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Presents

LEED FOR TRANSIT

RETHINKING TRANSPORTATION
FOR SUSTAINABILITY

BY GINNY DORN



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Transportation is an important factor in any city or district. USGBC has placed new, much-needed responsibility on transit owners to reduce their environmental footprint. Since building and transportation are the two biggest offenders in climate change, it's incredibly important that we focus on creating more sustainable transportation options. LEED for Transit sets a framework in place which provides transit owners and developers with clear-cut standards to focus on and relevant, effective ratings to achieve. With transportation being such a critical factor in the physical infrastructure of a city, it's imperative that we build new transportation systems sustainably and adjust existing systems to meet environmental standards.

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ORIGINS OF LEED FOR TRANSIT

LEED for Transit is fairly new, with LEED for Existing Transit making its debut in late 2017. USGBC took their LEED for Operation and Management (or LEED O+M) rating system and adjusted it to apply specifically to transportation. Delhi Metro Rail Corporation (DMRC) was the first to pursue the certification and test the rating system. Also referred to as LEED v4 O+M: Transit, this rating system was used by the DMRC first on their metro stations in Delhi NCR as well as other states in India. The DMRC's Metro Bhawan headquarters was the first project across the globe to achieve LEED certification using the Arc platform. (McCadden, 2017)

Delhi Metro Rail Corporation (DMRC) was the first to pursue the certification and test the rating system.

Projects like this and any other existing transit stations are monitored on the Arc performance platform. The platform allows for data tracking in regards to five categories:

water, energy, waste, human experience, and transportation.

The rating system itself was developed using feedback from the DMRC, which has been called "a global leader of mass rapid transit systems and a trailblazer in sustainability."

(McCadden, 2017) Overall,

LEED v4 O+M: Transit gives operation transit facilities the ability to benchmark their efforts toward efficiency and sustainability while also demonstrating ongoing improvement.

The certification allows transit owners to open a dialogue with riders on sustainability and the responsibility of the public transportation sector to minimize greenhouse gas emissions.

In 2018, USGBC released the LEED v4 Building Design and Construction: Transit Stations (LEED v4 BD+C: Transit) for new construction. With this rating system, USGBC now has a well-rounded offering for Transit projects both new and existing. Again, as USGBC created the rating system, they sought out input from top transit teams: the DMRC as well as from Shanghai Shentong Metro Group Co. Ltd. for China (Shentong), and Shanghai Green City Architectural Technology Co., Ltd. This input ensured that the LEED rating system would be viable. Melissa Baker, the senior VP for technical core at USGBC stated, “USGBC solicited the help of top transit teams in India and China to leverage their knowledge and technical abilities to fully ensure that LEED Transit ratings are both relevant and effective. The resulting LEED Transit program meets a growing interest in LEED certification from new and existing transit projects. Transportation is a rapidly growing sector and a critical component of physical infrastructure.” (Crea, 2018)

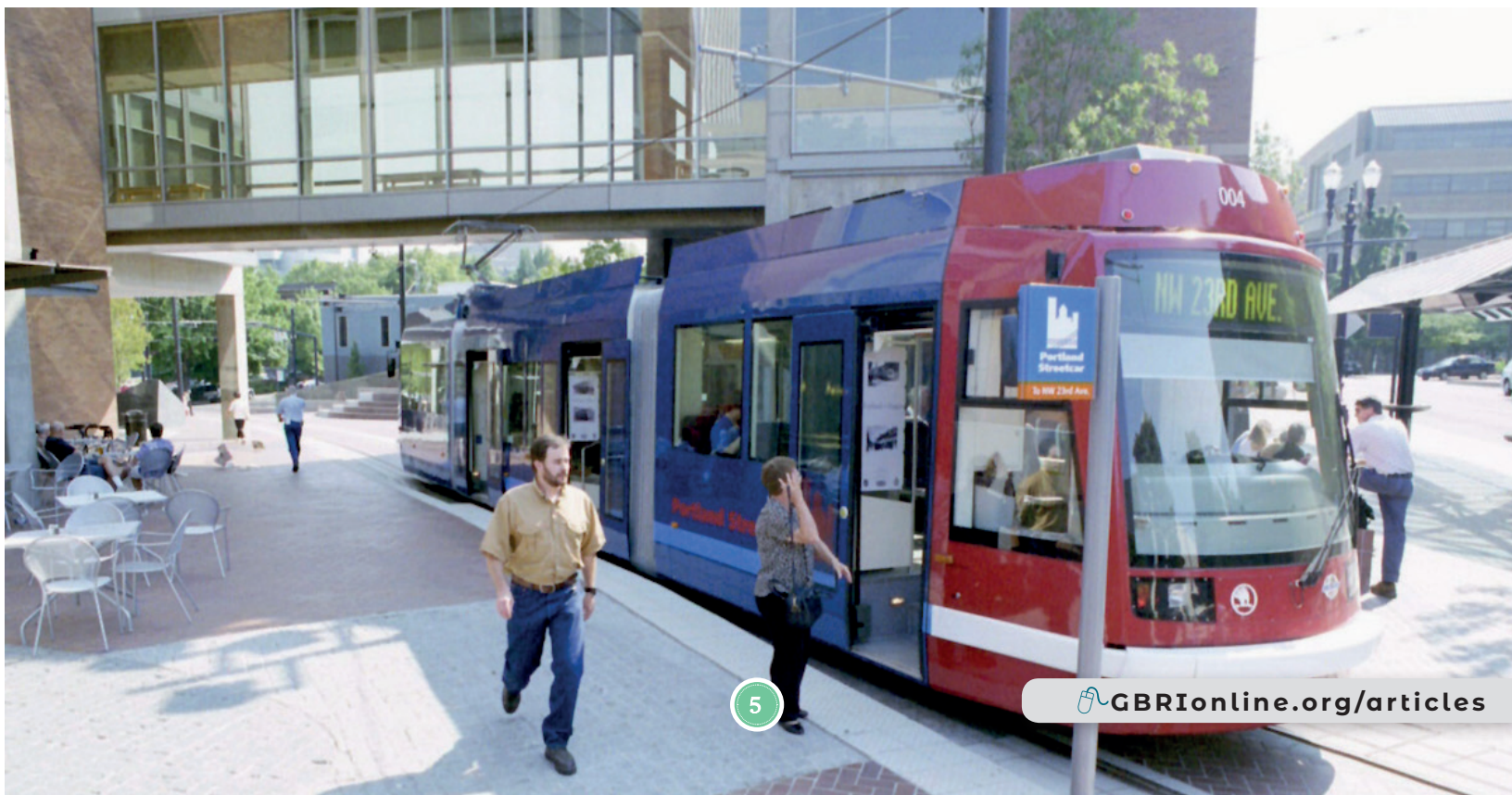
HOW LEED FOR TRANSIT WORKS

The combination of LEED v4 O+M: Transit and LEED v4 BD+C: Transit results in a comprehensive program that covers all types of transit stations. While it's important to develop new transit stations with sustainability built into the structure, we must also address and improve existing transit stations and networks. With transit stations reducing their environmental impact, transit riders will feel even better about using the transit system.

LEED for Transit works similarly to the other LEED rating systems. First, project leaders must register their projects and agree to the certification process. LEED v4.1 BD+C: Transit is still in the beta phase, so when you register and certify in this program, USGBC will seek out feedback to improve the system. (LEED v4 Building Design And Construction: Transit Stations 2019)

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Once a project is registered in the Arc platform, project leaders and teams will enter data in some or all categories to receive a performance score. The project will receive scores for each category as well as an overall score, which can be reviewed and shared through Arc. Performance scores require the following documentation:

- **Energy:** Utility bills from the most recent 12 months, for all fuels included for the project. Highlight consumption values and dates on the bills.
- **Water:** Utility bills from the most recent 12 months, for all water consumption included for the project. Highlight consumption values and dates on the bills.
- **Waste:** Hauler reports, audit reports, third-party reports, or bills verifying the data provided.
- **Human Experience:** Sensor readings, audit reports, third-party reports verifying

the data provided. Retain the template uploaded to Arc and a narrative describing procedures, how locations were determined, dates, times, and results of each test. Include floor plan/s identifying locations for testing.

Next, you'll provide documentation and information based on each LEED prerequisite. These prerequisites help you create a baseline. Once complete, you and the project team will choose credits and transit strategies to focus on for your specific project. These will vary depending on each transit station. You'll be able

Then GBCI will consider any new details and provide a final report - if the project receives more than 40 points, it will also receive a certification

to review the requirements for prerequisites, credits, and strategies before providing documentation to support your project's progress toward each goal. From this, your project will get a base score.

Finally, you enter the review phase wherein GBCI considers all documentation and assigns points. GBCI first provides a preliminary review report so that the project team can provide any needed clarifications. Then GBCI will consider any new details and provide a final report - if the project receives more than 40 points, it will also receive a certification. Project teams can always choose to supply additional information and go through further reviews if necessary. (LEED v4 Operations And Maintenance: Transit 2017)

While 40 points is the minimum necessary for certification, higher scores earn higher certification levels. Certification scores are based on an aggregate of the following:

- **Energy score** - total points possible: 33
- **Water score** - total points possible: 15
- **Waste score** - total points possible: 8
- **Transportation score** - total points possible: 14
- **Human experience score** - total points possible: 20
- **Base score** - total points possible: 10



CASE STUDY #1 – THE MOYNIHAN TRAIN HALL – NEW YORK, NEW YORK, US

The Moynihan Train Hall is named after US Senator Daniel Patrick Moynihan who, over his career, worked to improve Penn Station which was overcrowded and poorly planned. The underground train station connects to Moynihan Train Hall which reopened January 1st, 2021 following three years of construction. (Goode, 2021)



"Image Source: www.newyorker.com"

Improving Human Experience

The construction project was completed by Skanska, a construction company with years of experience improving New York's transportation systems. The project has had a hugely positive impact on the passenger experience. When the Penn Station station was demolished in 1965, the system had to go completely underground. This allowed for only 200,000 travelers daily. Previous to Covid-19, 600,000 people were actually passing through the station each day - far more than the space allotted for.

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(Goode, 2021) With the completed construction of the hall, Penn Station gained 486,000 square feet of space for people navigating and waiting for trains. As Penn Station is the main New York Train station and the busiest in the entire western hemisphere, this space is vital to people's welfare when using the transportation system.

Part of the renovation included adding upgraded lighting. Additionally, wayfinding digital screens were added to aid travelers by providing information and create a more positive passenger experience. (Skanska completes transformation of the James A. FARLEY building into New York CITY'S NEW MOYNIHAN train hall 2021)

Phase 1 of the project began in 2012, with Skanska working to expand and modernize the West End Concourse in Penn Station, effectively linking the Farley Building. This link greatly improved capacity for nine out of 12 train platforms. Passenger circulation was also improved. (Skanska completes transformation of the James A. FARLEY building into New York CITY'S NEW MOYNIHAN train hall 2021)

Built to Last

With a cost of \$1.6 billion, the materials and structure of the train hall were carefully chosen. The project allowed for a total of 1.4 million square feet of space for retail, transit, and office use.

Skanska was able to restore the building's original, historic facade. The star of the project is the massive skylight overhead which is 92 feet high and about an acre long. To build the skylight, 775,000 pounds of steel reinforcement and 2,200 individual glass panels were used.

Additionally, the project required major demolition of existing architectural and structural elements in order to remove any asbestos and lead abatement. This ensured that the new build could be air-conditioned and safe for all travelers. (Skanska completes transformation of the James A. FARLEY building into New York CITY'S NEW MOYNIHAN train hall 2021)

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"Image Source: www.seele.com"



Part of Something Larger

The project is part of New York governor, Andrew Cuomo's redevelopment plan for the Empire Station Complex. The goal is to restore the Farley Building's architectural dignity, which was built in 1912. It was also imperative that the project improved the passenger experience while maintaining some historical architecture.

Despite the project's size, the post office adjacent to the Farley Building was able to stay functional throughout. Over 5,000 construction jobs were created due to the project as well as an estimated 11,000 indirect jobs on top of that. Governor Cuomo required that Skanska prioritize union labor. They also subcontracted work to Minority and Women-Owned Business Enterprises (MWBs.) (Skanska completes transformation of the James A. FARLEY building into New York CITY'S NEW MOYNIHAN train hall 2021)

With all of these achievements, the Moynihan Train Hall is pursuing the LEED for Transit certification. The train station will serve as a beta test within the LEED for Transit category for adaptive reuse projects. (Sustainability and LEED 2021)

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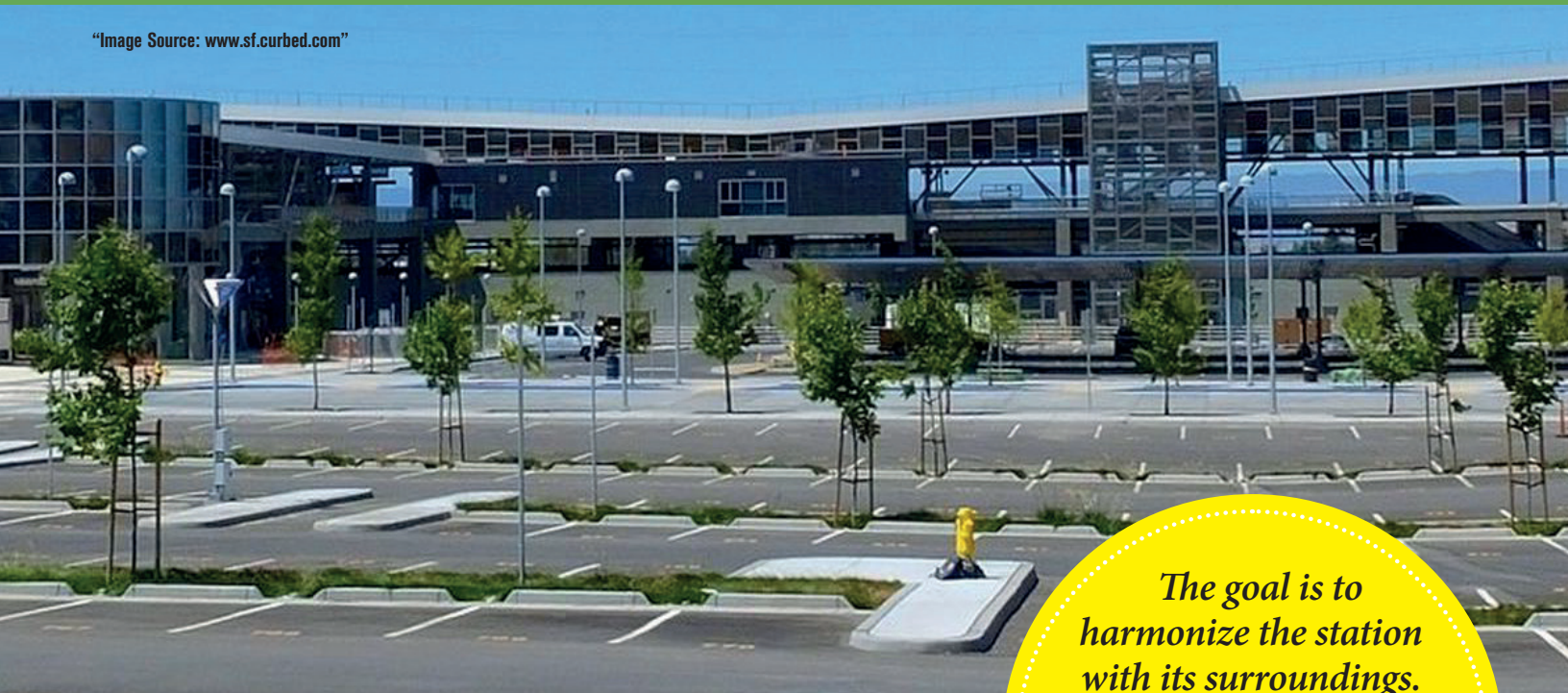
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CASE STUDY #2 – BART IRVINGTON STATION – CALIFORNIA, US

The Bay Area Rapid Transit District, better known as BART, is a heavy-rail system connecting the communities in the East and South Bays to the San Francisco Peninsula in California, United States. It operates in five counties, has 131 miles of track and 50 train stations. On the average weekday (pre Covid-19), BART averages 405,000 trips. (About BART) With so many people depending on the transit system, they are constantly working to improve it.

Part of that improvement is the Warm Springs Extension. The Irvington Station is a subject of that extension and is currently pursuing a LEED for Transit certification. The 80,000 square foot project completed preliminary engineering in the summer of 2020. (BART Irvington Station)

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Building Around Historic Components

The BART Irvington Station is currently completing its final design. Through survey data and field investigations, the design has been carefully crafted to incorporate the existing environment. This starts by being mindful of the character of the historic Irvington District. Project teams are carefully planning how the project will intertwine the history of the area with a state-of-the-art BART station. The goal is to harmonize the station with its surroundings. Immediately adjacent to the area is the Washington Boulevard bridge and Osgood Road which is elevated. With this in mind, the station will be built to fit into the landscape and will be made to serve communities far into the future.

Plans are also in place to incorporate nearby winery ruins into the design. The project will pay homage to the historic Gallegos Winery ruins by stabilizing and enhancing pedestrian and bike access to the site. (Warm springs extension news 2021)

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Enhanced Patron Experience

The design plan includes extensive details to ensure that the station will be safe and secure for all - that includes ADA access from all sides of the station. The station will include best practices for constructability, maintenance, and security.

The patron experience will be further complemented by following preferred practices from the BART Station Experience Design Guidelines. Most importantly, this includes wayfinding. There will also be opportunities for public art display, which will create a shared community experience. (Warm springs extension news 2021)

Through an artist selection panel, Rebeca Mendez was recently named the artist for Irvington Station. Community engagement meetings are being planned and will provide the community an opportunity to meet with Mendez and share feedback on what they love about Irvington and surrounding Fremont. The input will then be used to create meaningful artwork at the station.



"Image Source: www.en.wikipedia.org"

"Image Source: www.thetransportpolitic.com"



Community Involvement Shapes Plans

In addition to encouraging community feedback for onsite art, the community has also been called upon to provide feedback on the overall layout. Based on this community feedback as well as feedback from the BART board, the plans have been reshaped for a more compact station that feels more neighborhood friendly. To accomplish this, the footprint of the station shrunk from 25.9 acres to 13.1 acres. Parking was reduced from

960 spaces to 250, as the community expressed concern about increased traffic to local roads. Finally, strong community support of a pedestrian bridge from the station's concourse to Osgood Road led to its inclusion in the plans. This bridge will allow for people to walk and bike to the station from surrounding neighborhoods. (Warm springs extension news 2021)

Energy Efficiency & Environmental Impact

Another aspect of the plan centers around energy. The goal is to provide many opportunities for on-site renewable energy generation via rooftop solar. Energy storage is also being considered. The conceptual site plan has undergone environmental analysis, in accordance with the California Environmental Quality Act (also known as CEQA). (Warm springs extension news 2021)

FINAL THOUGHTS

Transportation and building are the main drivers of climate change. When USGBC unveiled LEED for Transit in 2017 and 2018, they aimed to address a major issue: transportation's ecological footprint. LEED for Transit offers up a framework for major transit providers to create better, more mindful transit developments. The framework provides guidance on various areas of improvement, from energy to human experience to waste and water. Every aspect of transportation is examined with LEED for Transit. The Moynihan Train Hall and BART Irvington Station are early adopters of LEED for Transit. Among other transportation systems, primarily in the US, China, and India, these transit providers are paving the way for more responsible, sustainable transportation and a brighter future.

"Image Source: www.dezeen.com"





"Image Source: www.nbcbayarea.com"

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