

LEED V4.1 CITIES AND COMMUNITIES: EXISTING CITIES

EDUCATION MODULE

TRANSPORTATION AND LAND USE CREDIT: COMPACT, MIXED USE AND TRANSIT ORIENTED DEVELOPMENT.

SECTION 1

Slide 1

Welcome to the discussion on compact, mixed use and transit-oriented development credit part of Transportation and Land use category in the LEED V4.1 Existing Cities rating system.

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In this education module, participants will be able:

1. To recognize the adverse effects of Urbanization.
2. To understand the Transportation and Land Use category in LEED v4.1 Cities and Communities: Existing cities rating system.
3. To determine the benefits of developing a city that is compact with mixed-use and transit-oriented development.
4. To become versed with the steps and calculations to achieve TR credit- Compact, Mixed Use and Transit Oriented Development.

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Today's session will be delivered by myself Dr. Mitali Kedia. As part of the technical team for LEED for cities and communities: existing cities rating system, I provide subject matter expertise for Transportation and Landuse category.

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Built by and for city governments, LEED for Cities and Communities: Existing Cities addresses places defined by their municipal public- sector governance or county governments and helps them measure and manage their sustainability performance.

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the LEED for Cities and Communities; existing cities certification program evaluates sustainability and quality of life in a city through its 9 categories:

These categories are:

1. Integrative Process
2. Natural Systems and Ecology
3. Transportation and Land Use
4. Water Efficiency
5. Energy and Greenhouse Gas Emissions
6. Materials and Resources
7. Quality of Life
8. Innovation, and
9. Regional Priority

These categories encompass environmental, economic, and social performance indicators and strategies and provide a clear, data-driven means of benchmarking and communicating progress.

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The 9 categories of the rating system have differential point weightages. Credits that most directly address the prioritized impacts are given the greatest weight.

transportation and Landuse category has the third highest weightage of 14% after Energy and Greenhouse gas emissions which holds 27% point weightage and quality of life category that holds 18% weightage.

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The Score card for LEED existing cities rating which displays points allocated to all pre-requisites and credits. The project can choose from this wide range of flexible options designed around pre-requisites and credits with a total of 110 points.

However, the focus of this course will be on Transportation and Landuse Category.

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The transportation sector alone is responsible for a quarter of energy-related greenhouse gas (GHG) emissions worldwide.

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The recent trends in urbanization indicate that the urban population is increasing rapidly, and the cities are getting densified. High levels of urbanization have started to deplete our cities.

UN stats show that in 2015 around 55% of the global population lived in urban areas and this is predicted to increase up to 68% by 2050. Projections indicate that the shift of population from rural to urban areas, combined with the overall growth of the world's population could add another 2.5 billion people to urban areas by 2050.

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Rapid urbanization leads to an increased reliance on motorized vehicles due to urban sprawl, requirement of high investment to meet the infrastructure demand and inequity due to rise in urban poverty.

Expansion of existing cities as well as development of new cities to accommodate the added population directly result in a steep upsurge in consumption of resources such as water, land and energy.

Therefore, it has become imperative to curb the growing trends of urbanization and hence the transportation and land use category aims at guiding cities to adopt a more sustainable approach towards urban planning.

SECTION 3

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The Transportation and Land Use category has one pre-requisite and five credits in total that add up to 15 points out of 110. These are:

- Transportation Performance
- Compact, Mixed Use and Transit Oriented Development
- Safe, Multimodal Accessibility.
- Clean Transportation
- Mobility Management.

- And High Priority Site.

In this education module, we will be presenting the intent, structure and step by step guidance for achievement of the first credit - Compact, Mixed Use and Transit Oriented Development.

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The intent of the credit is to concentrate development in compact, mixed-use centers, which allow efficient use of shared infrastructure and permit people to meet their daily needs without reliance on single-occupant vehicles.

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TR credit Compact, Mixed Use and Transit Oriented Development encompasses three interrelated concepts of urban planning with the premise that focusing on dense mix of uses around public transit stations with walkability can foster vibrant, livable and accessible communities.

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Compact and mixed-use development encourages.

- mix of uses,
- connects neighborhoods and concentrate density around public transit,
- aids in creating human-scaled, walkable, and universally accessible public spaces and
- promote design of complete streets through walking and bicycling, thereby reducing dependency on motorized vehicles.

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Aligning with the rating system's holistic approach, this credit also addresses three pillars of the triple bottom line:

- social benefits are prevention of low-income groups from being pushed outside the city, ease of mobility for all and better quality of life as well as improved safety for pedestrians and cyclists through non-motorized infrastructure.
- Environmental benefits are shorter intra-urban distances, less automobile dependency thus lesser emissions, conservation of farmland, ecosystem as well as relief from congestion.
- Economic benefits are increased efficiency of infrastructure investment, reduced cost of maintenance, easy access to local services and jobs as well as revenue gains for transit systems and economic returns to surrounding landowners.

SECTION 4

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In the following sections, we will provide step-by-step guidance to achieve the requirements. Projects should meet the following requirements within the compact, mixed- use and TOD credit to achieve desired number of points:

The first mandatory requirement in this credit is identifying compact and complete centers (CCC). CCCs are measured as areas within a ½ mile (800 meters) walking distance of a central point that represent a strong mix of uses, public transit availability, density, and walkability.

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Once the required CCCs are identified, project can choose from option 1,2 or 3 to achieve a total of up to 3 points.

Option 1 consists of density, diverse uses and public transit availability where,

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Density requires encouragement of higher residential and non-residential density within the CCCs.

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Diverse Uses- requires all buildings to be in walking distance of 8 diverse uses through mixed-use development.

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And Public transit availability: Requires all buildings to be within ½ mile (800m) walking distance of an existing or planned mass transit station with a minimum of 72 weekday trips and 30 weekend trips.

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Option 2 requires the project to demonstrate a minimum walk and transit score equal to or higher than 70 within each CCC.

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And finally, through Option 3 the project ensures future population and job growth occurs within areas satisfying CCC requirements.

SECTION 4.1

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We will now discuss each of these requirements in detail starting with the mandatory requirement of -
Identifying CCCs.

There are three main steps involved.

- Step 1 is to determine the required number of compact and complete centre (CCCs) to be identified and marked up on the master plan.
- Step 2 is to identify transit station(s), landmarks and diverse uses on the master plan of the development.
- And step 3 is to plot CCCs on the master plan.

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To achieve step 1 first determine the city's permanent population

The next step is to analyze the number of CCCs required to be plotted on the master plan based on the population using the table 1 as shown here.

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Here in the example-City A has a population of above 600,000 residents.

Since the population is in the range of 500,000- 749,999 residents the project identifies 8 CCCs to be plotted on the master plan for City A.

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Step 2 identifies transit station(s), landmarks and diverse uses on the master plan of the development.

For City A mark all the transit stations. these include mass transit stations and stops.

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B. Landmarks which include- Civic buildings, urban parks, squares, plazas or civic spaces, 100% intersections, or any other major destinations. AND

C. diverse uses- for instance food, retail, civic and community facilities.
All these requirements may be existing or planned to be developed in future.

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Step 3 requires the project to plot the CCCs on the master plan.
In order to do that identify centre points for CCC on the master plan. These may be mass transit stations or landmarks.

After identifying the center points. Plot a radius of $\frac{1}{2}$ mile (800 meters) walking distance or straight-line radius, whichever is lesser on the master plan.

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And finally mark the minimum number of required CCCs and name them.
Be sure to use one common master plan to plot all the CCC requirements and keep in mind that CCCs cannot be overlapping.

In this manner projects can satisfy the mandatory requirement for the credit.

SECTION 4.2

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Next, we will cover the requirements from option 1- The first requirement is calculating density. There are four main steps involved.

STEP 1. Identify building types and buildable land within required radius of project site.

STEP 2. Collect information on density.

STEP 3. Perform separate residential and non-residential density or combined density calculations, as applicable. OR

STEP 4. Prepare summary of densities

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For Step 1. Within each CCC document various building types and the buildable land available within the project boundary.

The example presented here documents variety of residential, non-residential and mixed-use buildings within $\frac{1}{2}$ mile radius.

As per table 1 land areas for residential is 80 acres, non-residential buildings is 60 acres and 10 acres for mixed-use buildings.

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For step 2 Collect information on density.

For each building type within the radius, determine whether sufficient information is available to calculate residential and non-residential building densities separately.

In case residential and non-residential components of mixed-use buildings are collected the mixed-use land calculations demonstrated in the example can be followed.

The project determines that 80% of the total mixed-use building floor area is residential and the other 20% is non-residential.

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Using the mixed-use residential land equations provided we can separate the residential and non-residential area component from mixed-use buildings. Therefore, total residential land area becomes 88 acres.

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Similarly applying the equation for mixed use non-residential land the total non-residential land area becomes 62 acres.

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The project team collected the following information for project B it was determined that Total number of Dwelling Units is 880, total residential land area is 88 acres, non-residential space within the radius is 1,600,000 sqft. and Total non- residential land area is 62 acres.

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In Step 3 perform calculations for residential and non- residential or combined density using the equations shown.

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residential density is calculated in Dwelling Units- total Dus are divided by total residential buildable land area. Therefore, total residential density for project B is 10DU/ acre.

The figure presented here illustrates varied residential densities based on the number of dwelling units provided.

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non- residential density is calculated in FAR- Total non-residential floor area/ total non-residential buildable area. Therefore, total non-residential density for project B is 0.59 FAR.

The figure presented here explains how different FAR can be achieved by varying the coverage.

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In step 4 List all the calculations done in Step 3 to create a summary of densities table and access if the project satisfies the requirement.

Table 2 summarizes the residential and non- residential densities calculated following steps 1 to 3.

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Since the credit requires a minimum residential density of 12 and non- residential density of 0.8 the project does not satisfy the requirement.

SECTION 4.3

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Next, we will cover the second requirement from option 1- diverse uses. There are three main steps involved.

STEP 1: Identify various land uses within each CCC.

STEP 2: Map walking routes to uses.

STEP 3: Count number of accessible diverse uses

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For step 1 Survey the eligible existing and planned diverse uses in each CCC and categorize them according to the table shown. Ensure all uses are supported with legend.

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Next, on a map, plot walking routes to diverse uses inside the CCC from the farthest points in CCC.

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For step 3 determine the number of diverse uses within the walkable distance.

To score 1 point from this requirement project needs a minimum of 8 accessible diverse uses within the CCC.

Ensure no more than two use types within each category are counted and the counted uses must represent at least three of the five categories, exclusive of the building's primary use.

The table shown here displays an example of one category with its associated uses. Please refer appendix 1 in LEED v4.1 existing cities document for a more comprehensive list of categories and uses associated with them.

SECTION 4.4

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Next, we will cover the third and final requirement from option 1- public transit availability. There are two main steps involved.

STEP 1. Map all transit stops and stations within each CCC.

STEP 2. Provide details of various transit services within the CCCs.

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Step 1 requires all transit stops and stations to be marked on master plan for each CCC. Make sure to support all different modes of PT with a legend.

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In step 2 provide Timetables or other-service level documentation showing frequency of weekday and weekend trips to satisfy the credit requirements

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the example here demonstrates daily trips per transit stop for City A.

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Transit stop name Bus1 and BRT 1 does not meet the combined minimum requirement of 72 weekday and 30 weekend trips.

SECTION 4.5

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To recap- we have covered the mandatory requirement and all the credit requirements for option 1.

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We now move on to understand the requirements for option 2 walk and transit score.

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There are two steps involved to achieve the requirements for option 2.

STEP 1. Access the Walk Score website and locate your respective city within the webpage.

STEP 2. Determine the Walk and Transit Score values for each ccc.

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Walk score is a public access walkability index that assigns numerical walkability and transit scores for addresses in multiple countries. Therefore, using the link shown on the screen access the walk score website and locate the project's walk and transit score data.

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After locating the project on the website, identify at least one neighbourhood in each identified CCC to have a walk and transit score equal to or higher than 70.

The table and map here demonstrate walk and transit score data of neighbourhood within each ccc for city A.

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From the example shown here it is clear that Only neighborhood 1 in CCC1 has a Walk Score and Transit Score higher than 70. rest of the neighbourhoods have a walkscore higher than 70 but a transit score lower than 70; therefore, CITY A does not meet the credit requirement.

SECTION 4.6

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We now move to the last credit requirement- option 3- planning for future development.

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Option 3 encourages cities to orient their future development in compliance with Compact and Complete Centers and incentivizing existing pockets to transform them into CCCs.

There are 3 steps involved:

STEP 1. Provide details of projected population and job growth.

STEP 2. Map the required number of CCCs on a spatial map of the city.

STEP 3. Indicate policies/ incentives/ strategies to address the population and job growth.

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First the project provides details of projected population and job growth by using any developmental document. An example demonstrates, how population and employment is projected for city A.

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Following with the data documented in step1, step 2 requires to map CCCs based on the projected population calculated.

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For example, City A currently has a population of 850,000 which requires it to have a minimum number of 9 CCCs.

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based on the projected population the number of CCCs required for city A will become 10 CCCs, therefore, the map here displays 9 existing CCCs and 1 planned CCC catering to the additional population growth.

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The last step is to provide list or documentation of existing policy/ strategies/ incentives to increase residential and employment densities and diverse uses in areas identified for compact, mixed-use development with public transit availability.

The examples here demonstrate indicative strategies that can be applied and implemented to address the population and job growth.

SECTION 5

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This completes all the requirements for compact, mixed use and transit-oriented development credit.

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In this manner we have achieved all the learning objectives established at the start of the presentation.

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For additional information you can access these links or visit our website.

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Additionally reach out to our team today to get started with v4.1! Visit us at www.usgbc.org or email cities@usgbc.org for more information.