



THE TORONTO AND REGION CONSERVATION AUTHORITY

Sustainable Communities Board Meeting #3/05

Chair:	Michael Di Biase
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	John Sprovieri
	Dick O'Brien - Chair, Authority

October 14, 2005

11:00 A.M.

SOUTH THEATRE, BLACK CREEK PIONEER VILLAGE

AGENDA

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| 1. | MINUTES OF MEETING #2/05, HELD ON JUNE 3, 2005
(Minutes Summary enclosed herewith on Green) | |
| 2. | BUSINESS ARISING FROM THE MINUTES | |
| 3. | DISCLOSURE OF PECUNIARY INTEREST AND THE GENERAL NATURE THEREOF | |
| 4. | DELEGATIONS | |
| 5. | PRESENTATIONS | |
| 5.1 | A presentation by Jamie James, Environmental Consultant, Tridel, in regards to Green Buildings Strategies for High-Rise Residential Development. | |
| 5.2 | A presentation by Deborah Martin-Downs, Director, Ecology, Toronto and Region Conservation Authority, in regards to item 7.3 - York Durham Sanitary Sewer Projects. | |

- 6. CORRESPONDENCE
- 7. SECTION I - ITEMS FOR AUTHORITY ACTION
 - 7.1 INDOOR AIR BIOFILTRATION SYSTEM AT HEAD OFFICE 3-6
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16th Avenue Phase II
Report to Follow
- 8. SECTION IV - ITEMS FOR THE INFORMATION OF THE BOARD
 - 8.1 ARCHITYPE: SUSTAINABLE HOUSE COMPETITION 10-13
 - 8.2 EASTERN POWER - GREENFIELD SOUTH LIMITED
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- 9. NEW BUSINESS

NEXT MEETING OF THE SUSTAINABLE COMMUNITIES BOARD #4/05,
TO BE HELD ON DECEMBER 2, 2005, IN THE
HUMBER ROOM, HEAD OFFICE

Brian E. Denney
Chief Administrative Officer

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TO: Chair and Members of the Sustainable Communities Board
Meeting #3/05, October 14, 2005

FROM: James W. Dillane, Director, Finance and Business Development

RE: **INDOOR AIR BIOFILTRATION SYSTEM AT HEAD OFFICE**

KEY ISSUE

Results achieved by the indoor air biofiltration system in terms of air quality and energy savings.

RECOMMENDATION

THE BOARD RECOMMENDS TO THE AUTHORITY THAT Toronto and Region Conservation Authority (TRCA) staff pursue potential funding partners to continue monitoring the indoor air biofiltration system at Head Office in 2006.

BACKGROUND

TRCA, with support from Air Quality Solutions and Toronto Public Health, was awarded a \$53,700 grant from the Green Municipal Fund (GMF) to install and test an indoor air biofiltration system, also known as a "biowall", in TRCA's Head Office. The project was initiated to demonstrate the benefits of this sustainable technology as a basis for recommending adoption by others. This green technology contains an air filtration system that utilizes plants to improve indoor air quality. This reduces the need to draw on outdoor air for ventilation which helps to reduce energy costs associated with heating and cooling of the building. In the spring of 2004, the completion of the biowall was officially recognized by two unveiling events: one internally for TRCA, and one for our partners and interested parties.

At Authority Meeting #6/03, held on July 25, 2003, Resolution #A155/03 was approved, in part, as follows:

...AND FURTHER THAT staff report to the Executive Committee in 2004 on the results achieved by the biofiltration system in terms of air quality and energy savings.

A study for the TRCA biowall was conducted by Air Quality Solutions, which is a company in the City of Guelph that uses innovative biofiltration technology to develop environmentally friendly and energy efficient systems, capable of improving the indoor environment. This report updates the TRCA on the progress and its future direction of the biowall project.

Description of the Study

The biofiltration of indoor air has been presented as an alternative means of removing indoor pollutants. Using this approach, the airborne contaminants are degraded by passing the building air through a specifically tailored biological system. The system relies on benign beneficial microbes, which consider the organic contaminants a food source. This approach reduces the need to bring outside air into the office space thereby improving energy efficiency.

Prior to implementing a full program of maintaining air quality by biofiltration, a study to determine how the population responds to air cleaned in this manner was implemented. The purpose of this study was to determine if the augmentation of the traditional ventilation system with biofilter air results in an indoor environment as good as, or better than, air maintained by traditional means only.

Approach

The impact of the biofilter was evaluated by three means as follows:

1. Occupant surveys on changes in environmental quality associated with the implementation of the biofiltration program.
2. Changes in physical characteristics of air quality with the implementation of the biofiltration program.
3. Potential energy savings to be realized with the implementation of the biofiltration program.

There are numerous studies indicating people can respond positively to the simple addition of plants into the work environment. Although the greening effect does have value, this study attempted to separate this effect from the effect of the system on air quality. To this end, an experimental design was used in which the implementation of the biofilter into a retrofitted space would separate this office greening effect from the effect of the biofilter, using three sampling periods as follows:

1. pre-installation;
2. post installation/pre-activation; and
3. activation of the biowall.

The population exposed to biofiltered air was also compared at each sampling period to a control group within the same building complex who were not regularly receiving the biofiltered air as their office environment has a separate ventilation system.

RESULTS OF THE STUDY

The biofiltration of indoor air by means of TRCA's Biowall appears to be an effective means of supplying good quality air to the building occupants. The biowall reduced both the number of different compounds present in the air and their concentrations while substantially reducing the energy required to heat and cool the building.

Psychological Impact of Biowall

TRCA employees, when surveyed about air cleansed by this technology, exhibited no negative responses when compared to a group that did not receive the treated air. The group exposed to the treated air experienced a general increase in the perceived air quality with the installation and activation of the biofilter. The treated group did not exhibit an increase in the frequency of physical symptoms, such as irritation to mucous membrane in the form of itchy eyes or runny noses, nor was there an increase in background odours associated with the operation of the biowall. This suggests that the acceptance of the biofiltered air was very high. Substantial improvement in indoor air quality was perceived with the installation and activation of the biofilter.

Physical Impact of Biofilter

Volatile Organic Compounds (VOCs) are represented by chemicals such as formaldehyde, benzene and toluene. These chemicals arise from activities that occur within the office, building materials and the occupants themselves. If not controlled, the contaminants may accumulate to the point of influencing the well-being of occupants. Estimates have placed the annual impact of poor indoor air quality on worker productivity in the USA to be between 20 and 200 billion dollars. Upon activation of the biofilter, there was a substantial impact on air quality in the area immediately adjacent to the biowall (front lobby). Passing the air through the biofilter reduced Total Volatile Organic Compounds (TVOCs) concentrations by 75% relative to the rest of the building. The air exiting the biofilter (sampled from the duct) exhibited an 80% reduction in the number of different VOCs present in the air. This is a major improvement on air quality.

Areas further away and not adjacent to the biofilter, exhibited a slight improvement in air quality although not significant. The limited impact of the biofilter on the more distant locations was likely due to the interference from enhanced ventilation during the sample period. The evaluation of the biofilter occurred during September and October when ventilation systems take advantage of cool air outside to “free cool” the building. Hence the higher volume of outside air may have diluted the impact of the biofilter in regions further from it.

The biofilter did not increase the fungal and bacterial spore loads in the spaces receiving the treated air. However, the duct system carrying air between biofilter and the central air handling system exhibited bacterial counts comparable to outdoors.

Impact on Energy Consumption

Energy required to provide required outside air to occupants:

- Peak summer energy requirement is approximately 0.36 KW of energy per occupant.
- Peak winter energy requirements are 0.62 KW per person for properly humidified air.

Energy requirement of biofilter

- The operation of the biofilter requires approximately 0.025 KW per m² or approximately 0.05 KW per building occupant.

Potential Energy Savings

- Potential savings during peak energy requirements in the heat of summer and the cold of winter are estimated to be 0.32 and 0.58 KW per occupant respectively. This translates into approximately a 5-10% annual energy savings.

DETAILS OF WORK TO BE DONE

Immediate actions include upgrading of the lighting fixtures and continued maintenance of the biowall. The system had a very large impact on the area adjacent to the biofilter and less of an impact further away. This may have been due to the enhanced amount of fresh air brought into the building during the fall. It is recommended that the impact of the biofilter be examined during peak heating and cooling seasons when ventilation is minimized and determine to what extent biofiltered air can replace outside air as a means of maintaining indoor air quality. Continued monitoring is subject to available funding. TRCA staff will be pursuing potential funding partners to continue the monitoring in 2006.

Report prepared by: Cindy Kambeitz, extension 5336
For Information contact: Glenn MacMillan, extension 5212
Date: September 22, 2005

TO: Chair and Members of the Sustainable Communities Board
Meeting #3/05, October 14, 2005

FROM: Brian Denney, Chief Administrative Officer

RE: UPDATE ON THE MAYORS' MEGAWATT CHALLENGE

KEY ISSUE

Participation in the Mayors' Megawatt Challenge by municipalities in Toronto and Region Conservation Authority's jurisdiction.

RECOMMENDATION

THE BOARD RECOMMENDS TO THE AUTHORITY THAT Members of Toronto and Region Conservation Authority (TRCA) whose municipalities are not participating in the Mayors' Megawatt Challenge be requested to encourage them to join the program;

AND FURTHER THAT staff report back with an update of the status of membership in the Mayors' Megawatt Challenge at the Sustainable Communities Board meeting to be held on December 2, 2005.

BACKGROUND

The Mayors' Megawatt Challenge brings municipalities together to improve energy efficiency and environmental management in their own buildings. Through the Mayors' Megawatt Challenge municipalities demonstrate leadership, inspiring other organizations and individuals to take action towards healthier, more sustainable communities.

Municipalities in Canada have long been champions of energy efficiency. Many cities, towns and regional governments have implemented projects and programs aimed at improving their energy performance. The Mayors' Megawatt Challenge takes these efforts to the next level by benchmarking performance between municipalities and sharing best practices for improvement.

The Mayors' Megawatt Challenge program helps municipalities improve the energy efficiency of their own facilities. The program provides:

- a web-based utilities management system;
- quarterly workshops to explore and assess benchmarking, action plans, best practices and actual savings;
- on-line tools for analyzing and budgeting energy use;
- collaborative projects;
- best practices checklists; and
- newsletters, awards and media releases.

Facility design, retrofits and operations in a wide range of facility types, combined with management practices and the actions of building users, all work together to achieve and sustain optimal levels of municipal energy efficiency. Sharing knowledge and experience with peers in each of these areas can yield better performance than any municipality can achieve by acting alone.

The inaugural meeting of the Mayors' Megawatt Challenge took place on June 23, 2003. Twenty-eight municipalities from the Toronto region were invited, and 12 municipalities took up the challenge, representing about 92% of the region's population (encompassing 5.3 million people). Participating municipalities for the first session of the challenge were: Barrie, Brampton, Burlington, Markham, Milton, Mississauga, Oakville, Oshawa, Richmond Hill, Toronto, Vaughan and Whitby. The pilot session ended with a final workshop at Richmond Hill City Hall on November 29, 2004.

By November of 2004, the program participants had reported savings of 640 kilowatts or 64% of the targeted megawatt in total. Based on the data gathered for 11 of the 69 buildings in the database, 2,617,000 kilowatt hours (kWh) were saved. Total gas saved was 137,000 cubic metres (m³) and total water saved was 6,000 m³. This translates to the prevention of approximately 1,400 tonnes of greenhouse gases (GHG) from being released into the atmosphere. Total energy use decreased by 4% and water savings of 7% were recorded. Cost savings from the energy and water savings were estimated to be approximately \$362,000. This is more than seven times the total program fees collected of approximately \$50,000. The program also attracted a federal grant which was used to keep municipal fees low.

In August of 2004, written surveys and phone interviews were conducted with the participants to gauge the interest in the next phase of the program and to determine the content and focus. Feedback was very positive. To support this expansion and to encourage small municipalities to join, participants suggested that a tiered fee structure be created for the 2005/2006 session.

Invitations and planning for the 2005/2006 session began in January 2005. Forty-three municipalities from around the Greater Golden Horseshoe were invited to participate in the program. As of September 2005, thirteen municipalities had joined the program, including Ajax, Barrie, Brampton, Burlington, Guelph, Kitchener, Milton, Mississauga, Oshawa, Richmond Hill, St. Catharines, Toronto and Waterloo. The Town of Markham is still considering joining, while the cities of Pickering and Cambridge have indicated that they would join in 2006.

In the current session of the program, a collaborative project has been initiated to identify energy savings and thus cost savings in the operation of arenas. Benchmarking for the Mayors' Megawatt Challenge indicates that there are major differences in energy use amongst seemingly similar single pad arenas. The single pad arenas project will involve audits of facilities, documentation of best practices and specification of building automation system installations. Municipal partners will provide input to existing operational procedures at rinks, along with ongoing energy use data. Working collaboratively and learning from the experience of others will provide support for municipalities in implementing projects that will save energy and money. By working collaboratively, economies of scale will be achieved and grants from government agencies will be received to provide municipalities with a cost effective and integrated assessment of energy and cost savings for arenas that are enrolled in the program.

RATIONALE

Feedback from participants has indicated that the program adds value to existing energy efficiency programs and helps municipalities get started on their own program. In last year's program, municipalities had estimated aggregate savings of \$362,000, which is more than seven times the total fees charged to the municipal participants.

The value of the program is linked in part to the number of municipalities participating. The more participants, the more opportunity there is for sharing of knowledge, experience and peer learning. The Government of Ontario has committed to lowering energy demand by 5% province-wide and by 10% within its own buildings by 2007.

Energy savings targets for publically funded buildings are likely to be included in upcoming energy conservation regulations. The Mayors' Megawatt Challenge provides participating municipalities with the tools and access to the experience and expertise to develop appropriate energy targets.

Report prepared by: Bernie McIntyre, extension 5326
For Information contact: Bernie McIntyre, extension 5326
Date: October 3, 2005

TO: Chair and Members of the Sustainable Communities Board
Meeting #3/05, October 14, 2005

FROM: Deborah Martin-Downs, Director, Ecology

RE: ARCHITYPE: SUSTAINABLE HOUSE COMPETITION

KEY ISSUE

Status report outlining the progress of the Architype Sustainable House Competition.

RECOMMENDATION

IT IS RECOMMENDED THAT the status report on the Architype Sustainable House Competition be received.

BACKGROUND

Project Overview

Toronto and Region Conservation Authority (TRCA), in partnership with the Design Exchange (DX), are hosting a sustainable house competition. This competition is based on the premise that in the 21st century, sustainable design is no longer a luxury but a necessity. The innovation of Canadian designers and their ability to adapt to the changing needs of contemporary society is now being called on to explore the application of sustainable design technology for the residential housing market in Southern Ontario.

As a part of The Living City initiative, we are issuing the Architype for The Living City: Sustainable House Competition. This presents a challenge for design teams to create a demonstration centre in the form of a detached single family home that creates awareness and builds understanding of sustainable technologies and building processes. Using a holistic and interactive approach to design, and measuring progress with the Leadership in Energy and Environmental Design (LEED) for homes green building rating system, the demonstration centre will stimulate community transformation towards sustainable living. The winning home design will be built at The Living City Campus at Kortright, north of Toronto and used as an archetype - or leading example - for building professionals and the general public. The winning design will address The Living City's objective to engage and educate through the following mechanisms:

Design Competition

The primary intent of the sustainable house competition is to:

- maximize public awareness for TRCA initiatives, programs, The Living City Campus;
- maximize media presence;
- develop professional interest via partnerships and training workshops;
- raise funds and product donations required to build the house; and
- showcase professionals leading the way with green design.

Home Construction

The primary intent of the sustainable demonstration house is to:

- educate and demonstrate new technologies, materials and processes for residential mass construction;
- provide training for product installation and systems management;
- provide equal opportunities for the demonstration and application of products;
- encourage a holistic approach to sustainable design (not just energy efficiency);
- engage municipal leaders and serve as a model home for new subdivisions being planned in municipalities throughout our regions; and
- work as an information centre for consumers looking to incorporate elements of sustainable design into their own home building projects.

Update on activities

On August 25, 2005 TRCA and the Design Exchange hosted a half day workshop with 35 community leaders from various related industry sectors to review the criteria for the competition before the public launch scheduled for September 30, 2005.

The competition was publicly launched on September 30 through the Design Exchange website, press releases and association engagement.

The Royal Architectural Institute of Canada has approved the competition for national roll out and offers full support and membership engagement.

Judges have now been selected and make up a team of 9 professionals.

Media interest is growing. To date, there have been articles in the *Globe & Mail* and *Building Magazine*. Articles in *Canadian Architecture*, and *The Toronto Star* are currently under development.

Sponsorship

Sponsorship dollars raised will go towards the costs associated with the competition, the construction of the house on site at the Kortright Centre for Conservation and the educational programming and exhibits. Sponsorship is also being sought in the form of in-kind contributions. In-kind contributions will include products and technology, trades and skilled help for the construction process, exhibit design and installation. Current committed sponsors have already assured in writing that in-kind efforts will be in place. Ozz Corporation and the Greater Toronto Home Builders Association (GTHBA) will be committing trades to ensure the house is constructed on schedule.

Competition

The required budget to fulfill our obligation to the Design Exchange is \$61,000. To date, sponsorship in the amount of \$65,000 has been committed toward the competition. An additional \$40,000 will be raised to cover TRCA staff time, promotions and events applied to the competition. If the money is not raised, our external commitments to the Design Exchange will be covered. Internal commitments would not be covered and the construction of the house would be delayed indefinitely.

House Construction

\$900,000 is the estimated budget to build the house, design the exhibits and develop training curriculum. This budget number is only a place holder. It is expected that the house will be built for \$0 dollars through in-kind sponsorship (trades, products and materials), partnership support of PowerStream, Environment Canada, the Canada Green Building Council, Seneca College and through marketing opportunities the house will provide for programs and product demonstrated on site.

Committed sponsors to date include:

PowerStream	\$30,000
Osram Sylvania	\$10,000
Enbridge	\$20,000
Ozz Corporation	\$5,000
TOTAL	\$65,000

Tentative sponsors to date Include:

Sponsor Name	Proposed Contribution	Update
Greater Toronto Home Builders Association	\$60,000	Dollar figure suggested from GTHBA September 29 meeting to be confirmed. In-kind trades for construction also under consideration
Canada Mortgage Housing Corporation (CMHC)	\$25-40,000	Firm commitment on funding will be set at a meeting on October 4, 2005
Hydro One	\$30,000	Of a greater overall funding request for The Living City Programs
TOTAL	\$115,000 - \$130,000	

Additional interested sponsors to date include:

Sponsor Name	Proposed Contribution	Update
Honda Canada	\$100,000	
Home Hardware	\$10,000	
Cement Association	\$40-60,000	Reviewing October 7 for final commitment
Environment Canada	\$30,000	Plus introduction to other potential sponsors
TOTAL	\$180,000 - \$200,000	

* Construction of the house will commence when all funding is in place.

DETAILS OF WORK TO BE DONE

A workshop for competing design teams will be held at Kortright on October 18, 2005. Competitors from across Canada will review the criteria and the site and have an opportunity to ask detailed questions before they begin creating designs.

Development of web pages and placement on the TRCA website is under construction. The goal for website presence is to document activity and events in chronological order.

The *Nature of Things* will be filming a 1 hour documentary on the competition and the building process. Final confirmation and coordination is ongoing.

Staff continue to develop and firm up sponsorships for the competition and house construction.

Report prepared by: Andrew Bowerbank, extension 5343
For Information contact: Andrew Bowerbank, extension 5343
Date: September 16, 2005

TO: Chair and Members of the Sustainable Communities Board
Meeting #3/05, October 14, 2005

FROM: Carolyn Woodland, Director, Planning and Development

RE: **EASTERN POWER - GREENFIELD SOUTH LIMITED**
Environmental Screening and Review Report Comments

KEY ISSUE

Receipt of the staff report on the Environmental Screening and Review Report for the Greenfield South Power Project.

RECOMMENDATION

THAT the staff report on the Environmental Screening and Review Report for the Greenfield South Power Project be received.

BACKGROUND

At Authority Meeting #6/05, held on July 22, 2005, Resolution #A156/05 was approved as follows:

THAT the Authority advises that the outcome of the environmental assessment (EA) process, including the application of criteria and establishment of an appropriate building envelope, shall take precedent with respect to the development of this particular project;

THAT TRCA staff be directed to work with the proponent to establish a satisfactory environmental impact study which will:

- (a) allow for a suitable building envelope to be established such that the natural heritage of the site is protected,*
- (b) provide for a net environmental gain, either on-site or in close proximity to the project area, and*
- (c) provide for site servicing which will not adversely impact the valley corridor or TRCA property;*

THAT TRCA staff be directed to report back to the Authority regarding the recommendations of the environmental impact study and conformance with the TRCA's conditions of approval;

THAT TRCA staff be authorized to use provisions within the Environmental Assessment Act to ensure that the above conditions for this environmental assessment application are achieved;

AND FURTHER THAT the proponent, the ministries of Environment and Energy, the City of Mississauga, the Credit Valley Conservation Authority and the Etobicoke-Mimico Watersheds Coalition be so advised.

PROJECT DETAILS

Through a review of the final Environmental Screening and Review Report for the Greenfield South Power Project, staff confirmed that a building envelope to the satisfaction of Toronto and Region Conservation Authority (TRCA) has been established on site, thus enabling the construction of the power generating facility.

Natural Heritage Protection:

- The preliminary site plan included in the Environmental Screening and Review Report increased the setback from the top-of-bank from 10 metres to 35 metres; details of the setback and valley stability will be confirmed through staff review of the site plan application; confirmation of TRCA permit requirements in relation to fill placement in a regulated area will occur at the site planning stage.
- Vegetation removal will be minimized as the tree and shrub species to be removed are non-native and in the view of the TRCA ecologist, found to not be contributing to the habitat of the area; details of the vegetation to be removed will be confirmed through staff review of the site plan application.
- The fuel storage area was relocated from the eastern side of the property (adjacent to the valley) to the northern section of the property (perpendicular to the property); details regarding the fuel containment as related to potential spills will be reviewed as part of the site plan application. The Ministry of the Environment (MOE) is responsible for ensuring that the proposal for storage meets provincial requirements.

Net Environmental Gain:

- TRCA has requested a commitment from the proponent to restore and augment the area adjacent to the valley, as well as the area noted on the attached plan as "construction laydown yard" with native, non-invasive species; the site specific details will be reviewed as part of the site plan application.
- There is commitment from the proponent to include sustainable technologies in the design of the facility and the site plan, including an investigation of the applicability of the Leadership in Energy and Environmental Design (LEED) building system for site design, and implementation of pollution prevention measures.

Site servicing which will not adversely impact the valley corridor or TRCA property;

- Most of the stormwater will be contained on site and recycled into the cooling system for the facility, thus reducing requirements for municipal water use; details regarding stormwater management will be refined during the site planning stage; TRCA permit requirements as related to fill placement in a regulated area, construction in the flood plain, or alteration to a watercourse will be made during the review of the site plan application.
- There is a commitment from the proponent to investigate in the future, with the City of Mississauga, opportunities for cogeneration and tie into the local grid system so that the heat loss from the facility could be recaptured and tied into the heating requirements of the local area.

Position from City of Mississauga

- On Monday, September 19, 2005 at a Special Meeting of Council, the city recommended that the a Part II Order be requested from the Minister of the Environment and that an Individual EA be completed for this application. It was Mississauga staff's conclusion that in order to address outstanding concerns, the project must be elevated to an Individual EA. Outstanding technical concerns include fire and safety as related to water supply and pressure within the local neighbourhood, and health as related to air quality.
- TRCA staff has completed our initial review and commenting on the issues of immediate regulatory requirements related to the EA process, however, we will continue to maintain dialogue with City of Mississauga staff related to broader issues of air quality with MOE, and issues related to immediate neighbourhood impacts.

DETAILS OF WORK TO BE DONE

- Staff comments in support of the project as related to the review of the Environmental Screening and Review Report have been released;
- Staff comments on requirements related to the site plan application have been released;
- Staff review of the required plans and documentation related to comments on the site plan will be undertaken once this information has been received;
- Staff will confirm Ontario Regulation 158 permit requirements once appropriate information has been received through the site plan review;
- Staff may or may not be required to review such permit applications.

Report prepared by: Beth Williston, extension 5217 or Chris Barber, extension 5715

For Information contact: Beth Williston, extension 5217

Date: October 3, 2005

Attachments: 1

