

3 OUTDOOR ENVIRONMENT MANAGEMENT

OUTDOOR ENVIRONMENT MANAGEMENT INDICATORS
Table 3. Outdoor Environment Management Indicators for Carnegie Mellon, FY 2004

Report Section	Indicator	Reason	FY2004	Unit
3.1.1	Community landscaping	Determines % of land specifically used for human use, vs. % of land specifically used for aesthetic use.		%
3.1.2	Land Use	Describes land use and amount of green space available		
	Area of sidewalks/terraces	Indicates amount of land set aside for human/bicycle traffic		%
	Area of roadways	Indicates amount of land set aside for automobile traffic		%
	Area of Surface Parking Areas	Indicates amount of land set aside for automobile use	27.5	%
	Area of green roofs	Indicates amount of roofs which have been cultivated to serve as a habitat	0.1	%
	Area of built space (buildings)		27	%
	Area of landscaped green space		40.2	%
	Area of unlandscaped green space		5.2	%
3.2		Chemical and Cultural Additives to the Grounds		
	Amount of pesticides used	A function of campus size but can show increase or decrease of use	1	qt
	Types of pesticides used		Sevin 25% emulsifiable concentrate	
	Amount of herbicides used	A function of campus size but can show increase or decrease of use	5	gal
	Types of herbicides used		Round-up Pro (glyphosate) concentrate	
	Amount of fertilizers used	A function of campus size but can show increase or decrease of use	4,950	lbs
	Types of fertilizers used		MillChem 12-4-8, Milchem 22-4-8, Osmocote 14-14-14	
	Amount of fungicides used	A function of campus size but can show increase or decrease of use	None	lbs
	Types of fungicides used		None	
	Integrated pest management methods	Indicates innovative techniques used to control pests which lessen the use of pesticides, herbicides, and fertilizers.	Methods included in text	
	Amount of deicers used	Usually is a function of winter severity but can show increase or decrease over time.	899,240	lbs

Environmental Indicators for Carnegie Mellon University: Baseline Assessment 2004

Report Section	Indicator	Reason	FY2004	Unit
	Types of deicers used		safestep ice melter, airport grade (urea) ice melter, roadway rock salt	
3.3.1	Total number of trees on campus	Indicates total tree population	FWD	#
3.3.1	Number of new trees planted	Taken with the number of trees removed, shows change of total tree population	25	#/yr
3.3.1	Number of trees removed		3	#/yr
3.3.1	Number of annuals planted annually		4,980	#/yr
3.3.4	Number of perennials planted annually		72	#/yr
3.3.2	Number of wildlife habitats		3	#
3.3.2	Area of wildlife habitat		5.2% + size of butterfly garden	%

OUTDOOR ENVIRONMENT MANAGEMENT INDICATORS RATIONALE

The Carnegie Mellon University campus has been planned and developed carefully in order to create a space that makes the most use of its built infrastructure without compromising the outdoor environment.¹¹ The Campus Planning Principles state that “The campus-like nature of the university's open space is a strong component of its physical environment, and therefore the university shall be its steward. Campus green space shall be protected and the quality shall be enhanced.”¹²

3.1 Landscape Planning and Management

3.1.1 Community Landscaping

On a campus the size of Carnegie Mellon, landscaping is used to provide an academic setting with traditional aesthetic qualities, and often compromises must be made between traditional aesthetics and human use. The community landscaping indicator is a measure of the percent of campus that is landscaped and designed for human use and interaction with the outdoors. It can be compared with the percent of land that is specifically used for aesthetic purposes. To this end, the Design Guidelines specify that “The University encourages a less formal landscape character for the campus than was originally envisioned.”¹³

3.1.2 Land Use

New construction and renovation are continuous at Carnegie Mellon. Land use indicators provide information about how much the outdoor environment is modified by this construction, and the extent to which the outdoor environment and open space is preserved. The following land use area indicators can be tracked annually to provide a picture of how the campus is evolving.

- Building footprint area: indicates new construction
- Green roofs: as a subset of building footprint area, provides an indicator of total square feet that are reclaimed from the classic building footprint and used for storm water mitigation, garden space, and to prevent heat islands.
- Paved surface parking areas: indicates the total amount of uncovered parking areas.

¹¹ Carnegie Mellon University, Master Planning Document. http://www.cmu.edu/planning/master_plan_index.htm

¹² Carnegie Mellon University Master Campus Plan, 2002. “Appendix A.2: Campus Planning Principles”, p. 45.

¹³ Carnegie Mellon University Design Guidelines, p. 2-7. http://www.cmu.edu/fms/Design_Guidelines/Cmu-div02%20V2003A.doc

- Roadways: should remain static, however, may increase or decrease if there is an emphasis on automobile use or reduction of automobile use.
- Sidewalks/terraces: provides an indicator of paved space that is specifically for human use.
- Landscaped green space: Provides an indication of the amount of green space on the Carnegie Mellon campus
- Natural slopes green space: there are very few remaining natural spaces on campus that are not landscaped. These fall on the steep slopes on the edges of campus. They are not ideal sites for development, but construction may impact these in the future. The Master Plan states that the natural wooded slopes shall be respected.¹⁴

These land use distinctions were developed to capture all uses of the Campus land. The paved areas were broken down into more detailed categories in order to identify areas of campus that are dedicated to vehicular use or to pedestrian use, while green roofs are an initiative on campus that will reduce surface water runoff, and offer other environmental benefits as well. These distinctions may be developed further in the future with more categories. For example, the Master Plan states that “Bicycle use shall be supported by the design of bicycle pathways, which are clearly distinguished from pedestrian pathways,”¹⁵ and when this occurs a separate indicator for bicycle pathway land use should be included.

3.2 Grounds Maintenance Additives and Techniques

The environment at Carnegie Mellon is largely artificially planted and must be groomed and maintained to an aesthetic standard appropriate for a prestigious university. The amounts of pesticides, herbicides, fungicides, and fertilizers that are used to achieve this can track the ability of Facilities Management to achieve this with a minimal impact, as well as the shifting emphasis from formal gardens to a more natural-environment style of landscape management. Types of fertilizers that are used should be specified as well. For example, in Spring 2004 the types used were: Spent Mushroom Compost (combination of straw, corn cob, horse/cow manure that had been used to grow mushrooms - about 3% nitrogen), Milorganite 6-2-0 (an organic fertilizer derived from wastewater treatment biosolids that has 6% by weight nitrogen and 2% by weight phosphorus), MillChem 18-5-9 (combination of milorganite and a sulfur coated urea fertilizer

¹⁴ Carnegie Mellon University Master Campus Plan, 2002. “Appendix A.2: Campus Planning Principles”, p. 45.

¹⁵ Carnegie Mellon University Master Campus Plan, 2002. “Appendix A.2: Campus Planning Principles”, p. 45.

that is 18% nitrogen, 5% phosphorus and 9% potassium by weight), Osmocote 14-14-14 (pelletized – coated slow release fertilizer that is 14% nitrogen, 14% phosphorus and 14% potassium by weight). The quantities of and types of fertilizers, pesticides, herbicides, and fungicides used in landscape management reflect the amount and characteristics of chemicals used in landscape management. Facilities Management also uses integrated pest management, which involves using cultural as well as chemical methods to control pests. The methods used by Facilities Management include use of fertilizer to promote the type of plant growth desired, use of aeration of soil to control growth of pests in turf grass, and plant selection for pest-resistant ecologies. Finally, the types and amounts of materials used for sidewalk and road deicing in winter indicates concern for impacts on vegetation.

3.3 Plants and Wildlife

3.3.1 New Plantings

The number of new trees planted on campus as well as the number of trees removed is a measure of care for the tree inventory on campus. The most recent baseline tree census was performed in 1989 by Facilities Management. More current information is obtained from the Carnegie Mellon Bioassay, a project in process¹⁶ that is assessing current flora on campus. The Campus Bioassay has not been completed and there is not a current tree census count available, therefore the total number of trees on campus is a forward-leaning indicator pending completion of the Bioassay. Addition and removal of trees during construction are governed by specifications in the Design Guidelines¹⁷. Based on this and on their own records, FMS should be able to ascertain the number of trees planted and removed on campus.

In order to keep the campus green and aesthetically pleasing, plantings occur throughout the year. The number of annuals planted annually and the number of perennials planted annually can be compared to gain an understanding of which plantings are intended for long term survival.

Finally, all new plantings should be assessed against a list of native or invasive plants. The Design Guidelines for the university specify that to the extent possible, trees¹⁸ and shrubs¹⁹

¹⁶ Personal Communication with Robert Kiger, Director, Hunt Institute.

¹⁷ Carnegie Mellon University Design Guidelines, Section 02950. p. 2-8.
http://www.cmu.edu/fms/Design_Guidelines/Cmu-div02%20V2003A.doc. Accessed 19 December 2004.

¹⁸ Ibid, Footnote 17.

¹⁹ Carnegie Mellon University Design Guidelines, Section 02950. p. 2-9.
http://www.cmu.edu/fms/Design_Guidelines/Cmu-div02%20V2003A.doc. Accessed 19 December 2004.

should consist of native regional plants while other plantings²⁰ should be diverse enough to withstand disease or climatic stress. The Pennsylvania Department of Conservation and Natural Resources provides guidance for native²¹ and invasive plant types²²

3.3.2 *Wildlife Habitats*

Animal life is able to reside on many portions of the campus and anecdotally there are many animals observed living in the maintained open space on campus. Some of the areas discussed above in Section 3.1.2 are specifically designed to encourage wildlife habitation. These habitats include butterfly gardens and can be measured by the number of habitats and the area of these habitats (% of campus basis). The natural slopes are included as a wildlife area total as they are the least disturbed areas of campus.

²⁰ Carnegie Mellon University Design Guidelines, Section 02950. p. 2-9.

http://www.cmu.edu/fms/Design_Guidelines/Cmu-div02%20V2003A.doc. Accessed 19 December 2004.

²¹ PA Department of Conservation and Natural Resources, "Landscaping with Native Plants in Pennsylvania," <http://www.dcnr.state.pa.us/forestry/wildplant/native.aspx>, accessed 21 December 2004.

²² PA Department of Conservation and Natural Resources, "Invasive Plants in Pennsylvania," <http://www.dcnr.state.pa.us/forestry/wildplant/invasive.aspx>, accessed 21 December 2004.

