

## THE DEVELOPMENT OF OFFICE SPACE AND ERGONOMICS STANDARDS AT THE CITY OF TORONTO: AN EXAMPLE OF SUCCESSFUL INCLUSION OF ERGONOMICS AT THE DESIGN STAGE

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### Abstract

In 1999, City of Toronto Council approved a document, *Strategy and Standards for Office Space and Ergonomics*, as a basis for internal office space standards at the City. This document had extensive ergonomics consideration in the design elements of the standards as well as in the resulting workstation configurations and allocated space. Three primary workspaces (A, B and C), illustrate the use of a standard 6'x 8' workstation to which furniture and equipment are added based on the functional requirements of the user. Potential changes to work methods and workstation tenants are accommodated with standard yet flexible workspaces. Although the office space standards have not yet been implemented consistently across the City, the collaborative development of the document with facility planners has led to the involvement of ergonomists at the design stage of additional space planning projects.

**Key words:** Office space standards, space strategy, space planning design stage

## LE DÉVELOPPEMENT DE NORMES EN ERGONOMIE SUR L'AMÉNAGEMENT DES ESPACES DE BUREAU À LA VILLE DE TORONTO : UN EXEMPLE DE L'INTRODUCTION RÉUSSIE DE L'ERGONOMIE À L'ÉTAPE DE CONCEPTION

### Résumé

En 1999, le Conseil municipal de Toronto a approuvé un document intitulé *Strategy and Standards for Office Space and Ergonomics* comme base pour les normes des bureaux intérieurs de la ville. Ce document comprend un grand nombre de considérations ergonomiques relatives aux éléments de conception des normes ainsi qu'aux configurations des postes de travail et de l'espace alloué. Trois espaces de travail primaires (A, B et C) illustrent l'utilisation d'un poste de travail standard de 6x8 pieds dans lequel l'ameublement et l'équipement sont ajoutés selon les besoins fonctionnels de l'utilisateur. On tient compte des changements potentiels des méthodes de travail ou de l'occupant du poste de travail grâce à des espaces de travail standards et souples. Bien que les normes en matière d'espace dans les bureaux n'ont pas encore été implantées dans tous les lieux de travail de la ville, l'élaboration du document, qui est le fruit d'une collaboration avec les planificateurs des installations, a mené à la participation des ergonomistes à l'étape de conception des projets de planification d'espaces additionnels de travail.

**Mots clés :** Normes de bureau, stratégie en matière d'espace, étape de conception de la planification de l'espace

In 1998, seven municipalities amalgamated to form the new City of Toronto. The need to consolidate space and ensure equitable employee environments within the new boundaries provided a unique opportunity for ergonomics to be considered at the origins of space planning. A team was formed consisting of facility planners, ergonomists, information and technology staff, and an external consultant. The goal of the team was to develop a *Strategy and Standards for Office Space and Ergonomics* to provide facility planners with a framework from which to logically and equitably plan space consolidation and renovations while supporting the business goals of the organization.

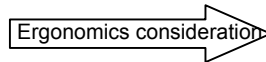
The objectives of the *Strategy and Standards for Office Space and Ergonomics* were to:

- Consolidate space standards and planning concepts across the organization
- Reduce facility costs by reducing the overall amount of space required
- Reduce the cost of internal moves by facilitating “briefcase” moves
- Establish a minimal number of standard workspaces
- Support new ways of working by implementing alternative work environments
- Optimize space utilization with built-in flexibility and modularity
- Promote health, safety and productivity by providing ergonomically sound, effective work settings

Fortunately, most team members had previous exposure to ergonomics as well as to the pitfalls of not implementing ergonomics at the onset of space planning. Not only were ergonomics principles considered in all key design elements, ergonomics was outlined as a key design element itself. Examples of design elements outlined in the document that emphasize the role of ergonomics include:

*Non-hierarchical Space Redesign*

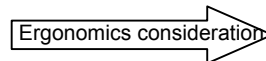
Individual staff workplaces will be sized according to the needs of the job, not the incumbent’s position in the hierarchy.



Design for the functional needs of the worker and work performed.

*Modular Design*

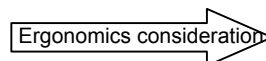
A generic, modular workstation will be provided for each employee, with a flexible discretionary space that can be adapted to suit job demands.



Inclusion of ‘flexible’ space to support varied space utilization as required for the tasks performed.

*Furniture*

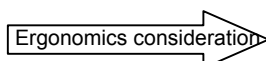
Selecting, purchasing, controlling Inventory and reallocating furniture are corporate responsibilities. All furniture will meet ergonomic requirements.



Monitoring of furniture purchases and reallocation of surplus furniture to ensure compliance with ergonomic requirements.

*Ergonomics*

Workstation design will allow employees to work safely and efficiently in a manner that minimizes the risk of repetitive strain injury or other adverse health effects.

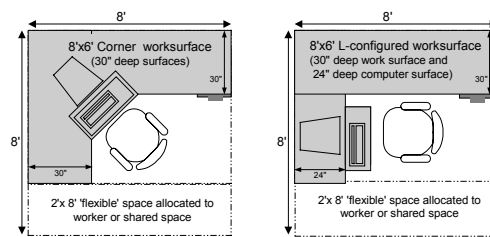


Direct order to implement ergonomic principles in the design of workstations.

The *Strategy and Standards for Office Space and Ergonomics* document that was developed proposed four workspace configurations and size standards based on the functional needs of various jobs performed at the City. The document provides written descriptions of each workspace application, potential workstation components and illustrations of possible arrangements. A selection of sample workstation arrangements provided in the document is illustrated below. These demonstrate the optional use of corner cut-out or 'L' configurations and show different options to accommodate the needs of the worker within the allocated space constraints. The first three are primary workspaces and the fourth is a touch-down station.

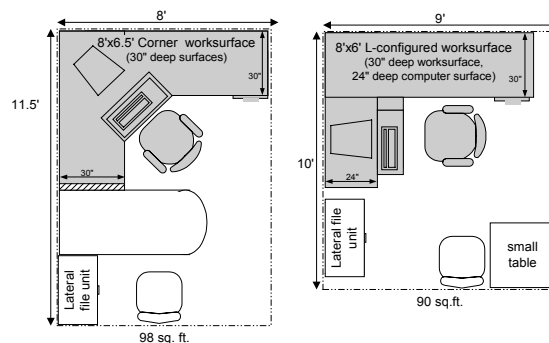
**Workspace A** – approx. 65 sq. ft.

Functionally accommodates computer tasks, reading/writing on a separate surface and low to moderate storage as required. The standard 6'x 8' workstation forms the basis of this and other workspaces. The 2'x 8' 'flexible' space may be allocated to the worker or may be used as common space. This workspace satisfies most of the City's operational needs.



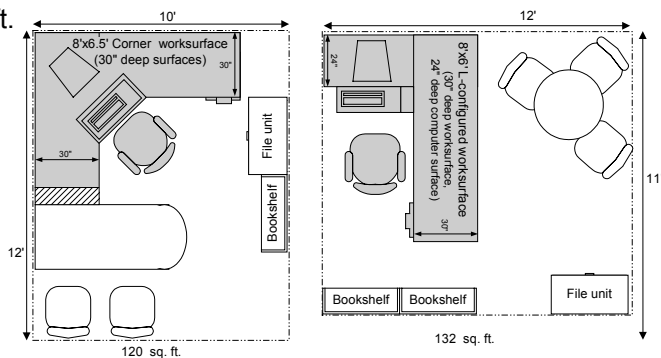
**Workspace B** – approx. 90-100 sq. ft.

Functionally accommodates computer tasks, reading/writing on a separate surface, moderate storage requirements and meeting space within the office for at least one additional person. Components used to meet the functional requirements of this workspace are dependent on availability of products for re-use and limitations of the floor plan.



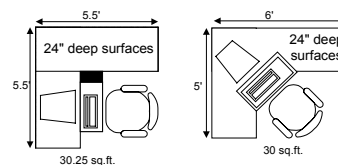
**Workspace C** – approx. 120-150 sq. ft.

Functionally accommodates computer tasks, reading/writing on a separate surface, large storage requirements and meeting space within the office for at least two additional people. Components used to meet the functional requirements of this workspace are dependent on availability of products for re-use and limitations of the floor plan.



**Workspace D** – approx. 30-36 sq. ft.

Designed as a touch-down station to allow mobile workers to complete computer/telephone work for brief periods of time while away from the office. These workstations are not dedicated for permanent use.



Workspace A meets the requirements of most office workers at the City, with an allocation of approximately 65 sq. ft. The minimal workstation footprint is 6'x 8', with an additional 2'x 8' identified as flexible space. The flexible space can be dedicated to an individual's workspace to meet individual job demands (e.g., to support a visitor chair, map storage unit, book shelf, etc.) or it can be incorporated into common space to support shared job demands (e.g., shared files, impromptu meeting space, common access to specialized equipment, etc.). The inclusion of flexible space supports the ability to adapt to changing work methods as well as changing tenants of the work area. The following are samples of various uses of 'flexible' space based on a grouping of 4 workstations.

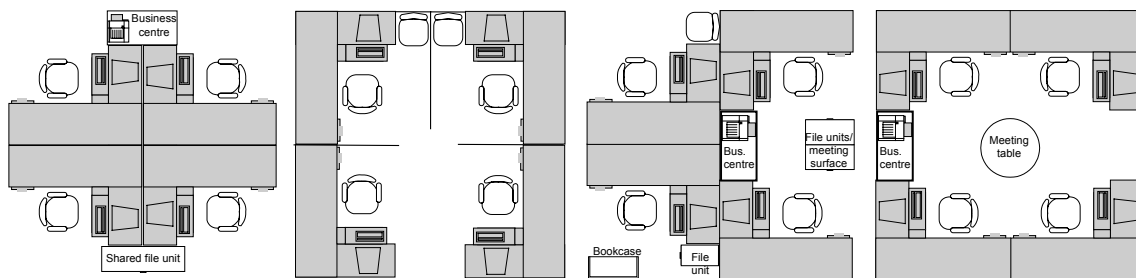


Illustration of various uses of 'flexible' space

The consistent use of a standard 6'x 8' workstation footprint in workspaces A, B and C ensures an ergonomically acceptable workstation for all users and facilitates the re-use of furniture on location. Standard yet flexible workstations reduce the moving costs associated with the fairly high relocation (churn) rate at the City of Toronto. Current projections estimate approximately \$100 for a content move ('briefcase' move), \$500 for a furniture move and \$1000 for a construction move. Given the City's 26% average yearly churn rate with an office staff of almost 8,000, the potential savings are considerable.

In acknowledgment that facility planners are required to work with clients whose space does not comply with recommendations, an appendix outlining *Ergonomics Standards* is included in the document. This appendix provides the facility planners with objective standards to ensure that variations in space design are, at the very least, consistent with ergonomic criteria. The *Ergonomic Standards* were developed from a review of literature on ergonomic standards (1, 2, 3), experience with space problems at the City, facility management concerns and detailed knowledge of the job demands performed across the City. A sample of standards presented in the appendix include:

- Minimum combined 27" length keyboard and mouse support mechanism
- Maximum 20" wrist rest positioned only in front of the keyboard tray, not the mouse
- The exclusion of corner-oriented workstations unless there is a 28 - 30" wide cut-out for the keyboard/mouse platform (to minimize reach distances to adjacent work surfaces)
- A minimum 28" knee well to accommodate swivel movements within an L-shaped workstation
- Chair roll-back space recommended at a minimum of 42" between the front work surface edge and any rearward obstruction
- In an 'L'-configured workstation, the keyboard is placed as close as possible to the adjacent work surface to minimize reach distances and concurrently avoid a pinch hazard between the desk surface and chair armrest

Although implementation of the *Strategy and Standards for Office Space and Ergonomics* has not yet been consistently achieved across the City of Toronto, significant benefits have been realized to date:

- Ergonomics staff are regularly requested to develop or review products and specifications prior to the initiation of the purchasing process.
- Ergonomics staff are regularly requested to assist with the furniture tender process by short listing acceptable bids and evaluating and selecting products that become the City standard.
- Ergonomics staff have been requested to assist with space planning where compliance with the space standards cannot be met.
- Ergonomics staff have developed an *Ergonomic Inventory of Office Furniture* guideline to evaluate existing furniture as 'unacceptable, conditional or acceptable' based on ergonomic criteria. These criteria are crucial to ensure that unacceptable equipment is not reallocated to employees.
- Repercussions of space planning that have not complied with ergonomic standards have been realized by facility staff and ergonomics assistance has been requested to provide feasible solutions.

Overall, the relationship that has evolved between the Ergonomists and Facilities & Real Estate staff from the collaborative development and implementation of the *Strategy and Standards for Office Space and Ergonomics* has been instrumental in the ability to incorporate ergonomic principles at the design stage of space planning.

## REFERENCES

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- (2) Canadian Standards Association (1989). *Office Ergonomics, A National Standard of Canada*. Z412-M89. Toronto, Canada: Canadian Standards Association International.
- (3) Ontario Ministry of Labour (1995). *VDT Workstations: Layout and Lighting, Health & Safety Guidelines*. ISSN 1201-1444 Toronto, Canada: Ontario Ministry of Labour.

Illustrations provided in this paper are based on design standards specifically established to meet the varied needs of work performed at the City of Toronto. They are provided as an example of the result of ergonomics involvement at the design stage of space planning and are not necessarily applicable to operations outside of this context.