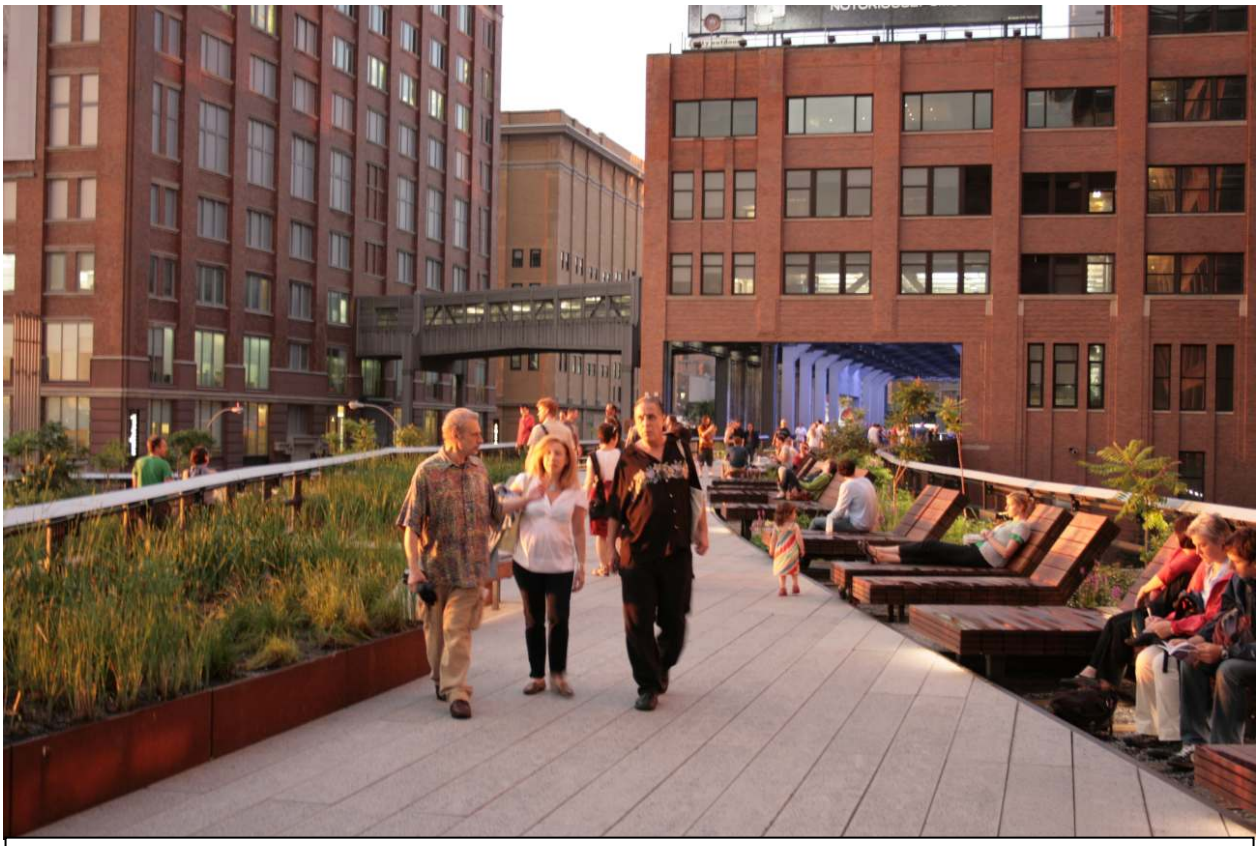

Image of completed High Line. Available <http-_culturefix.files.wordpress.com_2009_07_highline-chairs>

Urban Simulation Technologies And The High Line

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12.18.2009
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INTRODUCTION

The field of Urban Simulations is one that is very much in development. While it is not yet used regularly within the design profession, it has the potential to become an indispensable tool in the creation of new town and urban plans. Furthermore, should the accuracy of the developing programs continue to be honed, urban simulations could impact the way that architects conceive of their designs within their greater contexts. To explain how these simulation programs may soon impact the design field, this paper will explore the recent evolution and implementation of BIM within the design world, and how this may soon further evolve into Urban Simulation. A second part of the paper will explore the High Line project in New York City and how its implementation might have been aided or hindered should urban simulation technology have been in use.

THE DESIGN FIELD AND ITS FUTURE: URBAN SIMULATION TECHNOLOGY

Client-Designer communications have evolved steadily over the last century. Clients are no longer restricted to plans, sections, elevations and laborious hand-made models, which are difficult to update. Technology and simulation has allowed designers to present many more iterations of drawings to highlight information, full-scale mock-ups, material boards, life-like renderings, simulated walk-throughs etc. Technology and the computer have allowed the design process to excel, and speed to a rate that never could have been predicted. This rate has

come to a point where design turn around is unprecedented, and almost out of control. Clients want to see change, multiple iterations, and high quality presentations, and they want them on demand and with higher-frequency than ever before; we must wonder what cost this takes on the profession.

Before technology infiltrated the design field, clients were more cognizant of the effort and time required to make a change to building design, more thoughtful about what they asked to see, and more understanding of turn around rates and the products they saw each time they met with their design team. Clients had to be able to have a certain amount of understanding for the plans, sections and models they saw because it was simply not possible to show projects simulated realistically. However, with the introduction two-dimensional Computer Aided Design-type programs in the 20th century, expectations began to change. This development alone revolutionized they accuracy of drawings and the time they took to construct, as changes were simple to make and did not require restarting the drawing from scratch. Still, accuracy of these drawings is only 95%.[1] In recent years, two-dimensional drawing software has evolved into programs which can design in the third dimension are increasingly complex and accurate in their geometry.

Newer modeling programs such as Rhinoceros, 3D-Max, Maya, and many others have allowed buildings to be understood in the third dimension long before they are realized. Buildings, like sculpture, can now be designed in the round rather than initially conceived of through 2-D plans and sections. Furthermore, developments to these 3-D modeling programs have allowed realistic renderings and vignettes to become a stronghold in design presentations. Rendering

[1] James Cramer and Scott Simpson. The Next Architect. Norcross GA: Greenway Communications. 2006. 55

programs such as V-Ray, has taken output material possible to create in the 3-D modeling programs a step further, allowing detailed materials and bit-maps to be assigned to surfaces. These programs can also simulation sunlight, and even the sky allowing for a literal simulation of how a building will appear at a specific time of day, any time of year in a site-specific location. Clients no longer have to use their imagination to envision the final outcome of the building, empowering them to have more realistic expectations, greater ownership over the outcome, and more ground on which to take issue with design details.

Developments in building simulation, such as Ecotect can now take these 3-D models and apply environmental conditions to them, measuring design performance. Environmental simulation programs can look at shading, day lighting within the building, energy loads, wind performance etc. Furthermore, operators of the program have great control over the conditions that the model is analyzed with, meaning that a large variety of situations and outputs can be examined.

3-D modeling and simulation has most recently excelled an additional step into BIM or "Building Information Modeling." Architects are not the only, or first members of the design field that have been using 3-D modeling programs. While architects were slowly working to adjust to new three-dimensional programs in which they could design (often adapted from other fields such as ship-building and animation), the "construction industry was rapidly (and separately) developing software that would streamline the construction process by integrating documentation and project management tools within a single, automatically updated 3-D database-the building information model."[2] Structural engineers, M/E/P, lighting engineers and

[2] Cynthia Ottchen. "The future of Unformation Modeling and the End of Theory: Less is More is Different." Architectural Design, v. 79. March/April 2009. 23

other sub-contractors all may use 3-D modeling to design their piece of any given project as well.

The development of different programs used across fields can make sharing essential information difficult, and lead to oversights in areas where proposals from different sub-contractors do not match. This leads to more issues, change orders and construction delays—all adding to project cost and time. BIM programs are used to bridge the gap between the various sub-contractors and designers. "One of the biggest benefits of 3D is the clarity of information… a 3D model is the best way to pass information around." Said Gary William, the assistant director of structural engineers William Hare.[3] BIM programs allow all involved parties to work from one, automatically updated program, accessed over the Internet. While each party is responsible for their own part, and does not have permission to change the work of other firms, inaccuracies are far easier to catch. And, because all work is completed on one file, it is far easier to understand the relationship between the works of the different parties."[4]

BIM currently exists in two types. In the first BIM typology, parties work from a single program, and the program adjusts per the needs of each party. An example of this is the AutoDesk owned REVIT program, which allows certain information to be presented to, say the architect, who is meant to design everything from the massing to the wall type in the program, while other information is provided to subcontractors such M/E/P engineers who design in response to the architect within the same program. All parties are working from the same file, even if they do not see all information at the same time through a series of complex layers,

[3] Spiro Pollalis et al. "Exchange Square London: Information Technology for Collaboration." A Case Study completed at Harvard's Graduate School of Design. 2005. 5
[4] Pollalis, 2004, 5

allowing different parts of the model to be turned on and off to avoid confusion. The second type of BIM programs work to marry the disparate and fractured information that is created when different programs used by the participating parties. Programs work to allow the information produced by the different parties to be layered together as a whole so that inconsistencies can be exposed. Many of these programs are also capable of self-identifying issues between the different models. In either case, the collaborative nature of the files produced is what leads to the greater accuracy of production, as it becomes difficult to ignore conflicts created by different design components.

However, while these programs can increase accuracy, reduce change orders and construction time, as well as reduce the need for team meetings—they are an added up-front cost. Design teams often face already tight budgets, and clients can have very tight purse strings, making them hesitant to give extra money to buy the increased up-front accuracy that they may feel the design team is obligated to achieve under their initial contract. John Rourkis, director of the engineering firm JB&B states "we usually don't develop 3D models because it would be an additional financial burden to the client. We make quazi-3D models for certain areas that are difficult to resolve to make sure everything fits…"[5] Because of this burden, BIM is not economically wise for small projects, while benefits increase exponentially the larger the projects, and the more people involved.[6] It is also important to note that using BIM software is an additional cost to firms, as they must make the effort to initially transition to using BIM programs, requiring adjustments to project management as well as the training of staff to use the programs, and possibly hiring staff who can specifically respond to BIM issues. Additionally,

[5] Pollalis, 2005. 5.
[6] Steve Parnell. "Building Information Modeling." Achit J. No 4. July 23, 2009.

BIM requires a commitment and participation of all of the design parties for it to be able to function in the way the programs are designed, as it is meant to be a tool for collaboration.

While BIM can dramatically increase accuracy, it is by no means infallible, and is still susceptible to human errors. Architectural modeling programs especially have difficulty reaching the same level of accuracy that a construction document must reach. And, as one architect, Cynthia Ottchen describes, "The primary concern of many practicing architects in choosing a BIM package is the potential rigidity and composed rigidity that would be imposed on the design process. As a result many designers still use intuitive design process and switch to BIM for production, or they collect optimization data for several factors at the front end of the design process and try to rationalize the often divergent results cerebrally."[7] This disjointed nature can lead to confusion between subcontractors and design as well as inconsistencies in the design. And, considering that, as one critic suggested, "one piece of inaccurate data can undermine the integrity of the model," this sort of possibility raises concern about the smoothness of the process. Furthermore, a singular file brings up issues of ownership. "Who should enter verify and maintain that data? The architect? The engineer? The manufacturer? Or a company such as AutoDesk? Given the dominance of AutoDesk, will BIM become a proprietary standard or an open-source format? What about transferring data between models?"[8] In short, BIM cannot be considered a replacement for human checking and decision-making, and the different parties involved must still take clear responsibility of their work. It is, after all, still a program, so while it may be highly functioning and capable of providing a valuable interface of information exchange, it is not intelligent,

[7] Ottchen, 2009. 23
[8] Douglas MacLeod. "Roll up the BIM to Wim." The Canadian Architect. V. 53, no 8. August 2008. 35.

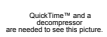


Diagram of how BIM functions from “Building Information Modeling” by Steve Parnell

The continual evolution of the BIM programs has certainly allowed designers to more effectively communicate ideas, and most importantly, has helped relay better information, more accurately to sub-contractors, regardless of faults. This has positively impacted the design process with more accurate budgeting, clearer expectations, and time saved explaining and re-explaining information. However, implementing the new practices is a task which always

proves difficult for designers as they are slow to change and adapt processes which they already feel work. BIM seems like a concept that one would have expected to be implemented much earlier and faster within the design world, as benefits are clear and valuable. Nonetheless, larger firms, especially, have been working to adapt to the BIM mindset. Still, there are many years to go before BIM is the norm throughout the design professions, and it is honed and improved so that the program works seamlessly.

While BIM is proving to be an increasingly useful and constructive tool as it develops, it is still caught, for the most part, at the building scale. BIM programs do not yet integrate information on the broader level of a campus, development, or city. However, as the design field develops alongside of technology, it has become no longer acceptable for architecture to internalize its focus solely on the individual building; it must also be contextualized in its surroundings. With increasing focus being placed on environmental, economic and social sustainability, buildings must understand and respond to the communities in which they lie. This means understanding neighborhood personalities, amenities, transportation, lighting, proximity, zoning and view corridors to name just a few. Of course these are things most would argue, and hope, that designers research and carefully consider when they are creating a schematic presentation. But, if each designer creating a building within the same neighborhood comes to different conclusions for these points, then what will the impact on the area be? And, the intense research required to determine stances on these issues takes away valuable time for architects and planners to conceive of a thoughtful schematic design to present to their clients. Furthermore, many of these considerations are forgotten as the design process continues.

This is where developing urban simulations technologies emerge as a potential tool in the design process. These technologies, though very much still in development, have seemingly endless expanding possibilities for analysis and visualization. While they are currently at a stage where they are most readily used for video games and movie simulations, increasing accuracy and improving simulation methods indicate that these technologies have the potential to become a priceless tool for both large-scale designs and for individual buildings. Urban simulation has the possibility to behave in a similar manner to BIM, but on the scale of the city, incorporating not only building information, but also mapping the city's infrastructure.

Urban Simulation programs have the potential to eventually three-dimensionally map systems such as waste, transport (above and below ground), telecommunications, erosion, and water. Having a city mapped in 3-D would mean that accurate day lighting simulations across projects could occur, and be mapped through the year, accurate wind studies could be tested, and in general the pedestrian and personal comfort outside of the building could be better considered. Should the technology develop to an even higher level, it would have the ability to map urban loads such as heating and electricity. Mapped on the urban scale, this sort of tool could look at the existing loads on a power grid and the impacts that each new construction project would have on the local power sources, whether it have methods to return power to the grid, or only take from it. This could better aid designers in understanding a) the impact that their energy load will have on the surrounding buildings and structures, and b) look at if the existing grid can support their needs.

An Urban Simulation Model would, like the developments in BIM, function as a file where

many levels of information could be compiled, allowing many people to access and update accurate information from a single file, a file that effectively, in three-dimensions maps a city, or a portion of a city, and all of its networks. It is a massive amount of data in one place, raising many pros and cons for the file use, but also possibly becoming an indispensable time saver in the implementation of new construction projects. Information access has come to rule modern thought. In an article written by Cynthia Ottchen, she notes that Clif Anderson, the writer of Wired suggests: "the need to have casual semantic models is over: the new availability of massive amounts of data (what he calls the 'petabyte'). Combined with applied mathematics, supersedes every other tool."[9] Having all of the types of information layered in relation to each other is indispensable.

What will eventually make the Urban Simulation programs invaluable will be the inclusion of a fourth dimension – time. "Cities are systems of high functional and visual complexity. They reflect the historical, cultural, economic and social changes over time in every aspect in which they are seen…New York reveals a fantastic diversity of street patterns, buildings, forms an textures."[10] The trick will be figuring out how such information can be modeled, and accurately. Through the use of GIS, or Graphic Information System, census data can be mapped on a two-dimensional plan. Given this capability, it does not seem so far off to map changes in census data over time on a 3-D urban map, allowing for easy analysis of changes in the urban fabric that may be leading to upturns of downturns in a specific area. The challenge of a 4-D city model, as one program developed suggests, "is to integrate various components into a coherent framework and to make sure that all necessary geometric qualities are

[9] Ottchen, 2009. 36
[10] Yoav I. H. Parish, and Pascal Muller. "Procedural Modeling of Cities." Published though the ETH Zurich, 2001. Available < *graphics.ethz.ch/Downloads/Publications/Papers/2001/p_Par01.pdf*> 12/16/2009

simulated."[11] Even if all of the data (which exists desperately) can be synthesized into one model, exposing errors and points of contention, at what point is there simply too much information to process?

As Urban Simulation Models develop the capabilities to process such information, the additional concern as to who will upkeep the files, and who is responsible for their security will arise, much in the same way it is becoming a question in the current world of BIM. "Knowing all model parameters is challenging and even more so for large urban spaces. Representing an existing urban layout as a set of procedural rules typically involves significant manual labor."[12] To give a non-architectural example, the Urban Model in the 2006 film *Superman Returns* took 15 man-years to complete.[13] Without the backing of a major motion picture studio, and with the added burden of layers and layers of complex information, responsibility and funding becomes a large concern. Furthermore, should a city take on, and maintain an up-to-date Urban Simulation, safety can become of concern. If the wrong people were to get a hold of the file, they would have, in one place, the complex working of the entire city, and be able to discover and exploit the city's faults.

At the current stage of development Urban Simulations are capable of mapping street grids and pipelines, and generate new city or neighborhood grids based on user parameters in a matter of seconds. Programs can also distribute building types by zone, and vary the assigned buildings

[11] Basil Weber et al. "Interactive Geometric Simulation of 4D Cities." Eurographics 2009. Vol. 28, No. 2. Available <http://www.procedural.com/publications/2008_EG_Urban_Simulation/2008.EG.Weber.UrbanSimulation.Paper.pdf > 12/16/2009

[12] Daniel G. Aliaga et al. "Interactive Reconfiguration of Urban Layouts," Purdue University. 2008. Available <http://www-users.itlabs.umn.edu/classes/Fall-2009/csci8980-compgnd/reading_list/urban%20design/aliaga_cga08.pdf> 12/16/2009

[13] Guoning Chen et al. "Interactive Procedural Street Modeling." 2008. Available <http://people.oregonstate.edu/~cheng/street_sig08/street_project.htm> 12/16/2009

within a user-defined parameter. Bit maps of appropriate façade types can also be applied to the facades of generated buildings. However, because the plethora of programs that are developing independently, with new programs emerging all the time, it is difficult to truly synthesize Urban Simulation capabilities at this time. However, given the rapid development so far, it is safe to assume that within the next five to ten years that Urban Simulation will be infiltrating the stubborn world of design in the way that BIM has in recent years. What only time will tell is how Urban Simulations will be able to affect not only urban scale new developments and major overhauls, but how such quantities of information will be applied to all of the individual projects which are occurring in a city at any given time.

Furthermore, should issues of ownership (most likely by a contracted third party or the city) be established, issues of the user will arise. Should the program be marketed to designers, questions of what cost they will be expected to pay, and to what extent they have access to the model will arise. If an architect requests use of the model for his new project, does he get to use information for proposed buildings that will be around his site, even if they are not necessarily fully public yet? To what extent does a user get to modify the model for the purposes of their project, even if they are only choosing to modify their site? Would a user get to adjust pipelines to show the delivery of water to their proposal, for example? Uses for the city seem clear,: should traffic patterns be mapped, the city could easily use a model to plan disaster relief efforts and simulate their implementation,[14] and tracking developments in infrastructure could be invaluable to the city's planners. What will become more apparent in time is to what level it is appropriate to make a city's urban simulation accessible to the public.

[14] Aliga, 2008

THE HIGH LINE

Image of High Line pre-construction. Courtesy of www.thehighline.org

Built in the 1930's, the High Line in the lower Manhattan area of New York City served as an urban rail line to deliver and receive products from the Meat Packing District. Over the course of the century, the area that the line moved through evolved quickly into one of New York's hippest neighborhoods, attracting high-end boutiques, galleries and restaurants. The old warehouses that had served the area when industry dominated were easily re-appropriated to create large, airy spaces that were difficult to find in the rest of Manhattan. Through this development, the High Line railway ceased to be used and was left untouched for several years. Though pieces were demolished over the years to make way for new construction, by the late 1990s, 6.7 acres of track, 296,000 sf over 1.45 miles (1.53 miles should an additional parcel near the Post Office be considered) covering 22 blocks in lower Manhattan remained.[15] "A rusting incongruity, the High Line is a hulking relic when viewed from below, its promise revealed only when one ascends its verdant deck of tall native grasses and wildflowers that have taken hold since the trains stopped running in the early 1980's. It emerges from a rail yard at 34th Street and runs about 30 feet above sidewalk level south to Greenwich Village, where it ends at Gansevoort Street."[16] Because of the Native growth and lack of maintenance, the High Line became a rare occurrence of wildlife within the city.

[15] Joshua David. Reclaiming the High Line. New York: Pentagram. 2002.. 7
[16] Mike McIntire. "Move to Reclaim Rail Line Receives Bipartisan Push," The New York Times. July 25, 2003.

Though it stopped being used in 1980, the highline remained undisturbed for almost 20 years before it became the subject of controversy among residents in the neighborhoods surrounding the abandoned tracks. In 1999, as the High Line was slated for demolition under the administration of Rudi Giuliani, Robert Hammond and Joshua David founded a group called the Friends of the High Line with the hopes of saving the tracks and turning them into valuable public space lacking within the old industrial neighborhoods the rails had once served.[17] The High Line was perceived to be a hindrance to local development, which was picking up as the neighborhood was becoming trendier. An organization, 'Chelsea Property Owners' (CPO) had been working since the mid-1980s to achieve this goal, and appeared to be nearing success. CSX, the owners of the railway were neutral about the future of the lines, and therefore were not taking a major role in the growing debate over the future of the High Line.[18] However, as Joshua David points out in the book published during the initial efforts to save the High Line, "where parks have been revitalized, the neighborhoods have blossomed with new life."[19] It was this that inspired he and Mr. Hammond to take such a strong stance in protecting the elevated

Image of High Line pre-construction. Courtesy of www.thehighline.org

[17] Friends of the High Line official website. Available <www.thehighline.org> 12.15.2009
[18] David, 2002. 14
[19] David, 2002. 4

lines.

While saving the High Line would prevent a lot of construction from taking place in the area, saving it not only provided a much needed park, but also a way to add another unique character to the area, improving the local economy and increasing local property values. The Friends of the High Line were not shy in pointing out that preserving and creating open, public spaces boosts property values and generates higher property tax revenue.[20] In other words, the High Line could be an asset in a way that endless development could not. However, in the middle of the initial efforts of Friends of the High Line, the attacks of September 11, 2001 occurred, and for some time all talks, both pro and con saving the High Line, stopped while the city tried to regroup. The book Joshua David published in 2002, long before the High Line was saved and developed into an urban park, indicated "it is still too early to know what direction New York City's rebuilding will take. But it is clear that all new construction in Manhattan, of private buildings and public spaces alike, has a vital role to play in our city's recovery. Any brick put down or any tree planted must recharge the urban economy"[21]

At the time of the books publishing, the High Line already had several notable, wealthy, and well-known donors. These donors, coupled with an endlessly growing group of smaller donations to the effort would eventually raise over $44 million of the projected $150 million cost.[22] By 2008, with a design chosen and construction under way, the New York Times, who had been following the project since 2003 when it was clear that the High Line would be saved,

[20] David, 2002. 15.
[21] David, 2002. 15
[22] Robin Poegrebin "First Phase of High Line Is Ready for Strolling." New York Times. Published June 8, 2009

stated that the High Line had over 1,500 private donors.[23] (For a full list of current Friends of the High Line visit <http://www.thehighline.org/about/supporters>) Among the largest, and most vocal benefactors were two New York power couples. Diane Von Furstenberg (the famous fashion designer) and her husband Barry Diller the Chairman and CEO of the InterActiveCorp (IAC) and previous head of Paramount Pictures, Fox Broadcasting, and USA broadcasting were both have offices adjacent to the High Line, and were early supporters or the projects were among the first supporters of the campaign. They pledged $10 million dollars to the project with Mrs. Von Furstenberg's Children Tatiana, a musician, and Alexander the CIO of Arrow Investments, Inc, who has himself been very involved in the efforts to preserve the High Line. Philip Falcone the Senior Manager of Harbinger Capitol and his wife Lisa Maria matched the $10 million dollar donation, although, as they proudly stated, they did not actually own property near the elevated rails.[24] Among the other notable supporters indicated by the New York Times between 2003 and 2009 were the Romanoff family, Dorothy Lichtenstein (the widow of the artist Roy Lichtenstein) who has an apartment near the High Line, Andre Balazs (owner of among many other luxury hotels the Chateau Marmont and the Standard Hotel which straddles part of the High Line, actors Edward Norton, Kevin Bacon and Kyra Sedgwick, Charles Rockefeller, Nicholas Stern and Jon Patricof among many others. The High Line had no shortage of prestige backing its success. (See Exhibit 1 for a list of the board members of the High Line, and Exhibit 2 for the major supporters and the members of its trust.)

Aside from private donors, the High Line's success was greatly dependant on backing from the Federal, State and City governments. The federal government had financial jurisdiction over the

[23] Robin Finn. "Two Friends, and the Dream of a Lofty Park Realized." The New York Times. Published July 11, 2008
[24] Poegrebin, 2009

fate of the High Line through the Surface Transportation Board.[25] The State controlled the largest considered developable below the High Line, and the City's support was necessary for effective and efficient public funding.[26] Though it was determined that funds could be gathered over time, and the project could be phased, the Friends of the High Line understood that the support of the varying levels of government were crucial to the success of the project and they tried to create specific allies within the government to aid their cause. The New York Times, on their reporting of the Project's opening in June of 2009, stated "With all the bureaucratic hurdles the project had to overcome, it was perhaps no wonder that so many representatives of different arms of government were there for Monday's celebratory news conference, including Amanda M Burden, the city planning commissioner; Adrian Benepe, the parks commissioner; and Representative Jerrold Nadler, Democrat of New York."[27]

Image of 2004 press conference with Mayor Bloomberg. Courtesy of www.thehighline.org

[25] David, 2002. 73
[26] David, 2002. 37
[27] Poegrebin, 2009.

In 1999, at the project's start, Mayor Rudi Giuliani had been in favor of tearing the project down, but the Friends of the High Line were fortunate enough to gain the new mayor Michael R. Bloomberg, who himself would become a private backer of the project, when the office changed. It was these sorts of connections that the friends of the High Line had to foster in order to succeed. According to the project's official website (www.thehighline.org), the group first received city support in March of 2002. In December of the same year, the City filed with the federal Transportation Board to make it the City's policy to preserve and reuse the Highline. The council speaker, Gifford Miller pledged $15 million over a four-year period in September of 2003. By October of 2004, Mayor Bloomberg had pledged $43.5 million over four years to develop the High Line.[28] In June of 2005, after several additional filings, the Surface Transportation Board finally granted a Certificate of Interim Trail use for the High Line. Throughout this period a design competition took place, and in April of 2006, ground was finally broken on phase 1 the project between the High Line's start at Gansevoort Street and 20th Street.

The design of the High Line was open to the general public as an initial exercise for use suggestion in 2003. The competition drew 720 proposals from 36 countries, and most importantly a large amount of publicity to the High Line cause. The submissions were publicly displayed in Grand Central Station and ranged from restoring the Rail lines to an urban cow pasture, to a 1.5-mile long lap pool. As Vishaan Chakrabarti was quotes as saying in an article covering the competition in the New York Times: "What it proves to me is that no matter what the design of the High Line ultimately is, something great will occur. It's obvious from this

[28] Gavin Keeny, "The High Line and he Return of the Irreal." Competitions. Winter 2004/2005. 16

competition that the conceptual is going to get us to the real."[29] Mr. Chakrabarti reviewed the many submissions with the help of architects Steven Holl, Marilyn Jordan Taylor, and Bernard Tschumi, as well as landscape architects Julie Bargmann and Signe Nielsen. This open competition led to the more formal, professional competition for the High Line design in March of 2004.[30]

The design competition to turn the High Line into a public park originally consisted a field of sixteen submission, which were narrowed down to a final four. These four options where than publicly displayed and critiqued before a final decision was made. The final four included designs by Steven Holl Architects, Zaha Hadid Architects, TerraGRAM, and Field Operations in conjunction with Diller, Scofidio and Renfro. Holl, who lives and works in a neighborhood traversed by the High Line, wanted to "make a slice of green,"[31] with the help of the Landscape architects Hargraves and associates. His proposal included public art installations, observation tower, and a bridge leading to water taxis. Holl had been interested in the High Line reuse long before the Friends of the High Line existed, in1980 after the trains creased to run. He proposed that the tracks be made into a 'bridge of houses,' a concept that was never seriously considered.[32] Holl's modern public promenade, along with the other finalists, was published in Competitions Magazine after the winner had been determined. Of his proposal, they stated: "The Chief concern for the Holl team seems to be to puncture, perforate and otherwise accentuate what moves above, below and through the High Line corridor."[33]

[29] David W. Dunlap "In This Pool, a Single Lap Is a Workout." The New York Times. Published June 1, 2003,
[30] The Friends of the Highline website. Accessed 12/15/2009.
[31] Julie V. Iovine. "Architecture; Elevated Visions." The New York Times. Published July 11, 2004
[32] Nicolai Ourousoff. "An Appraisal; Gardens in the Air Where the Rail Once Ran." The New York Times. Aug 12, 2004
[33] Keeny, 2004. 14

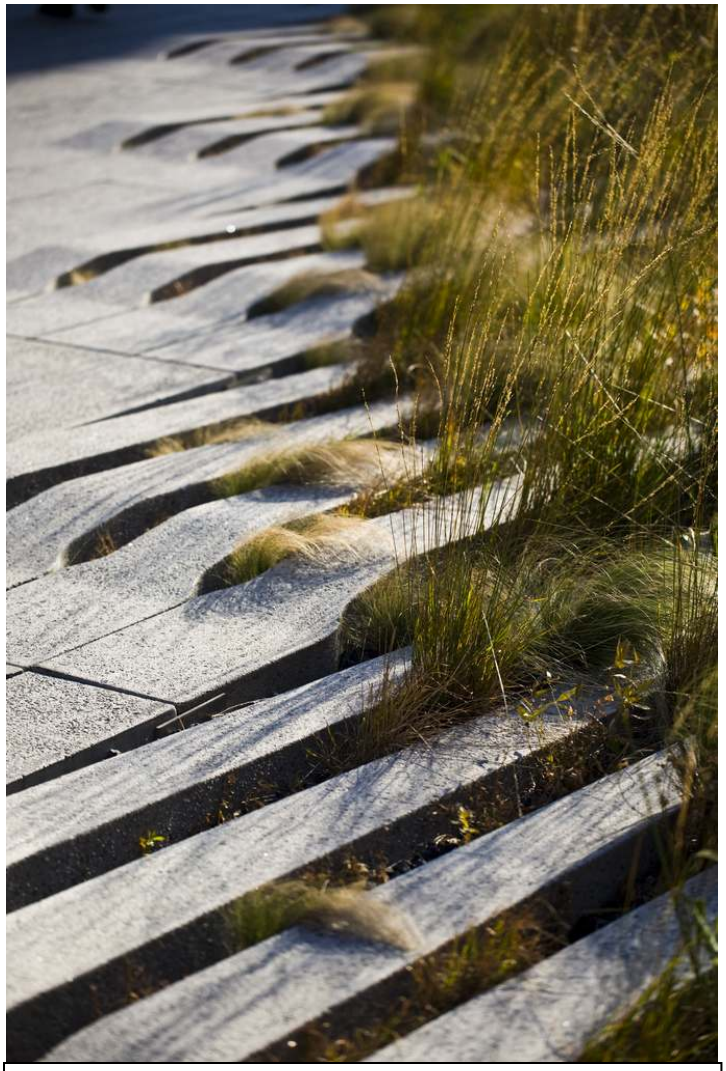
Hadid's design focused more on cultural institutions. With Skidmore, Owings and Merril and Diana Balmori, Hadid also looked to local public art groups for submissions to include in her design. Hadid proposed that the project be turned into something of a mobius strip, creating stages, seating and event space in the folds, and creating and uninterrupted flow of movement.[34] "Hadid has retained the essence of the radical constructivist and supremacist quest for evocative form while adding the topological inversions (twists and turns) that have recently displaced purely orthogonal, architectonic systems in instances where architecture becomes site."[35]

TerraGRAM, led by Michael Van Valkenburgh and partnering with Julie Bargmann of D.I.R.T. Studio, artist James Turrell, and architects Beyer Blinder Belle. As Van Valkenburgh described, they hoped to make the High Line into "a forest of trembling Aspens – like Alice in reverse. I fell in love with the contradictory power of this enduring industrial structure living in combination with the in-vitro natural landscape."[36] Looking to earthworks artists for inspiration, they reject a certain formalism found in the other proposals in favor of open-ended program.

The winning design, by James Corner's Field Operations and Diller Scofidio and Renfro, was the second major public project won by Field Operations in New York City in the span of four years after winning the Fresh Kills Landfill End-Use and Master Plan competition. The team partnered with Olafur Eliasson to produce a public art installation. The proposal sought to

[34] Iovine, 2004.
[35] Keeny, 2004. 14
[36] Iovinne, 2004.

create an urban ecology.[37] Corner wanted to choose sustainable plants, which would grow on the site naturally. A concrete path would seamlessly transition between plant bed and walk-able surface. The path is meant to allow people to meander slowly, contrasting their high-speed lives. "It will be broken up," Corner told the times, "fragmented, nothing will be straight on. The High Line is a different place from the rest of New York. There's a sense of slowness, distraction and otherworldliness. And that is what we want to preserve."[38] The Field Operations design is so strong because it promotes a sense of history while still creating a communal space that is easily used… "A seamless flow between past and future realties, a blend of urban grit and cosmopolitan sophistication.[39]



Detail of cast concrete pathways meeting the planted beds. Courtesy of www.thehighline.org

[37] Keeny, 2004 16
[38] Iovine, 2004
[39] Ourousoff, 2004.

Rendering at Gansevoort Street. Courtesy of www.thehighline.org

As Diller, Scofidio and Renfro describe in a recently published book of their work, the project team used "*agri-tecture* that combines organic and building materials into a vegetal/mineral blend, the park accommodates the wild, the cultivated, the intimate, and the social."[40] The final design uses a discreet unit of paving that bends to create curbs and seating and taper to create smooth transitioning between surfaces. AGRI-TECTURE, a term coined for the High Line

[40] Guido Incerti. Diller + Scofidio (+Renfro), The Ciliary Function: Works and Projects 1979-2007. Milan: Skira 2007. 198

project to describe the way that agriculture and pedestrian can interact. Diller, Scofidio and Renfro define AGRI-TECTURE as "A flexible, responsive system of material organization where diverse ecologies may grow."[41]

Rendering of a proposed wildflower field. Courtesy of www.thehighline.org and Field Operations

Their design had to be able to adjust to many disparate needs and neighborhood characters over the twenty-block span. The happiness and prosperity of the community, business/property owners and the city as a whole must be addressed. The Friends of the High Line hoped that the elevated tracks could become for New York what the Promenade Plantee is for Paris and the Stone Arch Bridge is to Minneapolis.[42] Additionally, the safety of pedestrians both on and below the highline was of utmost importance, including considerations of security and access to the High Line after-hours.

[41] Incerti, 2007. 198
[42] David, 2002. 18

Furthermore, from the creation of The Friends of The High Line group, development had been on the rise in the direct vicinity of the elevated railway. Andre Balazs, a supporter of the project, developed a standard hotel, which spans over the railway. Condominiums and other buildings by notable designers such as Jean Nouvel, Annabelle Selldorf, Renzo Piano, Frank Gehry, and the Della Valle Bernheimer firm among others have popped up over the last ten to fifteen years.[43] Furthermore, notable chefs and boutiques have infiltrated the area. In short, the High Line is located directly in the middle of one of Manhattans most trendy areas, and therefore one of Manhattans most quickly evolving. As of 2009, more than 30 projects are planned or under construction near the High Line, including a new Whitney addition designed by Renzo Piano meant to act in conjunction with the High Line at its Gansevoort street beginning.[44] This sort of development opens up issues of zoning and regulation within the area. In order to maximize air, light and views from the High Line, the city imposed set backs not consistent with area zoning, but allowed developers to apply variances to other sites they were developing in other parts of the city.

Image of the line of people waiting to access the High Line in the summer of 2009. Courtesy of www.thehighline.org

[43] Poegrebin, 2008
[44] Poegrebin, 2008

Regardless of all of the complexities involved in getting the project off the ground, Phase 1 of the High Line finally opened to rave reviews and big crowds in June of 2009. The Friends of the High Line hope that a second phase from 20th Street to 30th Street will open in 2010.[45] The High Line has retained strong attendance through the winter months, and by all accounts seems to be a success thus far, although it is still unclear if the third portion of the plan will ever be realized. It seems the High Line has become something that residents are proud of, even if it has lead to much publicity for the area and a large influx of visitor, local and tourist a-like. "Perhaps most important, the design confirms that even in a real estate climate dominated by big development teams and celebrity architects, thoughtful, creative planning ideas -- initiated at the grass-roots level -- can lead to startlingly original results."[46]

Rendering of Phase 2 of the High Line, currently in construction. Courtesy of www.thehighline.org

[45] The Friends of the Highline official website.
[46] Ourousoff, 2004

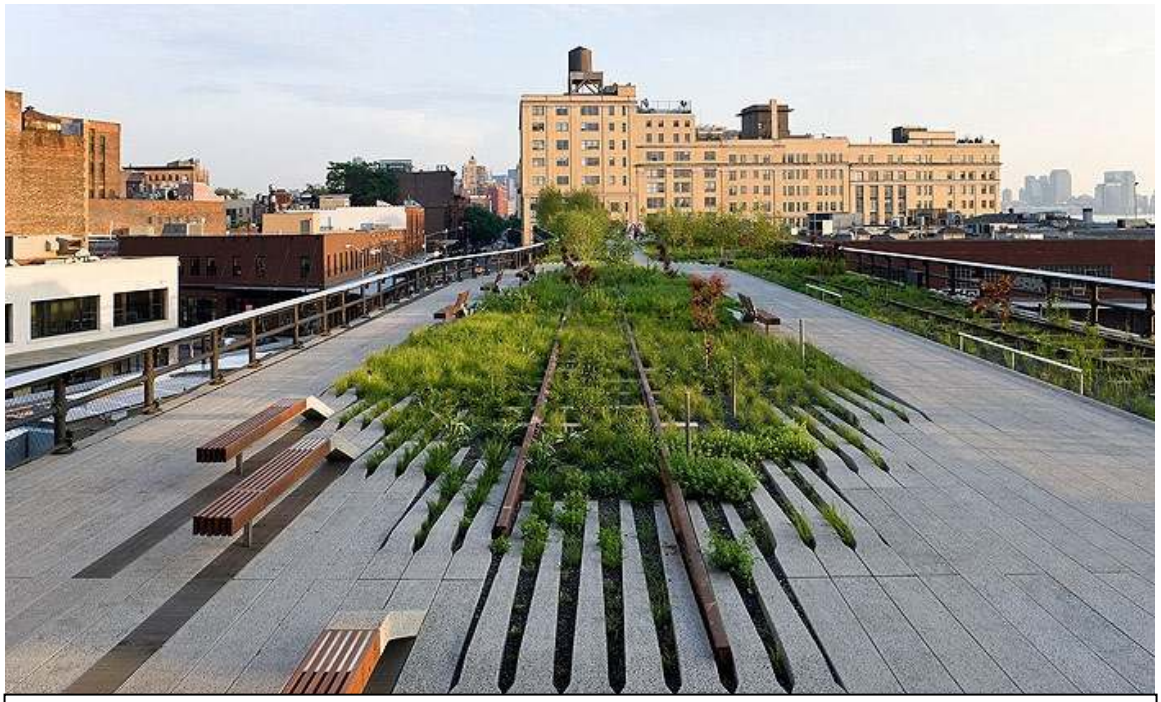


Image of completed High Line. Available <http-_www.archdaily.com_wp-content_uploads_2009_06_1121250496_dsr-highline-09-06-5054.jpg>

Image of completed High Line. Available <http-_www.jaunted.com_files_6193_HighLine3.jpg>

Image of completed High Line. Available <http-_farm4.static.flickr.com_3439_3943569014_aeb1f5d83d_b.jpg>

Image of completed High Line. Available <http-_www.travelogged.com_.a_6a010536af5f79970b0120a5bd387f970b-600wi>

HOW URBAN SIMULATION AND THE HIGH LINE COULD COME TOGETHER

Given the nature of a large-scale project, such as the High Line, with so many people involved and invested in its use and outcome, one may begin to see how an urban simulation could impact the design process for the High Line. At the least complicated end, the ability to place the project within its simulated urban setting would allow concerns to be addressed in real time, whether it be for political or public reasons. A neighbor concerned about the view from their window could see the simulated view post High Line development, the owner of an adjacent gallery could plug in facade improvements to see how he or she might be able to utilize the High Line to improve business and marketing, and a zoning official can see more clearly how the project is impacting the surrounding area.

Furthermore, as the area is known to be rife with new developments, especially by high-profile architects such as Jean Nouvel and Frank Gehry and many others, it is difficult to track how all of the new buildings will continually impact each other and the park. The park currently thrives off of the amount of light and air that it is afforded by fairly low surrounding buildings and multiple open lots. Developers may want to occupy these sites to utilize the draw of the High Line, but should they get too close and aggressive, they will deprive the narrow park of its light and air. These are all issues that could be quickly understood in the context of an urban model… especially one constantly updated with the most up-to-date, new information. To have a common file in which even just the massing of buildings could be placed would allow designers to not only collaborate within the project team, but also provide an opportunity for cross-project collaborations. Such small opportunities as this could revolutionize the way in which a neighborhood develops and allow for more synchronous design work.

Given the High Line's proximity in time to 9/11, an urban simulation of the area also could have provided safety information for the park's design. For city approval and support, New York had to believe that the park would be a safe place. An urban simulation could map how emergency exiting from the elevated park might occur in the event of a disaster. Placing the design within the simulated urban context could also highlight areas in which the park was susceptible to security faults do to its proximity to other buildings, and sun lighting and lighting analysis could more accurately show which part, above and below the High Line are not adequately lit.

Most of all, the Urban Simulation, applied to a project with so many involved people, could prove to be an invaluable marketing tool. As stated earlier, by 2008 the High Line had over 1,500 monetary supporters. In addition to these people, the park had to garner the affection of countless government officials at all from the district to the federal level. A lot of people needed to be able to see the project, but none of them necessarily wanted to see the same thing. The Urban model would have provided a file, which could have been sent to all of the people clambering to see the effects of the development without limiting the way in which they could see it. They would not be limited to the 'money shots' that the design team choses to render and highlight in a presentation – they would have had access to all the views of the project, even the inevitably less savory ones. Having such a model would effectively expose project weaknesses, especially if it were made visible to so many critical eyes, but is this a good thing?

The simulated High Line model could easily depict different development avenues – storefronts facing onto the upper deck, concession etc… things that Diller, Scofidio and Renfro and Field

Operations might not have direct control over, but designs that would greatly impact the feel of being a-top the elevated rail line. An Urban Simulation of the project is not necessarily adding new information into the mix, but providing an interface that may be easier for a greater number of people to understand. The general public, and many of the politicians involved in securing funding for such a large-scale project most likely lack a clear understanding of construction documents and project time-lines, but providing a realistic depiction, one that moves and adjusts to their interests, gives them something that they can relate to. The model would allow them to understand the project in conjunction to the surrounding neighborhood, and greater city context, in an even clearer way than a rendering, because it gives the user control over what they are seeing, and at what time of day/year.

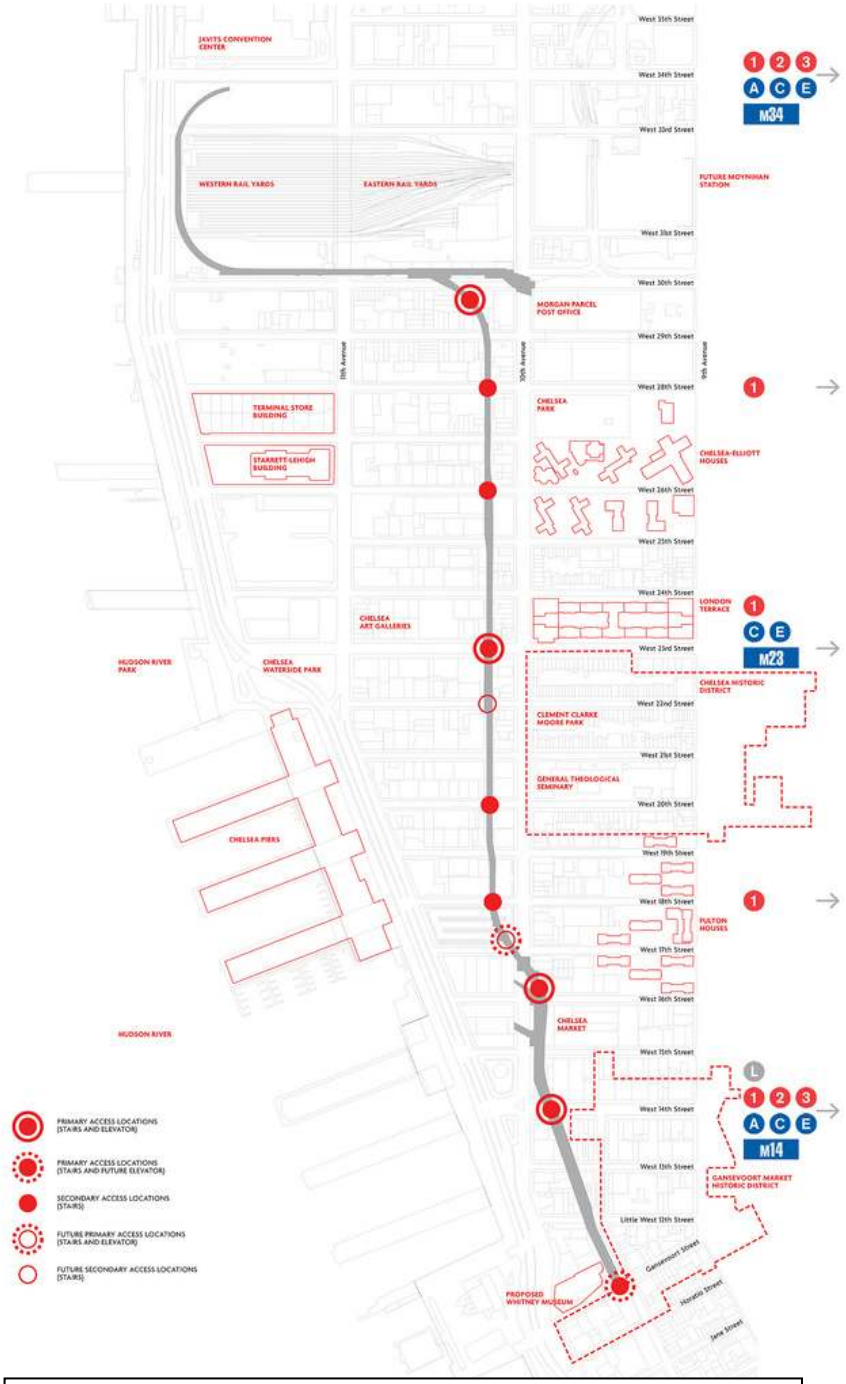
It is also important to address that there are negative factors to the endless streamlining of the design process through BIM and eventually Urban Simulation. While these programs are meant to assist in collaboration, one must question if eliminating the need to even speak regularly on the phone is truly a good thing in terms of the quality of design. Teams need to develop trust, especially when team members are from different fields and offices. Designs can improve when other design professionals challenge them, but removing the need to communicate removes a lot of opportunity for critical discussion to take place. Architects and engineers, for example, have long been known to have a love/hate relationship where engineers tell architects what they would like to design is not possible, and architects are in turn forced to work and push the engineer to come up with a system that will meet the expectations and abilities of both parties. It is through this process that the most interesting projects are often realized. Of course direct contact will never be completely eliminated, but in a design age where firms from all over the

world are thrown together on a project, it seems detrimental to design quality to encourage minimal contact with the sole goal of eliminating project cost and maximizing profit.

Furthermore, when presentations are made, there is nothing that can replace a human explaining a project and receive opinions. E-mail cannot read tone and cadence, perceptions that can only be made in person, or less ideally over the phone, and perceptions that are crucial to understanding a comment. To give a three-dimensional model to someone without any contact could lead to great contention, and misunderstanding of intentions – feelings that may then never clearly be conveyed if there is an initial lack of communication. Even video-conferencing seems to lack some of the personal connection that is made through the contact of a handshake. It is important to remember that design is a service, and that while speedy production may make the client happy, it is also important to foster a good connection to ensure future projects and recommendations. Being in the same room presenting a project demonstrates complete attention to the moment and to the client. And, having a good relationship to the subcontractors and being able to present their issues will only make the design team look more coordinated and in control of the project that they have been contracted.

It is difficult to presume exactly how Urban Simulation might have impacted the High Line project, or if it would have changed the design at all. An Urban Simulation might have only served to delay the ten-year project further as more concerns were raised over design choices and implications. It might also, however, have allowed the project to garner more supporters earlier, gaining the necessary backing and funding to get the project underway at an earlier date. However, it is clear that the persistent and passionate efforts of the Friends of the High Line and

its founders Joshua David and Robert Hammond were critical in ensuring the projects success. They were the ones who complied networks of people, and rallied for any and all attention they could bring to the project. This is something that a computer program will never be able to do on its own.



High Line map and access points. Courtesy of www.thehighline.org

Exhibit 1: List of the Board of the High Line:

Board of the High Line

John Alschuler, Chair
Philip E. Aarons, Founding Chair
Joshua David, Secretary and Co-Founder
Robert Hammond, President and Co-Founder
Karen Ackman
John Blondel
James Capalino
Barbaralee Diamonstein-Spielvogel
Lisa Maria Falcone
Philip Falcone
Alexandre von Furstenberg
Gary Handel
Hermine Riegerl Heller
Eugene Keilin, Treasurer
Wendy Keys
Catherine C. Marron
Gifford Miller
Edward Norton
Mario Palumbo
Steven Rubenstein
Jason Stewart
Darren Walker
Bronson van Wyck

Ex-Officio Members

Patricia E. Harris, First Deputy Mayor
Christine C. Quinn, Speaker, New York City Council
Robert Lieber, Deputy Mayor for Economic Development
Adrian Benepe, Parks Department Commissioner
Amanda M. Burden, City Planning Commission Chair

Emeritus Members

Vishaan Chakrabarti
Christopher Collins
Olivia Douglas
Elizabeth Gilmore
Robert Greenhood
Michael O'Brien, Esq.
Richard Socarides
Alan Stillman

Exhibit 2: High Line Supporters (A full list of 'The Friends of the High Line' can be found at www.thehighline.org)

Campaign for the High Line

It is with deep appreciation that Friends of the High Line recognizes these individuals and other funding partners for their visionary support of the Campaign for the High Line, which supports construction of the new park and an endowment for its future maintenance and operations:

The Diller – von Furstenberg Family Foundation

Philip A. Falcone and Lisa Maria Falcone

Donald Pels and Wendy Keys

Hermine and David Heller
Michael and Sukey Novogratz

Adam and Brittany Levinson
Christy and John Mack Foundation
The Pershing Square Foundation
The Tiffany & Co. Foundation

Philip E. Aarons and Shelley Fox Aarons
John Feinblatt, The Aber D. Unger Foundation
Lawrence B. Benenson
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The Bobolink Foundation, Wendy Paulson
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Olivia Douglas and David DiDomenico
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Janet and Howard Kagan
Michael and Deborah McCarthy
Edward Norton
Elizabeth and Michael O'Brien
Sherry Brous and Douglas Oliver
Mario J. Palumbo, Jr.
Paul Pariser and Erin Leider-Pariser
Jonathan and Joelle Resnick
Steven Rubenstein
Judith Zarin and Gerald Rosenfeld
Anonymous, In memory of Arland D. Williams Jr.
Anonymous (1)

John H. Alschuler and Diana Diamond
Joshua David and Stephen Hirsh
Mark Diker and Deborah Colson
Robert C. Greenhood
Robert Hammond
Gary Handel, Handel Architects
Jack Resnick & Sons
Katie Michel and Adam Schlesinger
Pamela and Gifford Miller
Donna and Alan N. Stillman
A. Woodner Fund
Bronson van Wyck
Anonymous (1)

High Line Trust

The High Line Trust is a group of visionary supporters who join together to build, maintain, and operate a one-of-a-kind park that will enrich the future of New York City. We would like to recognize the leadership of the following members of the High Line Trust:

Co-Chairs
Barry Diller and Diane von Furstenberg

High Line Trust Members
Altman Foundation
Chelsea Market
Kristen M. Dickey
Olivia Douglas and David DiDomenico
The Estée Lauder Companies Inc.
Johnson Family Foundation
Sonia and Paul T. Jones
Adam and Brittany Levinson
Christy and John Mack Foundation
Michael and Deborah McCarthy
Donald R. Mullen, Jr.
Tom Murry, President and CEO, Calvin Klein, Inc.
The New York Community Trust – LuEsther T. Mertz Advised Fund
Michael and Sukey Novogratz
Elizabeth and Michael O'Brien
Sherry Brous and Douglas Oliver
Paul Pariser and Erin Leider-Pariser
Wendy Paulson
Joelle and Jonathan Resnick
The Rockefeller Foundation
Andrew Rosen

Trevor Stahleski and Kyle Ransford, Cardinal Investments, LLC
The Tiffany & Co. Foundation
Judith Zarin and Gerald Rosenfeld
Anonymous, In Memory of Arland D. Williams, Jr.
Anonymous

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Altman Foundation
Greenacre Foundation
Johnson Family Foundation
The J.M. Kaplan Fund
The New York Community Trust – LuEsther T. Mertz Advised Fund
The Rockefeller Foundation – NYC Cultural Innovation Fund
The Tiffany & Co. Foundation
Trust for Architectural Easements
The Aber D. Unger Foundation, Inc.

A G Foundation
Achelis & Bodman Foundations
Lily Auchincloss Foundation, Inc.
The Arthur M. Blank Family Foundation
The Brown Foundation, Inc.
Ford Foundation
The William Randolph Hearst Foundation
Leon Levy Foundation
Merck Family Fund
National Endowment for the Arts
The New York Community Trust
New York State Council on the Arts

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