understanding of urban forestry and the scientific principles of sun angles at different times of the day and during different months of the year. Specialized software and web-based applications have been developed (e.g. WebShade Pty Ltd, Australia) which assist municipalities and consultants to prepare strategic plans for public open space using a Shade Audit tool to objectively determine solar protection needs and solutions. An interactive tool allows planners to assess UV risks of outdoor activity areas and prepare shade projection models for anytime during the day and any time during the year.

Staff are currently investigating the feasibility of investing in this software and getting access to these applications to train staff, carry out the pilot shade audits and generate shade plans as effectively as possible.

### **Standards for Shade Provision**

Staff will continue to work with Toronto Public Health to confirm standards for shade provision to be applied during the shade audit process. Once a site has been investigated to understand existing patterns of use, the level of shade protection being provided by the existing tree canopy and structures, then standards for ultraviolet radiation (UVR) protection can be applied to ensure that solutions that are recommended will provide the proper level of protection to address the health risk. Factors that are considered in setting standards for UVR protection include:

1. Establishing the Critical Protection Time (CPT), centred seasonally around June 21 (summer solstice) and centred daily on solar noon, the point in the day when the sun is highest (1:20 pm EDT for Toronto). Typically the CPT would be focused on the months between March and September and between 11 am to 4 pm daylight savings time for sites in Toronto.
2. The strength of the solar ultraviolet radiation (UV Index), which is influenced by the angle of the sun during different times of the day, latitude, season, cloud cover, ozone layer, elevation and air pollution.
3. The acceptable time limit of exposure relative to users and different age groups and the activity engaged in at that site (i.e. typical length of stay/play at facility, clothing worn), before it becomes a health risk?
4. What is the % of shade coverage desired at each location and for sub-locations (e.g. kids' play area vs. caregiver watching area)? How much discretion is given to allow users the choice to be in the sun or not?
5. What is the level of shade (UV-blocking) needed at each identified shade zone (e.g. total, filtered)

Once a standard is identified, a designer should be able to specify and locate a known shade structure or tree planting that will provide the shade required, for the duration needed and to the degree of UVR-blocking required to address the identified health risk.

Staff will work with Toronto Public Health to develop a standard to be applied in the shade audit pilot projects. As there is no local standard to draw from, practices from other municipalities will be looked at to identify any useful precedents that can be applied. The pilot projects will help to confirm a standard for shade to be used in future shade audits.

### **Existing Shade Availability in Playground and Waterplay Facilities**

A preliminary assessment of existing shade at Parks, Forestry and Recreation playground and waterplay facilities revealed that fewer than 20 percent of sites currently provide significant levels of shade/UVR protection, which would require only minor levels of improvement. Park Supervisors were asked to evaluate playground and waterplay facilities on the basis of whether they felt the facility:

- has little to no shade and requires major planting, structures or moving of the facility to provide shade;
- has some shade but requires significant infill planting, replacement of old trees, or/and addition of structures to provide shade;
- has significant shade and needs only a small amount of infill planting, replacement of old trees, or shade structure to provide shade; or
- is well shaded and needs minimal or no extra trees or structure to supplement existing shade.

#### **Preliminary Assessment of Shade Availability in Parks, Forestry and Recreation Playground Facilities**

Little to No Shade=Requires Major Improvements	319	38%
Some Shade=Needs Significant Improvements	360	43%
Significant Shade=Needs Minor Improvements	108	13%
Well Shaded=Needs Minimal or No Improvements	52	6%
<b>Total Playground</b>	<b>839</b>	<b>100%</b>

#### **Preliminary Assessment of Shade Availability in Parks, Forestry and Recreation Waterplay Facilities**

Little to No Shade=Requires Major Improvements	79	45 %
Some Shade=Needs Significant Improvements	67	38%
Significant Shade=Needs Minor Improvements	23	13%
Well Shaded=Needs Minimal or No Improvements	6	4%
<b>Total Waterplay</b>	<b>175</b>	<b>100%</b>

## **Criteria for the Selection of Pilot Project Sites**

A minimum of two pilot projects will be undertaken in each district, resulting in at least eight shade audits being executed city-wide for playground and waterplay sites. The criteria for selecting sites include:

1. Minimum of two pilot projects per district (one playground and one waterplay);
2. Feasibility: have to use existing staff resources (avoid complex sites);
3. High priority sites (identified as having “little to no shade” by parks staff – see above: Preliminary Assessment of Shade Availability);
4. Variety of sites and facility types so that pilot projects inform future planning;
5. High level of use by community;
6. Existing community interest – outstanding requests for shade, organized community group to work with; and
7. Potential to combine future work with scheduled Capital projects (e.g. park redevelopment, state-of-good repair, playground upgrade, conversion of wading pool to waterplay) and other available funding under the Clean & Beautiful Program.

\* Clean & Beautiful City Secretariat has indicated that there would be a funding allocation for a pilot shade structure installation in a park environment – amount to be confirmed based on requirements. Clean and Beautiful City staff have already been assessing sites for shade structures in a number of parks and at Long-term Care Homes and Service locations.

## **The Next Steps**

The preliminary assessment of existing playground and water play facilities demonstrated that most playgrounds and waterplays have little or no shade. The execution of pilot shade audit projects will advance a city-wide approach and improve the provision of shade at these sites. Pilot projects will allow staff to develop a consistent set of standards and guidelines to apply to future projects, confirm a shade audit process and anticipate capital and operating costs required to plan, implement and maintain additional plantings and shade structures.

## **CONTACT**

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## **SIGNATURE**

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Brenda Librecz  
General Manager, Parks, Forestry and Recreation

## **ATTACHMENTS**

Attachment A – Developing, Designing and Executing a Shade Audit



## ATTACHMENT 'A'

### Developing, Designing and Executing a Shade Audit

(Excerpt from Policy for the Provision of Shade at  
Parks, Forestry and Recreation Sites)

#### **A. Planning**

Planning is essential for effective shade implementation. The following steps should be considered when planning for shade.

- ◆ Establish a project team, including representatives of key stakeholders. Conduct an inventory of shade provision across a range of facilities and prioritize urgency.
- ◆ Conduct a shade audit to determine the adequacy of existing shade and need for more shade at specific sites. Need to determine if shade is appropriately located, of adequate size, and cost effective. See below for more details on how to conduct a shade audit.
- ◆ Prepare a project plan or timeline.
- ◆ Design phase - consider shade requirements, use of natural and/or constructed shade, range of shade options and costs, durability, risk factors such as vandalism, discuss with relevant stakeholders, and determine preferred shade option.
- ◆ Determine implementation process based on Capital works schedule, funding issues and ability to incorporate with other work planned for site or facility.
- ◆ Implementation should include a communications/education strategy and post implementation monitoring for effectiveness.

#### **B. The Shade Audit**

The purpose of conducting a Shade Audit is to provide a strategic plan for the provision of sufficient UVR protective shade at a given site. This is achieved by:

- ◆ Establishing usage patterns at the site;

- ◆ Assessing the quantity and usability of existing shade and the need for additional shade;
- ◆ Providing recommendations on how to create additional shade at the site and/or how to modify existing usage patterns to maximize use of existing shade;
- ◆ Incorporating any recommendations into future development plans for the site.

#### **a.) Conducting a Shade Audit**

A shade audit consists of four components:

- 1) Interviews
- 2) Site Examination/Fieldwork
- 3) Assessment
- 4) Recommendations

A project team skilled in measurements/scaling, horticulture and an understanding of sun angles/light exposure is essential.

#### **b.) Interviews**

Important background information should be obtained by conducting interviews with site managers, city staff and site users. This will provide invaluable assistance in undertaking the assessment stage of the audit.

Information obtained during interviews should include:

- ◆ The availability of a site plan or survey detailing the location of hard services and existing features (e.g., pipes, underground cables, trees, play structures, etc.) and any other relevant site data that may be relevant;
- ◆ Site usage patterns – activities that take place at the site, along with where and when they occur;
- ◆ The time of year day when the site is most in use;
- ◆ The number of people using the site and their age breakdown
- ◆ Opinions as to the adequacy of existing shade at the site and the need for more shade / UVR protection;
- ◆ Longer term development plans for the site;
- ◆ Required performance characteristics of new shade structures (e.g., rain protection, wind protection, etc.); and
- ◆ Other considerations such as resistance to vandalism, durability requirements.

### c.) Site Examination/Fieldwork

This stage of the audit involves the collection of site data as well as the confirmation of information obtained during the interview stage of the process. As both observation and detailed measurement need to be made, two site visits may be optimal. The first visit should be at a time of typical site use so observations of usage patterns can be made and the critical protection time confirmed. The second site visit should occur at a time when users will not be inconvenienced so that measurements can be made.

Measurements of sun exposure can be either observed or calculated, depending on the time available and the expertise of the individual undertaking the work.

- ◆ Observation method: shade is marked on the ground at the site and measured on two occasions (critical protection time and at the same time on at non-critical period such as a winter day).
- ◆ Projection method: involves the use of sun angles and charts to plot where shade will theoretically fall on two occasions (critical protection time and at the same time on at non-critical period such as a winter day).

In using the observation method, a six month period must lapse so that the shade patterns can be assessed at both the critical protection time (summer) and again in winter.

Main tasks for undertaking fieldwork are:

- ◆ Observing site usage patterns
  - type of activities, gathering locations, are people utilizing existing shade (if any);
- ◆ Preparation of the site plan
  - obtain accurate site plan, confirm accuracy of the site plan (random measurements to confirm), add any elements not captured;
- ◆ Investigating the site
  - photography of site including usage, trees, existing structures, problem areas etc.
  - make note of any significant ground level changes, site considerations such as emergency access, types of ground surfaces (concrete, grass areas, gravel) etc.
  - building / structure heights, length & width
  - locations of trees, the species, maturity, condition and estimated canopy diameter.
- ◆ Measure existing shade – either observation or projection method and record results on the existing site plan.

#### **d.) Assessment**

At this stage in the Shade Audit, shade patterns at two periods in time should be plotted to scale on the site plan. The next stage of the audit involves assessing the quantity and usability of existing shade and the need for additional shade.

Tasks to be completed during this stage include:

- ◆ Consider the impact of future tree growth on the amount of shade at the site.
  - Will tree growth significantly alter the amount or distribution of shade?
  - How long will it take before significant changes occur?
- ◆ Consider the amount of existing shade at the critical protection time and compare this with the need for shade, taking into account the additional shade that may result from tree growth.
- ◆ Consider whether the location of existing shade is appropriate given the usage patterns at the site, addressing areas of inadequacy, access etc.
- ◆ Where should additional shade be located (if required), considering seasonal usage patterns.
- ◆ Consider impact of indirect UVR on the site and possible means of reducing its impact on the site.

#### **e.) Recommendations**

The final stage involves the formulation of recommendations related to each of the following:

- ◆ The desired shade/UVR protection goal for the site
- ◆ Strategies for achieving the desired goal, addressing:
  - site management practices
  - optimization of existing shade
  - creation of new areas of shade
  - minimizing the effects of indirect UVR
- ◆ The proposed timeframe
- ◆ A proposal for undertaking the implementation, including a project management approach and any financial considerations.

### **C. Design Brief**

As a final part of the Shade Audit, a design brief should be developed in order to set out the parameters within which the designer /supplier must work. It is intended to convey the information you have gathered and developed through the various stages of the audit to relevant professionals who will be undertaking the

next steps. Information required for the design brief includes, but is not limited to, the following points:

- ◆ Site information:
  - location of proposed project;
  - location of underground services;
  - emergency or other access routes to be maintained;
  - any site constraints that may impact the design (future development, ground conditions etc.)
- ◆ Performance Characteristics:
  - area to be protected from UVR
  - critical protection time
  - type of shade required (built or natural, permanent or non-permanent)
  - specific requirements such as rain/wind protection
  - nature of activities in the proximity of the project location
  - special climatic conditions
  - maintenance requirements
  - longevity
  - other considerations (e.g., threat of vandalism, etc.)
- ◆ Financial and Human Resources:
  - Provide as much budget information as available
  - Advise if there are skills within the organization that can be accessed in order to assist in the project completion
  - Advise of any community involvement or concerns that might exist.