

MEMORANDUM

To: Mayor Michael R. Bloomberg

From: Rohit T. Aggarwala, Director of Long-Term Planning and Sustainability

CC: Deputy Mayor Edward Skyler
Deputy Mayor Patricia E. Harris
Deputy Mayor Robert C. Lieber
Commissioner Adrian Benepe
Commissioner Janette Sadik-Kahn
Commissioner John J. Doherty
Commissioner Kate D. Levin
Commissioner Martha K. Hirst
Commissioner David J. Burney
President Seth Pinsky
Director of Operations Jeffrey Kay

Date: February 11, 2008

Subject: Tropical Hardwood Reduction Plan

I. Introduction

On December 13th, at the UNFCCC Conference in Bali, you announced that the Office of Long-Term Planning and Sustainability would work with the Department of Parks and Recreation (DPR), the Department of Transportation (DOT) and other agencies to conduct a review of the City's tropical hardwood use and report back in 60 days with a plan to reduce that aspect of the City's contribution to global climate change.

Logging of tropical forests to supply timber and pulpwood has contributed to deforestation at a rate of 0.2% a year. According to the World Resources Institute, this deforestation accounts for approximately 20% of the world's annual man-made greenhouse gas emissions. Because of its unparalleled strength and durability for outdoor uses, New York City utilizes large amounts of tropical hardwoods on boardwalks, benches, ferry piers, marine transfer stations and the Brooklyn Bridge promenade.

With one of the nation's longest boardwalk networks and its largest park system, it is possible, as some have alleged that New York City is one of the leading consumers of tropical hardwoods in the nation. The City has piloted some use of

alternatives, like recycled plastic lumber and domestic hardwoods, but has not thus far adopted a comprehensive approach to reduce tropical hardwood use.

This memo lays out an approach to reducing New York City's use of tropical hardwoods. Eliminating all tropical hardwood use in the near term is not feasible because substitutes in many cases would require major structural redesigns. However, we have identified some uses for which direct substitutes are currently available, and this plan also includes a series of studies and pilots to assess alternatives. Furthermore, as certain tropical hardwood structures finish their useful lives, alternative materials will be designed into the replacement structures.

Overall, this plan will immediately cut the City's tropical Harwood use by 20%, with further reductions or complete elimination expected over the longer term if major components due to normal replacement can be redesigned with substitutes. Because we cannot be certain that complete elimination is feasible, the City cannot yet make a commitment to do so.

The incremental cost of pursuing this plan in the short term is an additional estimated \$14,000 for benches annually and \$20,000 for the necessary studies.

II. Background

A. Regulations prohibiting tropical hardwoods

New York State Finance Law §165 prohibits the use of specific tropical hardwoods, such as teak and ebony. It is generally agreed that the law is not comprehensive. While the law specifically bars the use of these woods, many additional tropical hardwoods are not listed and are thus excluded from the law's prohibition. In addition, the law provides a number of exceptions, including ones based on cost and the absence of acceptable alternatives.

B. New York City Tropical Hardwood Use

The City of New York currently uses tropical hardwoods that are not prohibited by law to construct and maintain ferry piers and fender racks, waste marine transfer station docks, benches, small scale City construction projects and the Brooklyn Bridge Promenade. The ten miles of boardwalk maintained by DPR is the largest single use. The City's total average annual expenditure on large scale projects and infrastructure is approximately \$1,000,000.

A number of characteristics unique to tropical hardwoods make it an important part of city infrastructure. Tropical hardwoods are more durable, rot resistant, and stronger than domestic hardwoods. Some species are also resistant to marine animals that can quickly destroy other woods. Historically, they have also been

cost competitive. **Table 1** below summarizes the City’s current use of tropical hardwoods.

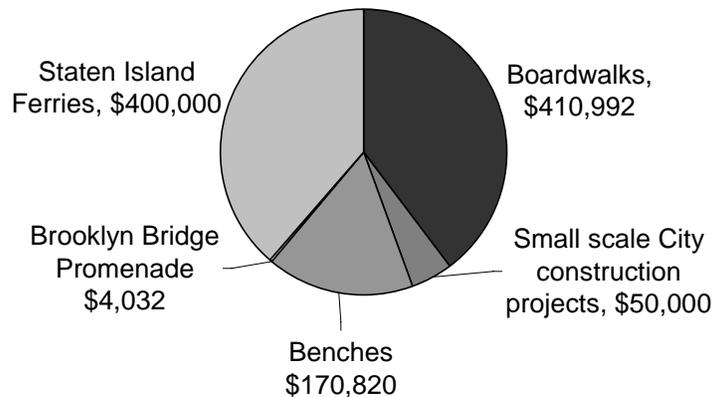
Table 1 - New York City’s Use of Tropical Hardwoods

Wood	Origin	New York City Use
Ipe	South America	<ul style="list-style-type: none"> • Boardwalks • Benches
Cumaru	South America	<ul style="list-style-type: none"> • Boardwalks
Greenheart	South America	<ul style="list-style-type: none"> • Brooklyn Bridge Promenade • Staten Island fender racks • Marine transfer stations • Boardwalk support structure
Garapa	South America	<ul style="list-style-type: none"> • Benches

Other woods used by the City in small-scale ongoing projects include jatoba, Spanish cedar and mahogany. The use of these woods is on such a small, specialized scale that they have not been addressed in this report.

CHART 1 - Annual New York City Spending on Tropical Hardwoods*

Total City expenditure: \$1,035,844



C. Department of Sanitation

The Department of Sanitation (DSNY) is about to begin the bid phase for the construction of four new Marine Transfer Stations (MTSs), three of which include docks and fendering systems that will employ greenheart. The three MTSs are scheduled to begin construction in late 2008 and 2009, and when combined, the total one time greenheart material cost is estimated to be \$1,815,000. Additionally, the DSNY will soon begin design of two additional MTSs for barging recyclables from Manhattan that could involve the use of greenheart.

D. Economic Development Corporation, Department of Cultural Affairs, and Department of Design and Construction

The New York City Economic Development Corporation (EDC), the Department of Cultural Affairs (DCLA) and the Department of Design and Construction (DDC) use tropical hardwoods in small amounts on various construction projects, but the amounts are negligible in relationship to the large users outlined above. DDC managed construction projects account for on average approximately \$50,000 worth of tropical hardwoods a year.

*Average annual spending is based on the estimated amount of wood used per year not the amount purchased. Boardwalk money is based on a 10 year average of annual wood used because actual amount can vary dramatically from year to year. The table excludes the cost of the new marine transfer station docks of \$1,815,000 and various DCLA projects.

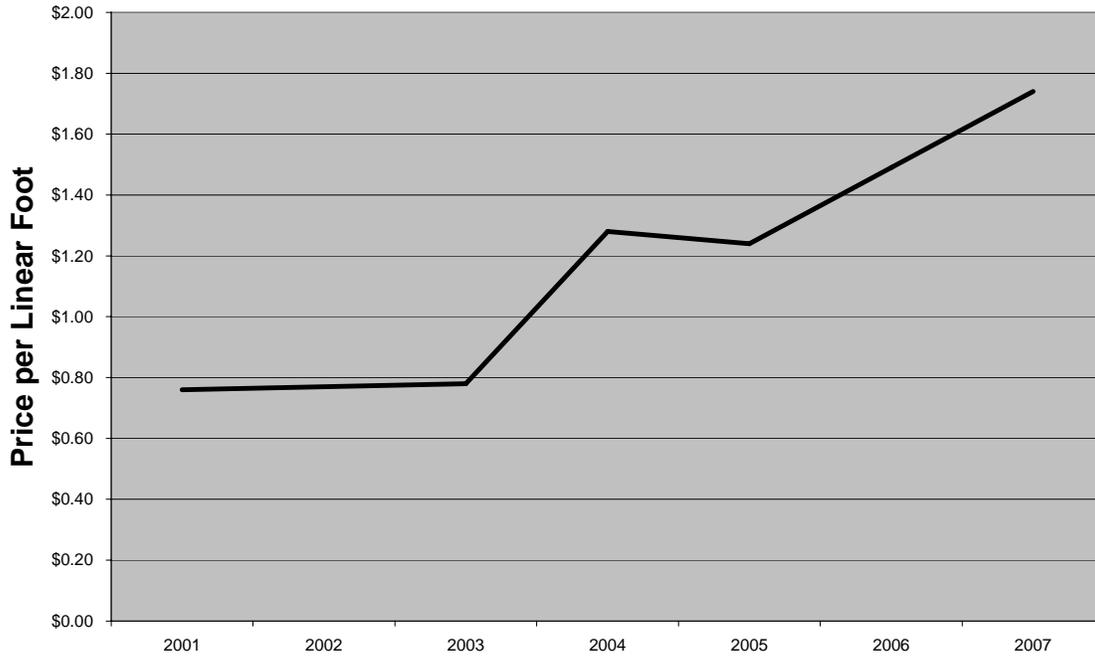
E. Trends

Generally, New York City's tropical hardwoods usage has remained consistent over the past few years. Due to recent construction and development levels, we can expect to maintain this rate into the future. Some agencies have been attempting to move away from tropical hardwoods to more sustainable alternatives, including DPR and EDC. However, with business as usual we will continue to consume around \$1,000,000 worth of tropical hardwoods a year for the uses outlined above. In the next two years, the three marine transfer stations will also come online, which will double the City's purchase of tropical hardwoods for those years.

The cost of ipe and other tropical hardwoods is increasing. Over the past seven years, the price of ipe bench slates has increased by 120%, from \$0.76 to \$1.76 per linear foot. Likewise, the price of ipe boardwalk decking has increased close to 100%, from \$1.62 to \$3.23 per linear foot. These cost increases are demonstrated below in **charts 2 and 3**.

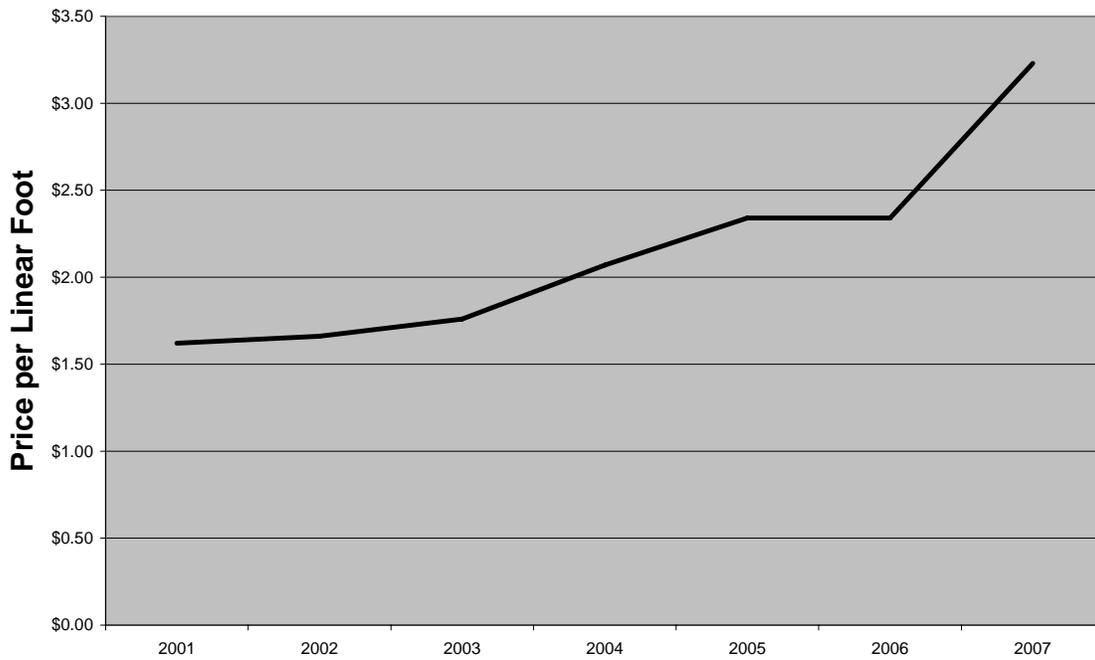
Cost increases can be attributed to increasing scarcity, rising freight prices, growing competition from China, and the decreasing value of the American dollar. In the future, wood prices are projected to increase as energy and natural resources become scarcer. In addition, carbon trading systems that recognize prevented deforestation (such as agreed in Bali) may increase prices as well.

CHART - 2 Price of Ipe Bench Slats*



Sources: CECCO Trading

CHART 3 - Price of Ipe Boardwalk Decking



Sources: CECCO Trading

* Data from 2001 and 2006 are estimates

III. Alternatives to Tropical Hardwoods

There are a number of alternatives to tropical hardwoods on the market today. Many of the alternatives listed below have potential as substitutes for tropical hardwoods, but due to the engineering of City infrastructure, direct replacement may not always be possible. Therefore, materials must be analyzed for two different characteristics: their suitability as short-term in-kind substitutes and their appropriateness for long-term major renovation, where engineering and support structure can be redesigned.

A. Recycled plastic lumber (RPL) and recycled plastic and wood composites

Recycled plastic lumber is recycled plastic which has been extruded into a form similar to wood lumber. Trex, a commercially available brand of recycled plastic and wood composite, is manufactured from wood shavings and post-consumer or industrial plastic. RPL and composites are durable, very weather resistant, and do not need to be painted.

However, the City has found RPL and composites to be generally more expensive than tropical hardwoods, and when used as decking material, they have not as of yet been able to span the same lengths without additional support structure. RPL may be a viable material for some City applications, but it must be piloted to ensure its safety and feasibility. Widespread use of RPL as boardwalk decking will likely require redesigning the support structure and thus must await the next replacement cycle.

B. Domestic and non-tropical hardwoods and softwoods

Domestic and non-tropical woods, like douglas fir or white oak, originate either within the United States or from other non-tropical forests. Generally, these woods are not as strong or as durable as tropical hardwoods, and some may have a shorter lifespan when used in certain applications. DPR has also found that domestic woods can be more expensive than tropical hardwoods.

Black locust is the only domestic hardwood that has similar strength and durability as tropical hardwoods. Black locust is a small tree that tends to twist as it matures, generating smaller dimensional lumber that can be more difficult to mill than ipe or cumaru. In the past, DPR has been unable to find an adequate supply of black locust in the sizes most commonly used.

However, a few local sources have supplies of black locust in sizes suitable for some City infrastructure. The Albany Pine Bush Preserve, a nature preserve of 3,010 acres in upstate New York managed by the Nature Conservancy, considers black locust an invasive species and removes about 30 acres of it a year. The trees are removed by a contractor who then chips

them and sells the wood for boiler fuel. According to the contractor's estimates, one acre can produce up to 90 tons of wood, or about 5,000 usable boards. Both the contractor and the Nature Conservancy are amenable to piloting the black locust wood from the Albany Pine Bush Preserve as material for New York City infrastructure. Purchasing wood from the Preserve would remove one of the hurdles associated with black locust, the lack of adequate supply.

C. Bamboo

Bamboo, which is scientifically categorized as a grass, is an extremely fast growing and thus a highly sustainable material. Bamboo may be made into lumber with adhesives. While it is an available alternative for indoor applications, it has been shown to mold when subject to wet weather in outdoor applications.

D. Steel

Steel is made from 60% post-consumer and 40% post-industrial material. It is durable and weather resistant. For some applications it can also be more expensive than tropical hardwoods and may have to be treated to prevent rusting and corrosion.

E. Concrete

Concrete is an extremely strong and durable material made of water, cement, sand (or aggregate) and stone. Currently, DPR has a pre-cast slab concrete boardwalk that is approximately 40 years old that has little to no maintenance or repair issues. There is also a 20 year old tiled concrete section on the Rockaway Boardwalk that has remained in good condition. Concrete boardwalks can take many forms, including molds, bricks, and poured slabs.

Concrete eliminates constant challenges inherent in wooden boardwalks, including insect infestations, tripping, splinters and fire hazards. The material is also readily available with no supply concerns. However, concrete may be expensive and may require structural reconstruction of boardwalks.

Cement also releases greenhouse gas emissions during production and is responsible for between 5-8% of annual global emissions. The emissions can be greatly reduced between 20-30% and perhaps higher by using concrete with high fly ash or blast furnace slag content. Concrete can also pose aesthetic challenges in historic areas, like the Coney Island Boardwalk where wood is the public's preferred material. Attractive concrete designs, however, do exist in the New York City region and elsewhere around the world.

F. Clay stone pavers

Clay stone pavers are dry pressed, bevel-edge building materials that offer permanent color; freeze-thaw resistance; minimal chipping; and good dimensional stability. The clay stone pavers are good for boardwalks where aesthetics and durability are of equal importance. Clay stone pavers can potentially pose the same aesthetic challenge as concrete in historic areas where wood is the preferred material.

G. Certified sustainable tropical hardwoods

Certified sustainable woods come from sustainably managed forests and suppliers that have been certified by an independent organization. The Forest Stewardship Council (FSC) is the most widely known and only international certification program. FSC covers forest management practices that ensure healthy, responsibly managed and traded timber forests and the tracking, labeling, and marketing of certified products through third party organizations.

The City has found that certified woods, like FSC Certified, can be subject to availability and supply issues and may cost approximately 20-30% more than non-certified products. In addition City agencies are unable to specify certified woods under New York State General Municipal Law §103, which governs New York City's procurement process. The law has been interpreted to prohibit municipalities from using the procurement process to advance "social goals." The use of certified sustainable wood is considered a "social goal", since there is no physical difference between sustainable and unsustainable woods. Therefore, it is generally illegal for the City to specify FSC certified wood, or its equivalent, in bidding contracts. However, as discussed below, there is an exception for certified sustainable tropical hardwoods that are prohibited under the existing New York State Finance Law § 165.

IV. Recommendations to reduce New York City's tropical hardwood use

A. General

New York City will evaluate New York State Finance Law 165 to determine whether an amendment would allow the City to legally procure certified sustainable tropical hardwoods not prohibited under the current law. If accomplished, the language change would allow the City to specify sustainable harvested wood, like FSC Certified, for short-term uses where tropical hardwoods are unavoidable.

B. Brooklyn Bridge Promenade

Since the mid 1980s, DOT has used greenheart for the 3,500 feet of the Brooklyn Bridge Promenade, and now uses approximately \$4,500 worth of greenheart a year to maintain and repair it. The entire promenade is

scheduled for renovation by 2017. Any material chosen for the replacement must be strong, durable and able to withstand large amounts of foot traffic. In the meantime, repair and maintenance of the promenade must continue with a material that works with the existing support structure.

- **Evaluation of alternatives.** With the current design of the Promenade, RPL and domestic or non-tropical woods would require additional support structure to achieve the necessary durability and strength. Some domestic woods might also entail more frequent replacement of the decking. Black locust, in particular, may have adequate strength and durability, but currently, the lengths required by the Promenade are not readily available.
- **Short-term plan for the Brooklyn Bridge Promenade.** Due to the current structure, DOT has been unable to identify replacement materials available for short-term repairs. DOT will begin studying alternative materials and designs for the replacement of the Brooklyn Bridge Promenade to take place by 2017. The study will identify the available domestic woods, such as oak and douglas fir, as well as composite and recycled materials; assess the strength and durability characteristics of these materials; measure the costs associated with reconstruction of the Promenade with different materials; and calculate their long-term costs and maintenance levels.

In the meantime, DOT will continue to purchase greenheart as a maintenance material for the remaining 10 years of service life. However, if language changes are made to the New York State Finance Law §165 prohibiting the use of greenheart and allowing for the use of certified alternatives, DOT will instead purchase FSC Certified ipe.

- **Long-term plan for the Brooklyn Bridge Promenade.** By 2017, the DOT will fully replace the promenade and reengineer the support structure in order to utilize an alternative material.
- **Cost implications.** The study of alternative materials and design is estimated to cost \$20,000. The long-term cost to replace the Promenade will depend on which material DOT chooses to use.

C. Staten Island Ferry Fender Racks

The Staten Island Ferry fender racks, bulkheads and pilings are made from greenheart. Fender racks are designed to absorb ferry impact energy and guide the ferryboat to the loading/unloading bridges. Due to the engineering of the ferry racks and the propulsion system of the Staten Island Ferry, the material used for dock building must have a strong surface that still offers the flexibility necessary to absorb a large amount of force. Any substitute material must be able to be driven deeply into the mud, which provides strength and

durability, and must be resistant to marine animals, such as mollusks and isopods, which can reduce the lifespan of wood.

- **Evaluation of alternatives.** DOT piloted RPL in the past by introducing a small section of it into one of the rack systems. DOT found that it was much heavier than wood, could not be easily cut or drilled because of the rebar running through it, and seemed to shift more than tropical hardwoods. Therefore, to be able to use RPL as a substitute for greenheart the rack system would need to be redesigned.

Due to the docking methods of the Staten Island Ferry and its flexibility requirements, concrete would necessitate the current ferry and dock system to be redesigned as well.

Domestic and non-tropical woods are not considered as strong or as dense as greenheart. They are subject to deterioration by marine animals, which reduce the usable lifespan of the wood. For example, one of the fueling slips at the St. George Terminal was constructed with creosoted pine pilings in 1993, a material now banned by the EPA (the fuel slips experience approximately three dockings a day compared to the 110 dockings daily that the Staten Island Ferries make into the regular slips). Because the pine was not able to withstand the weight of the ferries over time, DOT is now replacing the pine pilings with greenheart. To resist marine animals, domestic woods might also require chemical treatment.

Black locust, while stronger than most domestic wood, is not currently available in the current sizes required by the Staten Island Ferry racks with its existing design.

- **Short-term plan for the Staten Island Ferry fender racks.** DOT had previously designed a study that would evaluate the long-term viability of the existing ferry rack system to serve the new, heavier Molinari Class ferries. The study is intended to investigate methods for strengthening the existing system as well as the feasibility of replacing the existing rack with an alternative system that can satisfy the docking demands of the newer vessels at both the Whitehall and St. George Staten Island Ferry Terminals. To address the use of tropical hardwoods, the study will include an assessment of alternative materials as part of the strengthening and/or replacement designs, and an assessment of the potential use of alternative materials to reduce wear and required maintenance. DOT is currently seeking grant money from the Federal Urban Partnership Agreement to fund this study and expects to have funding in place by March 2008.

- **Long-term plan for the Staten Island Ferry fender racks.** Based on the results of the study, DOT will choose materials to pilot before widespread application.
- **Cost implications.** The fender rack study is estimated to cost \$3.5 million. The funding is part of the Urban Partnership Agreement with the US Department of Transportation. The cost of the pilots and replacement will depend on the outcome of the study.

D. Marine Transfer Stations

As part of the Solid Waste Management Plan (SWMP), DSNY has four marine transfer stations (MTSs) that have been designed, but have yet to be built, and two recyclable MTS projects for which design will begin shortly. Three of these MTSs include specifications for greenheart in their docking and fendering systems at a total combined cost of \$1,815,000. These MTSs are scheduled to begin construction in late 2008 and early 2009, respectively.

Due to the cost of changing current designs and the lack of adequate time for testing, the stations will proceed as planned. To reevaluate design would also delay the City's ability to switch waste transfer from long-haul truck to barge and rail, which could have serious environmental implications.

However, for those MTS projects for which design has not yet begun and for the future repair, maintenance and eventual rehabilitation of docking and fendering systems at all MTSs, DSNY will evaluate the use of alternative materials. For many of the same reasons as at the Staten Island Ferry, (durability, strength, and flexibility requirements) any substitute material will need to be able to withstand the constant movement and docking of ships, while offering a flexible surface to absorb excess energy.

- **Evaluation of alternatives.** The assessment of alternatives is the same as in the Staten Island Ferry discussion above.
- **Short-term plan for marine transfer stations.** During the design process for the two remaining MTS projects, DSNY will assess the potential alternatives to greenheart to determine if they can be employed without compromising facility performance, availability or life cycle cost.
- **Long-term plan for marine transfer stations.** DSNY will again seek to identify reasonable alternatives to greenheart if reasonable alternatives are not identified through the short-term plan described above. When the DSNY begins design work for the rehabilitation of the docking and fendering system at the MTSs in six to eight years, DSNY will study assess the performance of the materials originally employed, identify possible alternative materials and evaluate their suitability, prepare

comparative cost and life cycle analyses, and recommend suitable alternate materials.

- **Cost implications.** The design work is part of the regular process for maintaining the marine transfer stations and will have no additional cost.

E. Benches.

Today, DPR benches are made from a number of different materials, including RPL, steel, and tropical hardwoods. However, nearly 95% of existing DPR benches are made from tropical hardwoods. Due to agency environmental concerns and price increases, DPR has already begun to move away from tropical wood towards alternatives. The agency has also chosen to use more sustainable materials for bench repair and maintenance and has primarily purchased douglas fir, a domestic softwood, to maintain existing benches.

- **Evaluation of alternatives.** RPL, steel, concrete, black locust and other domestic hardwoods are all suitable alternatives to tropical hardwoods for new benches. While douglas fir is less expensive than alternative materials, its low durability levels require DPR to replace it every 6 years compared to around 25 years for ipe. The other alternative materials each have lifecycles greater than 20 years, which is approximately the timeframe in which City parks go through capital development and all benches are replaced. **Chart 4** demonstrates the bench construction costs of alternative materials (lifecycle costs are similar).

Due to the small size of lumber required for benches, black locust is available as a suitable substitute material.

- **Short-term plan for benches.** DPR will remove all tropical hardwoods from their bench specifications and instead specify RPL, steel, black locust or other domestic hardwoods. Where appropriate, DPR will assess options for including concrete in bench specifications (with fly ash blend to reduce the carbon footprint).

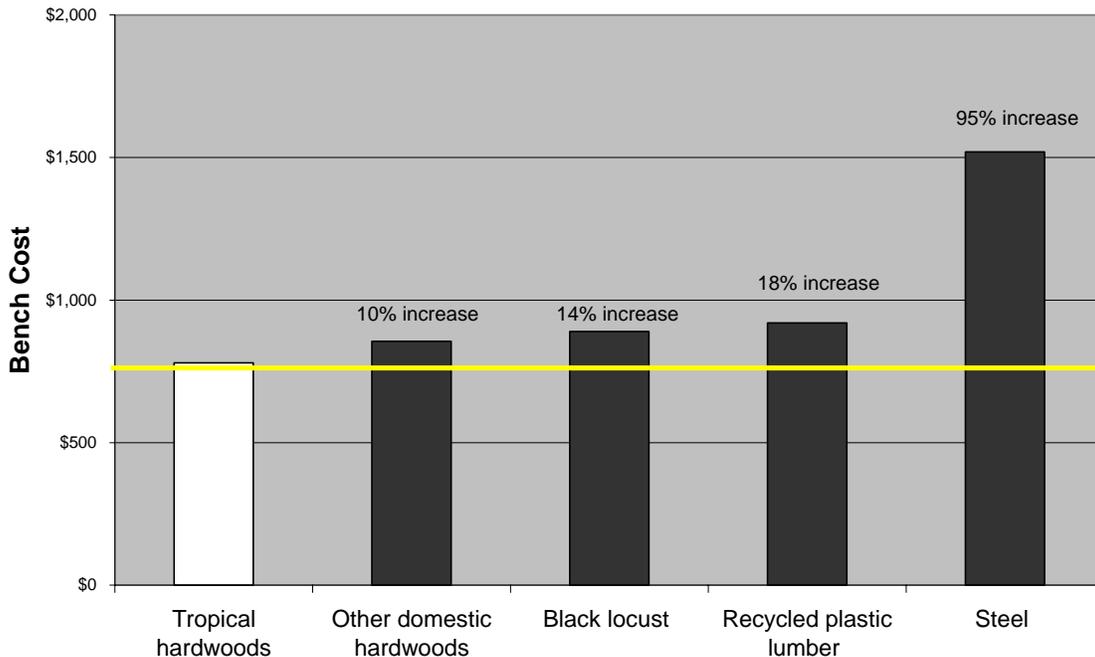
For repair and maintenance of existing tropical hardwood benches, DPR will no longer use tropical hardwoods and will instead use douglas fir or other domestic woods.

In addition, DPR will seek to purchase black locust slats from the Albany Pine Bush Preserve or similar sources for bench maintenance and repair, with a \$25,000 contract. This amount of wood will provide enough material to re-slat approximately 150 benches. While DPR will be able to purchase fewer replacement slats than usual douglas fir procurement, the black locust slats are expected to last longer.

DPR will also list the Albany Pine Bush Preserve contractor in the technical specification for new benches as a potential source of black locust.

- **Long-term plan for benches.** New benches will be made from the alternative materials named above.
- **Cost implications.** Changing the repair and maintenance specifications will not have any budgetary impact. Changing the capital project specifications will increase new bench costs by 10% depending on the material and design of the bench. **Chart 4** summarizes new bench construction costs by material.

CHART 4 - New Bench Cost by Material



Source: DPR estimates based on bench costs

F. Existing Boardwalks

DPR has an average annual capital budget allocation of \$1.25 million to replace sections of boardwalk, approximately \$400,000 of which is used to purchase tropical hardwood for decking, support members and some handrails. The funding has been targeted to the most seriously deteriorated sections of boardwalk and does not cover systematic replacement of the boardwalk on a scheduled basis. The boardwalks are constructed primarily

with tropical hardwoods from South America, including ipe, greenheart and cumaru. DPR has already begun to move away from tropical hardwoods for boardwalk elements like handrails and steps. Due to the strength requirements imposed by emergency and maintenance vehicles, DPR has not yet replaced those woods for maintenance of boardwalks. Any substitute material for the boardwalk itself must be extremely strong and durable, and be able to span the existing support structure of the boardwalk

- **Evaluation of alternatives.** The RPL currently available would require additional tropical hardwood support structure in order to span the same length as tropical hardwoods. However, RPL could potentially be used for the support structure with a complete redesign. A pilot would first be necessary.

Domestic and non-tropical hardwoods, like black locust and white oak, would also require additional support structure. Douglas fir, which is being piloted as a replacement material on some deteriorated sections or boardwalk, requires three boards bolted together to attain the required strength. The lifespan of some domestic woods, like douglas fir, can also be shorter than tropical hardwoods.

Black locust, one of the only domestic hardwoods available that is both durable and strong enough to serve as decking material for boardwalks, is not currently available in the large supply and sizes required by Parks. Because black locust is only generally available in shorter lengths, two boards may need to be bolted together to achieve the same length as tropical hardwoods. Due to the length requirements black locust would need to be piloted to study its viability as a boardwalk material.

Concrete is strong, durable, and long-lasting, with negligible maintenance required. However, concrete's high price and the many aesthetic concerns of communities must be overcome in order to consider it a viable boardwalk material. To ensure that the greenhouse gas emissions are low, high fly ash or blast furnace slag content can and must be specified.

- **Short-term plan for boardwalks.** DPR will remove tropical hardwoods from their specifications for handrails for boardwalks and instead use steel or other domestic alternatives.

The Financial Plan Summary for Fiscal Years 2008-2012 includes \$5 million in new funding in DPR's budget for Fiscal Years '08 and '09 to accelerate boardwalk replacement and pilot new approaches to boardwalk construction. DPR will expedite the replacement of the most deteriorated sections of boardwalk by making limited use of tropical hardwoods during the pilot period. DPR will also construct test sections of boardwalk in each borough using concrete. The test sections will total a few hundred feet and

will use two alternative design techniques. The first involves installing RPL or domestic wood decking over a concrete slab to maintain the historic feel of a boardwalk. The second approach will use decorative concrete treatments or clay pavers over a concrete slab.

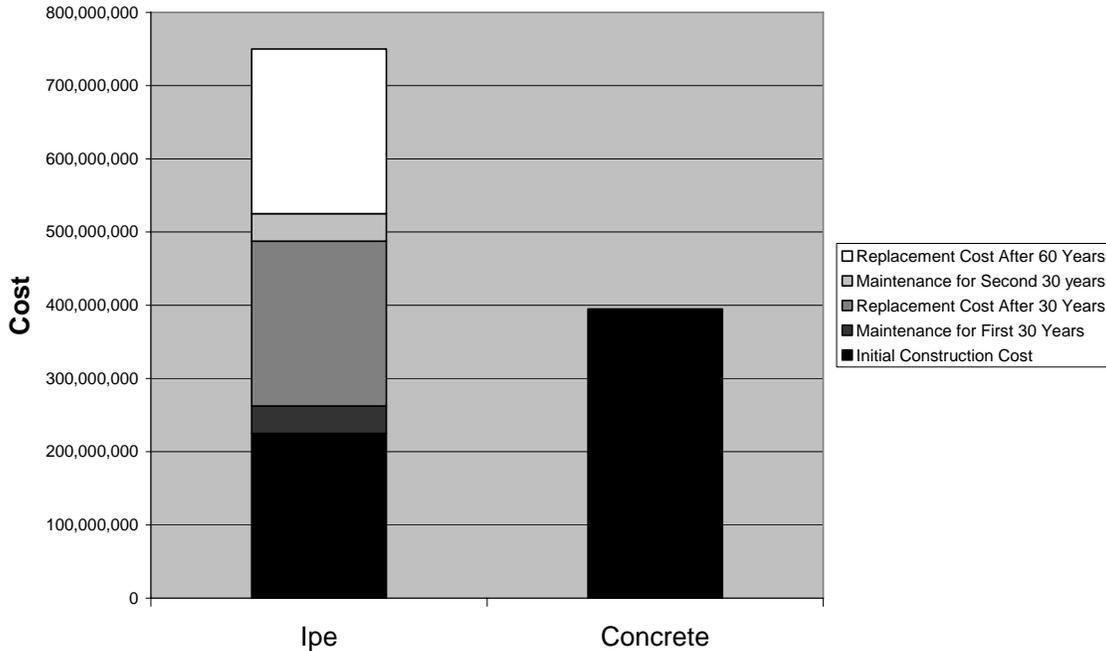
DPR has committed to using concrete with a high fly ash or blast furnace slag content in order to greatly reduce the greenhouse gas emission associated with the production of concrete.

DPR will also reconstruct sections of boardwalk using PRL or black locust as decking material and recycled plastic structural support members as demonstration projects

DPR is working with EDC on a study to evaluate the structure and possible materials for the replacement of the Coney Island Boardwalk. The study will review the results of the pilot projects described above and will also inventory other municipalities' boardwalk strategies and materials and repair policies. The resulting report will include recommendations based on cost, engineering and availability. The results of the study, while focused on the boardwalk at Coney Island, will provide information and details that will help inform the maintenance, repair and eventual reconstruction of other city boardwalks. Based on the recommendations of the study, DPR will renovate sections of the boardwalk in need of repair with an alternative to tropical hardwood. The Coney Island Boardwalk study will take a total of 18 months, with the first phase of the study focusing on alternative materials, and best practices.

- **Long-term plan for boardwalks.** DPR will replace boardwalks that are due for full replacement or major renovation with alternative materials based on the results of the study.
- **Cost implications.** Removing tropical hardwoods from the handrail specifications will have no additional cost. The boardwalk study on alternative materials and best practices is projected to cost between \$100,000 and \$300,000, and is included in the Coney Island Development Plan managed by EDC in coordination with DPR. All funding is in place for the boardwalk pilots of concrete, RPL and domestic woods.

CHART 5 - 60 Year Life Cycle of Boardwalks



Source: DPR estimates for the full replacement for all three major NYC boardwalks

G. New Boardwalks.

New York City will no longer design boardwalks or waterfront promenades made of tropical hardwoods and will instead use alternative materials that last longer and require less maintenance. This policy has already gone into effect. For example, the design for the East River Esplanade managed by the Mayor’s Office of Capital Project Development and the Economic Development Corporation, is considering alternatives for tropical hardwoods.

H. EDC Projects

EDC, which is not governed by General Municipal Law 103, has decided to move away from tropical hardwoods towards more sustainable materials. When tropical hardwoods are unavoidable, EDC will specify certified sustainable woods.

I. Mayor’s Office of Capital Project Development Projects

The Mayor’s Office of Capital Project Development oversees the development process on complex and large scale public projects, but all of its projects are funded and run through the capital programs of Mayoral agencies or EDC. Therefore, the rules on the use of tropical hardwoods developed by each City agency or EDC will apply to individual projects.

J. Projects of other Agencies, including DDC and DCLA

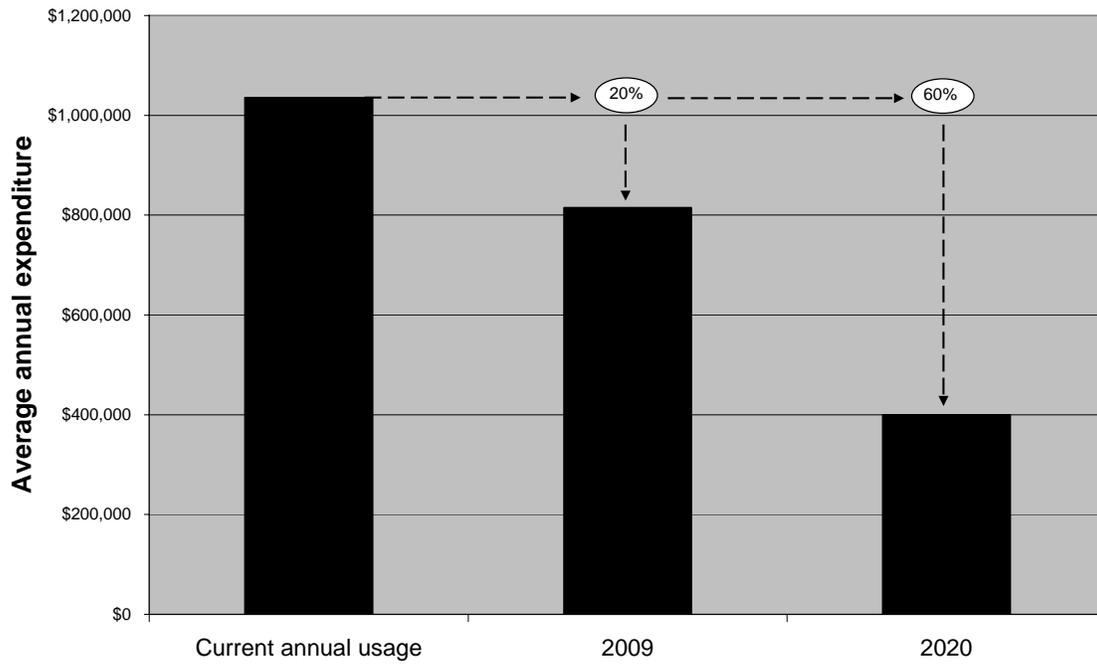
Where feasible, City agencies will include language in procurement bids that will reduce, to the greatest extent possible, the use of tropical hardwoods that are not specifically prohibited under State law.

V. Conclusion:

To reduce New York City's contribution to global greenhouse gas emissions and lessen the City's role in the destruction and deforestation of tropical rainforests the City will significantly cut its reliance on tropical hardwoods. To accomplish this goal, the City is seeking practical, cost effective solutions that consider safety, cost, durability and other concerns. However, doing nothing is not an option.

In the short-term, the City will reduce annual tropical hardwood usage by approximately 20%. To further reduce our use of tropical hardwoods in the long-term in a safe and cost-effective way, the City will undertake series of studies to evaluate alternative designs and materials for our marine transfer stations, Brooklyn Bridge Promenade, maintenance of existing boardwalks, and Staten Island Ferry docks. For example, if DOT uses an alternative material for the replacement of the Brooklyn Bridge Promenade, then it will save approximately \$3,000,000 worth of greenheart. The same can be said for the two recyclables marine transfer stations, which, if they proceed with substitute materials, will save approximately \$1,815,000 of greenheart.

CHART 6 - Annual New York City Spending on Tropical Hardwoods



* Total annual wood usage is based on amount used per year and does not include one time capital costs. 20% reduction assumes the elimination of tropical hardwoods purchased for bench repair and maintenance and for the majority of DDC managed projects. DDC will eliminate, to the greatest extent possible tropical hardwoods usage, but in projects where it is unavoidable DDC will continue to purchase tropical hardwoods. The additional 50% reduction by 2020 assumes the replacement of the Brooklyn Bridge Promenade with an alternative material by 2017 and the reduction of the tropical hardwoods purchased for boardwalk repair and maintenance.