Case study on

NYC Department of Design and Construction (DDC) Project and Portfolio Management: An Envision-based Approach

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The Business Case
For Sustainable Infrastructure

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ABSTRACT

The subject of the present case is the workplan for integrating sustainability into public projects using Envision® by the New York City Department of Design and Construction (DDC), New York's primary capital construction project manager. Sofia Zuberbuhler-Yafar, RLA, Project Executive of DDC's Sustainable Infrastructure Unit and her team presented work in progress in the Zofnass workshops of October 2017 and March 2018. The presentations demonstrated an innovative approach in the use of the Envision® toolkit. DDC, through its planned use of Envision, establishes a new standard for project delivery and management. Moreover, "by reforming current City processes and practices that govern planning and construction of public projects, the City would be able to avoid the unnecessary costs they generate; avoided costs could serve as funds available to increase the total number of projects."[1]

1. ABOUT DDC

DDC is the city's primary capital construction project manager, managing a vast portfolio of projects for 30 agencies. DDC was formed in 1996 to unify the construction programs of those agencies and coordinate them to avoid conflicts between different citywide works. DDC does not have an expense or capital budget of its own. All of the agency's funding comes from managing projects for the client agencies. DDC acts as an owner's representative for city agencies whenever a capital need and site are identified by the client agency. Once identified DDC manages the design and construction of the capital project.[2] So far it has completed 4,151 projects for a total of $16 billion.

Nearly 59% of DDC's budget and 50% of its projects are infrastructure projects for the New York City Department of Transportation (DOT) and Department of Environmental Protection (DEP), and consequently much of DDC's Infrastructure Division's focus is on the large projects initiated by these two agencies, a portfolio of more than $4.2 billion.[3]

For each of their projects, DEP and DOT, the owner agencies, issue to DDC, a Capital Project Initiation (CPI), a document that outlines the project goals as well as schedule and budget. The work of DDC begins after the CPI and involves project management and delivery. DDC uses a combination of in-house staff, a workforce of almost 1,500 and contracting with private consultants and contractors in a public bid environment to execute its mission.

As a city agency, DDC's performance is subject to oversight by the City. A public report released twice a year, the Mayor's Management Report (MMR), sets goals and measures performance in project delivery.[4]

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[1] The Association of the Bar of the City of New York, Report by the Construction Law Committee on improving New York City's design and construction processes and practices.

[2] The Council of the City of New York, Finance Division Briefing Paper, "Report on the Fiscal 2017 Executive Budget: Department of Design & Construction," May 24, 2016.

[3] New York City Department of Design+Construction, "Infrastructure challenges and NYC climate risks" presentation, 2011.

[4] The Council of the City of New York, Report of the Finance Division on the Fiscal 2018 Preliminary Budget and the Fiscal 2017 Preliminary Mayor's Management Report for the Department of Design and Construction, March 6, 2017.

The FY2017 MMR for DDC recorded an upward trend at the agency's performance for the period FY14-18 (near or above targets set, especially on schedule and budget).[5]

2. SUSTAINABILITY AT DDC AND THE USE OF ENVISION

"Because we don't own property, we are just managers, we should steward for sustainability."[6]

Sustainability has been an evolving process with different actors within NYC's infrastructure systems. Federal and state policies and local laws set the conditions for sustainable design, with which DDC has to align and comply when delivering projects. Sustainability became a requirement with the development of plans by its top client agencies, the DOT's Sustainable Streets: Strategic Plan for the New York City Department of Transportation of 2008 and the DEP's NYC Green Infrastructure Plan of 2010.

Sustainable infrastructure planning, design, and construction are promoted by DDC's Sustainable Infrastructure Unit, while the Office of Sustainable Design of the Public Building Division identifies and implements cost-effective ways to promote sustainability in the public buildings portfolio. Since its formation, DDC has gathered experience on the design and construction of infrastructure through practice and research that have been reported in various publications.[7]

This case study explores the agency initiative to establish a system for internal oversight of its sustainable performance. ISI's Envision rating system, a nationally recognized tool, that can be applicable to DDC's infrastructure projects profile, has been selected as the framework for evaluating the sustainability of the agency's projects. However, Envision is not just to be used as a rating tool, but also it can be used as a project scoping and planning tool at both the project and the portfolio levels.

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[5] The detailed list of performance indicators for project delivery in response to the goals and measures set by MMR includes the following:
- Design projects completed early/on time
- Construction projects completed early/on time
- Average cost change for all completed consultant design and construction supervision projects (excluding programmatic scope changes)
- Construction completed on schedule
- Active construction projects: Early/on time
- Active design projects: Difference between projected and scheduled duration
- Active construction projects: Difference between projected and scheduled duration
- Projects audited
- Project inspections with at least one high-risk deviation
- Eligible projects with completed post-construction surveys
- Post-construction satisfaction surveys returned with respondents rating a project as adequate or better.

[6] Sofia Zuberbuhler-Yafar, Project Executive, Sustainability Unit, DDC, Zofnass workshop presentation transcript, 19-20 March– NYC DDC's Approach to Sustainability.

[7] An example is the High-Performance Infrastructure Guidelines in 2005 in partnership with Design Trust and landscape architects. The team worked closely with the agencies that have jurisdiction over New York City's infrastructure and solicited input from an array of other expert sources, including an advisory panel of regional officials and academic and private-sector peer reviewers. High Performance Infrastructure Guidelines provides a road map for incorporating best management practices (BMPs) into New York City's right-of-way infrastructure capital program.

3. USE OF ENVISION FOR PLANNING PROJECTS OF HIGHER PERFORMANCE

The Envision-based effort was prompted by the need to create an operational starting point for DDC to know where it stands in terms of sustainability and how it can move forward to reach required citywide targets. "It is a baseline that shows how good we are doing already."[8]

Envision provides a holistic framework for evaluating as well for rating, if desired, the sustainable performance of all types and sizes of infrastructure projects through a broad range of criteria and levels of achievement. When used as a self-assessment tool, Envision helps teams better recognize their project's contribution to sustainability and make well-informed decisions for improvements.[9]

DDC identified a high alignment of the Envision framework (criteria and documentation) with its own agency-specific projects profile and processes, making the tool a good fit for the agency's needs. As Sofia Zuberbuhler-Yafar explained, "DDC already requires several documents in every project that can be used as documentation for Envision accreditation, including EIS, CPI statements, meeting minutes between stakeholders, etc. Each aspect of the project's documentation undergoes rigorous review. At the present time few deliverables, such as lifecycle assessment and cost analysis, are not produced, but these are planned to be produced as part of the agency's work for 80x50, to deliver project excellence."[10]

The Envision® credits and categories enable DDC to benchmark the current performance for all its project types, using the Envision point and award system:
- *Silver* (30% of total applicable points),
- *Gold* (40% of total applicable points), and
- *Platinum* (50% of total applicable points).

The agency-wide baseline score quantifies the sustainability efforts already in place and provides a point of reference for future projects to surpass.

The Sustainable Infrastructure Unit team's credentialed Envision Sustainability Professionals (ENV SPs), who are trained and already familiarized with the Envision process, perform pilot ratings for selected projects following the self-assessment process dictated by Envision:
- Review of all Envision credits,
- Compilation and organization of all materials relevant to each credit documentation (produced by consultants, client agencies, and DDC staff),
- Determination of the appropriate level of achievement to pursue,
- Completion of credit coversheets that summarize how the credit requirements are being met.

DDC ENV SPs finally assume the role of the independent verifier and review the material to determine whether the assigned level of achievement is sufficiently supported by documentation. In other words,

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[8]   Conversation with Sofia Zuberbuhler-Yafar and her team
[9]   https://sustainableinfrastructure.org/how-it-works/
[10] Meeting 1. "80x50" refers to the goals established by NYC Mayor's Executive Order No.26, or Climate Action Executive Order, released on June 2, 2017. This EO requested all city agencies to develop plans and work together on climate change mitigation and adaptation actions, toward a common citywide goal of an80% energy consumption reduction by 2050 (the 80x50 plan).

they perform the entire Envision verification process for internal management purposes, using Envision as an agency-wide decision-making tool.

Undergoing the self-assessment process using the Envision templates results in a comprehensive well-focused database that can easily be upgraded, for future projects to use. The effort of summarizing and concentrating the relevant materials facilitates consulting and saves a significant amount of effort at the time of decision-making.

4. USE OF ENVISION AS A MEANS TO COLLABORATE WITH OTHER NYC DEPARTMENTS

In addition to DOT and DEP, as discussed above, DDC partners and coordinates with three other NYC agencies for infrastructure projects: NYC Department of Parks and Recreation (DPR); NYC Mayor's Office of Recovery and Resiliency; and NYC Emergency Management. Each of these agencies is subject to citywide requirements and targets, and DDC as project manager coordinates their plans and actions.[11] The Envision DDC tool was chosen as a consistent, consensus-based framework for projects of all client agencies, supporting a shared understanding of what sustainability is. DDC has identified common and overlapping principles across agencies and matched them with the Envision categories, confirming their alignment.

Table 1: Guiding Principles across agencies[12]					
DPR	**DEP**	**DOT**	**Mayor's Office #ONENYC[13]**	**DDC**	**ENVISION**
Resiliency and sustainability	Health and environment	Safety and efficiency	Growth	Equity	Quality of Life
Include communities	Safe and clean drinking water	Environmental responsibility	Sustainability	Sustainability	Leadership
Innovate	Regulate quality of life	Encourage sustainable transportation	Equity	Resiliency	Resource Allocation
Care; not just maintenance	Collect and treat rainwater for reuse	Rehabilitation	Resiliency	Healthy living	Natural World
		Increase quality of life			Climate and Risk

Envision represents a single project management system for DDC's internal agency-wide practices and interagency coordination, providing:

- Standardized industry-wide metrics for assessing performance,
- Standardized documentation that guides what issues to address,
- Benchmarking for sustainable performance through different levels of achievement.[14]

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[11] E.g., by the Mayor's Executive Order No.26.

[12] As presented by DDC in the March 2018 Zofnass Program Workshop "Making the Business Case for Planning Sustainable Infrastructure."

[13] #One NYC is a comprehensive plan for a sustainable and resilient city, released by Mayor de Blasio in 2015.

[14] It is worth highlighting that the DDC initiative on Envision has common directions with DOT's new initiatives for portfolio management and project delivery. According to the DOT's new initiatives description:

In terms of asset management:

However, full integration of sustainability into current city processes and practices for public projects is a task that requires an overall reform of capital project planning, budgeting and design and construction practices. DDC has, however, created a detailed plan for the integration of Envision into all stages of its design process and workflow for in-house work, external consultants, and its client agencies. DDC's plan proposes the formal adoption of Envision as a contract requirement in task orders to further optimize sustainable performance. Additionally, the agency's staff involved in the entire project development process is encouraged to participate in Envision training, and currently there are over 130 Envision® Sustainability Professionals (ENVSPs) within the DDC workforce.[15]

5. FROM MULTIPLE SIMILAR PROJECTS TO TYPICAL GROUPS RATING

DDC's Infrastructure Division has a portfolio of projects with recurrent similar features for the same owner client agencies that can be characterized as typical or even routine projects for a dedicated unit within the agency, as in the case of pedestrian bridges or plazas.

Having decided to adopt Envision® for rating project sustainability, DDC had to address the challenge of its large number of simultaneous projects, with currently about 660 projects active. The Envision assessment, as structured, is performed on a project level, and a self-assessment per project would represent an exhaustive effort for the agency, with a great amount of replicated work. DDC responded to this challenge by grouping similar projects into certain typologies to efficiently manage and optimize the assessment process. Seven main typologies were identified:

- Creation of an asset management taskforce to institutionalize best practices within the agency and, where practical, seek to create asset management systems that group asset classes.
- Development of decision-making tools and a process to help agencies to allocate effectively the available limited capital resources across a diverse range of assets.
- Integrate social, environmental, and economic costs into decision-making tools: not only cost savings over the long-term, but also seek to mitigate or avoid adverse social and environmental costs.

In terms of project delivery:

- Require the use of a single agency-wide project management system for all DOT capital projects: By using a single system, DOT will better manage its capital projects, resulting in shorter project timelines. Later, DOT will seek to develop a centralized project management system with DDC and DEP.
- Create standard approval processes for routine capital work: DOT will create standard project and contract documents for typical capital projects, such as sidewalk extensions and bus hubs. These boilerplate forms will streamline internal and intra-agency approvals for routine capital projects, thereby freeing agency staff to process complex projects.
  Source: http://www.nycdotplan.nyc/initiative-table

[15]As presented by DDC in the October 25, 2017, Zofnass Program Workshop "Putting Together the Puzzle of Sustainable Infrastructure: Making the Business Case and Opportunities for Sustainable Infrastructure."

Table 2: Grouping typical projects into seven main typologies	
Typical Projects:	**Main Project Typologies:**

- Plaza
- Sidewalks
- Street reconstruction
- Resurfacing
- Sanitary sewer
- Storm sewer
- Water mains
- Blue belt (BMP)
- Rain gardens
- Vision Zero
- SBS (Select Bus Service)
- Step streets
- Pedestrian bridges
- Retaining walls
- Safe route to transit
- Safe route to schools
	- **Typology I: Comprehensive site work**
	  (plaza, sidewalks, street reconstruction, resurfacing, sanitary sewer, storm sewer, water mains, pedestrian safety improvements)
	- **Typology II: Engineered wetlands**
	  (BMP, storm sewer, sanitary sewer, water mains)
	- **Typology III: Subsurface linear work**
	  (sanitary sewer, storm sewer, water mains)
	- **Typology IV: Stand-alone plazas**
	- **Typology V: Pedestrian bridges**
	- **Typology VI: Step streets**
	- **Typology VII: Coastal resiliency**

The typologies vary in level of complexity and width of scope. As the terms imply, some project types are more straightforward, and some are more multifaceted. DDC performs pilot Envision ratings of selected projects for each typology; after review and cross-reference with other similar projects, the agency scales up the results to the project typology level. This methodology has been tested and communicated with the corresponding agency units to make sure that each credit and level of achievement properly represents those aspects typical of most of the projects for each typology, and to make sure they have been verified. This process results in scorecards and baseline scores per typology of project, not per single project. Typologies aim to approximate the singularity of certain types of projects, avoiding a repetitive, time-consuming self-assessment for each individual project, and thus enabling management-level conclusions. It turns Envision into a portfolio management tool for more efficient sustainable performance oversight.

6. CAPTURING DIFFICULTY OF HIGHER RATING

The Envision self-assessment highlights both the agency's strengths and its weaknesses. Most of the DDC project typologies demonstrate a high performance in the Quality of Life category, an expected outcome since from project scoping the purpose of DDC projects is always to rehabilitate public space, include community in the design process through outreach, and receive approval by the Public Design Commission. This category is "a good showcase of how DDC procures and designs and constructs projects."[16] Among the identified deficiencies, and thus areas for improvement, is Resource Allocation. Especially in this category, the Envision criteria specify actions that DDC had not previously considered, such as use of recycled materials, and provides ranges of metrics directly linked with levels of achievement, e.g., at least 50% use of recycled materials for superior performance and 80% for conserving performance.

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[16]   Conversation with Sofia Zuberbuhler-Yafar and her team

Through this process, DDC ends up with an overall baseline score in all project typologies as a point of reference, currently 30% and equivalent to the silver award in the Envision rating. However, DDC's workplan goes beyond the rating results to set new higher targets of performance, and it has employed Envision and advanced it to create the Envision Calculator to evaluate what it would take to reach higher targets and how to prioritize steps towards this goal. The DDC Envision Calculator measures the difficulty in obtaining higher scores in certain credits and getting to the next achievement level. A three-level scale for measuring effort is assigned to credits:
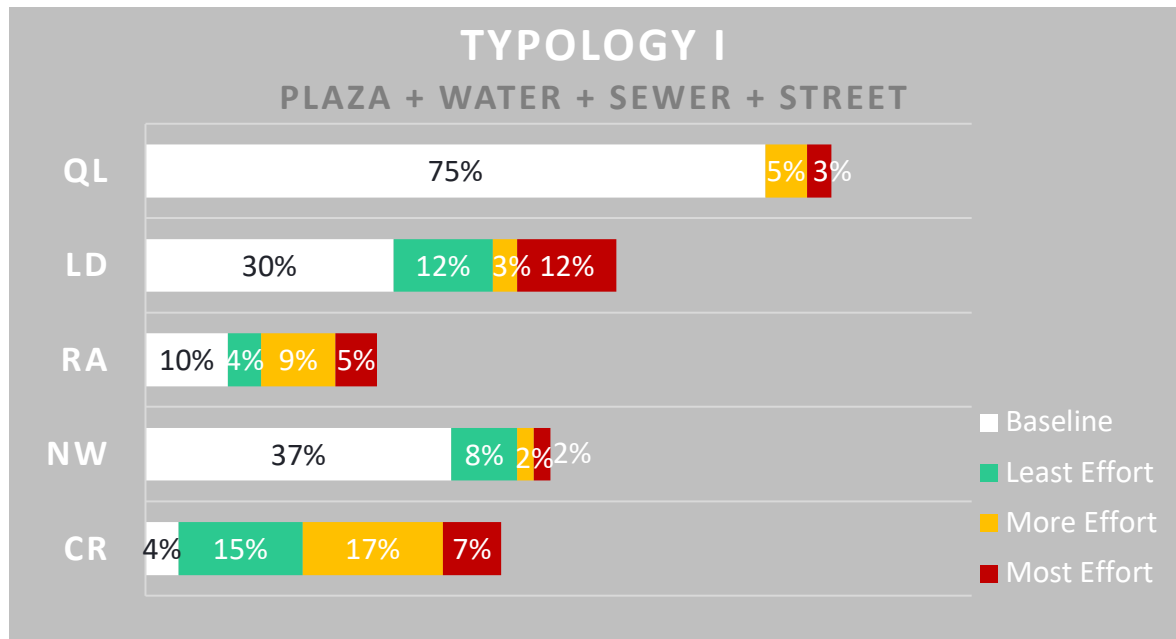
- LESS EFFORT: Credits in which DDC is already doing what is suggested by Envision for the next level, but without providing the proper documentation.
- MORE EFFORT: Credits in which DDC may not be reaching a goal immediately, but in which it can be achieved.
- MOST EFFORT: Credits in which reaching the next achievement level would be too costly or would go against policy or require major reform.

The three levels of difficulty as defined by DDC reflect the main areas identified where the formal adoption of Envision can contribute to increasing targets, better documenting of practices, clear long-term goal-setting, and policy gaps and associated institutional reforms. Each credit's difficulty level is supported by a description of tasks to be performed; the tasks are linked with specific stages of the project development process; and, through a generic responsibility matrix, those tasks are assigned to specific agency units or consultants. Moreover, Envision's available industry-wide metrics provide new measurable targets.

To provide an example of conclusions on actions for improvement, DDC's Comprehensive Site Work typology, or typology I, is presented. Being the most complex typology that DDC manages for multiple city agencies it is representative of the design and coordination challenges that DDC has to address through sustainability. In 2013, typology I projects represented $1 billion or 23.6% of the agency's $4.2 billion active portfolio.[17]

The calculations for Typology I processes are summarized by DDC per Envision category:

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[17]   Infrastructure Division of DDC, "Infrastructure challenges and NYC climate risks" presentation of 2013.

TYPOLOGY I
PLAZA + WATER + SEWER + STREET

	Baseline	Least Effort	More Effort	Most Effort
QL	75%		5%	3%
LD	30%	12%	3%	12%
RA	10%	4%	9%	5%
NW	37%	8%	2%	2%
CR	4%	15%	17%	7%

Source: provided by DDC

The calculator identified that the typology baseline of 32% can be upgraded "easily," with "least effort," to 39%, mainly through better recordkeeping as evidence of practices already taking place. The "more effort" to achieve a 47% score (gold award) would involve adding specifications and contract requirements. Finally, the hard to-get credits that would elevate the score to 51% (platinum) are related to "monitoring of systems" that must be funded with expense, not capital, funds from the client agency.[18]

7. THE EXAMPLE OF DUMBO/VINEGAR RECONSTRUCTION PROJECT

To have a clear understanding of DDC's sustainable practices as depicted in its projects and its coordination with other city agencies, the Dumbo[19]/Vinegar Hill streets and plaza reconstruction project is presented.

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[18]The high-difficulty credits for integrated plaza projects are:
- QL2.2 Minimize Noise and Vibration
- QL2.2 Encourage Alternative Modes of Transportation
- LD2.1 Pursue By-Product Synergy Opportunities
- LD3.1 Plan for Long-Term Monitoring & Maintenance
- RA2.2 Use Renewable Energy
- RA2.3 Commission and Monitor Energy Systems
- RA3.3 Monitor Water Systems
- NW3.3 Restore disturbed soils
- CR2.4 Prepare for Short-Term Hazards

[19] Dumbo, short for *Down Under the Manhattan Bridge Overpass*, is a neighborhood in the New York City borough of Brooklyn, located between the Brooklyn and Manhattan Bridges.

Fig.1: *Dumbo district and Vinegar Hilldistrict, Brooklyn, NY*   **Fig.2:** *Project phases I and II[20]*

The project, currently in procurement, consists of the reconstruction of cobble roadways and centuries-old subsurface utilities on multiple blocks of the Dumbo and Vinegar Hill neighborhoods along with the construction of a 27,000 sqft plaza. It is managed by DDC in coordination with DOT for roadway and plaza works, DEP for water/sewage subsurface works, and a local district management association. It is the continuation (Phase II) of a $20 million reconstruction project, completed between May 2009 and November 2011 (Phase I), to reconstruct poor-condition historic roadways that impede bicycle and pedestrian traffic and do not meet ADA accessibility guidelines.

Fig. 3, 4, 5, 6 7: *Patchwork-look roadways resulting from piecemeal repaving work done over many years*

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[20]   Image source: presentation to the Landmarks Preservation Commission, August 15, 2017, by DOT, DDC and AECOM

This project is representative of the challenges involved in the highly complex projects that DDC manages**, challenges it addresses by incorporating sustainability:**

- Integration of DOT and DEP work scopes,
- Integration of community input and coordination with the local district management association, the Dumbo Business Improvement District (BID), which has been a long-time advocate of the project and for preservation of the neighborhood identity to the greatest extent,
- Integration with adjacent ongoing development of the Brooklyn Bridge Park and coordination with the developer to ensure consistency of design,[21]
- The design and construction of the public plaza part of the DOT plaza program,[22] through which neighborhood plazas are created (it was approved for funding due to its prime location and intended use; the plaza's maintenance will be the responsibility of the Dumbo BID),
- Oversight by the Landmarks Preservation Commission (LPC), which designated the DUMBO Historic District on December 2007, for both its historic buildings and its dramatic streetscapes,
- Criticism raised about the street rehabilitation, with some preservation groups considering it "historically inaccurate,"
- Incorporation of lessons learned from Phase I and delivery of Phase II's wider scope in a more cost-effective way. The $20 million price tag of Phase I was higher than a basic roadwork project would have been, due to the expensive and time-consuming process of preserving and resetting the historic blocks. This task required keeping a detailed inventory of cobblestones, documented with drawings, as the blocks had to be removed, stored, and reinstalled in the roadbed.

Fig.8, 9: *Construction works on Washington St during Phase I*

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[21] The 85-acre waterfront park project is managed by the Brooklyn Bridge Park Corporation, a not-for-profit entity responsible for the planning, construction, maintenance, and operation of the park

[22] The NYC Plaza Program is a key part of the City's effort to ensure that all New Yorkers live within a 10-minute walk of quality open space. DOT works with selected organizations to create neighborhood plazas throughout the City to transform underused streets into vibrant, social public spaces. Eligible organizations can propose new plaza sites for their neighborhoods through a competitive application process. DOT prioritizes sites that are in neighborhoods that lack open space, and partners with community groups that commit to operate, maintain, and manage these spaces so they are vibrant pedestrian plazas. DOT funds the design and construction of the plaza, while maintenance in a state of good repair is the responsibility of the partner organization. With community input through public visioning workshops, DOT assists partners in developing a conceptual design appropriate to the neighborhood. A professional team of designers then uses the conceptual design to create formal plans. Partners are involved throughout the design process. Possible amenities may include tables and seating, trees and plants, lighting, bike racks, public art, and drinking fountains. Partner organizations are also responsible for outreach to the public to gather relevant data and provide active participation in the public workshops, and the programming of events to make the plazas vibrant centers of activity and neighborhood destinations.

Fig. 10, 11, 12: *Completed Phase I works on Water St.*

The project was a collaborative design between AECOM and DDC. Envision had not been used as a planning tool during the project's development. However, the draft pilot Envision rating performed internally by the Sustainable Infrastructure Unit team on August 29, 2014, demonstrates a high alignment with Envision guidelines and documentation, accomplishing a 36% score (silver award).

The context-sensitive design of the project contributes to increased quality and capacity for the local communities and accommodates expected future growth:

- Extending the bike network in NYC by providing smooth and context-sensitive granite bike paths throughout the historic road network of the neighborhood,
- Providing ADA-accessible pedestrian networks via new concrete sidewalks and smooth ADA-compliant crossings across the historic re-laid cobble streets. More specifically, and in order to keep the unique character of the neighborhood and layers of history, the originals rails in street and sidewalk were reset, as well as bluestone sidewalk and large ADA accessible granite slabs. Additionally, the crosswalk design was also based on the historic NYC crosswalk design and involved granite slabs.
- Replacing and upsizing of existing water and sewer mains,
- Constructing new high-level storm sewers connected to new catch basins to help alleviate combined sewer overflow during storm urges.[23]

Moreover, those features related to management take this infrastructure project beyond mere compliance:

- Community-driven design for the plaza: three public workshops were hosted by representatives from the DOT and DDC to reveal plans and solicit community feedback, instead of the usual one or two held for public plaza projects,
- Consideration of prior initiatives, or ephemeral interventions related to the plaza and pedestrian and bike improvements,[24] some of which were depicted in reports or plans,

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[23]   Pilot Envision Rating for Dumbo/Vinegar Hill reconstruction project conducted by DDC on August 2014.

[24]   Among prior related initiatives powered by BID's requests are:
The DOT 2015 York, Jay, and Pearl Streets Intersection Improvements and Bicycle Facility. In January 2015 DOT's Pedestrian Projects Group presented a plan to the Brooklyn Community Board 2 Transportation Committee that proposed several updates to streets in Dumbo on four key street corners and sidewalk areas. As a result of a community walk-through organized by the Dumbo BID in December 2013 and the following request from BID on February 2014 for bicycle and pedestrian improvements at 12 locations, DOT has developed a proposal to calm traffic, improve pedestrian safety, and improve pedestrian and bicycle access.

- Intensive investigation to capture the historic quality of the original cobblestone, and site-specific design for the maximum restoration of historic character to address major public concern regarding the quality, color, and texture of surfaces that would be replaced
- Full-scale model mockups of alternate cobblestone paving solutions to get the public's opinion on newer granite block pavers versus reclaimed ones,
- Close coordination with the Dumbo BID and homeowners to provide user-specific solutions.

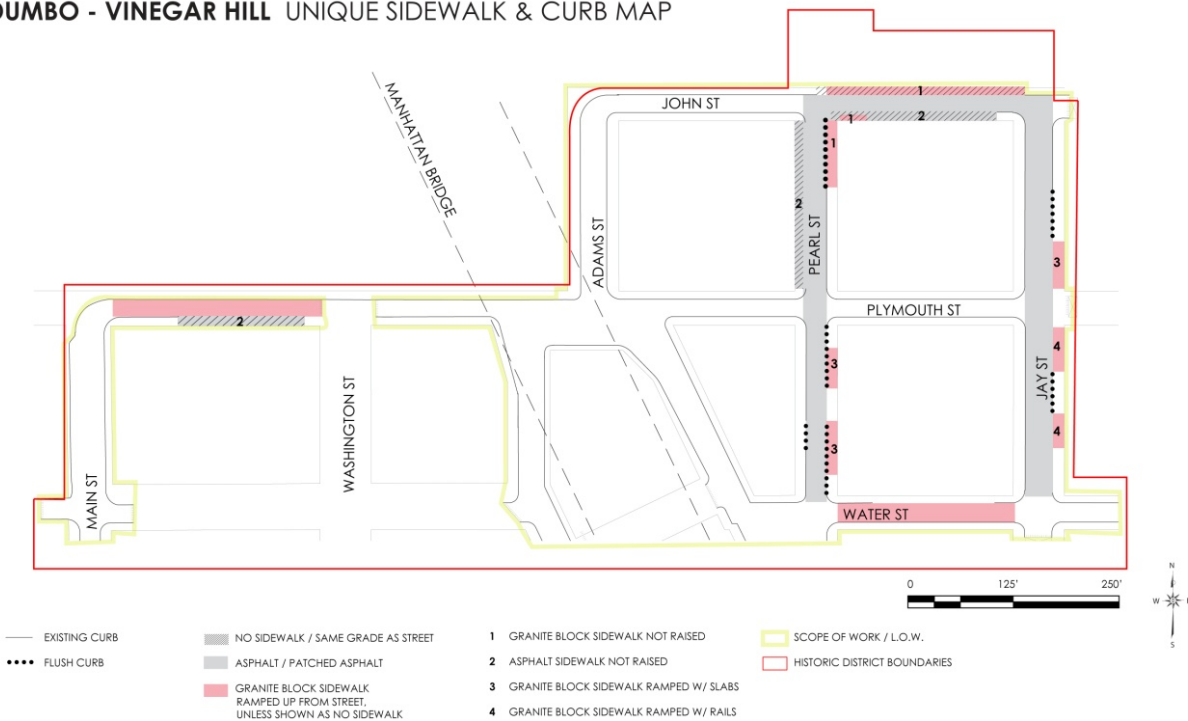**DUMBO - VINEGAR HILL** UNIQUE SIDEWALK & CURB MAP

Fig.13: *Detailed sidewalk and curb maps*[25]

The "Reimagine Jay Street" safety planning workshop hosted by Transportation Alternatives (a non-for-profit organization) together with Council Member Stephen Levin and Brooklyn Community Board 2 on March 10, 2014. The Jay Street community street safety planning workshop was attended by approximately 100 people, and its findings were summarized in the "Reimagine Jay Street! Community street safety planning workshop summary report," October 26, 2014.
Other initiatives (2007) included reclamation of streets and underutilized spaces for public use: a reimagined Pearl Street Triangle, overhaul of the Brooklyn Bridge pedestrian walkway, reopening of the Manhattan Bridge arch as a pedestrian thoroughfare, a public market initiative, etc.
[25] Image source: Presentation to Landmarks Preservation Commission, August 15, 2017
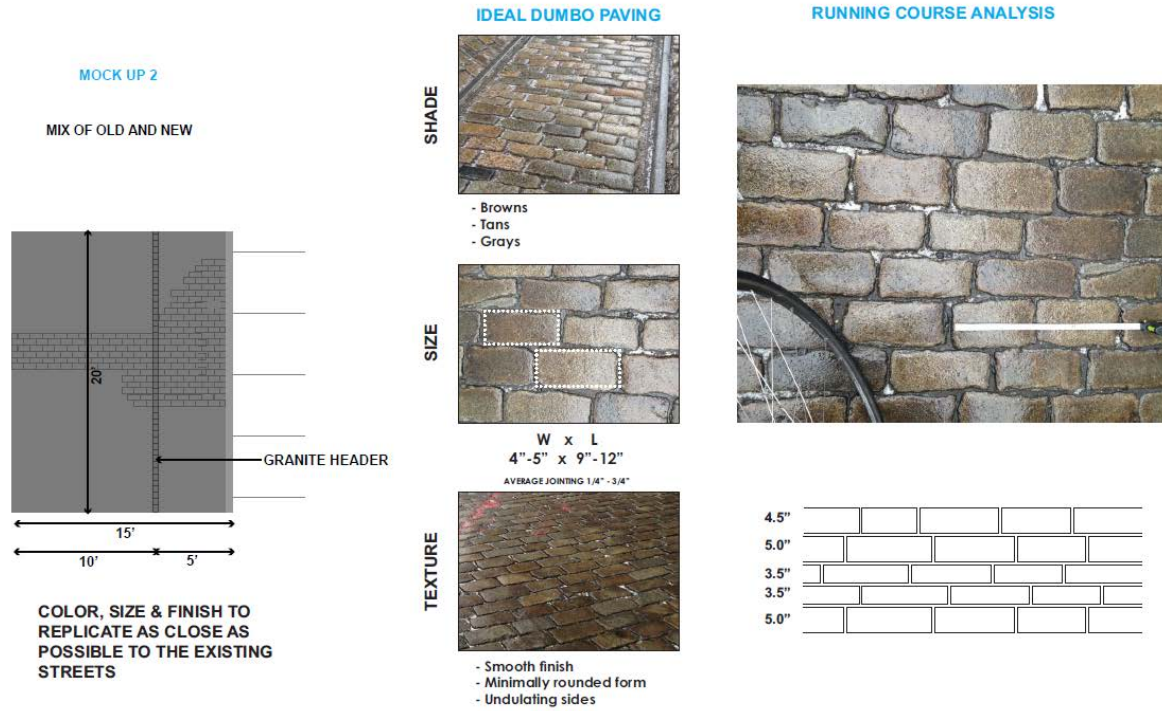
Fig.14:(Public Workshop#3, March 2013) Diagram of combination of new and reused cobble

Fig.15: Cobble Mockups, July 2013[26]

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26   DOT, DDC, Dumbo BID, and AECOM, "Reconstruction of DUMBO/Vinegar Hill Streets and Pearl Street Plaza," presentation to Community Board 2, July 22, 2013.
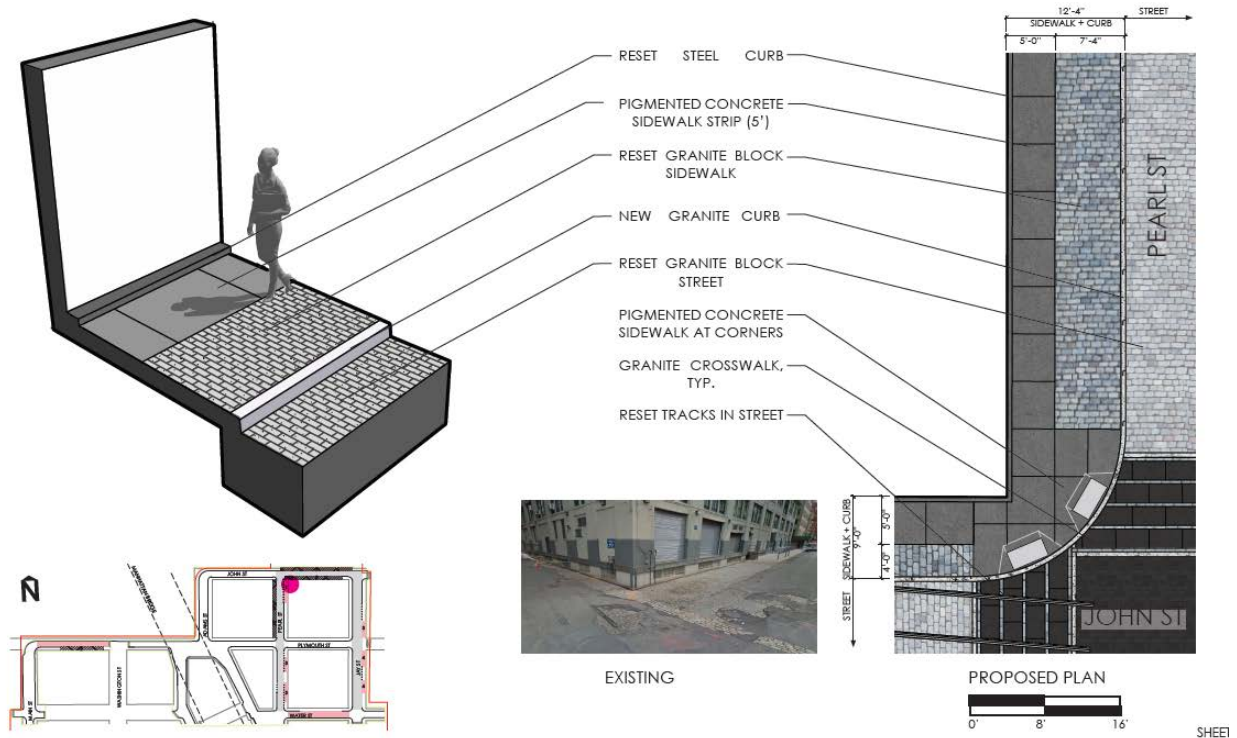
Fig.16: *Level of detail incorporated in plans[27]*

The Dumbo/Vinegar Hill project was one of the two projects selected and rated to determine the typology I baseline and targets. The pilot rating performed was supplemented by input from DDC's Plazas team on which aspects of this project were project-specific and which were more typical of typology I projects, and the baseline for the entire category was established. The lower value per credit among selected projects was chosen in an effort to find what the minimum performance of this project typology would be. That explains the 30% as baseline score for the typology while the score for the Dumbo project was 36%.

A juxtaposition of the project's performance with the baseline performance of the typology highlights the areas of excellence. Quality of Life is the Envision category where the project demonstrated exceptional performance, as in most QL credits the project exceeded both the typology's baseline and the target for higher performance. At the same time, the credits and categories where the project exceeded the typical project baseline indicate the areas that the agency can easily address in similar projects just by following the Dumbo/Vinegar Hill project paradigm. The summarized project scorecard and the compiled documents of the pilot rating serve as a reference and consulting material for future DDC project actions.

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[27]Presentation to Landmarks Preservation Commission, August 15, 2017

Table 3: *Summary of Draft Pilot Envision Rating for Dumbo/Vinegar Hill*

Envision category	Dumbo project Envision score	Typology baseline	Typology target score	Highest possible score per category
QL	141	115	140	181
LD	38	36	64	121
RA	24	10	44	182
NW	40	46	61	135
CR	23	5	53	122
Overall score	266	212	362	741
Award	36%silver	30%silver	50%platinum	

Table 4: *QL Category: Dumbo performance vs. Comprehensive Site Work typology baseline and target*[28]

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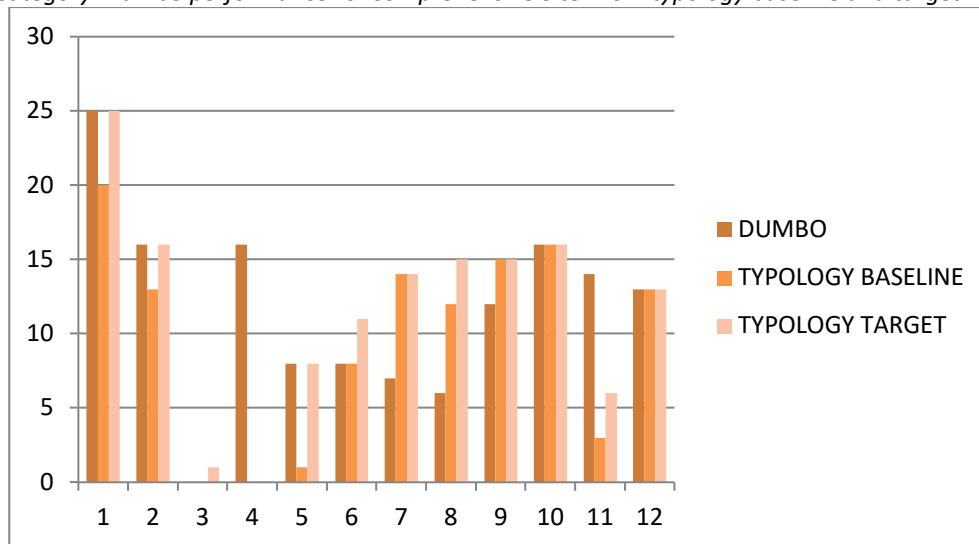
[28] Graphs created as a comparative representation of data extracted from "Draft Pilot Envision Rating on a NYC DDC Project – Dumbo/Vinegar Hill streets and plaza reconstruction," conducted on August 29, 2014, and "Typology I DDC: plaza+stormsewer+street restoration baseline," conducted on September 14, 2017; documents produced and provided by DDC.
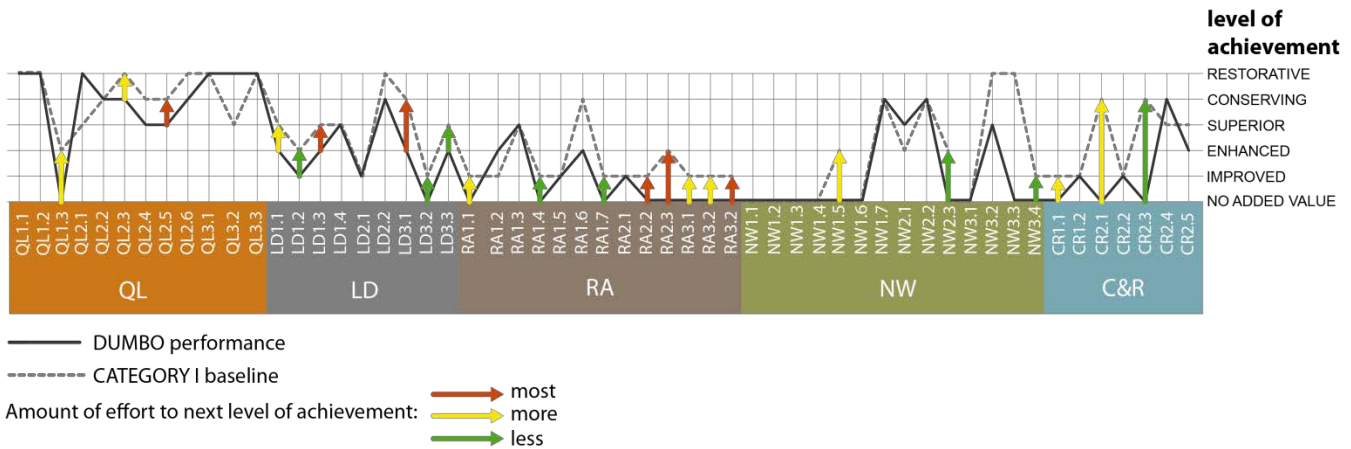
Fig.17: *Graph of the amount of effort required to reach the next level of achievement in the case of Dumbo(created by author)*

MOVING FORWARD

Making the business case for sustainability, i.e., assessing the costs and benefits of pursuing sustainable projects, is a complex task dependent on many direct and indirect factors. This case study refers to the necessity of using assessment tools to support a business case, recognizing that what cannot be measured cannot be managed. Moreover, it is worth mentioning that the use of evaluation tools is not only important when weighing conventional as opposed to sustainable options and benchmarking performance, but also for choosing the level of sustainable performance. In the case of DDC, Envision has been used as the guide to explore feasible actions for the agency to improve its overall portfolio of projects performance. The actions defined as requiring "most effort" refer to long-term changes (such as culture change within the agency's established practices) and are not expected to show results in the short term, while "least effort" actions refer to immediate short-term measures, or multiple small easy-to-apply changes that can make a combined bigger impact.

DDC's workplan is the outline of an agency-wide, interagency, and across-teams integrated plan with performance-based criteria adopted by Envision. DDC, after a thorough and in-depth study of the Envision tool, has taken it one step forward, to construct a customized agency-specific and project-typology-specific plan for sustainability. Using the basis of a documented and certified sustainable performance can lead to a standard sustainable performance for multiple projects and eventually to an agency-wide standard of sustainable performance.

APPENDIX

EXHIBIT: List of NYC policies and strategies for Sustainable Design for DDC alignment and compliance

- The City of New York, Mayor Michael R. Bloomberg, "PlaNYC: A Greener, Greater New York"[29] of 2007: sets citywide goal of 30X30
- NYC DOT's "Sustainable Streets: Strategic Plan for the New York City Department of Transportation" of 2008: new approach to transportation planning
- NYC DOT's "Green Light: Sustainable Street Lighting for NYC" of 2009: plan for sustainable street lighting
- DEP, PlaNYC, Mayor Michael R. Bloomberg, "NYC Green Infrastructure Plan: A Sustainable Strategy for Clean Waterways" of 2010: continues the implementation of PlaNYC
- MOS/EDC/CUNY launch NYC Solar Map and Portal of 2011
- NYC Bike Share of 2013: NYC's newest public transport system
- NYC DOT's Vision Zero of 2014: plan for zero pedestrian fatalities
- NYC Zero Waste of 2014: NYC sets goal of sending zero waste to landfill by 2030
- NY State's Reforming the Energy Vision (REV) of 2015: NYS shifts to a distributed and renewable energy strategy
- "Sustainability Districts for NYC: Building an equitable and resilient future" of 2016: NYC Eco District Council proposes 2030 District for Brooklyn CD2
- "Blueprint for the New York State Offshore Wind Master Plan" of 2016: NYS and NYC launch study for offshore wind in the New York Bight
- Passive house accelerates of 2016: LL31sets low-energy-use intensity targets (effective 2017)
- The City of New York, Mayor Bill de Blasio, "New York City's Roadmap to 80X50" of 2016: aims for drastic energy consumption reduction by 2050
- The City of New York Office of the Mayor, Executive Order No.26, or the Climate Action Executive Order, released on June 2, 2017: commits NYC to the principles of the Paris Agreement for climate actions. The EO 26 requires all city agencies to develop their own plans and deliver climate actions that are consistent with or greater than 80x50 commitments.

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[29] **PlaNYC** is an effort released by New York City Mayor Michael Bloomberg in 2007 to prepare the city for one million more residents, strengthen the economy, combat climate change, and enhance the quality of life for all New Yorkers. The Plan brought together over 25 City agencies to work toward the vision of a greener, greater New York. Since then, significant progress has been made toward the long-term goals set by the Plan.

EXHIBIT: DDC managed projects by agency FY 16-20[30]
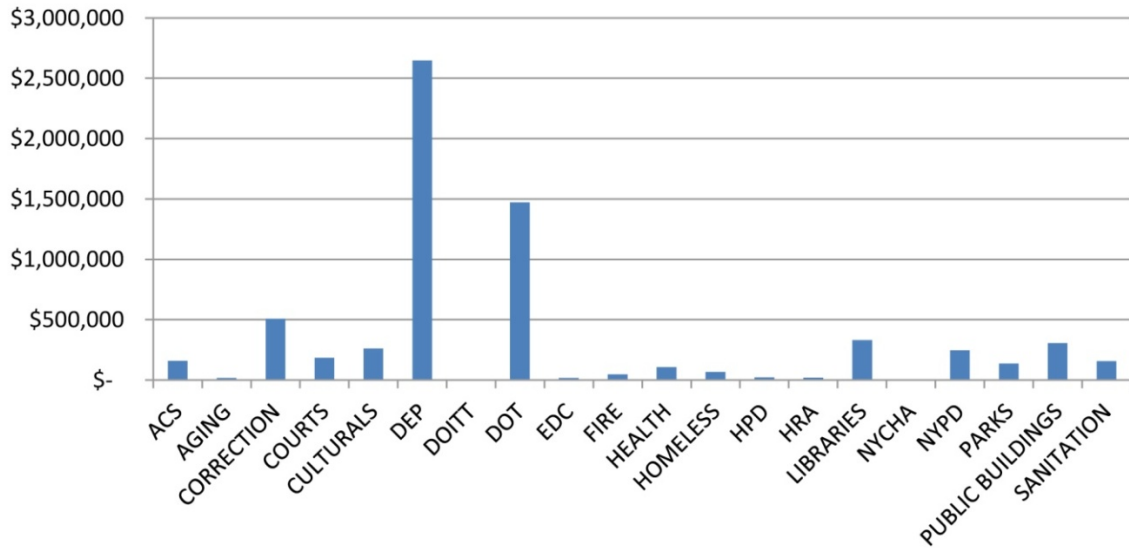
EXHIBIT: DDC Infrastructure 5-year active portfolio by project type[31]

INFRASTRUCTURE 5-YEAR ACTIVE PORTFOLIO BY TYPES OF PROJECTS
$4,296,597,000

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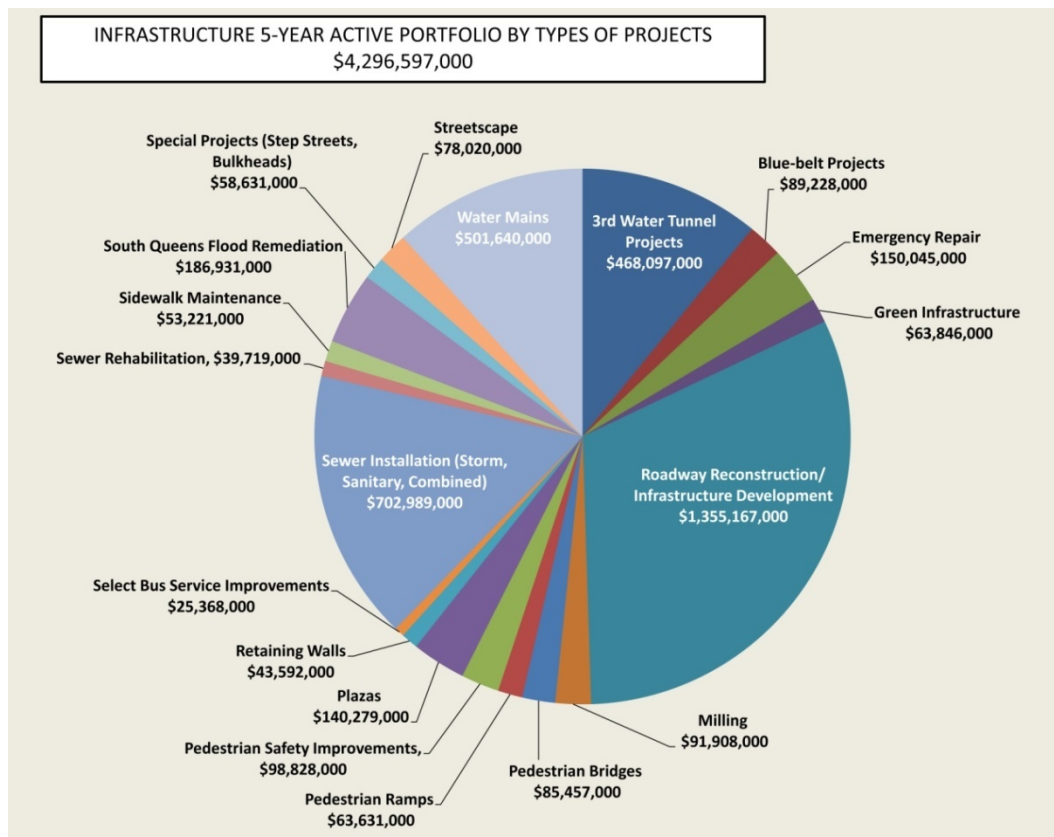
30 Graph source: The Council of the City of New York, Finance Division Briefing Paper, "Report on the Fiscal 2017 Executive Budget: Department of Design & Construction," May 24, 2016.

31 Graph source: Infrastructure Division of Department of Design and Construction, Infrastructure challenges and NYC climate risks presentation, 2013.

EXHIBIT: Dumbo performance pilot rating vs. Comprehensive Site Work typology baseline and target per Envision category

Table 5: LD Category: Dumbo performance vs. Comprehensive Site Work typology baseline and target
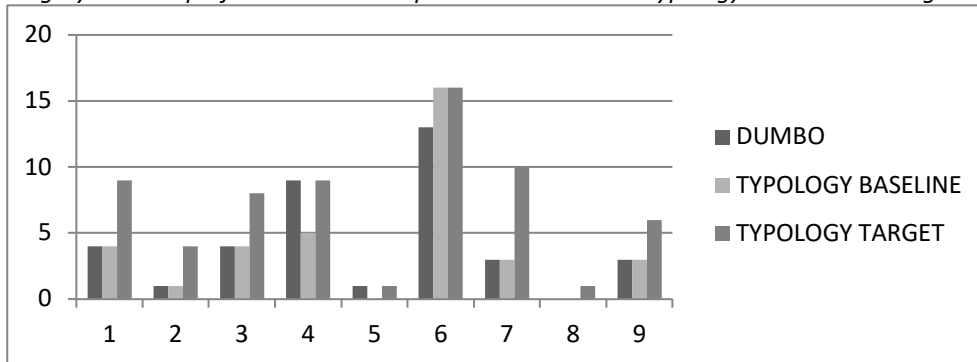

Table 6 RA Category: Dumbo performance vs. Comprehensive Site Work typology baseline and target
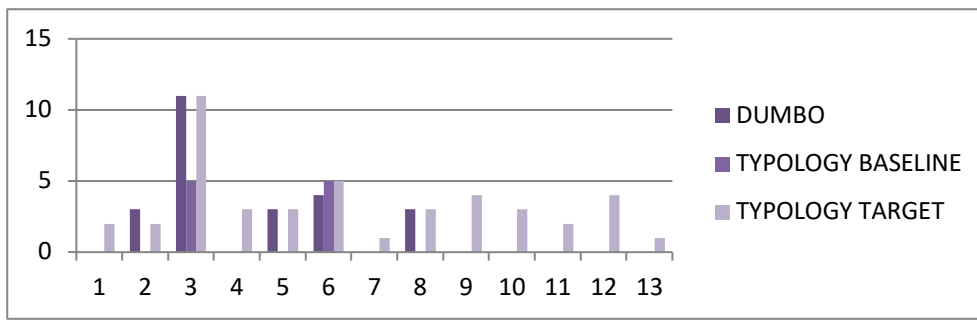

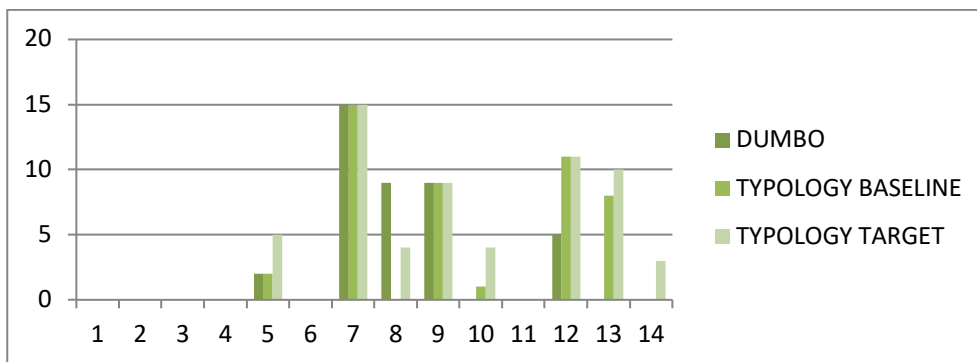*Table 7:* NW Category: Dumbo performance vs. Comprehensive Site Work typology baseline and target

Table 8: CR Category: Dumbo performance vs. Comprehensive Site Work typology baseline and target
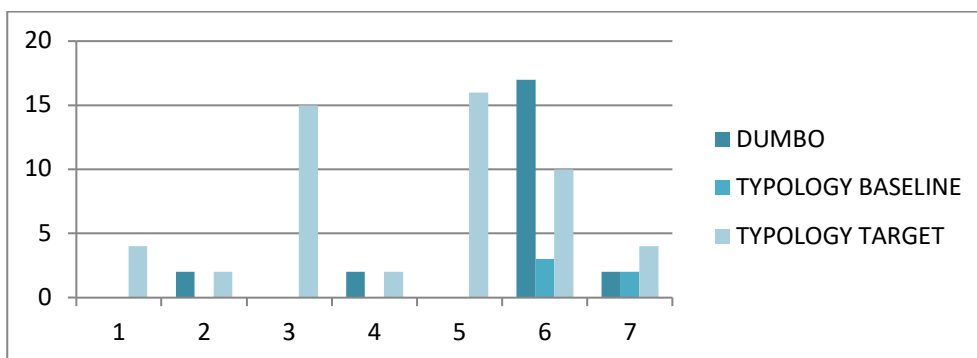
Table 9: *Draft Pilot Envision Rating for Dumbo/Vinegar Hill streets and plaza reconstruction project, conducted on August 29, 2014*

		ENVISION CREDITS		APPLICABLE POINTS	LEVEL OF ACHIEVEMENT	POINTS ACHIEVED	TOTAL POINTS	% OF POINTS ACHIEVED
Quality of Life								
1	PURPOSE	QL1.1	Improve Community Quality of Life	YES	Restorative (25)	25	25	100%
2		QL1.2	Stimulate Sustainable Growth & Development	YES	Restorative (16)	16	16	100%
3		QL1.3	Develop Local Skills and Capabilities	YES	No added value	0	15	0%
4		QL2.1	Enhance Public Health and Safety	YES	Restorative(16)	16	16	100%
5		QL2.2	Minimize Noise and Vibration	YES	Conserving (8)	8	11	73%
6	COMMUNITY	QL2.3	Minimize Light Pollution	YES	Conserving (8)	8	11	73%
7		QL2.4	Improve Community Mobility and Access	YES	Superior (7)	7	14	50%
8		QL2.5	Encourage Alternative Modes of Transportation	YES	Superior (6)	6	15	40%
9		QL2.6	Improve Site Accessibility, Safety & Wayfinding	YES	Conserving (12)	12	15	80%
10		QL3.1	Preserve Historic and Cultural Resources	YES	Restorative(16)	16	16	100%
11	WELLBEING	QL3.2	Preserve Views and Local Character	YES	Restorative(14)	14	14	100%
12		QL3.3	Enhance Public Space	YES	Restorative (13)	13	13	100%
		QL0.0	Innovate or Exceed Credit Requirements	NO				
			TOTAL			**141**	**181**	**77,9%**
Leadership								
13		LD1.1	Provide Effective Leadership & Commitment	YES	Enhanced (4)	4	17	24%
14	COLLABORATION	LD1.2	Establish a Sustainability Management System	YES	Improved (1)	1	14	7%
15		LD1.3	Foster Collaboration and Teamwork	YES	Enhanced (4)	4	15	27%
16		LD1.4	Provide for Stakeholder Involvement	YES	Superior (9)	9	14	64%
17	MANAGEMENT	LD2.1	Pursue By-Product Synergy Opportunities	YES	Improved (1)	1	15	7%
18		LD2.2	Improve Infrastructure Integration	YES	Conserving (13)	13	16	81%
19		LD3.1	Plan for Long-Term Monitoring & Maintenance	YES	Enhanced (3)	3	10	30%
20	PLANNING	LD3.2	Address Conflicting Regulations and Policies	YES	No added value	0	8	0%
21		LD3.3	Extend Useful Life	YES	Enhanced (3)	3	12	25%
		LD0.0	Innovate or Exceed Credit Requirements	YES	No added value	0		
			TOTAL			**38**	**121**	**31,4%**
Resource Allocation								
1		RA1.1	Reduce Net Embodied Energy	YES	No added value	0	18	0%
2		RA1.2	Support Sustainable Procurement Practices	YES	Enhanced (3)	3	9	33%
3		RA1.3	Use Recycled Materials	YES	Superior (11)	11	14	79%
4	MATERIALS	RA1.4	Use Regional Materials	YES	No added value	0	10	0%
5		RA1.5	Divert Waste from Landfills	YES	Improved (3)	3	11	27%
6		RA1.6	Reduce Excavated Materials Taken Off Site	YES	Enhanced (4)	4	6	67%
7		RA1.7	Provide for Deconstruction and Recycling	YES	No added value	0	12	0%
8		RA2.1	Reduce Energy Consumption	YES	Improved (3)	3	18	17%
9	ENERGY	RA2.2	Use Renewable Energy	YES	No added value	0	20	0%
10		RA2.3	Commission and Monitor Energy Systems	YES	No added value	0	11	0%
11		RA3.1	Protect Fresh Water Availability	YES	No added value	0	21	0%
12	WATER	RA3.2	Reduce Potable Water Consumption	YES	No added value	0	21	0%
13		RA3.3	Monitor Water Systems	YES	No added value	0	11	0%
		RA0.0	Innovate or Exceed Credit Requirements	YES	No added value	0		
			TOTAL			**24**	**182**	**13,2%**
Natural World								
35		NW1.1	Preserve Prime Habitat	NO	No added value		18	
36		NW1.2	Protect Wetlands and Surface Water	YES	No added value	0	18	0%
37		NW1.3	Preserve Prime Farmland	NO	No added value		15	
38	SITING	NW1.4	Avoid Adverse Geology	NO	No added value		5	
39		NW1.5	Preserve Floodplain Functions	YES	No added value	2	14	14%
40		NW1.6	Avoid Unsuitable Development on Steep Slopes	NO	No added value		6	
41		NW1.7	Preserve Greenfields	YES	Conserving(15)	15	23	65%
42		NW2.1	Manage stormwater	YES	Superior (9)	9	21	43%
43	LAND & WATER	NW2.2	Reduce pesticide and fertilizer impacts	YES	Conserving (9)	9	9	100%
44		NW2.3	Prevent surface and groundwater contamination	YES	No added value	0	18	0%
45		NW3.1	Preserve species biodiversity	YES	No added value	0	16	0%
46	BIODIVERSITY	NW3.2	Control invasive species	YES	Superior (5)	5	11	45%
47		NW3.3	Restore disturbed soils	NO	No added value	0		
48		NW3.4	Maintain wetland and surface water functions	YES	No added value	0	19	0%
			TOTAL			**40**	**135**	**29,6%**
Climate and Risk								
49	EMISSION	CR1.1	Reduce Greenhouse Gas Emissions	YES	No added value	0	25	0%
50		CR1.2	Reduce Air Pollutant Emissions	YES	Improved (2)	2	15	13%
51		CR2.1	Assess Climate Threat	YES	No added value	0	15	0%
52		CR2.2	Avoid Traps and Vulnerabilities	YES	Improved (2)	2	20	10%
53	RESILIENCE	CR2.3	Prepare for Long-Term Adaptability	YES	No added value	0	20	0%
54		CR2.4	Prepare for Short-Term Hazards	YES	Conserving (17)	17	21	81%
55		CR2.5	Manage Heat Island Effects	YES	Enhamced (2)	2	6	33%
		CR0.0	Innovate or Exceed Credit Requirements	NO	No added value			
			TOTAL			**23**	**122**	**18,9%**
			GRAND TOTAL			**266**	**741**	**36%**

EXHIBIT: Dumbo /Vinegar Hill project maps of components and relation with surroundings
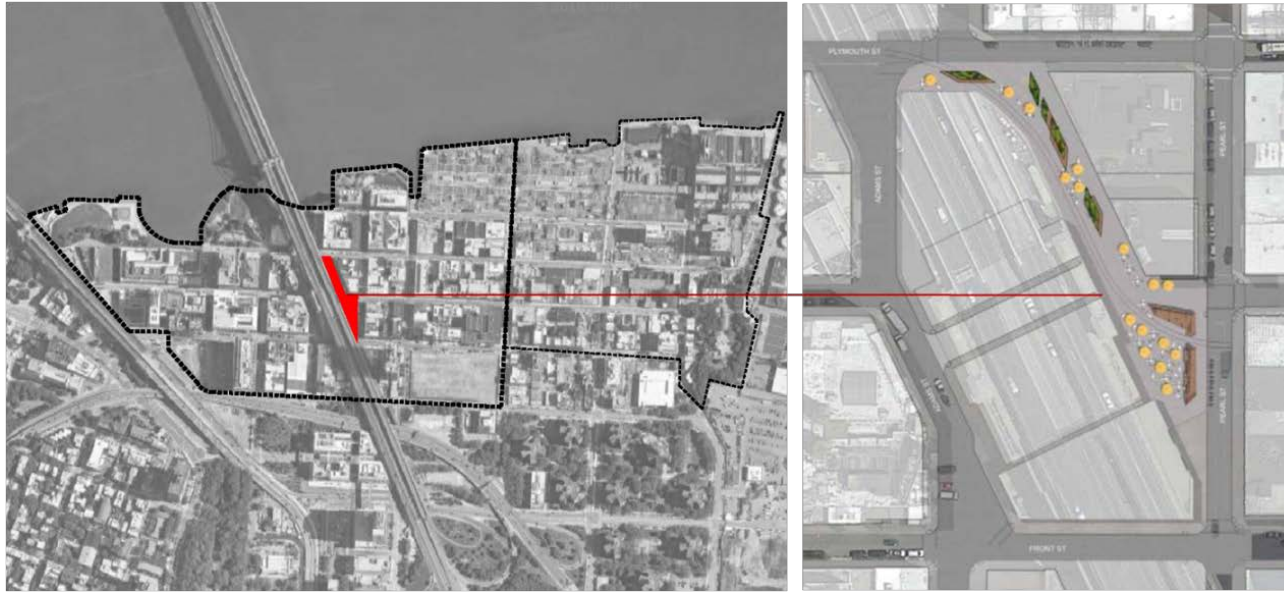
Fig.18: The Pearl St Triangle plaza location within Dumbo district and the proposed design.

DUMBO project **PHASE I**
DUMBO /Vinegar Hill project **PHASE II**

Fig.19: Brooklyn Bridge Park in relation to Dumbo district (created by the author)

Fig.20: Brooklyn Bridge Park in relation to Dumbo project phases (created by the author)