

STARTRAN MULTIMODAL TRANSIT CENTER

Feasibility & Concept Design Study
Summer 2020



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1.0 Executive Summary

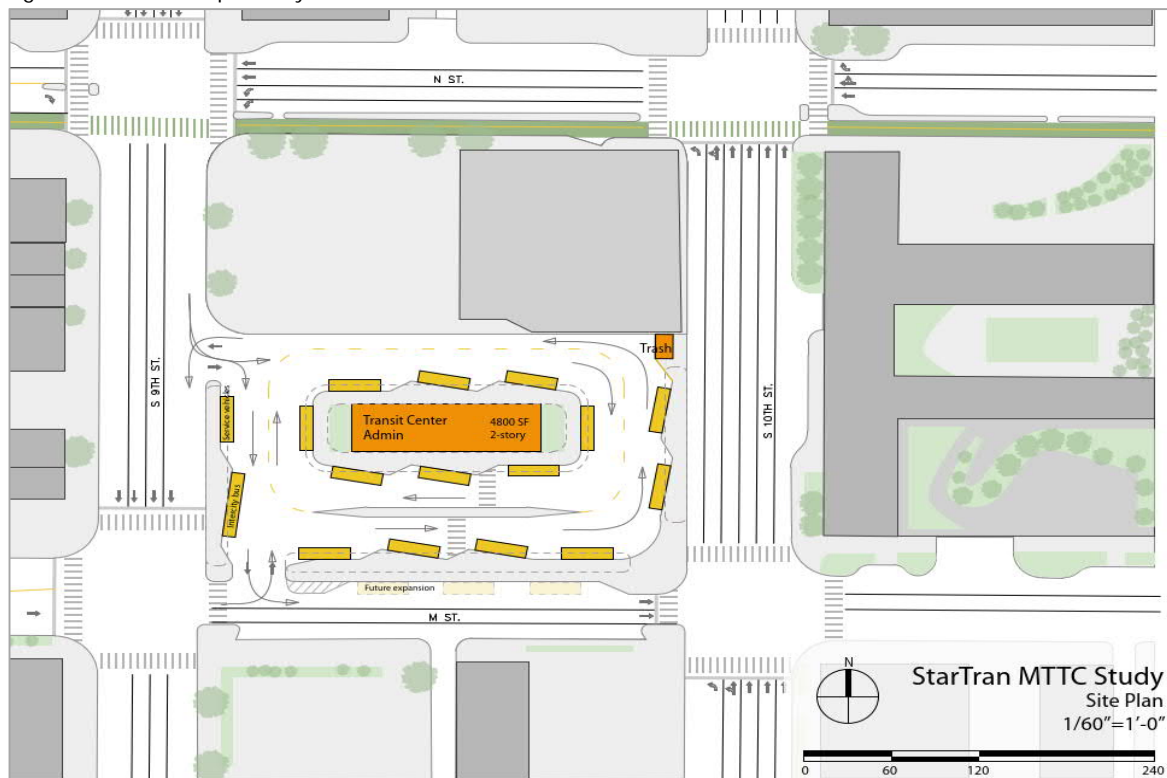
Beginning in the fall of 2019, StarTran conducted a six-month Multimodal Transit Transfer Center (MTTC) Feasibility and Concept Design Study to explore transfer improvements for the fixed-route bus system.

Today, the hub of StarTran’s operations is centered around an on-street transfer facility located at 11th and N Streets adjacent to the Gold’s Building. This location is undersized and does not provide an optimal layout for the safe and efficient transferring of passengers between routes. The Gold’s location offers limited passenger amenities that would make waiting for the bus more comfortable, and the site limits future expansion of the transit system due to its size and configuration.

The MTTC Study reached out to the community for input to help guide a transparent process to develop a needs-based assessment to inform selection of the site and amenities. A key goal of the project was to improve mobility by integrating multiple transportation modes (buses, bikes, scooters, pedestrians, and others) and investigate potential economic development opportunities. Key priorities for transit users were the inclusion of climate controlled indoor waiting areas, covered boarding platforms, seating, and enhanced technology amenities (e.g. free public WI-FI, real-time next bus arrival information).

The MTTC Feasibility and Concept Design Study assessed multiple sites in downtown Lincoln and identified a preferred location for the new transfer facility on the southern half of ‘Block 69’ located along M Street, between 9th Street and 10th Street. A conceptual layout for this site is shown in Figure 1.

Figure 1: MTTC Conceptual Layout for Southern Half of Block 69



This location and layout configuration would allow up to 14 bus bays for fixed routes, allowing the transit system to expand the total number of routes in the future. Today, StarTran operates 12 fixed routes that

serve the transit center. This location would also accommodate one bus bay for a new intercity commuter route between Lincoln and Omaha that will begin service in the coming years. It is anticipated that M Street will be converted to two-way traffic in the future. When that change occurs, there is potential for an additional three bus bays along M Street if further transit center expansion were required.

A ground-floor, indoor, climate-controlled passenger waiting area with restrooms and information counter would be constructed on the center boarding island of the transit center. The waiting area, customer service, and restroom areas are estimated to be approximately 1,400 square feet. StarTran administrative offices would be constructed on the second floor, above the passenger waiting area. This area would have room for offices and meeting space and be approximately 3,400 square feet. The entire MTTC site is approximately 1.25 acres.

The total estimated Rough Order of Magnitude capital cost for this facility at this level of conceptual planning is \$12,361,645. This cost will be further refined as more detailed planning and design are completed.

StarTran will be seeking federal funding opportunities through multiple sources to support the construction cost of the new MTTC including the US Department of Transportation's BUILD Program and others. BUILD funding would require a minimum 20 % local matching contribution.

Key Benefits of Block 69 Site and MTTC Conceptual Plan:

- Improves StarTran operational efficiency
- Locates majority of site on City-owned property
- Improves StarTran passenger safety
- Enhances passenger comfort, customer service, and convenience
- Consolidates StarTran administration with on-street operations
- Allows StarTran riders to transfer between all routes concurrently
- Requires minimal change to StarTran downtown route alignments
- Provides space for transit system future growth
- Enhances multimodal connectivity with adjacency to N Street Cycle Track
- Develops blighted property in Downtown
- Aligns with Downtown Master Plan

As part of this study a benefit-cost analysis was conducted. The results from this analysis showed a Benefit-Cost Ratio of 1.8, meaning the MTTC project would yield a highly positive rate of return for the investment in a new downtown transit center.

Following the conclusion of the MTTC Feasibility and Concept Design Study, StarTran will continue its efforts to secure federal funds needed to make this plan a reality. In the months and years to come, StarTran will need to further advance this project for more detailed design, engineering, and evaluation of any environmental impacts in coordination with partners at the Federal Transit Administration and other State of Nebraska agencies. The MTTC is a critical piece of transportation infrastructure that is needed to support the future of multimodal transportation in the greater Lincoln metro area.

2.0 Introduction

StarTran is the primary mobility and fixed route transit provider for the greater Lincoln metro area. StarTran is conducting this Multimodal Transit Transfer Center (MTTC) Feasibility and Concept Design Study to explore improvements to transfer operations for the transit system. Today, the hub of StarTran's operations is centered around an on-street transfer facility located at 11th and N Streets adjacent to the Gold's Building (Figure 2). This location is undersized and does not provide an optimal layout for the safe and efficient transferring of passengers between routes. The Gold's location offers limited passenger amenities that would make waiting for the bus more comfortable, and the site limits future expansion of the transit system due to its size and configuration.

Figure 2: Gold's Transfer Location



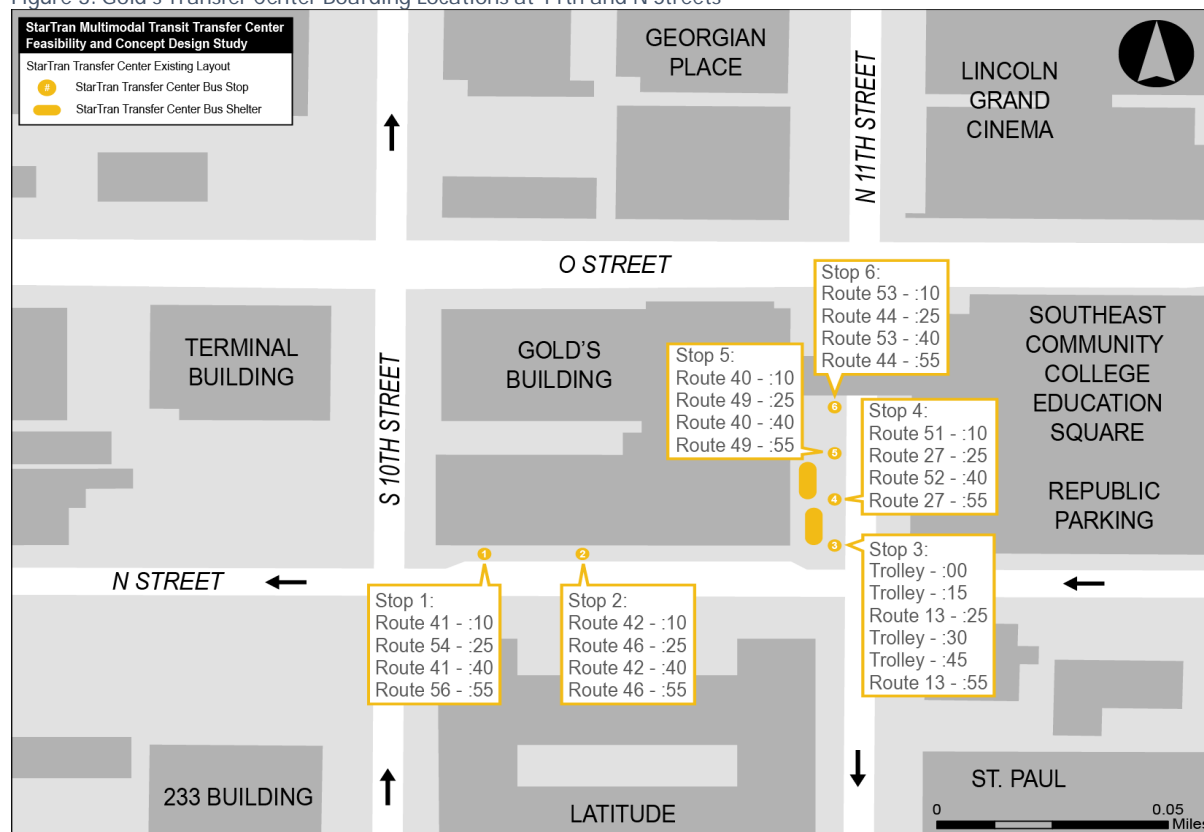
The MTTC Feasibility and Concept Design Study assessed multiple sites in downtown Lincoln to identify a new location for a transfer facility that can best serve StarTran and its riders. The Study collected community input to guide a transparent process to develop a needs-based assessment to inform selection of the site and amenities. A key goal was to improve mobility by integrating multiple transportation modes (buses, bikes, scooters, pedestrians, and others) and to investigate potential economic development opportunities. The Study developed estimated facility costs and reviewed potential impacts to the existing transit system.

2.1 MTTC Purpose and Need

Since the 1970s, StarTran has utilized the exterior of the 'Gold's Building' along the eastern block face of 11th Street and the southern block face of N Street as the primary transfer center for the fixed route transit system. Over time the configuration and available passenger amenities have adjusted. Today along 11th Street there are two enclosed passenger waiting shelters, trash receptacles, and next bus real-time arrival

signage. In 2015 a third enclosed passenger shelter was removed to provide higher visibility to the sidewalk area behind the shelters. Along the 11th Street side of the transfer center there are multiple benches located under an overhang off the building which provides shade and cover from precipitation. There is space for four buses to board and deboard passengers along 11th Street, and two boarding locations along N Street (Figure 3).

Figure 3: Gold's Transfer Center Boarding Locations at 11th and N Streets



StarTran currently has more fixed routes in its system than boarding / deboarding locations at the Gold's transfer location. This has caused StarTran to develop a network schedule that splits its timed, or 'pulse', transfer. Buses arrive at one of the six numbered boarding locations at four times throughout the hour:

- : 10 after
- : 25 after
- : 40 after
- : 55 after

This staggered pulse makes transferring between routes confusing for passengers as well as causing inconvenient additional transfer time to their daily trips.

The Gold's transfer location is limiting to StarTran if new routes are to be added to the transit system in the future. StarTran needs a transit center that can both accommodate current route operation needs and accommodate options for future transit network growth.

Safety and security have become concerns at the Gold's location in recent years causing StarTran to hire off-duty Lincoln Police Department officers to provide security at the transfer facility during the morning

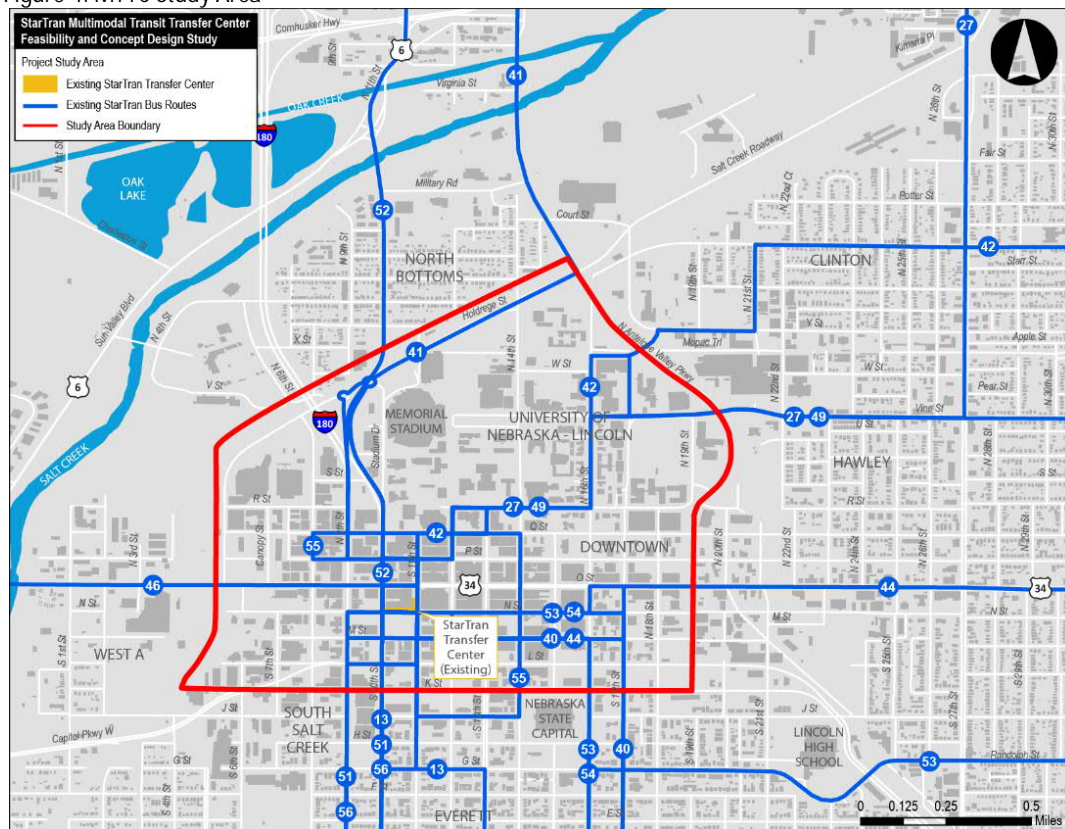
and evening peak periods of the day. The site offers limited lighting in the evenings and constrained visibility from the street with views obstructed from the two enclosed passenger shelters along 11th Street. The presence of on-site police security has helped, but passenger safety and security remain an on-going concern at this location.

The purpose of the MTTC Feasibility and Concept Design Study is to locate and develop detailed plans for a new Downtown transit center that can support StarTran bus operations, provide for future system expansion, improve operational efficiency, reduce transfer waiting times, and improve StarTran customer safety and comfort. The following report details past planning efforts related to the development of a new downtown transit center, assesses peer transit center facilities and lessons learned, identifies a preferred location for the MTTC and develops conceptual layouts that can best address the needs of StarTran and its passengers utilizing the transit system in Lincoln.

2.2 Study Area

The study area for the MTTC Feasibility and Concept Design is focused on Downtown Lincoln and includes the University of Nebraska – Lincoln (UNL) main campus. The study area is bounded by Salt Creek Roadway on the north, Pinnacle Arena Drive on the west, K Street on the south, and Antelope Valley Parkway on the east (Figure 4). Downtown Lincoln is a primary destination for many StarTran riders and also has the greatest concentration of residents and jobs in the greater Lincoln metro area. For transit service to maintain its operational efficiency it was a critical factor that the future transit center remains in this vibrant and busy area to best serve the mobility needs of the community.

Figure 4: MTTC Study Area



2.3 Study Goals

Early in the MTTC Feasibility and Concept Design Study, an Advisory Committee was formed and comprised of transit users, bus operators, key community stakeholders, and City of Lincoln staff to guide the study and serve as a sounding board for transit center concepts and other impactful decisions. At the outset, the Advisory Committee established the direction for the study by defining the MTTC project objective and project goals that would drive the study as it developed.

Project Objective:

Develop a plan and concept for a new Multimodal Transit Transfer Center in Downtown Lincoln that will enhance StarTran passenger experience, improve safety, catalyze new economic development opportunities, attract federal capital funding, and be operational in the next five years.

Project Goals:

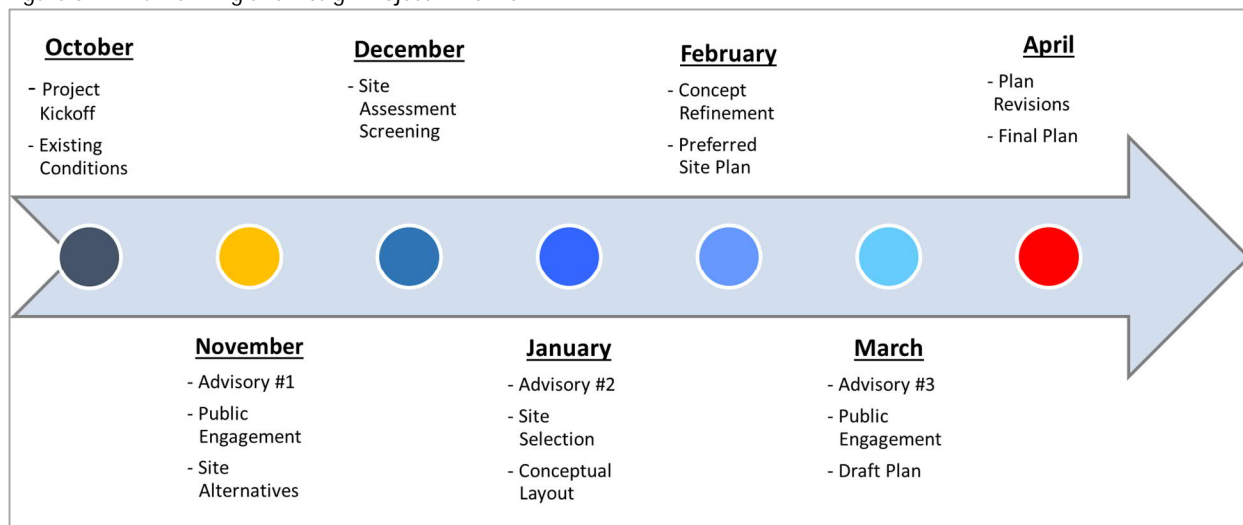
1. MTTC should reflect needs of StarTran passengers, stakeholders, and the greater Lincoln community.
2. The new MTTC facility will be designed with sustainable best practices, and examine opportunities for LEED Certification or include sustainable features.
3. The new MTTC facility should accommodate multiple mobility services that include, but are not limited to buses, pedestrians, cyclists, electric scooters, Transportation Network Companies (i.e. Uber/Lyft), Inter-City Commuter Bus, Bus Rapid Transit, and Autonomous Vehicles.
4. Improve safety, comfort, and convenience for StarTran passengers.
5. MTTC should improve StarTran operational efficiency and reliability.
6. The MTTC feasibility study will investigate opportunities for mixed-use, joint development, or other forms of Transit Oriented Development.
7. The new MTTC should be flexible and adaptable as infrastructure and passenger needs evolve in the coming years.
8. A new MTTC should provide equitable access for users of all ages and abilities to multiple mobility options that will improve availability for opportunities across the City of Lincoln.
9. The MTTC plan should be developed to attract federal capital funds and meet requirements of those funding programs.

The overall objective and goals were used throughout the planning project to set expectations and to develop an understanding of the benefits of the MTTC when successfully been completed.

2.4 Project Timeline

The MTTC study was initiated in October 2019 with scheduled completion in the spring 2020 (Figure 5). The seven-month project was targeted to complete in time to support StarTran and the City of Lincoln with submission of a construction funding grant through the United States Department of Transportation's (USDOT) competitive Better Utilizing Investment to Leverage Development (BUILD) grant program.

Figure 5: MTTC Planning and Design Project Timeline



The MTTC project worked through a process of examining existing conditions for transit in Lincoln and the greater downtown area, identifying multiple location alternatives for the future MTTC, selecting the most appropriate site to build the new transit center, and developing site planning concepts to arrive at a preferred MTTC solution that would achieve the project objective and goals. Throughout the planning study, two opportunities were offered to gather public input on the project and to provide StarTran riders and other stakeholders information on the project. As noted earlier, an Advisory Committee was used to guide the project and that group met three times throughout the project. The details and findings from this MTTC study process are detailed in the pages that follow.

2.5 What is a 'Transit Center'?

Transit Centers may be known by many different names or terminology such as transfer center, mobility hub, depot, metro center, and many others. At the most fundamental level a transit center is a facility that provides for the safe, convenient, and efficient transferring of passengers between transit routes and modes of transit. In the case of Lincoln this would mean providing a centralized location to transfer between all StarTran routes and connecting with bike share, scooters, intercity bus routes, as well as walking to final destinations.

Transit centers are highly context sensitive and come in a wide variety of form and function depending on modes of transit served, passenger volumes, availability of funding, opportunities for joint or adjacent development, and other factors.

Many of the most common functions of transit centers include:

- Facilitate transferring between bus routes off street – provide spaces for buses or other transit modes to allow centralized movement between routes and minimize waiting time.
- Provide protection from elements – offer both indoor and outdoor protection from rain, snow, wind, heat, etc. to make using transit and transferring more comfortable.
- Accommodate seating – provide adequate space to sit and relax while waiting to board a bus or other transit modes to offer comfort and convenience to riders.

- Enable driver relief – provide private space for transit operators to take a break between runs of their routes to help keep them refreshed and alert and to make the job more enjoyable and less stressful.
- Provide maps, wayfinding, and information – provide customers with information about arrival times as well as maps of the surrounding area to enable easy connections to nearby businesses and other services; accomplished through static maps, interactive touch screen kiosks, or television display boards.

Transit centers work to improve passenger and transit system safety by moving transfer activity off street and consolidating pedestrian activity into a controlled area. Security can be enhanced for transit riders through design elements, lighting, cameras, and other features built into the facility design like open lines of sight. Transit centers can also improve ridership by lowering waiting time while transferring between routes and shortening overall travel times. These facilities may also enhance the image and perception of transit systems, which can improve ridership trends and overall customer satisfaction.

3.0 Existing Conditions

3.1 Study Area Overview

Downtown Lincoln is the center of the city for employment, education, arts, culture, and recreation. It is the home to two major institutions that attract people across the state and internationally, the Nebraska State Capitol and the University of Nebraska – Lincoln (UNL). The capitol district draws thousands to Downtown Lincoln for employment as well as to conduct government business. Surrounding the capitol are other state office buildings and federal government buildings. UNL is a large land-grant university that occupies the northern portion of the MTTC study area. UNL’s total enrolment for 2020 was 25,820¹. UNL draws a vibrant and diverse student population from across the Midwest and around the world to Downtown Lincoln and shapes an important piece of the community’s identity. UNL is also a major employer in the study area.

Figure 6: Nebraska State Capitol



The MTTC study area also includes the Haymarket District, a rapidly developing entertainment area with new hotels, restaurants, bars, and housing. The Haymarket District has redeveloped many historic properties in recent years with plans for continued redevelopment that will continue to make this area denser with population and employment opportunities.

For the future transit center to be the most impactful and serve as the center of transfer activity for StarTran for decades to come, it is important that the siting of the MTTC remain as close as possible to all education, employment, and entertainment activities in the greater downtown area.

3.1.1 Total Population and Employment

Population and demographic information were collected from the US Census Bureau’s most recent five-year average from the American Community Survey to provide insight on the current population and key demographics of the MTTC study area and its impact on the public transit market. According to this data there are over 11,000 residents (4.1% of the total City of Lincoln population) and just over 24,000 jobs (14.5% of total jobs in the Lincoln area) within the study area (Table 1). This information indicates that Downtown Lincoln is a significant employment center for the greater metro area; and with a relatively small number of near-by residents, many are traveling from outside Downtown to access the employment opportunities offered in the study area.

¹ US News and World Report. Best University Summaries. University of Nebraska-Lincoln. 2020. <https://www.usnews.com/best-colleges/university-of-nebraska-2565>

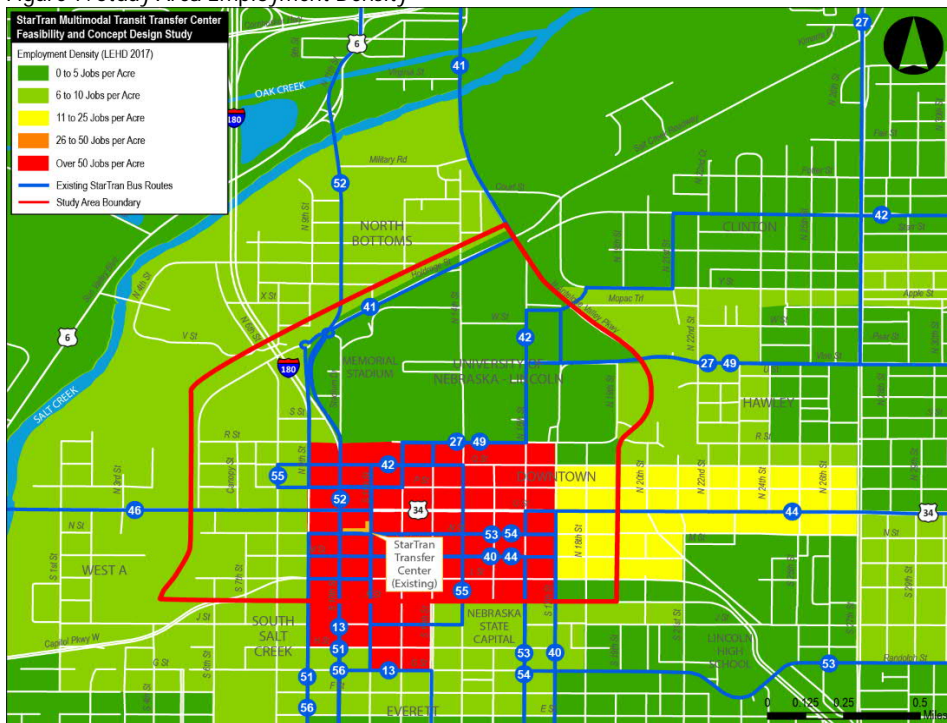
Table 1: MTTC Study Area Population, Employment and Demographics

	City of Lincoln	Study Area	Percentage
Total Population	277,315	11,436	4.1%
Total Employment/Jobs:	166,388	24,088	14.5%
Total Minority Population:	40,663	2,728	6.7%
Total Population Below Poverty Line:	40,288	1,843	4.6%

Source: US Census Bureau

Figure 7 illustrates the areas of Downtown Lincoln with the highest concentration of jobs per acre in relation to the MTTC study area and the current Gold's transfer facility. Currently the Gold's location is well positioned in the area with the highest concentration of employment.

Figure 7: Study Area Employment Density



3.1.2 Demographics

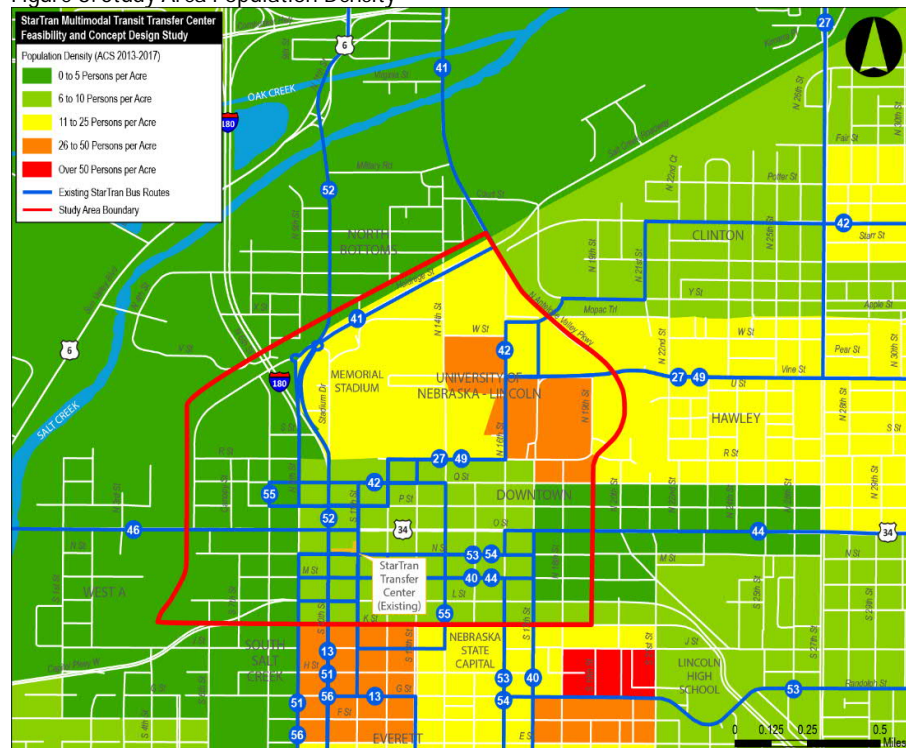
Understanding the demographics of the MTTC study area provides insight into the potential transit travel market both in terms of where transit trips may begin and end.

Population density is often one of the most important indicators of potential transit productivity. In terms of an area's transit market, areas of high population density simply have more people living within a short distance of transit stops than areas of lower population density. Additionally, areas with high population density are often associated with urban design characteristics that promote transit use, like a complete sidewalk network, smaller lot sizes and setbacks, bicycle facilities, mixed-uses, and amenities that promote pedestrian activity and attract visitors.

The level of population density is an indicator of the volume and type of transit service that an area can support. For example, areas with a population density between five and ten residents per acre generally can support only infrequent, hourly bus service. Higher population, or combined population and employment densities are required to operate more frequent bus service cost-effectively.

Figure 8 identifies the areas in and around Downtown Lincoln with higher density in orange and red. Currently the core of Downtown has lower population density, but numerous more dense multi-unit housing developments are being planned and constructed that will likely increase the overall population density in the coming years. Today the areas of highest population density are at the UNL campus and south of K Street.

Figure 8: Study Area Population Density



Along with population density and employment density, two other reliable demographic indicators of areas that are likely to utilize public transit services are areas with higher concentrations of households that fall below the poverty line as well as minority populations.

Figure 9 provides information on the location of minority populations in and around the MTTC study area. Areas on the eastern, southern, and southwestern edges of the study have minority populations that are over forty percent of that census block group's total population.

Figure 9: Study Area Minority Population Percentage

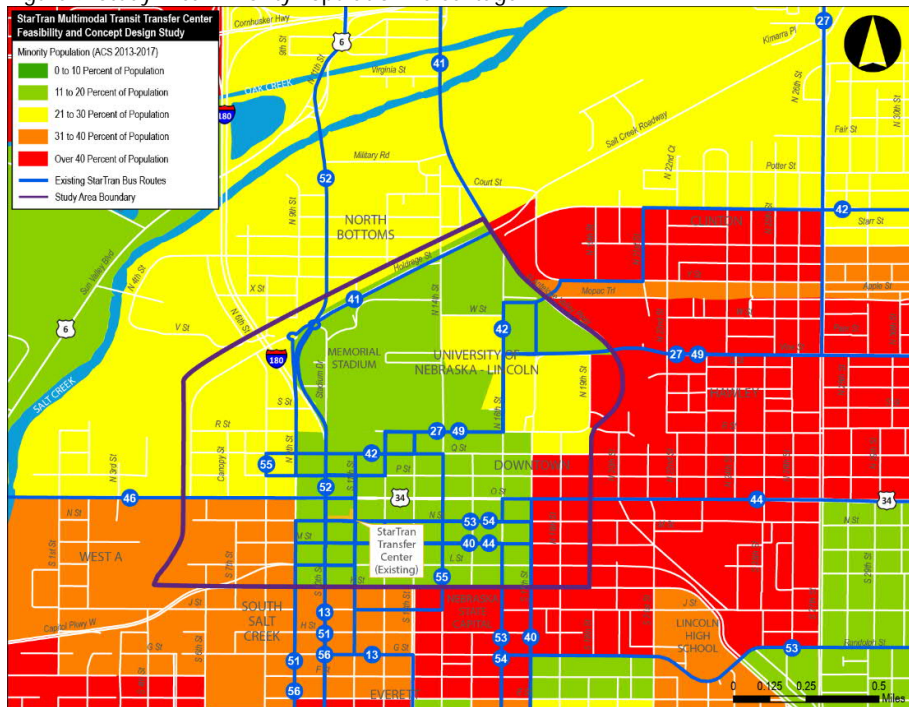
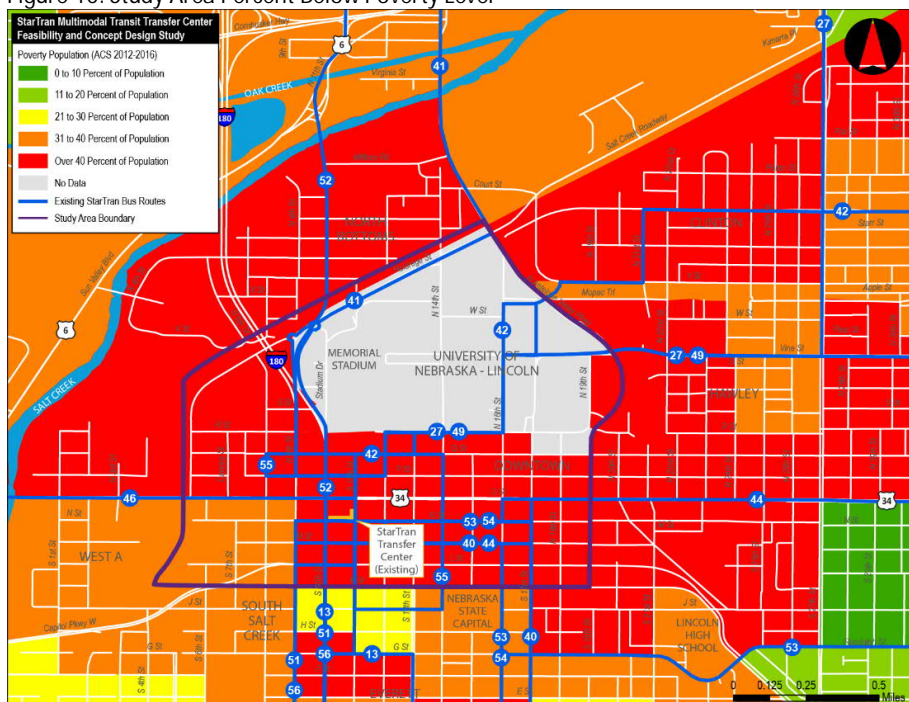


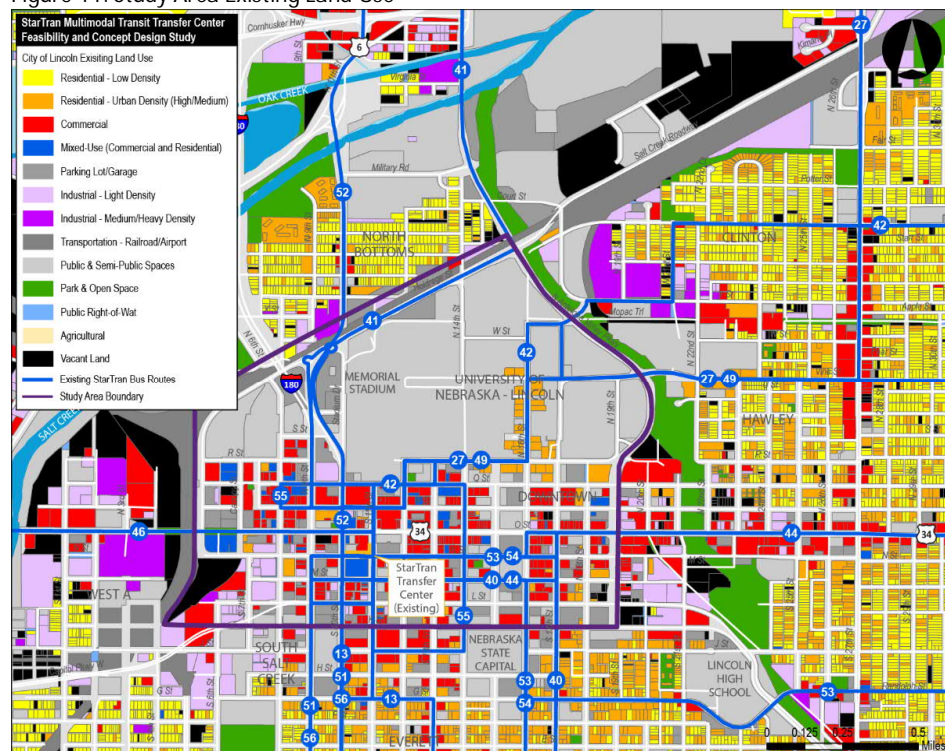
Figure 10 displays concentrations of households that are living below the federal poverty line. According to the data from the American Community Survey nearly the entire study area and surrounding areas have high concentrations of households in poverty. This may be a reflection of the high number of households that are students attending UNL that would likely report little to no income as part of the US Census information collection.

Figure 10: Study Area Percent Below Poverty Level



Existing land use in the MTTC study area is shown in Figure 11. As the MTTC looks to identify the optimal location for potential future construction, understanding existing land use patterns is highly important to site location. The Downtown area of Lincoln is dominated by commercial land use as well as the UNL campus and other governmental uses surrounding the State Capitol. In recent years there has been growth of denser mixed-use development with retail or commercial space on the ground floor with multi-story residential above. Much of this has been targeted at student housing for those attending UNL.

Figure 11: Study Area Existing Land Use



The O Street (US Highway 34) corridor is one of the primary commercial, retail, and entertainment areas running east/west through the heart of Downtown Lincoln. The Haymarket District on the western edge of the MTTC study area is a rapidly growing and developing area for housing, retail, and evening/weekend entertainment. To the extent possible, transit centers should be located in environments rich with residential, employment, and entertainment opportunities to make it as convenient and accessible for as many potential riders as possible.

3.2 StarTran Downtown Transit Operations

StarTran is a critical link to access opportunities across the greater Lincoln metro area. On an average weekday StarTran provides almost 9,000 trips to its customers and over 2,600 on Saturday². Currently twelve of StarTran's nineteen total weekday fixed routes serve the main transfer location at the Gold's Building. Weekday routes serving the Gold's transfer location are shown in Table 2.

² National Transit Database – City of Lincoln. Transit Agency Profile. 2018.
https://www.transit.dot.gov/sites/fta.dot.gov/files/transit_agency_profile_doc/2018/70001.pdf

Table 2: Weekday Routes Serving Gold's Transfer Location

Route	1 st Arrival Time	2 nd Arrival Time	Hours in Service	Sept. 2019 Average Weekday Ridership
13 – South 13 th	:20	:50	5:55a – 9:50p	697
27 – North 27 th	:20	:50	5:55a – 9:50p	853
40 – Heart Hospital	:05	:35	5:55a – 9:05p	494
41 – Havelock	:05	:35	5:40a – 9:05p	551
42 – Bethany	:20	:50	5:40a – 8:50p	433
44 – “O” Street	:20	:50	6:20a – 9:50p	833
46 – Arnold Heights	:20	:50	5:50a – 8:50p	610
48/54 – N. 48 th / Vet’s Hospital	:20	--	5:54a – 8:20p	451
49 – University Place	:05	:35	5:55a – 9:05p	494
51 – West “A” Street	:05	--	6:10a – 7:05p	292
52 - Gaslight	:35	--	5:40a – 6:35p	399
53 – South Pointe	:05	:35	5:52a – 8:05p	692
55 – Downtown Trolley	Every 15 Min.		6:15a – 8:30p	563
56 - Sheridan	:50	--	5:55a – 6:50p	248

As noted earlier, because of space constraint at the Gold’s location, only six bus routes may use the curbside transfer center at one time. This creates the need for a staggered arrival and departure pattern for the twelve routes that provide service here. The staggered transfer timing makes the StarTran network challenging to understand for newer riders as well as increasing wait times for riders transferring between the various routes.

3.2.1 Gold’s Transfer Location

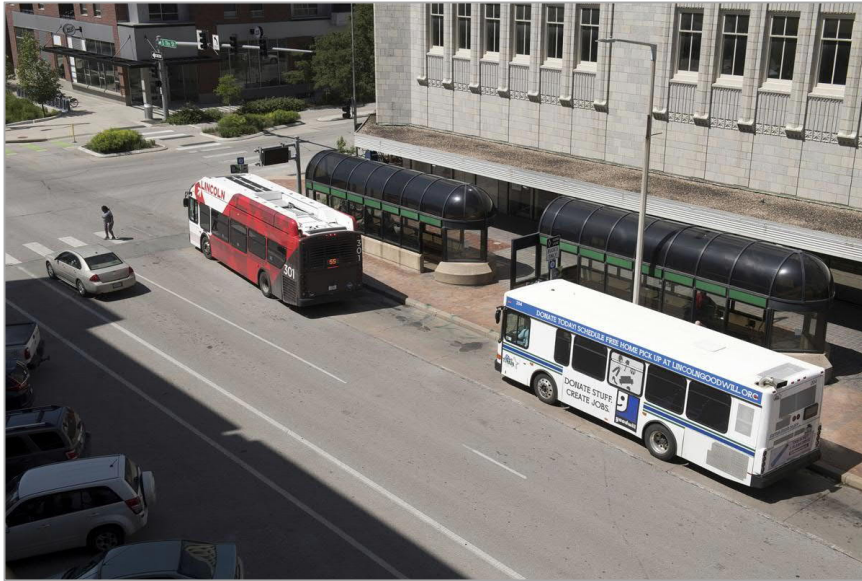
StarTran’s main passenger transfer hub has been located adjacent to the Gold’s building along the west side of 11th Street and the north side of N Street for decades. Until 2016 a secondary transfer node was located in the capitol / government district at M and 14th Streets. Following StarTran’s 2016 Transit Development Plan it was decided that consolidating all transfer activity to the Gold’s location would be beneficial and the staggered pulsing schedule was developed to allow routes to access the limited number of bus bays to facilitate transfers throughout the day.

3.2.2 Passenger Infrastructure at Gold’s

Passenger amenities around the Gold’s location are minimal. Today there are two bus shelters located along 11th Street near the corner of N Street (Figure 12). Both shelters are nearly fully enclosed with a tinted roof to provide shade and protection from rain/snow. Each shelter is approximately forty feet long, has bench seating, and trash receptacles within.

The Gold’s Building is surrounded by an overhang that provides additional protection from the elements for passengers waiting to transfer between routes, but behind the two bus shelters the overhang creates a type of tunnel feeling that constrains the sidewalk area and also obstructs the view of sidewalk activity from the street. Until 2015, a third similar shelter was in place just north of the second shelter. This third shelter was removed to improve safety and security and improve line of sight from the street.

Figure 12: Passenger Shelters along 11th Street



Source: Lincoln Journal Star

Along the N Street side of the Gold's transfer site there are minimal passenger amenities. Under the building's overhang there are approximately six benches and three trash receptacles. Lighting for early morning and evening operation is limited. The underside of the Gold's Building overhang appears to be in disrepair and shows signs of water damage. The two boarding areas along the N Street side of the Gold's transfer location are displayed in Figure 13.

Figure 13: Gold's N Street Boarding Area



The surface of the sidewalks and passenger boarding areas on all sides of the Gold's Building are made from brick pavers. In many instances pavers are utilized for their durability as well as aesthetic look. In transit applications, where there are high volumes of pedestrians and individuals with mobility challenges using wheelchairs or with visual impairment, brick pavers are not the optimal surface for transit boarding

platforms. Pavers may shift over time and create uneven surfaces that can create trip hazards making mobility more difficult. Pavers also make clearing snow and ice from boarding areas more difficult because of the uneven nature of the surface.

As noted earlier, bus routes serving the Gold's location use one of six boarding areas. Four boarding areas are located along 11th Street and the remaining two are around the corner on N Street. The two boarding areas on N Street are located mid-block or closer to 10th Street due to signed handicap parking stalls and a loading zone on N at 11th Street. This separation causes passengers to have to walk further to access these two boarding locations. Each of the six boarding areas are numbered one through six with signage that includes the boarding area number as well as the StarTran Routes that are assigned to that boarding location as seen in Figure 14.

Figure 14: Boarding Location Signage



The Gold's location currently has one real-time next bus arrival display board located near the intersection of 11th and N Streets. The display board faces north to boarding areas three, four, five, and six to show arrival and departure times for upcoming routes (Figure 15). There is no real-time next bus information for boarding areas one and two.

Figure 15: Real-Time Next Bus Display at Gold's



3.2.3 Challenges at Gold's location

The Gold's Building transfer location has served as the primary hub of on-street operations for many years but has presented StarTran and its customers with several challenges. The greatest challenge is inefficiency of transit operations caused by the limited number of bus stalls and boarding platforms that have forced StarTran to arrange a split pulse making some transferring wait times to be longer than necessary.

Limited passenger information is another challenge for the Gold's location. Because of the facility configuration there is no permanently staffed customer service station that can sell bus passes, provide information, and generally assist customers using the StarTran system. Bus route schedules and system maps are not available currently. This can make the system challenging or intimidating to use for those

that may be new to riding transit. Along with this, passenger amenities are limited including no climate-controlled waiting space or publicly available restrooms.

Safety and security of passengers transferring or waiting to board buses has been an ongoing challenge for many years at the Gold's location. Data from the City of Lincoln Police Department (LPD) reported sixty-four calls for police service at the Gold's location between 2018 and 2019. It is unclear if each of these instances were directly related to transit passengers, but the calls for LPD services were to the transfer center location. Of these calls for LPD intervention, nearly thirty-three percent were related to the use of drugs or alcohol. Many of these were to report individuals with open containers or under the influence. The second highest reason for LPD calls to the Gold's location were for a variety of disturbing the peace type incidents that included verbal altercations, mental illness intervention, and several others. Overall there were few assaults, thefts or other serious criminal activity reported at the Gold's location. To provide additional safety and to resolve incidents prior to escalation, StarTran began a partnership with LPD to hire off-duty officers to provide on-site security at the Gold's transfer center in the busy AM and PM peak periods. The split configuration of the transfer center creates line of sight issues for security to monitor both sides of the facility at the same time.

Addressing these issues and seeking opportunities for improvement in operational efficiency, overall customer service, and enhancement to passenger and transit operator safety are the purpose for this study.

3.3 Previous Planning Studies

In anticipation of the development of a new central transit center in the downtown area of Lincoln, it is important to understand other planning efforts in the area that interrelate and have influence on where and how the MTTC could be designed and located. The Downtown area has been the focus of many different planning efforts over the last five to ten years. Each of these plans have generated detailed information, goals, priorities, and community visions that are highly valuable as planning develops for the transit center. The MTTC study has reviewed those studies that will have the most insight and impact on the planning and development of a future transit center.

One of the high level, regional planning documents is the Long-Range Transportation Plan (LRTP) that is developed by the Lincoln Metropolitan Planning Organization (MPO). The LRTP is the Lincoln metro region's long-range investment strategy that looks ahead over the next forty years to plan for critical capital investments for roads, bridges, public transit, bicycle, and pedestrian modes. The most recent version of the LRTP was adopted in 2016. The LRTP contains seven key goals for the regional transportation system the future MTTC will seek to help achieve:

- 1.) Maintain the existing transportation system to maximize the values of these assets.
- 2.) Improve the efficiency, performance, and connectivity of a balanced transportation system.
- 3.) Promote consistency between land use and transportation plans to enhance mobility and accessibility.
- 4.) Provide a safe and secure transportation system.
- 5.) Support the economic vitality of the community.
- 6.) Protect and enhance environmental sustainability, provide opportunities for active lifestyles, and conserve natural and cultural resources.
- 7.) Maximize the cost effectiveness of transportation³.

³ Lincoln MPO. Long Range Transportation Plan. <https://lincoln.ne.gov/city/plan/lrtpupdate/final/lrtp.pdf>. P. 25. 2016.

Generally, the LRTP recommends improved connections between land uses that encourage higher density along major corridors and more mixed-use development that can more adequately support fixed route public transportation. In the long term the 2040 LRTP considers the O Street Corridor as a potential alignment for Bus Rapid Transit (BRT) or other high-frequency transit service.

As a future MTTC will be a fifty year or longer investment in the transportation system for the greater Lincoln region, it will be important to take long term plans into consideration. The following pages provide summaries of key plans in the Downtown area and highlight significant outcomes and their impact related to the MTTC plan.

3.3.1 StarTran Development Plan - 2016

In 2015 StarTran began a thorough review of the entire transit system seeking opportunities to improve transit operations and improve the system for its riders. The Transit Development Plan (TDP) created a clear plan to adjust route alignments, schedules, frequency, and span of service to better meet current and future needs for mobility in the Lincoln region. Some of the key findings from the system review included:

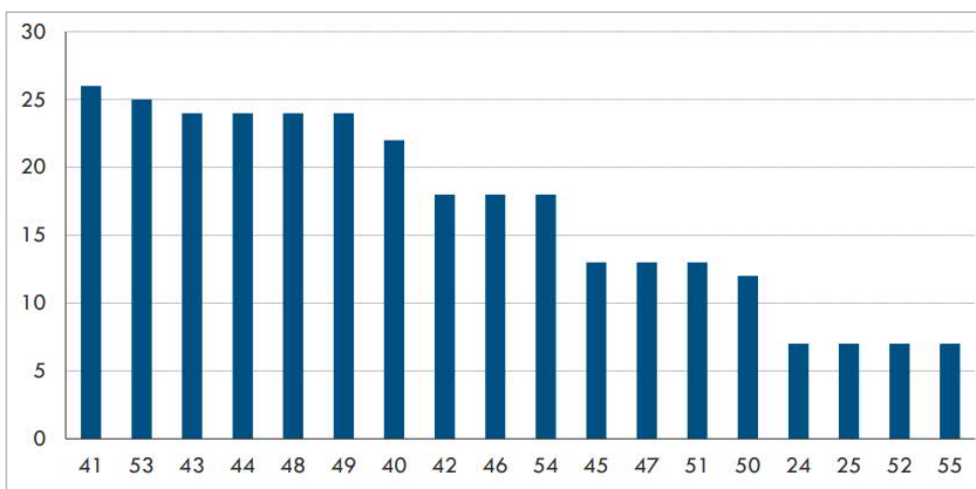
- StarTran end service time is too early to support second-shift employees.
- Radial setup of StarTran network caused riders to travel out of direction to access destinations.
- Long route loops at outer ends caused further out-of-direction travel.
- Limited on-street bus capacity at the Gold's transfer facility forced staggered connections/transfer opportunities.
- Irregular schedules prevented timed connections in downtown for easy transfers.

The TDP developed a cost-constrained plan for enhancement of the StarTran system that was created through extensive public involvement and guided by an Advisory Committee. Key recommendations related to improvement of transfer facilities in Downtown were addressed in the TDP. The TDP found that, "the creation of a single transfer point within downtown that accommodated all routes would allow for streamlined alignments that would improve operational efficiency and reduce customer travel time."⁴

The TDP conducted a transfer analysis to determine total volume of vehicles accessing the Gold's facility by time of day, as well as total volume of passengers transferring between routes. This data will be useful as the MTTC planning process advances to best align transit routes with highest transfer activity in closest proximity to each other for greatest ease of transfer. Results of this analysis are shown in Figure 16 with route numbers along the bottom and total transferring passengers on the left.

⁴ StarTran. Transit Development Plan. <https://www.lincoln.ne.gov/city/ltu/startran/tdp/pdf/tdp-final-report.pdf?april2016>. P. 3-11. April, 2016.

Figure 16: Total Transfer Activity by Route (2016)⁵



3.3.2 Downtown Transit Center BUILD Application – 2018

In 2018 StarTran submitted a grant application for a new transit center to the United States Department of Transportation (USDOT) as part of the Better Utilizing Investments to Leverage Development (BUILD) program. BUILD is a nationwide discretionary competitive program to assist in funding nationally or regionally significant infrastructure investments for transit, road, bridge, port, and multimodal transportation projects. StarTran’s 2018 BUILD application requested approximately \$18.5 million in federal funds of a \$31 million project to plan, design, and construct a new transit center in Downtown Lincoln. The project would have been matched with approximately \$13.7 million in local funding through a Certificate of Participation (COP) bond if the federal funds were awarded for the project.

The BUILD application described the Lincoln Multimodal Transit Center (LMTC) project as a new transit facility that would be the focal point of the transit system, enabling transfers between bus routes and allow transfers to be better coordinated. The LMTC would provide indoor climate-controlled waiting areas for passengers, with real-time next bus arrival information, security, restrooms, free public Wi-Fi, customer service desk, and other needed passenger amenities. The new transit facility would also provide additional multimodal transportation alternatives that included bicycle share, a direct connection to on-street protected bicycle lanes, improved pedestrian connectivity, space for Uber/Lyft/Taxi drop off and pick up, as well as a location for boarding a planned Autonomous Vehicle shuttle that is being developed for Downtown Lincoln. Along with transit and multimodal amenities, the envisioned LMTC would also serve as the new home for StarTran’s administrative offices, bringing management and customer service staff closer to transit customers and daily on-street operations.

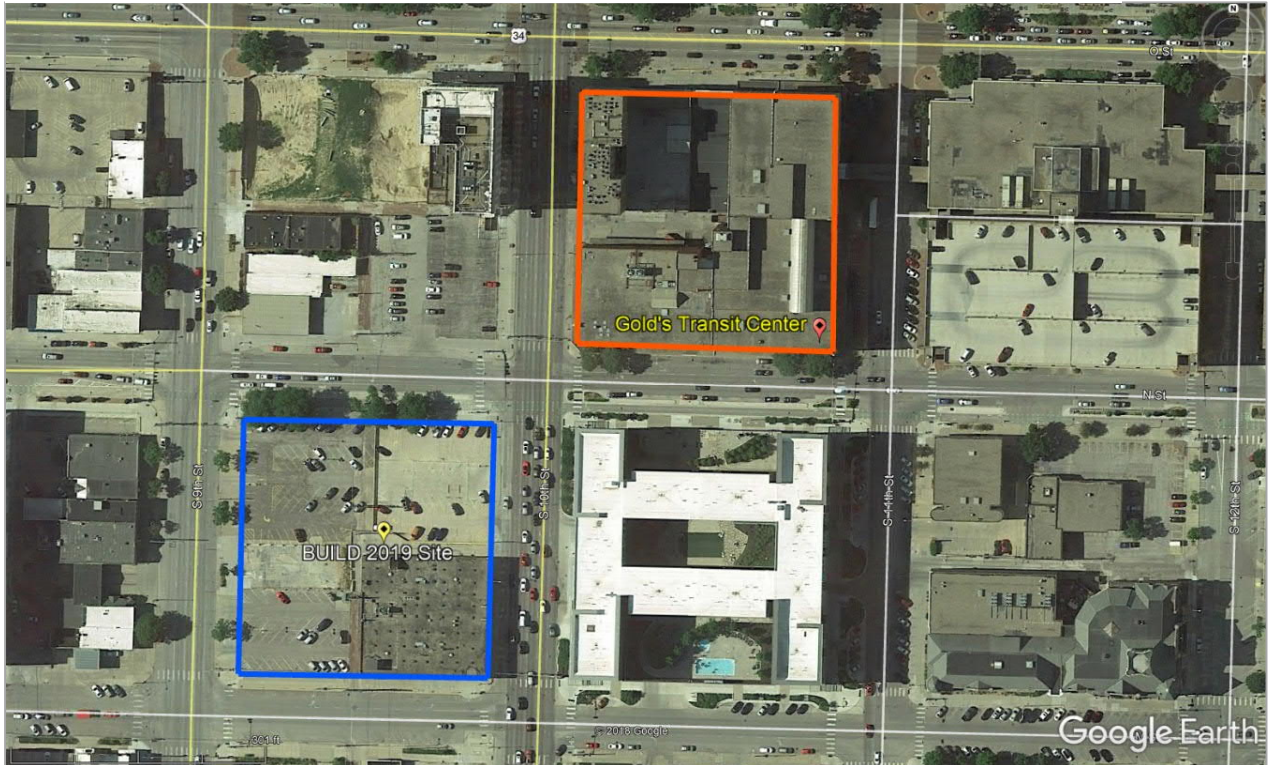
The grant application identified a site for the LMTC that would occupy the entire block located one block southwest of the current transfer location at 11th and N Streets. The BUILD application describes the LMTC location and the site’s unique opportunity and advantages.

“The LMTC site will be in Downtown Lincoln on Block 69, bounded by M Street to the south, N Street to the north, 9th Street to the west and 10th Street to the east (Figure 17). A fire occurred in the winter of 2014 destroying most of the structure on Block 69. This created an opportunity for the City of Lincoln to

⁵ StarTran. Transit Development Plan. <https://www.lincoln.ne.gov/city/ltu/startran/tdp/pdf/tdp-final-report.pdf?april2016>. P. 6-2. April, 2016.

construct a centrally located multimodal transit center. This location is ideal due to its proximity to University of Nebraska – Lincoln campus, the State Capitol, the redeveloping commercial districts of West Haymarket and South Haymarket, as well as dense residential development for student and workforce housing.”⁶

Figure 17: 2018 BUILD Transit Center Location



⁶ City of Lincoln. 2018 BUILD Application to United States Department of Transportation. P. 9. July 18, 2018.

Figure 18: LMTC Conceptual Visualization Included in 2018 BUILD Application



As part of a required cost benefit analysis for the project in the BUILD grant application, the LMTC showed many positive benefits for StarTran, transit riders, and the greater Lincoln community. Results of the benefit-cost analysis presented a positive return on investment, with a BCA ratio of 1.3 for the overall project. While the 2018 BUILD application was unsuccessful in securing federal funding for the LMTC project, the application and planning work that went into the development of the application did help focus the needs and desires for a future centralized transit center for downtown Lincoln and identified a potential viable site for further investigation in this planning effort the MTTC.

3.3.3 Lincoln Downtown Master Plan – 2018 & South Haymarket Neighborhood Plan - 2015

The City of Lincoln developed a new Downtown Master Plan in 2018 to define priorities for future capital improvements, catalyze development projects, and set new policies that would guide the continued successful development of downtown Lincoln over the next ten years, making it the center of opportunity for the city.

The purpose of the Downtown Master plan was to:

- Develop a strategic vision and investment plan to guide Downtown Lincoln.
- Promote increased synergy between the Downtown Core and surrounding neighborhoods and the University of Nebraska Lincoln (UNL).
- Build on prior planning efforts to engage stakeholders and the greater community.

- Align the City's resources and programs with the priorities of the master plan to advance implementation⁷.

Figure 19: Downtown Lincoln Master Plan Study Area

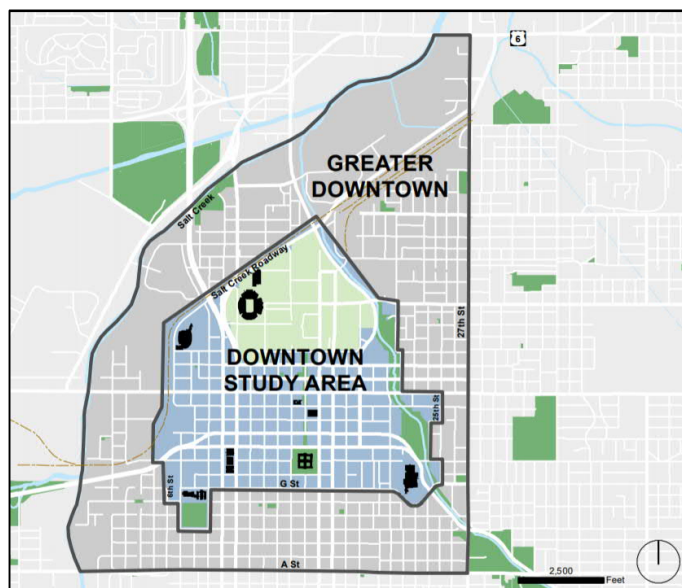


Figure 19 depicts the study area for the Downtown Lincoln Master Plan. The primary focus was on the core of Downtown shaded in blue, while also providing planning for how Downtown integrates and interrelates to the surrounding neighborhood and UNL.

Among the plan's top priorities was improvement for mobility and connectivity. Specifically, the plan recommends enhancement of bicycle, pedestrian and transit connections with UNL, Antelope Valley, and Haymarket, along with surrounding neighborhoods, with emphasis on 11th, 12th, 13th, M, and O Streets. The Downtown Master Plan developed clear direction for the future of the area and in relation to transit and mobility the plan

created a goal that states:

"As the 'Center of Opportunity' Downtown residents and visitors should have the opportunity to enjoy multiple travel choices that include driving, bicycling, walking, riding public transit, and ride hailing. Downtown should be accessible for drivers with vehicle parking available in well-marked parking structures, as well as convenient on-street parking spaces. There should be multiple low-speed and low-traffic volume routes for bicyclists with ample, convenient bicycle parking near destinations, and the sidewalk networks should be well-connected, well-maintained and comfortable for pedestrians. Once in Downtown, it should be easy for people of all ages and abilities to move about."⁸

Directly related to the future MTTC, the Downtown Master Plan makes several important recommendations that include:

- Continued support and coordination with StarTran for a new transit hub when funding is secured.
- Coordination with StarTran on final location and design elements for the MTTC in the short term.
- Consider co-locating the MTTC with a future parking structure at 14th and M Streets in the mid-term future (18 months to 5 years).
- Coordinate with M Street Greenway planned improvements with MTTC site development

Other input received through the Downtown Master Plan public and stakeholder engagement process provided insights for the MTTC as more detailed planning develops this included:

⁷ Lincoln/Lancaster County Planning Department. 2018 Downtown Lincoln Master Plan: Center of Opportunity. <https://lincoln.ne.gov/city/plan/long/downtown/DMP%202018.pdf>. P. 1.1. December 17, 2018.

⁸ Lincoln/Lancaster County Planning Department. 2018 Downtown Lincoln Master Plan: Center of Opportunity. <https://lincoln.ne.gov/city/plan/long/downtown/DMP%202018.pdf>. P. 4.3.1. December 17, 2018.

- Provide a transit hub allowing flexibility for persons working, living, or coming Downtown for entertainment to choose the most efficient and affordable travel mode.
- Centrally locate the transit facility between the downtown core, UNL, and Haymarket with convenient access to Downtown area destinations.
- Provide opportunity for mixed use development.
- Maintain strong access to bicycle system.
- Include all modes at the transit hub – bike share, pedestrian access, autonomous and taxi vehicle drop off/pick up, etc.
- Include ground floor transit supportive uses, i.e. daycare, coffee shop, bike repair, showers, and bike lockers.
- Locate buildings on the edge of the site oriented toward primary streets based on existing neighboring context.
- Incorporate traffic calming measures for improved pedestrian safety.
- Locate autonomous shuttle stops on site or adjacent to transit facility.
- Provide ticket and information counter with other StarTran system information.
- Consider open space component with potential dog park area⁹.

Directly adjacent to the southwest of the core of Downtown Lincoln is the South Haymarket District. In 2015 a development master plan was created for this area. The South Haymarket Neighborhood Plan presents a path to redevelopment of this area with the vision of creating an additional 1,000 to 2,000 new residential units in the next five to twenty years. The plan also calls for improved streetscapes, connections to trails, new urban plazas or open spaces, expanded commercial or office development, and adequate parking for these new uses. As the neighborhood densifies and redevelops, the plan recommends that transit routes be reviewed through the area to meet changing mobility demands over time. The South Haymarket Neighborhood Plan makes the following recommendation for a future transit center in the area:

'If a transit center were to locate in South Haymarket, it should incorporate private development as much as possible. For example, a parking structure could be developed in conjunction with the transit center. If a site in South Haymarket is not chosen for the transit center, a location further east should be explored that would increase operational efficiencies."¹⁰

3.3.4 Lincoln Bicycle Master Plan

Early in 2019 the Lincoln Metropolitan Planning Organization (MPO) published the regional Lincoln Bike Master Plan. The plan laid out a city-wide comprehensive plan to improve multimodal safety and expand the on- and off-street bicycle facilities over the coming years. The plan was developed with extensive public outreach and determines multiple bicycle corridors and facility types that could be implemented to achieve the vision and goals for the plan.

⁹ Ibid. p. 4.3.6.

¹⁰ Lincoln/Lancaster County Planning Department. South Haymarket Neighborhood Plan. 2015. P. 2.58.
<https://www.lincoln.ne.gov/city/plan/long/sohay/COMPLETE-SoHay%20Plan.pdf>.

Lincoln Bicycle Master Plan Vision:

Lincoln will be a bicycle friendly community where bicycling is safe and convenient for all and a common form of transportation and recreation.

Goals of the Bike Plan Include:

- Safety: A safe environment for all travel modes.
- Comfort: A network of low-stress bike facilities that are comfortable for all ages and abilities.
- Culture: A culture of respect and responsibility for all transportation system users.
- Equity: A network that provides equal access to bicycling for all members of the community.
- Connected: A network that connects people with places.
- Ridership: A bicycle network and culture that increase bicycling for all trip purposes.
- Education: A community that is aware of travel options, rules of the road, and the benefits of bicycling.
- Funding: Sustainable and reliable funding for bicycle infrastructure and programs.
- Travel Options: A multimodal system that provides travel options to support a more compact and livable urban environment.
- Bicycle Friendly: A community that is recognized as a Gold Level Bicycle Friendly Community.

Figure 21 (below) illustrates the different estimated levels of bicycling demand across the greater Lincoln area. The entirety of Downtown, including the UNL campus is an area of highest demand for bicycling. This demand further underscores the need for the MTTC to include amenities for cyclists, as well as providing good connectivity to existing and planned on-street bicycle facilities.

Today the N Street cycle track is the primary bike connection from Pinnacle Bank Arena and the Haymarket District, east to the Antelope Valley trails. Bike lanes have also been implemented on 11th and 14th Streets through downtown. In the future both the Lincoln Downtown Master Plan and the Bike Plan envision potential bicycle facilities be added to 16th and 17th Streets between G and R Streets. 13th Street is proposed to have a bicycle facility that would extend the existing facility that ends at Lincoln Mall to R Street.

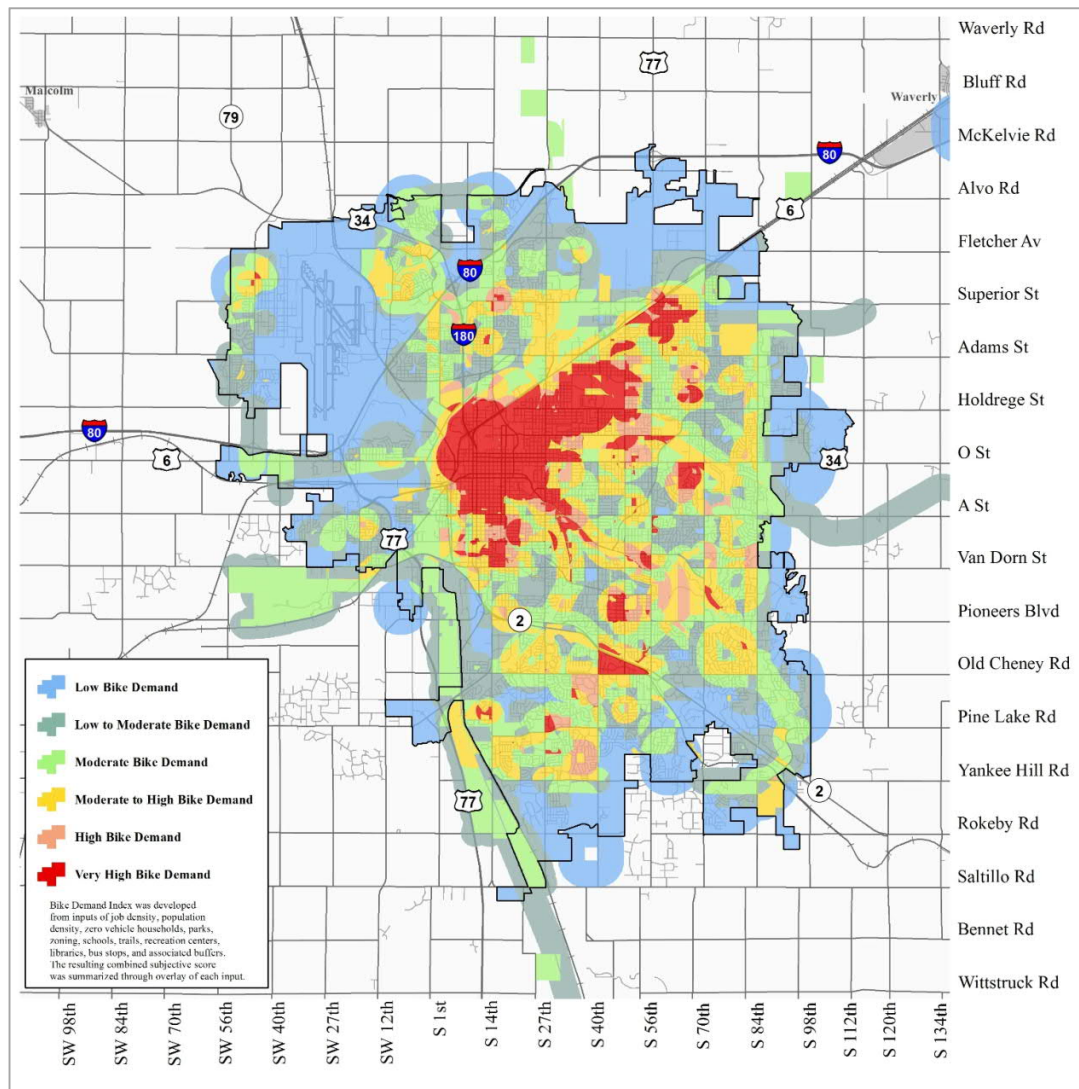
The Bike Plan also makes recommendations for the development of supporting elements that can make bicycling more safe, accommodating, and convenient. Two that are most relevant to planning for the MTTC are inclusion of long-term bike parking at transit centers, like bike lockers, and public bike work stands (Figure 20) for cyclists to make minor repairs to bikes, inflate tires, etc.

The MTTC will also need to partner with the Lincoln Bike Share Program to host a new bike share station integrated into the transit center to provide improved first mile/last-mile connectivity for transit riders using the MTTC.

Figure 20: Bike Workstation



Figure 21: Bicycle Demand - City of Lincoln



Source: Lincoln Bike Master Plan¹¹

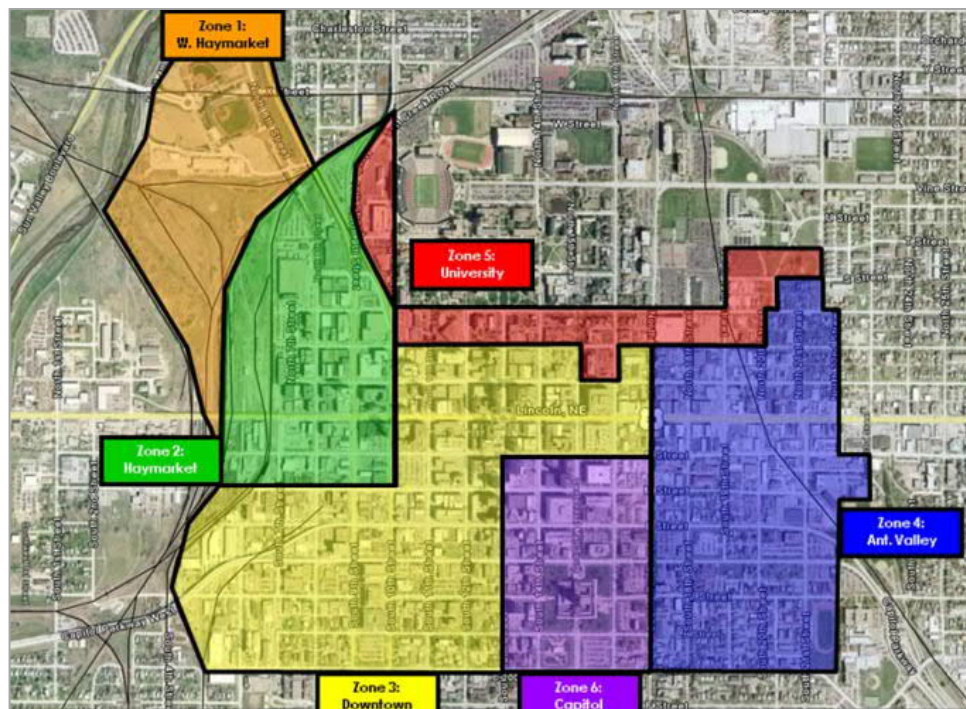
3.3.5 Downtown Lincoln Parking Study – 2009

In 2009 the City of Lincoln’s Urban Development Department conducted a comprehensive study of street and structured parking alternatives in Downtown Lincoln. The central purpose of the study was to provide city planners and decision makers with the status of current parking demand, issues, and to develop solutions to improve parking for the future of Downtown.

¹¹ Lincoln Metropolitan Planning Organization. Lincoln Bike Master Plan. P. 13.
<https://static1.squarespace.com/static/5a90401b25bf0260b7fc4d54/t/5c6f8adb9140b7994432f400/1550813991895/FINAL+Lincoln+Bike+Plan+February+2019.pdf>. 2019.

The study area for the parking study included the greater downtown area but did not include the central portion of the UNL campus. The study area was subdivided into six subareas: West Haymarket, Haymarket, Downtown, Antelope Valley, University, and Capitol (Figure 22).

Figure 22: Lincoln Parking Study Area



Source: Lincoln Parking Study, 2009

At the time of the study there was a total parking supply of approximately 33,500 parking spaces, with 86% off-street and 14% on-street. Occupancy of this total supply at peak hour was inventoried at 58%¹².

Overall the parking study found that there were over 5,800 public parking spaces available to support future development, yet there remained a perception that parking shortages existed in the study area. The study made specific recommendation for the West Haymarket area as planning was ongoing at the time for what would become Pinnacle Arena. The study estimated the new arena would potentially need an additional 5,100 parking spaces to support the facility for most events. The analysis showed an existing supply within adequate walking distance of roughly 2,500 spaces, meaning that an additional 2,700 new parking spaces would be needed. It was also recommended that an additional 1,000 parking spaces be added to support new mixed-use development in the West Haymarket area. Since the time of this study the arena was constructed along with three multi-story parking garages in the West Haymarket.

In the Downtown area, a catalyst project had been envisioned for the block bounded by P, Q, 13th and 14th Streets and to include a hotel, condominiums, retail, and office space. The study developed a conceptual layout for the site and estimated parking for 430 spaces on a four-level structure. Total estimated cost for the parking structure was \$7.3 million (\$2009). Today a six-story parking facility has been constructed on this site along with a mix of ground floor retail and residential on the upper floor.

¹² City of Lincoln. Downtown Lincoln Comprehensive Parking Study Final Report. P. 5. 2009.

It is likely that concern for a constrained parking supply will continue in the Lincoln Downtown area, whether real or perceived. Development of the MTTC would raise the profile for the StarTran system and potentially make public transit a more attractive mode of transportation for those living, working, or shopping in the Downtown area, further reducing congestion and demands on existing parking supply.

Each of these studies provide important considerations as plans develop for the MTTC. The Transit Development Plan clearly identified issues with operations at the current Gold's transfer center and the need for a new facility. The TDP also provided excellent data about routes with highest levels of ridership and transfer activity which will be valuable later in the MTTC planning process as a new transit center assigns boarding platform locations for the most efficient transferring of passengers. The BUILD application provides details on a viable site option for a future MTTC as well as expressed desires for functionality of a new transit center, along with cost estimation and benefit-cost analysis data. The updated Downtown Master Plan provides overall support for the development of a new transit center and through its public involvement efforts generated several insights and items to consider as plans evolve. The Bicycle Master Plan highlighted the criticality of including multimodal considerations to the MTTC and identifies future Downtown corridors that may have enhanced bicycle infrastructure. Making transit connections to these corridors would help to improve the connectivity of the new transit center to the rest of the downtown. Lastly the 2009 Downtown Parking Study provided data that parking needs in downtown and Haymarket were developing rapidly at the time of the construction of Pinnacle Arena, but that public transit could be an important strategy to reduce demand on parking and a new MTTC could help to increase transit usage.

4.0 MTTC Needs Assessment

4.1 Peer Transit Center Assessment

The project team reviewed several transit centers from around the United States to gather important lessons learned from other transit agencies and communities that have recently planned and built a centralized transit center to serve as the hub of transfer activity. The initial list of candidate peer facilities was narrowed to four peer facilities that aligned well with StarTran’s operational parameters and with the objective and goals of the MTTC Feasibility and Concept Design Study. The peer facilities include Des Moines Area Regional Transit Authority (DART) Central Station, City Utilities of Springfield, Missouri – Transit Center, Sioux City Transit System – Martin Luther King Jr. Transportation Center, and The Plaza Transit Center, Spokane Washington. Each of these examples provide unique transit center configurations and elements that could be incorporated into planning and design of the future MTTC. Information for the peer analysis was gathered through online research and through phone interviews conducted with staff from each of the peer transit agencies if available.

Table 3: Peer Transit Facility System Comparison

	StarTran	DART	Springfield, MO	Sioux City, IA	Spokane, WA
Annual Ridership	2,378,652	4,580,613	1,320,307	920,774	10,920,193
Total Fixed Routes	14	28	14	10	44
Service Area Square Miles	93	163	95	53	248
Service Area Population	280,364	374,910	189,257	122,128	423,267
Annual Operating Budget	\$12,858,078	\$27,969,531	\$9,169,987	\$4,617,693	\$63,744,282

Source: National Transit Database (2017 – most current data available)

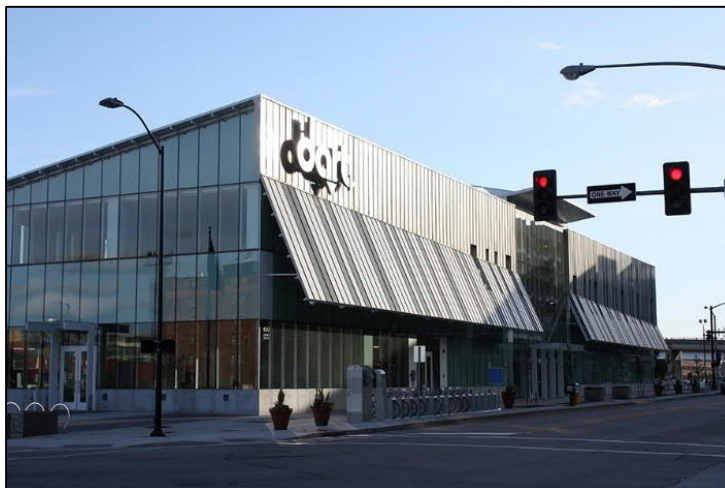
Table 3 above provides statistics for each of the transit system’s operations selected for the peer transit center analysis. The four systems selected present a wide range of operating environments in terms of transit system size, number of routes, service area size, and annual operating budgets. Each of these transit system’s transit centers offer interesting aspects to consider for the MTTC.

4.1.1 Des Moines Area Regional Transit Authority (DART) – Central Station

Facility Overview:

DART Central Station (Figure 23) is the primary transfer center for the Des Moines regional fixed route public transit system that replaced an aging ‘transit mall’ along Walnut Street in downtown. DART is a bus-based transit system with 17 fixed routes, 7 express routes, shuttles and flex routes serving over 15,000 daily riders on an average weekday. Of these 30 routes, 15 provide service to Central Station. The Central Station transit center facilitates 5,600 boardings on an average weekday making it by far the highest single boarding location in the Des Moines metro.

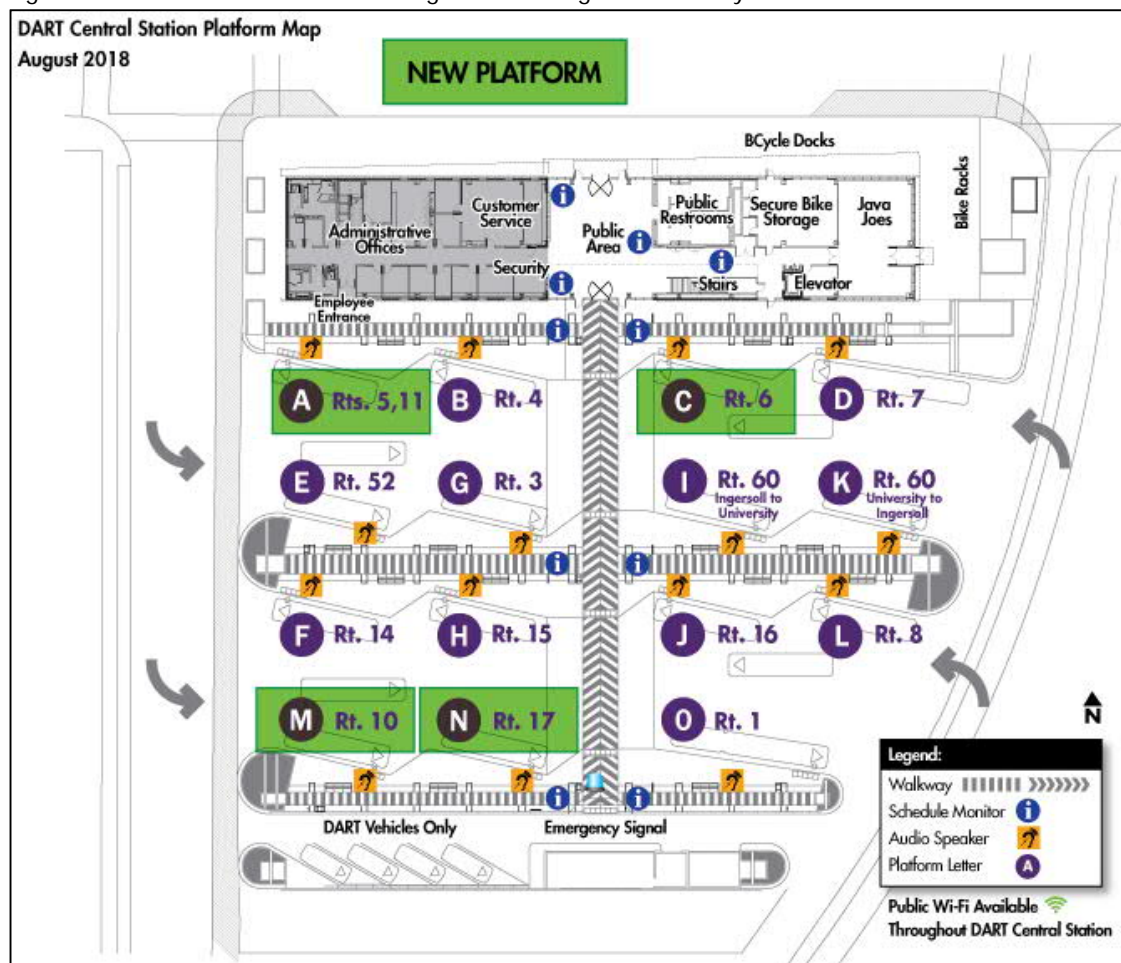
Figure 23: DART Central Station



DART’s Central Station is also the home for the agency’s management and operations staff on the second floor. The ground floor offers an indoor passenger waiting area with a customer service station as well as a local coffee shop and subscription-based bicycle storage facility. The facility provides access to multiple modes of transportation including bus, bicycle rental, electric scooters, and pedestrians. A layout of the DART Central Station facility and bus boarding platforms is presented in Figure 24.

Central Station was planned and designed as a sustainable transit facility. The Central Station facility was certified as LEED (Leadership in Energy and Environmental Design) Platinum, the highest LEED certification offered by the United States Green Building Council. The facility includes solar panels, seventy geothermal wells for heating and a 20,000-gallon rainwater cistern for grey water uses like flushing toilets. The rainwater recovery system has saved over 4 million gallons of water usage for grey water and landscape irrigation since opening. The LEED elements in Central Station have realized significant costs in utilities for electrical, water, and heating/cooling.

Figure 24: DART Central Station Waiting and Boarding Platforms Layout



Source: DART

Key Lessons Learned

A phone interview was conducted with DART CEO, Elizabeth Persutti and Keith Welch, Central Station Operations and Maintenance Director to gather insights from the planning, design, and operations experience in Des Moines. These included:

- Use a community and rider base input process to understand needs of patrons across a diverse group of users including those with mobility challenges.
- Set clear goals for the outcome of the facility to define how the transit center should perform and meet prioritized needs. It is critical to understand safety, efficiency, and sustainability.
- Central Station was important to change perception of DART and public transit in Des Moines. It was important in the planning phase to create advocates for the project.
- Consider both capital costs and ongoing maintenance in planning and design of a transit center.
- Fully enclosed boarding areas drive up capital costs due to mitigation for birds, air quality, and other issues. Recommend covered, but open-air bus boarding platforms with an enclosed passenger waiting area.
- Look for balance when selecting materials for finishes between upfront capital cost and long-term durability. Floors of central station are polished concrete and most walls are a stone finish – resulting in higher up-front cost but have been more durable than dry-wall and have lower maintenance costs.

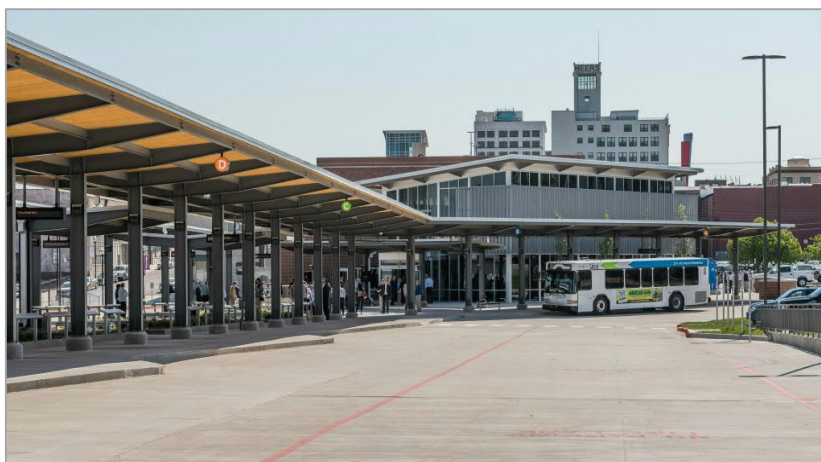
- If including public restrooms for passenger waiting area, use an open-door entry/exit concept to help reduce illicit activities. Also, have cleaning staff to clean and inspect hourly throughout operating hours. Plan for this staff position in operations cost. DART budgets \$500,000 annually for operations of the Central Station facility.
- Build redundancy into the facility if transit staff offices are co-located. Natural Gas generator provides electric back up. Also, include office space for dispatch operations in case separate bus operations and maintenance facility were to lose power.
- Include space for a security office that has clear view of passenger waiting and boarding platforms.
- Video monitoring is highly effective, but data storage for video has been a challenge. Plan for adequate data storage space for video feeds.
- Develop partnerships with local police department for off-duty officers to contractually provide on-site security at highest volume hours of the day.
- It's easier to include public art pieces directly into the facility than stand-alone pieces.
- Carefully consider pedestrian and transit passenger flow in and around transit center, especially boarding areas to limit conflict points of buses and passengers for safety.
- USB charging was added later, and it would be ideal to provide more locations.
- Plan for intercity bus boarding point, even if intercity bus companies may not seem interested at first. May want to serve location after opening. Allow for flexibility later.
- Begin asking questions in customer satisfaction surveys early in process related to transfer facilities to set a good baseline to monitor change over time.

4.1.2 City Utilities of Springfield Missouri – Downtown Transit Center

Facility Overview:

The City Utilities Department of the City of Springfield, Missouri manages and operates The Bus public transit system. In the spring of 2016, The Bus opened a new Downtown Transit Center to serve as the central fixed route transfer location for the 12-route transit system (Figure 25). The facility provides indoor customer waiting areas and a fully covered passenger loading platform that can accommodate 14 transit vehicles. Two of The Bus's routes do not serve the downtown transit center. The Bus transit system carried nearly 4,500 average weekday passengers in 2017 according to the National Transit Database.

Figure 25: Springfield, MO Downtown Transit Center



Source: mopublictranist.org

The downtown transit center's indoor waiting area has a customer service window for transit pass sales and has a kiosk for Springfield residents to pay utility bills. Also available are real-time next bus arrival screens, free public Wi-Fi, driver's lounge, USB charging ports, bicycle repair station, and bicycle lockers. The building also contains office space and a public meeting room that may be rented for public events.

Key Lessons Learned

To gain further insights of important lessons learned concerning the planning, design, construction/operation of the Springfield Downtown Transit Center a telephone interview was conducted with Matt Crawford, Transit Director for City Utilities Department of the City of Springfield. The following were important items noted from the interview:

- The site location process can be highly challenging. From initial transit center planning to groundbreaking for the project was ten years, largely due to complications in locating a site for the new facility.
- Public restrooms, while very popular with customers, are very costly in terms of ongoing cleaning and maintenance. They also allow space for illicit activities that can be difficult to monitor. The Director highly recommended not installing publicly available restrooms.
- Transit has agreement with local police department to have officer on site several hours a day for security purposes.
- Consider installing leaning rails over benches. Provides comfort to waiting passengers, while not providing a place to lay down.
- If bus ticket vending machines (TVM) are installed, only have TVMs accept cards. Cash makes the TVM a potential target for theft and has lower maintenance costs.
- Work with other city departments and local organizations to understand if there are reoccurring street closures where transit center site is selected. If there are multiple street closures per year for festivals or other purposes, it can be very disruptive to daily operations.
- Plan for passenger/pedestrian flows in and around the transit center to limit as many potential conflict points between buses and pedestrians to increase safety.

4.1.3 Sioux City Transit – Martin Luther King Jr. Transit Center

Facility Overview

Sioux City Transit hubs its transit network from the Martin Luther King Jr. Transportation Center located in downtown Sioux City Iowa (Figure 26). Fixed route transit services are operated on weekdays only on 10 routes that serve Sioux City, and South Sioux City Nebraska and provide service to the MLK Jr. Transportation Center. All routes are scheduled to pulse at the transit center at 20 minutes after each hour to facilitate transfers between all routes in the system. Sioux City Transit's offices are located in the facility as well.

The transit transfer center is covered and located on the ground floor of a five-story parking structure. Buses enter from both the north and south sides of the facility on a bidirectional track. The transit area has space for passenger ticket sales, covered waiting area for transfers and 8,200 square feet of retail space around the ground floor perimeter of the building. Public art and bicycle racks have been installed in the sidewalk areas.

Figure 26: Martin Luther King Jr. Transportation



The parking garage can accommodate 472 parking spaces. Parking rates are:

- 1st hour and weekend parking FREE
- Hourly rate \$.75
- Daily maximum \$5.25
- Overnight parking (7 p.m. to 7 a.m.) \$3
- Weekend parking FREE
- Monthly contract parking \$50 per month

The center is multimodal and provides connections to taxis and intercity bus travel through Jefferson Lines. The MLK Jr. Center is connected into the downtown’s climate-controlled skywalk system for access to the greater downtown area in winter and other inclement days.

Key Lessons Learned

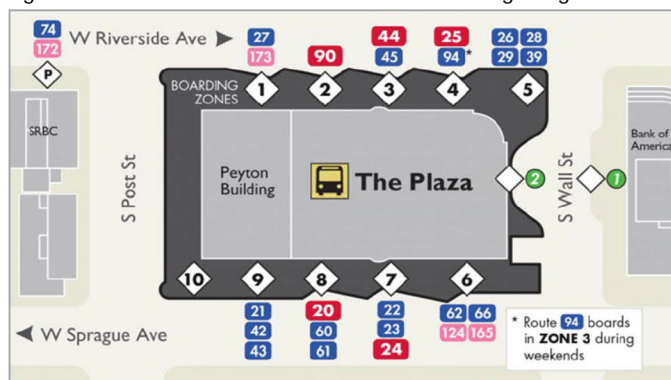
Study team members reached out to Sioux City Transit for further discussion concerning the planning, development, construction, and ongoing operations of the MLK Jr. Transit Center, but were unable to connect with staff from the agency to conduct the needed interview.

4.1.4 Spokane Transit Authority – The Plaza Transit Center

Facility Overview

The Spokane Transit Authority (STA) Plaza, located in the city’s central business district, is the region’s busiest passenger transportation center. Currently, 28 of STA’s 40 routes affect passenger operations at or near the Plaza at W. Riverside and Wall Street using a staggered pulse system to facilitate transfers (Figure 27). The facility opened in 1995 and today serves over 10,000 daily riders. Prior to construction of the STA Plaza, Spokane Transit’s downtown bus operations were dispersed outdoors along downtown streets obstructing storefronts and congesting sidewalks. Customer service and security offices are housed in the building. Amenities at the facility include a convenience store, Subway restaurant, local pizza chain, and a Metro PCS store. Spokane has three other transit hubs. The Plaza is the only hub with indoor waiting areas.

Figure 27: STA Plaza Transit Center - Route Boarding Assignments



Source: Spokane Transit Authority

Images from STA Plaza Transit Center:

Figure 28: STA Plaza Customer Service



Figure 29: STA Plaza Transit Center Boarding Area



Figure 30: STA Plaza Transit Center Indoor Waiting



Key Lessons Learned

- System and schedule design should be taken into account, and re-evaluated when developing major transit facilities.

- Ensure supporters continue to express support even during difficult times that surely come when making any significant investment.
- Be sure facilities are designed to meet customer needs.
- In 2017 Spokane completed a major renovation of the building that included moving passenger services, such as the customer service shop, restrooms, and retail vendors, to the first floor. Also, as much as technology helps people with real-time information, if you plan indoor components of the transit center, be sure to have bus loading areas visible from indoors, otherwise people will feel obliged to wait outside for their bus (major complaint in 1995 and rectified with new indoor waiting areas in 2017).

Table 4 below provides a side by side summary of the peer transit center analysis.

Table 4: Peer Transit Center Analysis Summary

	DART Central Station Des Moines, IA	Downtown Transit Center Springfield, MO	MLK Jr. Transit Center Sioux City, IA	The Plaza Transit Center Spokane, WA
Address	620 Cherry Street Des Moines, IA	211 N. Main Ave Springfield, MO 65806	505 Nebraska St. Sioux City, IA 51101	701 West Riverside Avenue, Spokane, WA 99201
Year Opened	2012	2016	2003	July 16, 1995
Total Facility Cost	\$20.5 million	\$5.1 million	\$11.6 million	\$20 Million (\$1995) \$ 5 Million renovation in 2017 All project costs from local sources (fare revenue, local sales tax, funding from state motor vehicle excise tax)
Project Funding Sources	<ul style="list-style-type: none"> • Federal - \$16.5 million (Mix of TIGER and State of Good Repair Sources) • Local - \$4 million (State of Iowa funding) 	<ul style="list-style-type: none"> • Federal – 80% • Local – 20% 	Data unavailable	Data unavailable
Approximate Site Size	1.6 acres	2.65 acres	1.1 acres	1 acre
Transit Modes Served	<ul style="list-style-type: none"> • Bus • Bike Share and storage • Pedestrian • Transit Center was located adjacent to freight rail lines in the eventuality Amtrak service was ever rerouted through Des Moines and provide flexibility to serve as an intercity rail depot 	<ul style="list-style-type: none"> • Bus • Bicycle • Pedestrian • Park and Ride 	<ul style="list-style-type: none"> • Bus • Auto • Bicycle • Intercity Bus • Taxi 	Bus
Number of Routes Accommodated	17 Routes	14 Routes	10 Routes	28 Routes (Loading Platforms for ten buses per pulse)
Other Accommodations	<ul style="list-style-type: none"> • Coffee shop integrated into facility 	<ul style="list-style-type: none"> • Indoor heated/cooled waiting 	<ul style="list-style-type: none"> • Public art included around facility 	<ul style="list-style-type: none"> • Customer Service / Security counter

	<ul style="list-style-type: none"> • Staffed information, ticket sales and customer service • Covered passenger loading/unloading area • Real-time bus arrival information • Upper floor for DART administrative offices • LEED Platinum facility • Public restrooms • Secure indoor bicycle storage facility • Free public Wi-Fi • Public meeting space 	<ul style="list-style-type: none"> • Public restrooms • Office space for dispatch, customer service, and road supervisors • Community meeting room • Real-time arrival information • Ticket Vending Machine • Public Utilities payment kiosk • USB charging stations • Public Wi-Fi • Bicycle storage and repair • Platform rain garden with native plantings • Connectivity to cycle track 	<ul style="list-style-type: none"> • Direct connection to downtown skywalk system 	<ul style="list-style-type: none"> • Indoor waiting area • Real-time rider information • Restaurant / Retail space • Conference room • Connection to skywalk system • Public art/streetscaping
Notes		<p>Funding for the Downtown transit center was largely secured through a congressional earmark in 2006, prior to the end of congressional earmarking. Project funds were administered by the Federal Transit Administration through the Region VII office in Kansas City.</p>		<p>Transfers occur curbside in sawtooth bus bays on three sides of the block surrounding a building on an approximate one-acre site.</p>

4.2 Needs Assessment

The MTTC project’s overall purpose was to develop a feasibility design concept for StarTran that would result in a recommended location and conceptual layout that will provide covered passenger boarding areas, interior passenger amenities, connections between passenger platforms, and connection with other modes of transportation.

The MTTC study conducted a comprehensive transit center needs assessment to provide definition of the operations and functional needs at the future facility. This assessment was used to define the infrastructure capacity required to support the new MTTC and serve as the programmatic baseline of requirements to determine the scale of the development needed for the site selection process. The purpose of the needs assessment was to understand the sizing of the MTTC to sufficiently serve all transportation and facility needs of the proposed center. As part of the early stages of this study, the study team developed a questionnaire consisting of key design questions and considerations which addressed a wide range of topics, goals, objectives, concerns, and opportunities related to this project. These questions were issued to StarTran for their further distribution to key stakeholders associated with this project. StarTran received the comments from stakeholders and consolidated them into a point-by-point response and returned those to WSP. Below is a consolidated list of the key stakeholder’s objectives and goals generated from the questionnaire:

1. Develop and plan a concept for the new MTTC in downtown Lincoln that will:
 - a. Enhance StarTran passenger experience.
 - b. Prioritize safety.
 - c. Catalyze new economic development opportunities.

- d. Attract federal capital funding.
2. The MTTC needs to allow for growth and a possible mixed-use facility with partnering opportunities.
3. The MTTC should be in operation in five years (approx. 2024).
4. Success of this project is dependent on finding the right location.
5. It is undesirable to include parking garage elements and high-noise levels.
6. It is desirable to include the following amenities at this facility:
 - a. Public restrooms
 - b. Driver restrooms
 - c. Indoor waiting area
 - d. Staffed ticket booth
 - e. Passenger information
7. The following are non-transit specific functions which are desirable at this facility:
 - a. Possible private development
 - b. TOD such as coffee shop or restaurant
8. Desired inter-modal connectivity elements at this location include:
 - a. Buses
 - b. Pedestrians
 - c. Cyclists
 - d. Electric scooters
 - e. Uber/Lyft
 - f. Inter-city commuter bus
 - g. Bus rapid transit
 - h. Autonomous vehicles
9. The following are desired adjacencies or connectivity to other key elements in the City of Lincoln.
 - a. Proximity to University of Nebraska-Lincoln
 - b. Police presence at the facility (possible sub-station)
10. The following are important features of material finishes for walls, floors, ceilings for both interior and exterior.
 - a. Durable
 - b. Vandal-resistant
11. Security measures to address include:
 - a. Crime Prevention Through Environmental Design (CPTED)
 - b. Ballistic resistance per UL for front desk and reception area
12. This project should set LEED Certification as a goal and should include responsive design solutions for stormwater control, energy conservation, water conservation, and green power, among the other LEED requirements.

4.2.1 Project Requirements

The project team received input and comments on the project requirements from key stakeholders via StarTran staff, in order to identify the desired operation and function requirements and building systems. Each stakeholder set guidelines, operational needs, and proposed uses of the MTTC. The study team also considered the needs of alternative fuel vehicles, future modes of transportation, and vehicle storage. The information projected in the sections below are a functional, space-by-space assessment of what is needed to allow the proposed MTTC to fully support the growth and expansion of a comprehensive transportation network in the City of Lincoln.

Exterior Transportation Program Requirements

Bus Transit

The proposed MTTC plans to offer Bus Rapid Transit (BRT), local bus service, regional bus service, inter-city bus service, and Paratransit service on site. These bus services would be offered by StarTran and Greyhound or another inter-city bus operator. Transit operations plans intend for bus service to operate on a pulse transfer system. StarTran is considering development of a BRT corridor service in the coming years that could offer a high frequency route with enhanced passenger amenities. Future BRT plans are not yet defined; however, for planning purposes at this facility, two bi-directional routes with ten-minute headways will be accommodated.

StarTran currently has four electric buses and another six electric buses will be delivered later in 2020, the agency may consider the proposed MTTC as a designated charging station. If desired, details of electric power needs, charging equipment, and charging locations within the MTTC will be determined in the next phase of the project. Local and regional buses would range in length from 35 to 45 feet, but the site program should be configured to accommodate articulated buses in the future. Paratransit buses would range in length from 20 to 27 feet. A sawtooth design is preferred for bus platforms and boarding areas to allow for consistent bus route bay locations for passenger convenience and independent vehicle movement for operational efficiencies. BRT loading areas should accommodate 60-foot articulated buses, and it is assumed that level boarding criteria should be applied to the platform areas on BRT service. It is StarTran's expectation that the bus waiting areas are fitted out for canopy coverage, radiant heat, wind protection, benches, trash cans, information panels, audio and visual announcements, Wi-Fi, etc. Sizing requirements for all bus bays and platforms can be found in the table below.

Table 5: Bus Bay / Platform Needs

DESCRIPTION	QTY	UNIT SIZE (NET SF)	TOTAL AREA (NET SF)
StarTran Fixed Route Bus Bays, 40' Bus	20	520	10,400
Paratransit Bay, 25' Bus	2	400	800
Intercity Bay, 45' Bus	1	520	520
BRT Bay, 60' Bus	4	680	2,720
TOTAL PLATFORMS	27		
TOTAL BAYS	27		

StarTran intends to allow bus operator breaks to occur at this location; therefore, layover space has been designated to stage the non-operations bus in a location outside the revenue bays. No BRT layover space is expected for this site. StarTran intends to conduct bus operator shift change at this location. While the operators will not drive/park at this location, there will need to be site accommodations for the vehicle to drop off and pick up bus operators. In addition, StarTran requires parking on-site for a field supervisor vehicle and a security vehicle. Parking for administrative staff will need to be coordinated off-site. No public parking is planned as part of this project. Sizing requirements for these spaces can be found in the table below.

Table 6: Transit Layover Spatial Needs

DESCRIPTION	Number of Layover Spaces	Unit Size (Net Feet ²)	Total Area (Net Feet ²)
StarTran Service Vehicle Space	1	200	200
StarTran Staff Space	20	200	4,000
StarTran Supervisor Space	1	200	200
Security Vehicle Space	1	200	200
StarTran Layover for Operator Break Time	2	520	1,040
Shift Change Van Space	1	200	200
Total			5,840

Vehicle Queuing for Non-Transit Vehicles

StarTran and partnering agencies proposing to use the MTTC will require some organized layer of queuing locations at or near the site. The on-site pickup and drop-off areas should have high visibility internally and externally at the MTTC so riders can wait in sheltered areas or inside during inclement weather. The adjacent queuing areas should reduce congestion on the roads around proposed MTTC and needs to accommodate vehicle queuing during surge loads related to peak loads and surges generated by events, while not impairing passenger and pedestrian movement on the site. Additionally, considerations for future technology and mobility alternatives are to be considered. All pickup and drop-off locations for vehicles will be compliant with City of Lincoln traffic control guidelines. Sizing requirements can be shown for all queuing and pickup and drop-off needs in the table below.

Table 7: Queuing Spatial Needs

Queuing Need	Number of SPACES	Unit Size (Net Feet ²)	Total Area (Net Feet ²)
Autonomous Vehicle	4	160	640
Electric Vehicle Charging Station	4	200	800
Queue Area for Waiting Rideshare	4	350	1,400
Drop-off and Pick-up for Rideshare	2	480	960
Total	10		3,800

First-Mile / Last-Mile Needs

Allocation of space for existing and future modes of First-Mile/Last-Mile forms of transportation are programmed at the MTTC. Considerations have been made for bicycle racks, bike- and scooter-share staging areas, and their strategic locations at the proposed site to identify this location as a bike-friendly facility. These staging and trailhead outpost locations should be well lit, sheltered, and close to site entrances and exits. Sizing requirements can be shown for bicycle and micro-transit needs in the table below.

Table 8: First-Mile/Last-Mile Spatial Needs

Description	Quantity	Unit Size (Net Feet ²)	Total Area (Net Feet ²)
Scooter Staging Area	20	8	160
Dockless Bike Staging Area	20	12	240
Bike-share	10	18	180
Bicycle Rack	20	12	240
Bicycle Locker	8	21	168
Trailhead Outpost			
Total Bikes and Scooters	50		
Total Bicycle Storage	28		
Total Space			988

Parking

StarTran has indicated an interest in incorporating parking at this location for users other than StarTran staff. At this time the quantity of parking or the type of parking (revenue vs. non-revenue) has not yet been determined.

Table 9: Parking Table

Description	Spaces	Unit Size (Net Feet ²)	Total Area (Net Feet ²)
Revenue Parking	0	350	
General Parking	0	350	
Car-Share	4	200	800
Electric Vehicle Charging Station			
Total Parking			800

General Exterior Services

In addition to transit functions, the proposed design of the MTTC should find ways to activate its public exterior space. StarTran would like to provide space for artwork areas and a public gathering space (forum). Other services include general site lighting, Closed Circuit Television (CCTV) cameras, audio announcement system, trash and recycling collectors, irrigation, maintenance storage for de-icing, snow removal, landscaping, and a secure and enclosed emergency generator. StarTran has also requested incorporation of a clock tower feature in the design concept. Sizing requirements for all general services can be found in the table below.

Table 10: General Exterior Services

Description	Quantity	Unit Size (Net Feet ²)	Total Area (Net Feet ²)
Public Gathering Space	1	400	400
Trash and Recycling Enclosure	1	240	240
Exterior maintenance storage	1	350	350
Generator	1	800	800
Dedicated Artwork Location	1	400	400
Bioswale and Surface Rainwater Processing Area		TBD	TBD
Designated Smoking Area	1	400	400
Green Space		TBD	TBD
Total Space			2,590

Interior Transportation Program Requirements

Interior Transit

StarTran anticipates an interior, air-conditioned passenger waiting area at the MTTC which should accommodate 40 seated and 60 standing passengers (100 total). Desired amenities include bench seating, lounge seating, TV, transit information monitors, vending, direct access to restrooms, and passenger assistance interface. In addition, StarTran will locate administrative functions at this facility, so necessary office functions and support spaces are to be provided. StarTran bus operators will take their breaks at this facility and will require a breakroom and possibly a wellness / fitness room. The bus operator breakroom will also be available to maintenance staff at the facility. Additional passenger services should include both staffed and automated services for ticketing, route planning, and general information.

Table 11: Interior Transit, Passenger Services

Description	Quantity	Capacity	Unit Size (Net Feet ²)	Total Area (Net Feet ²)
Passenger Ticketing	1	2	120	120
Self-service Kiosks	3	0	40	120
Men's Passenger Restroom	1	4	240	240
Women's Passenger Restroom	1	4	240	240
Family Restroom	1	1	60	60
Shared Men's Passenger Restroom	1		36	36
Shared Women's Passenger Restroom	1		36	36
Total		9		852

StarTran plans to have office space in the proposed MTTC. This space would include 15 offices, reception area, staff breakroom, conference room, copy and marketing rooms, office storage space, and restrooms. Each office should have space for a desk and electrical outlets. The reception area should have waiting chairs and a side table. The conference room will hold a 15-person area, have a presentation system and connected monitors, tables, and chairs. This space will also hold a shared office space for all other agencies using the MTTC. Sizing requirements of the office space and associated facilities can be seen in the table below.

Table 12: StarTran Administrative

Description	Quantity	Total Capacity	Unit Size (Net Feet ²)	Total Area (Net Feet ²)
StarTran Office Reception	1	1	160	160
StarTran Admin Waiting	1		120	120
StarTran Staff Restroom: Men	1	2	180	180
StarTran Staff Restroom: Women	1	2	180	180
StarTran Nursing Room	1		64	64
StarTran Staff Conference Room	1	15	225	225
Conference Room Storage	1		100	100
StarTran Office a	3	3	150	450
StarTran Office b	9	9	120	1,080
StarTran Staff Break Room	1		180	180

Description	Quantity	Total Capacity	Unit Size (Net Feet ²)	Total Area (Net Feet ²)
StarTran Copy Room	1		108	108
StarTran Marketing Room	1		210	210
StarTran Materials Storage	1		48	48
StarTran Supplies	1		30	30
StarTran Seasonal Storage	1		128	128
Custodial Space	1	1	60	60
Partner agency Shared Office	1		120	120
Total		33		3,443

StarTran plans to offer private restroom facilities, break areas, and a quiet room for StarTran drivers. Spatial requirements for these areas can be seen in the table below.

Table 13: StarTran Bus Operators

Description	Quantity	Capacity	Unit Size (Net Feet ²)	Total Area (Net Feet ²)
Driver's Restroom: Men	1	2	180	180
Driver's Restroom: Women	1	2	180	180
Passenger Services Toilet	1		60	60
Driver Breakroom	1	12	320	320
Driver Quiet Room	1	1	64	64
Wellness Room	2		240	240
Men's Locker Room	1		100	100
Women's Locker Room	1		100	100
Men's Shower Room	1		40	40
Women's Shower Room	1		40	40
Total		24		1,260

Interior Non-Transit

StarTran and the City of Lincoln want to attract people to the proposed MTTC beyond transit uses. Some form of a mixed-use center with a multi-modal component would be a plus for this type of facility. Space for Transit Oriented Development (TOD) has been set to incorporate restaurants, commercial shops, office space, market areas, and general services; however, none of the uses have been quantified at this time. Additionally, there is a preference for locating a police sub-station at this location. The amount of TOD space will be determined when a site is selected and accommodated if a preferred site has the space to include in the MTTC's program. General interior spatial requirements of the proposed MTTC can be seen in the table below.

Table 14 - Interior Non-Transit

Description	Quantity	Capacity	Unit Size (Net Feet ²)	Total Area (Net Feet ²)
Police sub-station	1	4	120	120
TOD-Retail			TBD	TBD
TOD-Food/Drink			TBD	TBD
TOD-Commercial			TBD	TBD
Residential			TBD	TBD
Vending Machines	4		10.5	42
IT Room	1		60	60
Electrical Room	1		200	200

Description	Quantity	Capacity	Unit Size (Net Feet ²)	Total Area (Net Feet ²)
UPS Room	1		100	100
Mechanical Room	1		400	400
Fire Suppression and Pump Room	1		50	50
Total				TBD

General Interior Requirements

General services provided in the MTTC include environmental conditioning, lighting and electrical power, data, voice, and telecommunication. The MTTC as a City facility will require fiber so a plan should be developed to route conduit from roadway per the City's wiring standard, plus adequate space inside the mechanical room. The site will need to provide dedicated City fiber to this location to support the technology density. It is understood that StarTran desires card reader access control on doors and security CCTV surveillance throughout the project area; however, further coordination is required to determine what interconnectivity is required for CCTV and access control with City of Lincoln emergency services.

Waiting Areas

The waiting areas should be in a strategic location near pickup and drop-off areas so users can see all arrivals and departures. These waiting areas should be well lit, have telecommunications and intercom capabilities, incorporate durable seating, tables for places to work, mobile charging stations, and trash and recycling receptacles. All modes of transportation will require Passenger Information Display Systems (PIDS) in waiting areas. Ticketing desks, self-serve kiosks, and restrooms should be near the waiting areas and customer services.

Restrooms

All restrooms will have ADA accessible stalls with toilet paper accessories, paper towel dispensers, baby changing stations, and sinks. The public restrooms will be in a central and easy-to-find location, be well lit, and have a high-impact, durable design to limit vandalism and deterioration. Family Restrooms will also be provided at each location of public restrooms.

Transit Staff Areas

Breakroom areas should have lockers for staff storage of coats / valuables during work hours, a kitchen with counter tops and ample cabinet space, a microwave, refrigerator, dishwasher, coffee machine, sink, icemaker, and seating and tables for staff. These spaces should be in proximity to exterior transit loading and unloading areas and have a quiet and relaxing environment with environmental conditioning.

Janitorial Areas

The janitorial closets should have a mop sink, shelves for cleaning supplies, and storage carts for mobile cleaning. They should be near restrooms for janitor convenience but hidden from public spaces.

Storage Rooms

The storage room should maximize linear feet of fixed storage shelving and flat files. Storage rooms should be organized to accommodate general office supplies, marketing materials, seasonal storage, etc. These spaces should be in secure areas near office space, away from building exteriors, and environmentally conditioned.

Conference or Multi-purpose Room

The meeting venue rooms should have a flexible capacity via operable partitions, provide capability in room HVAC and electrical systems to accommodate surge cooling for larger staffing loads, provide floor mounted power, have audiovisual presentation system, and storage space for chairs, tables, and benches. The room should have good acoustics and staged lighting.

Building Services Spaces

The building services spaces include electrical rooms, mechanical rooms, IT rooms, fire suppression rooms, pump rooms, etc. These spaces should accommodate the necessary equipment, panels, controls, clearances and access for maintenance, replacement of parts and services. The room should be secure, have no windows, hidden from public spaces, and be environmentally conditioned.

To determine the overall space and programming needs for the future MTTC, the study worked closely with StarTran staff and bus operators, along with stakeholders from the City. To help the study team better understand the needs, preferences and priorities of what elements and amenities should be included in the MTTC, a public outreach effort was also used to gain this input from a broad spectrum of Lincoln citizens.

4.3 Public Engagement and Survey Findings

Planning for the new MTTC was developed using an open and transparent process that gathered input from an Advisory Committee comprised of City of Lincoln staff from various departments, downtown stakeholders, transit riders and bus operators to help guide the study. StarTran also reached out to transit

Figure 31: Public Engagement at Gold's Transfer Center, November 2019



riders and the general public to gather information on their needs, preferences and priorities for a new downtown transit center. This outreach took two forms; first through an in-person event held at the Gold's transfer center (Figure 31) where representatives from StarTran and the study consultant team met with and discussed the project with StarTran riders as they waited to transfer between routes. The second method used to engage the public was through an online

survey using the MetroQuest survey platform.

The survey was designed to identify participant's priorities for the planned facility and to identify where participants begin and end their most common trips. The survey was made available online in both English and Spanish; and Vietnamese translation was available upon request. In addition to the online format, hard copy surveys were made available for in person meetings or upon request.

The success of using the platform, in terms of engaging as many people as possible, depended on informing the public and stakeholders about its availability. Therefore, an outreach campaign was conducted to direct people to the MetroQuest page. This effort included positioning the survey

opportunity on the StarTran website project page, StarTran Facebook page, news release, links in e-mails to stakeholders, promotion through presentations, public meetings, and other communications efforts. The MetroQuest site was available from November 7 to December 31, 2019.

Survey Input Results

There were 593 surveys completed through the MetroQuest site. Five screens were used to inform survey visitors about the MTTC Study and to solicit input around priorities for the new facility. The five screens were Welcome, Priority Ranking, Budget Allocation, Trip Pattern Mapping, and Demographic Questions. The following includes key takeaways from the input received.

Survey Welcome:

The first survey screen provided information about the MTTC Study, the Study's goals, and shared how input would be used to help guide the selection of a new transit center site as well as passenger amenities (Figure 32). There were 1,146 visits to both the English and Spanish versions of the MTTC MetroQuest survey site. Visitors are those who may read information but do not provide input (participants).

Top Ranked Priorities:

The first interactive survey activity through MetroQuest was the ranking of MTTC Study goals (Figure 33). Participants were asked to consider eight goals and rank three of them in order of most important to least important.

Figure 32: MetroQuest Survey Welcome Screen

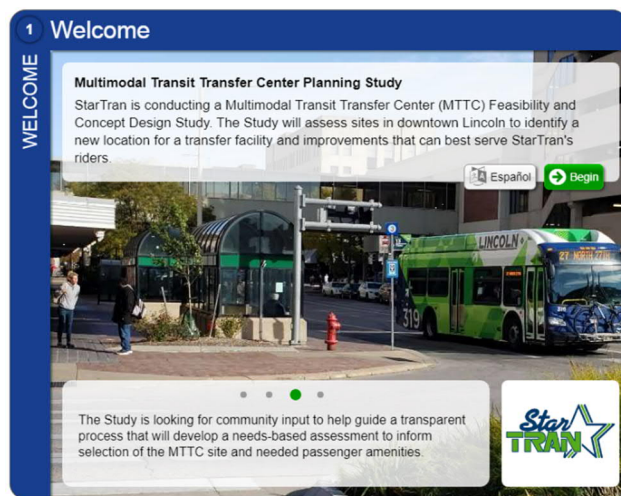


Figure 33: MetroQuest Survey - Rank Study Goals Screen

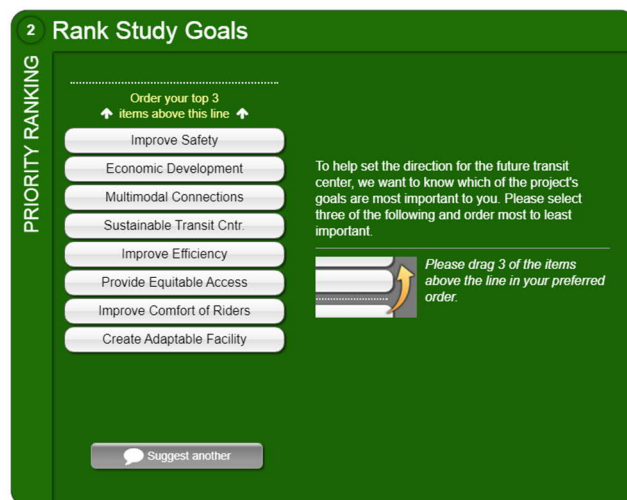
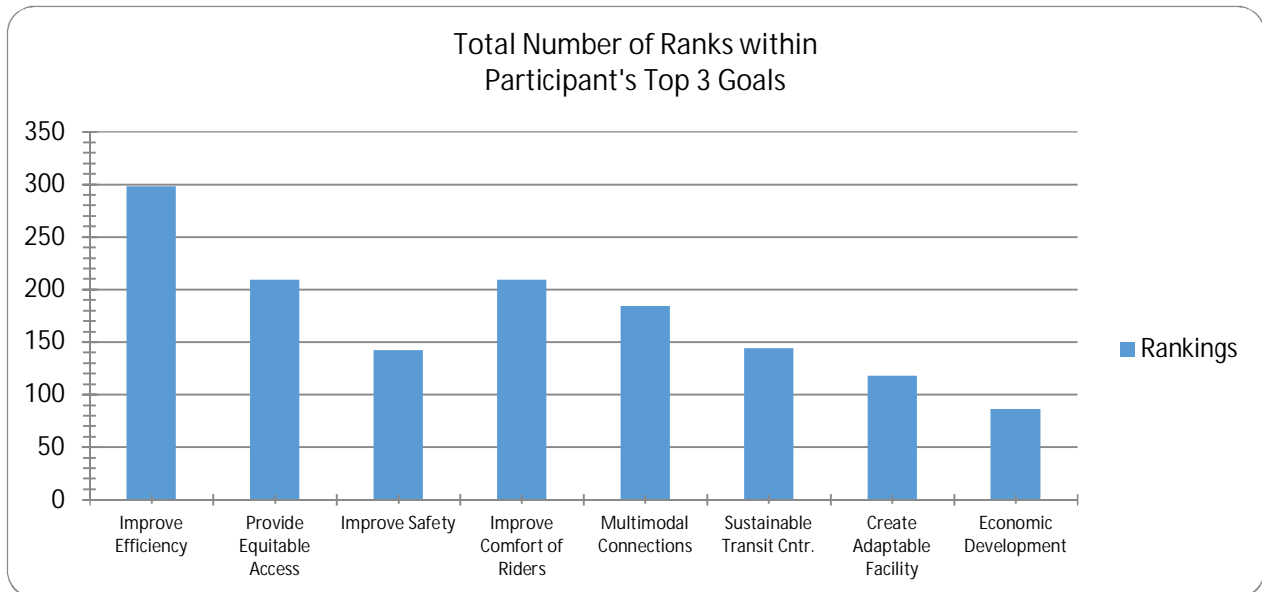
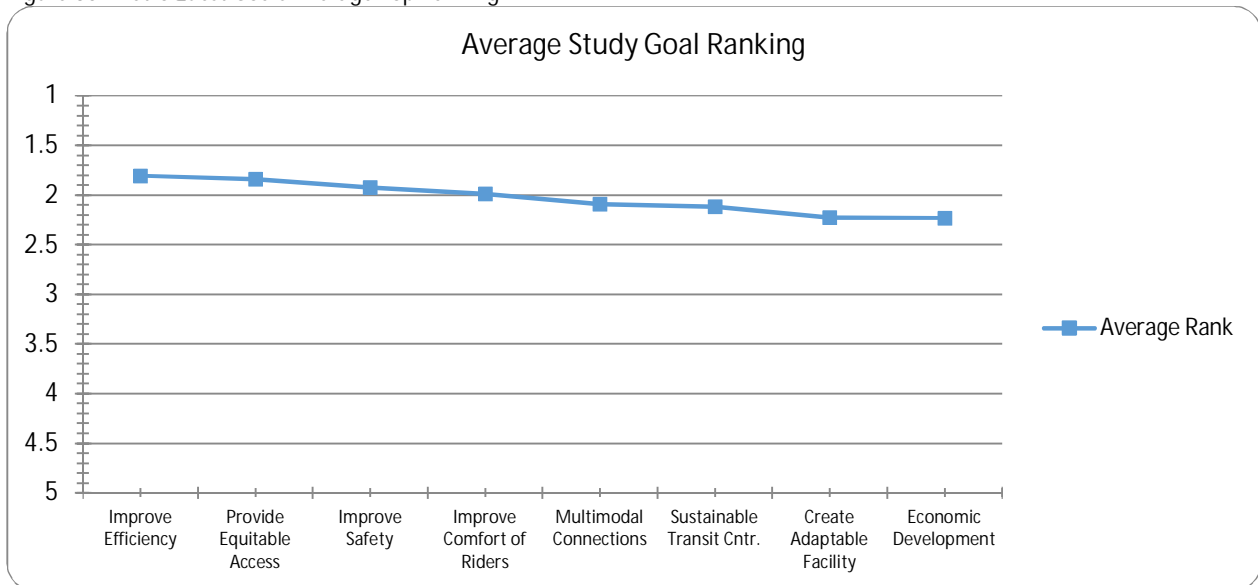


Figure 34: MetroQuest Survey Top Goal Results



Improve Efficiency was ranked in the top three participant priorities more times than any other option. It was ranked 298 times. Provide Equitable Access and Improve Comfort of Riders tied for second place with 209 rankings each (Figure 34). When we consider the ranked order of each Study goal, Improve Safety rises into third place (bumping Improve Comfort of Riders into fourth). This indicates that Improve Safety was ranked within the top 3 priorities less frequently; however, when it was ranked, it was indicated as a top priority. In Figure 35 below, note that the highest rank is 1, so lower rankings and averages are better than high ones. These results indicate that Improve Efficiency, Provide Equitable Assess and Improve Safety when ranked in the top three, were most often listed at the highest priority.

Figure 35: MetroQuest Goals Average Top Ranking



Budget Allocation:

The third MTTC survey screen asked participants to indicate how they would allocate funds on a new transit center’s passenger amenities. Respondents were given the equivalent of \$100 in virtual stars (nine \$10 stars and ten \$1 stars) to distribute into eight different amenity categories (Figure 36). Within each transit center amenity category, respondents could select the ‘Details’ button for a photograph example and short description of what each general amenity category could entail.

Indoor Waiting Area received 20% of the virtual money, Covered Boarding Platform came in second with 16%, and Seating earned 14%. These top three categories reinforce a high priority ranking (in the previous exercise) for Improved Comfort for Riders. “Technology Amenities” and “Lighting” tied for fourth with 13%. These results are displayed in Figure 37.

Figure 36: MetroQuest Survey - Amenity Budget Screen

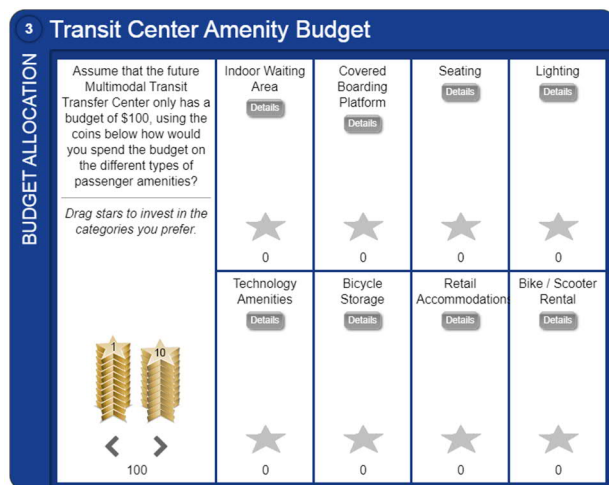
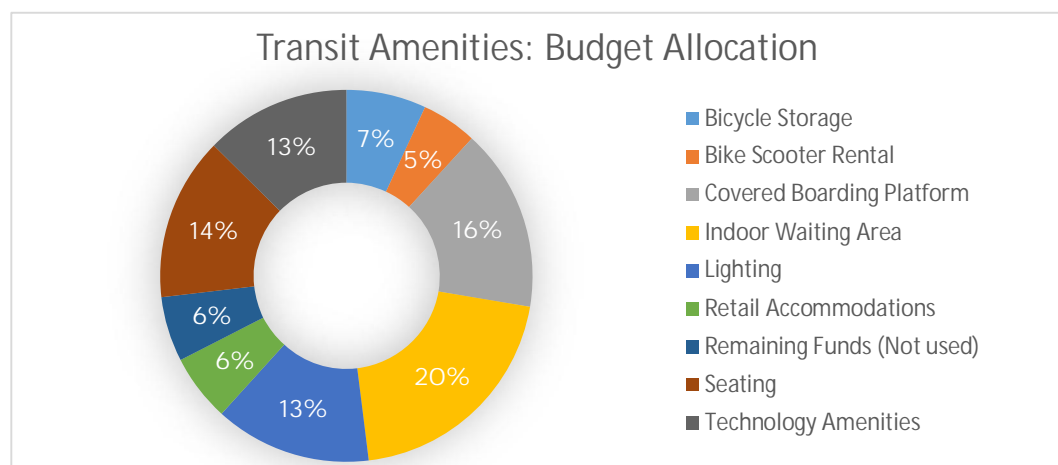


Figure 37: MetroQuest - Transit Amenity Budget Allocation Results

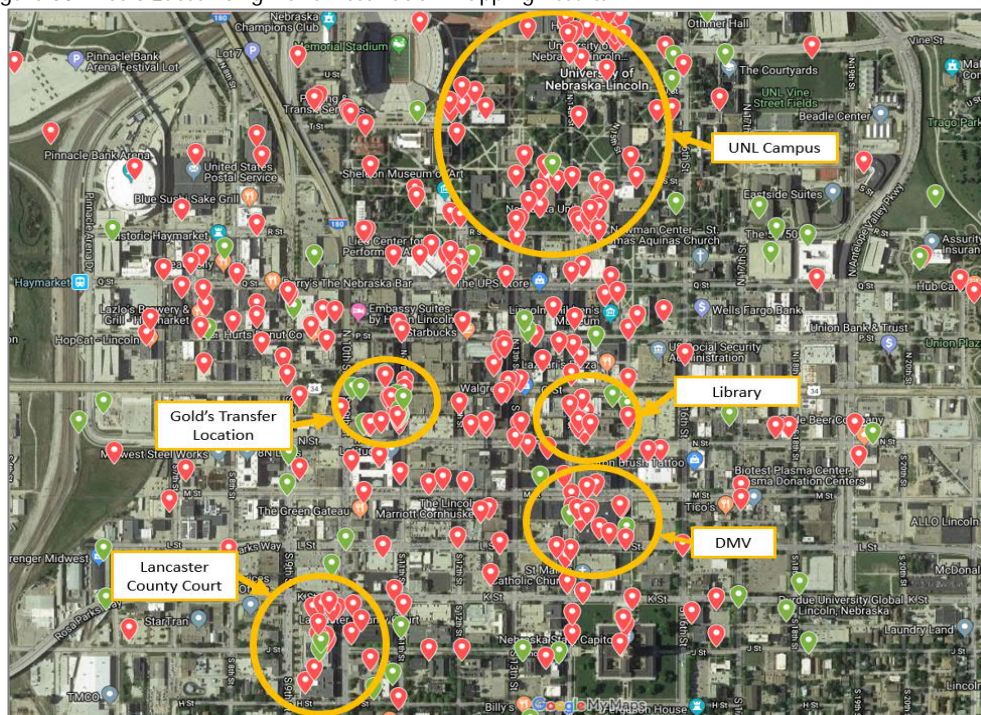


Trip Pattern Mapping:

The fourth and final survey exercise asked participants to drop pins on a map indicating where, on average, they start their day and their most common destination (work, school, etc.). Participants dropped 1,041 ‘pins’ on the maps.

In the map in Figure 38 below, the red pins indicate where survey participants listed their general trip destination. While destinations were noted across the downtown study area, notable concentrations were shown at the southern edge and central portion of the University of Nebraska – Lincoln (UNL) campus, downtown Public Library, State of Nebraska Department of Motor Vehicles, Lancaster Court facilities, and current Gold’s Building StarTran transfer location.

Figure 38: MetroQuest - Origin and Destination Mapping Results



MTTC Survey Comments

In total, the MTTC Study survey received 501 comments (the Spanish survey received five comments on the Priority Ranking Screen only). An export of all comments is available for further review; the below presents only a few of the comment highlights.

Comment Highlights on the Priority Ranking Exercise:

- “Improve Safety” comments:
 - Need to have safety mechanism for early commute passengers as bus stops does not have light posts
 - Why did you all take out the weather shelters at the bus stops?! People freeze outside and get rained on. What were you thinking?! (Lincoln weather and covered shelters were referenced multiple times in various categories)
 - I have felt creeped out at bus stations, bus stops, and on the bus.
- “Improve Efficiency” comments:
 - Transit center should be in center of city to increase efficiency and time for all passengers, avoid everything being downtown and at UNL
 - There should be more than one transfer center with facilities. (Multiple transfer center locations were referenced three times.)
 - Having a North/South bound only bus on 70th or 84th street would greatly improve transit times for those not wanting to go downtown first to change routes.
- “Improve Comfort of Riders” comments:
 - This is very important to me. The current waiting station has no heating or cooling. The A street bus is unbearably crowded.
 - It is very cold and there are no restrooms. Bus times could be up to an hour long.
 - How about restroom access for those waiting for a connection bus?
 - Restrooms are very important! (Restrooms were referenced four times)

- I commute via Route#40 from Golds to Van dorn in evening. Older versions of Bus are not at all comfortable. In contrast, Routr#53 always gets newer version of StarTran Bus and always on time. Please fix that.
- “Provide Equitable Access” comments:
 - Equitable access needs to be provided to all city residents, not just focusing on downtown, low income and UNL students.
 - When the routes were redrawn a couple years ago, they pulled buses out of the neighborhoods that they serviced and made it harder to effectively connect with the buses. Some neighborhoods, including several in the west Lincoln area have been excluded from the bus's new system due to the distance you have to walk to get to a bus stop.
 - Accessible buses would be amazing!
- “Create Adaptable Facility” comments:
 - Still would love to see trolleybuses here in Lincoln someday...
 - Need sheltered bus stops and when snow/ice accumulates near bus stops, Bus Drivers can stop bus little further near Traffic Stop as Stepping on Ice/snow causes injury
 - We could use more bus shelters around Lincoln on both sides of the street there are some people who can't stand while waiting for the bus!!!!
- “Sustainable Transfer Center” comments:
 - That is an ambitious plan. Definitely agree with incorporating what can be done with a reasonable return for the money. It should not be the main focus.
 - Do not sink any more taxpayer dollars into the transit system that is already dependent on subsidies. No one uses the bus system or wants to. If you put Wi-Fi in it will only attract homeless people. A deli will not generate enough revenue to support itself. Stop funding bad ideas with taxpayer money.
- “Economic Development” comments:
 - I feel like what I pay for a bus pass is expensive compared to cost of living adjusted prices in other cities.
 - If I struggle to get around town, I would really appreciate some resources collocates at my bus station especially if I have a 20- or 30-minute wait before my next bus. Prepared food to go, small grocery items and convenience items, much like what you might find at the airport.
- “Suggest another” comments:
 - Adding Bus Shelters Around Lincoln
 - Tourism guide
 - Amtrak Depot
 - More routes and less waiting. Easier to figure out connections and timing for trip
 - Offer transportation to more than downtown; run transportation after 5 pm
 - Provide access and routes on Saturday and Sunday, especially to the Farmers Market and area Churches and Stores.
 - Better routes/ 24/7 run times
 - Provide opportunities for higher density redevelopment, including affordable housing.

Survey Demographics:

At the conclusion of the MetroQuest survey, participants were asked a series of demographic questions (Figure 39) as well as how often, if at all, they used public transportation in Lincoln. The overwhelming majority of respondents identified as Caucasian. Approximately fifty-five percent of survey takers were between the ages of 30 and 50 years of age and roughly the same percentage reported a household income between \$25,000 and \$100,000 per year.

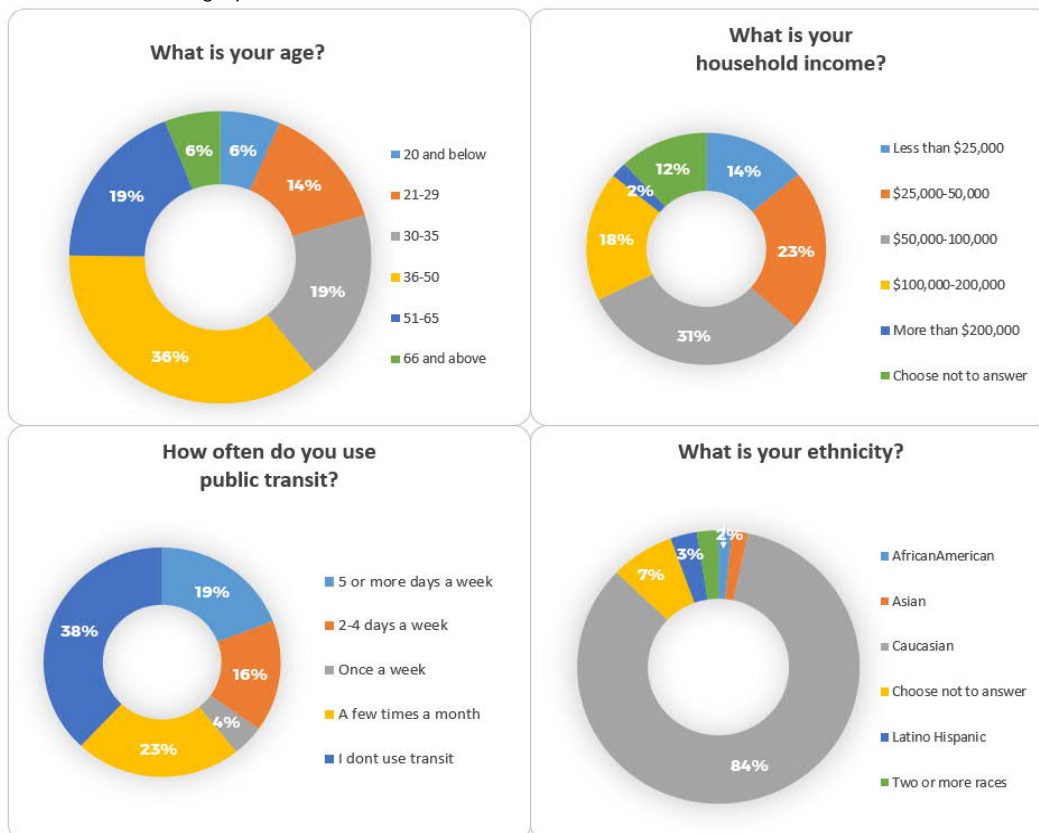
There was a good mix of current transit users and those that do not currently utilize StarTran services. Sixty two percent of survey respondents use transit at least a few times a month. Almost twenty percent said they use StarTran routes five days a week. Thirty-eight percent said that they do not currently use public transit in the City of Lincoln. Results from the demographic and survey wrap up questions are displayed in Figure 40 below.

Figure 39: MetroQuest - Demographic Questions Screen

The screenshot shows a 'Wrap Up' screen with the following elements:

- Final Questions:**
 - How often do you use public transit? (Select...)
 - What is your age? (Select...)
 - What is your ethnicity? (Select...)
 - What is your zip code? (Type...)
 - What is your household income? (Select...)
 - Enter your email below if you would like to receive future communication from the City of Lincoln (Type...)
- Buttons:** 'Submit Final Questions' (green) and 'Skip' (grey).
- Thank you:** A message asking users to share the survey with friends to help shape the future of transit.
- Logos:** StarTran and City of Lincoln Nebraska.

Figure 40: MetroQuest - Demographic Questions Results

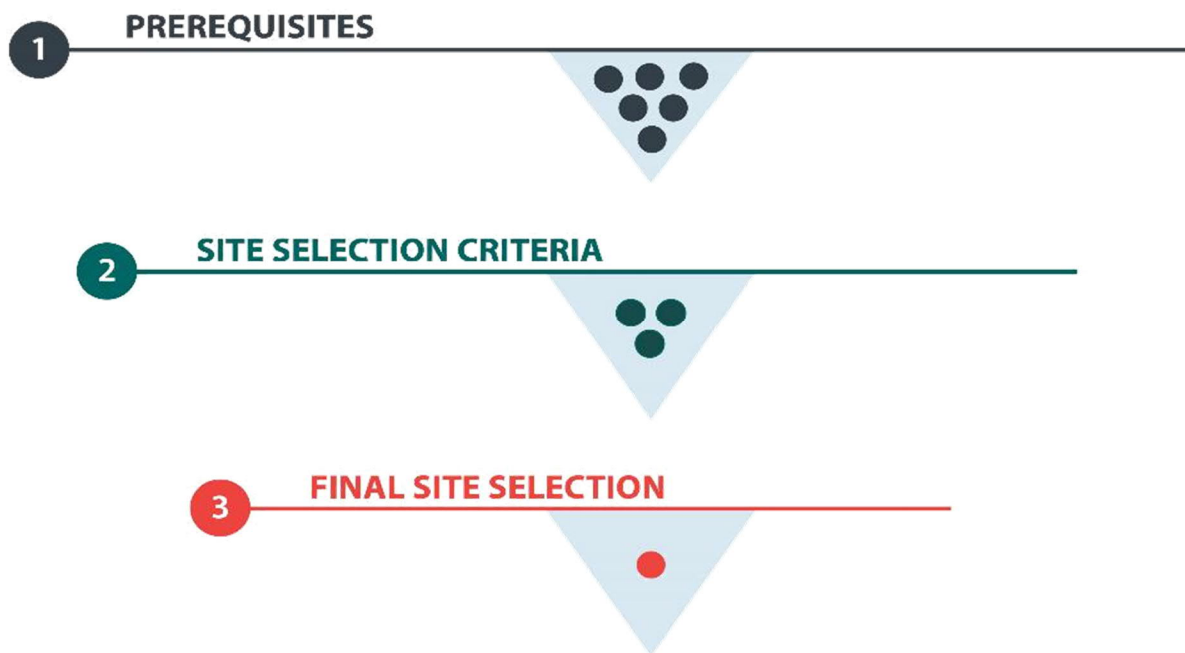


4.4 MTTC Site Requirements

By gathering the information developed in the functional needs assessment above, the general information related to overall size of the site can be understood. The process of actually selecting a site was addressed through a repetitive screening process of criteria developed and refined by the key stakeholders on the project (Figure 41). Through this process, the stakeholders were able to make informed decisions in an iterative, information sharing environment, allowing everyone involved to arrive at a preferred site which would provide the best overall solution for the aggregate. In order to facilitate open communication, both the goal-setting process, where prerequisites and selection criteria are determined and the final site selection review were conducted via in-person workshops.

The selection followed a three-step sequencing process where each site was screened for meeting prerequisites determined by the key stakeholders. This initial stage was simply pass/fail. Second, the sites which passed stage one were then rated based on weighted selection criteria across a number of categories which essentially resulted in a scorecard for each site. The sites which separated themselves from the others in the final scorecard tally were then test-fitted with various conceptual operational layouts and discussed in a workshop setting with the key stakeholders.

Figure 41 - Site Selection Screening Diagram



4.5 Site Selection Criteria

The criteria were developed initially by the design team as a draft to illustrate common preferences or themes typically seen in peer facilities nationwide. These criteria lists were then presented to the key stakeholders in a site selection criteria workshop and this workshop resulted in a vetted list of prerequisite requirements for each site and the list of site selection criteria.

The Prerequisites were determined to be as follows:

Prerequisites	
In the downtown area	For purposes of this evaluation, the "downtown area" is defined as the project study area.
Accommodates full program	This includes both operational site components and building functions.
Approach streets can accommodate bus movements	This includes bus arrival and ability to accommodate pulse-style departure.
No environmental restrictions	Site is not in a floodplain.
Historic restrictions	Existing structures on site are not protected, registered or designated as historic.
Adjacent / near bike corridor	Must be within one or two blocks of existing or planned downtown bike corridor.
Location does not cause StarTran to incur additional operational costs	Is this 0% increase or is there an acceptable % increase?

Next, the stakeholders established what would be the key criteria that would make a site more successful or less successful. These selections would later be weighted by the stakeholders to add a layer of ranking within each criteria, thus helping to filter sites which may score high, but achieve fewer of the more important criteria vs. a site which may not score relatively as high, but does achieve the most important of the key criteria.

The key stakeholders conducted a group exercise where criteria were identified in each of three main categories: Multi-modal Connectivity, Suitability & Feasibility and Social & Economic Benefit. The list of those criteria were determined as indicated in the Worksheet that follows.

Table 15: MTTC Scoring Criteria Worksheet

Multi-modal Connectivity												
Bicycle Infrastructure												
Vehicular Accessibility (rideshare, kiss-n-ride)												
Public Parking Availability												
Pedestrian Connectivity												
Public Transit Connections												
Suitability & Feasibility												
Legal Condition (Easements, Liens, or Deed Restrictions)												
Site Preparation Issue (such as physical encumbrance, ownership, environmental)												

In each category, the bold text represents the two criteria which scored the highest weighted tally based on stakeholder feedback.

4.6 MTTC Site Alternatives

Parallel to the establishment of Site Selection Criteria, stakeholders also participated in the site selection workshop with the purpose of identifying transit center sites within the study area boundary, which either were owned by the City of Lincoln, were considered available in terms of a favorable negotiation of sale with the current land owner, could physically contain the programmatic needs of the MMTC, and were located in a manner which would not be detrimental to bus route configurations or deadheads. Both deadhead analyses and route configurations were performed on sites receiving the more favorable scores as part of the overall evaluation process.

Figure 43: Sample Prerequisite Site Scoring Matrix

		Bounding Streets O/P10/78	MN 9/10	MN 13/4	P/Q 16/77
StarTran Multi-Modal Transit Center Study		Northwest quadrant of block. Former Single Barrel site. MTTC site assumes Single Barrel property.	Building on southeast quadrant of block with remainder of block surface parking. Approximately half of block under City ownership.	MTTC site would assume southern half of block. Currently four story commercial building and structured parking. Under City ownership.	MTTC site assumes norther half of block that is currently occupied by one-story retail center. Property is currently for sale. one owner. Close proximity to UNL Campus.
All Sites		Block 42	Block 69	Block 65	Block 51
Prerequisites		FAIL	PASS	PASS	FAIL
In the downtown area	Site within downtown Study Area	Yes	Yes	Yes	Yes
Accommodates full program	Site can accommodate all routes with space for expansion	No	Yes	Yes	Yes
Approach streets can accommodate bus movements	Roadway system to /around site allows for min bus movement	Yes	Yes	Yes	Yes
No environmental restrictions	Site is not in floodplain	Yes	Yes	Yes	Yes
Historic restrictions	Site does not impact historic property	Yes	Yes	Yes	Yes
Adjacent / near bike corridor	Site located adjacent to existing or planned bike corridor	Yes	Yes	Yes	Yes
Location does not cause StarTran to incur additional operational costs	Site does not add new operational costs	Yes	Yes	Yes	No

Ultimately, the potential sites were pared down to 17 sites considered viable to proceed into the site selection process. Of those 17 sites, 10 failed the prerequisite criteria leaving 7 sites for the Selection Criteria scoring.

Figure 44: Site Scoring - Selection Criteria Matrix Example

			Score	weighted	total	Score	weighted	total	Score	weighted	total	Score	weighted	total
			I-VES	score	points	I-VES	score	points	I-VES	score	points	I-VES	score	points
			O-NO			O-NO			O-NO			O-NO		
Multi-modal Connectivity				11.36	125		11.36	125		9.91	109		9.91	109
Bicycle Infrastructure	Site located adjacent to existing or planned bike corridor	255 28	1			1			1			1		
Vehicular Accessibility (rideshare, kiss-n-ride)	Ability for passenger vehicles to access site area for pick-up/dropoff	182 20	1			1			1			1		
Public Parking Availability	On-site or immediately adjacent public parking	145 16	1			1			0			0		
Pedestrian Connectivity	Site connects to existing sidewalk network	291 32	1			1			1			1		
Public Transit Connections	Site located with convenient access to other modes of transportation	224 29	1			1			1			1		
Suitability & Feasibility				6.91	98		6.27	69		6.27	69		4.71	52
Legal Condition (Easements, Liens, or Dead Restrictions)	No known easements, liens or deeds which would restrict ability to develop and operate on this site	218 24	1			1			1			1		
Site Preparation Issue (such as physical encumbrance, ownership, environmental)	No known obstacles to allow for development such as owner unwilling to sell, or environmental issues	155 17	1			1			1			0		
Block Size and Geometry	Overall a viable site dimensions accommodate bus movement and operations	264 29	0			0			0			0		
Site Visibility	Site located in a visible location for passengers to find and use safely	255 28	1			1			1			1		
Maintains existing routing and operational scale	Site location can support approach / departure movements for bus routes	264 29	1			0			0			0		
Transit Operational & Future Growth Needs	Site can accommodate current and future operational growth needs	255 28	1			0			0			0		
Social & Economic Benefit				2.74	29.8		3.84	41.8		4.40	48		1.66	18.2
Align with City of Lincoln Downtown Master Plan	Site development and operations support and contribute to goals of the master plan	290 32	0			0			0			0		
Development Potential	Site allows for TOD opportunity in tandem with transit functions	210 23	0			0			0			0		
Promote Economic Development in Downtown Area	Development opportunities improve for adjacent properties if site becomes a transit center	180 19	0			0			0			0		
Proximity to Compatible Uses and Amenities	Total Population within 1/4 mile	280 31	0.4			0.6			0.8			0.4		
Proximity to Ridership Origins/ Destinations	Total Employment within 1/4 mile	270 29	0.6			0.8			0.8			0.2		
SITE SELECTION - TOTAL SCORE			Rank	2301	25280	Rank	2148	23580	Rank	2058	22600	Rank	1630	17920
			Block 69			Block 65			Block 97			Block 20		
Proximity to Compatible Uses and Amenities	Total Population within 1/4 mile		818			1013			1566			950		
Proximity to Ridership Origins/ Destinations	Total Employment within 1/4 mile		8386			12854			11327			4373		

4.7 Site Selection Analysis and Preferred Site

The 7 sites in the Selection Criteria, resulted in two sites which appeared most favorable to site layout and test-fitting; Block 63 and Block 69.

Additional criteria were also reviewed in more detail as the preferred sites became more and more clear. Due to the many one-way streets currently in downtown Lincoln, this restriction was considered an additional element which may constrain a site to the point of failure. Therefore, a traffic study was performed to review AM peak and PM peak for vehicular traffic on the intersections surrounding the existing site and the two preferred sites. Fruin level of service standard was applied to each intersection with the corresponding LOS letter designator.

Figure 47: Current AM Peak Traffic Level of Service Around MTTC Site Alternatives

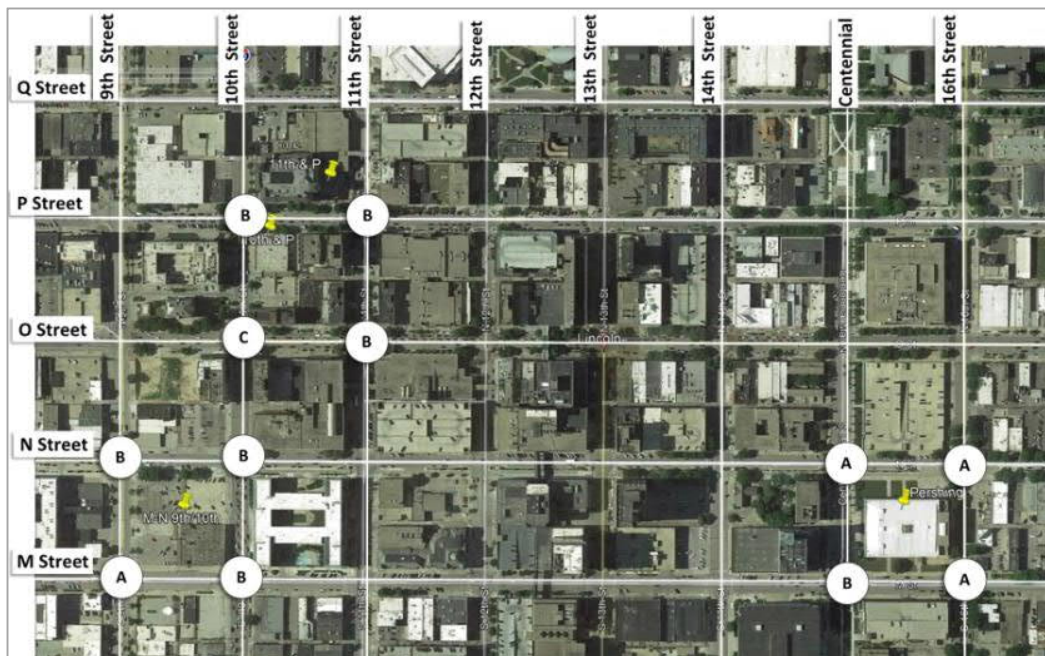
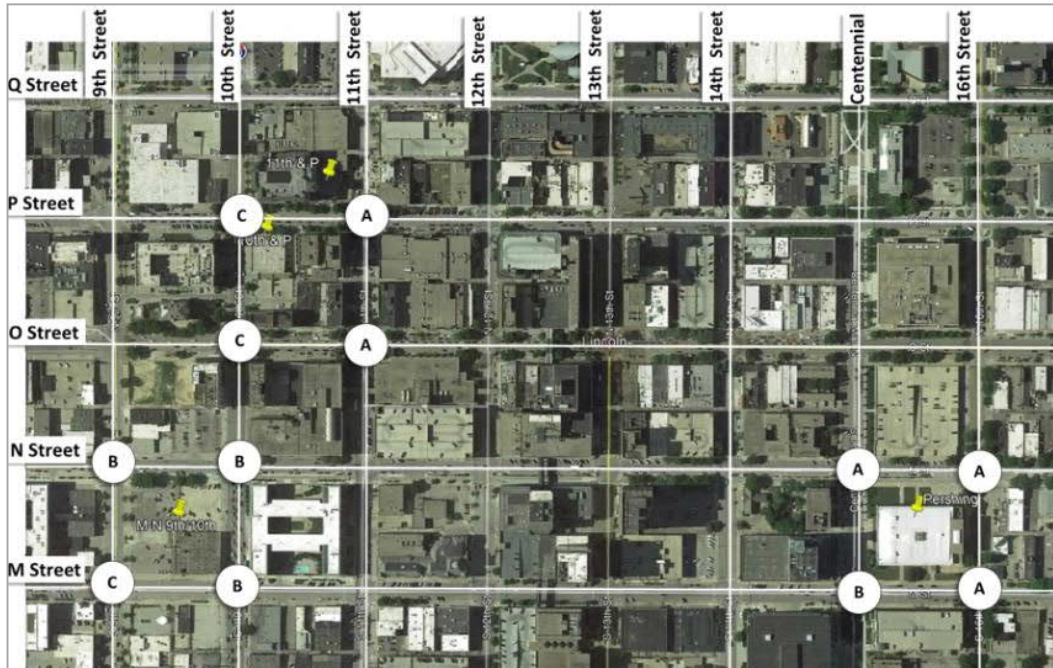


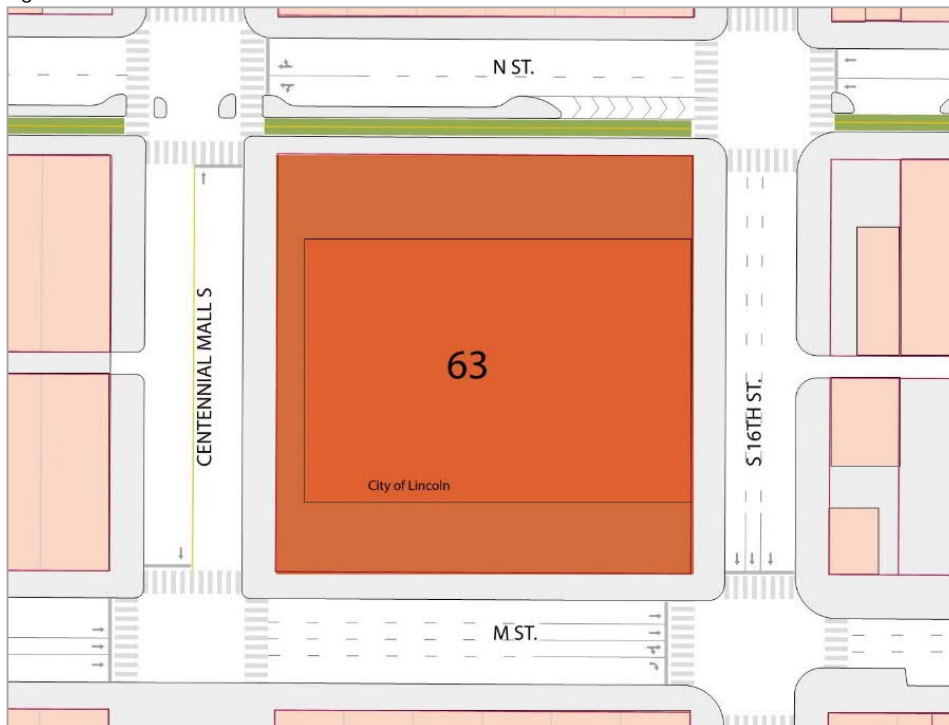
Figure 48: PM Peak Level of Service Around MTTC Site Alternatives



Block 63 – MTTC Conceptual Layouts

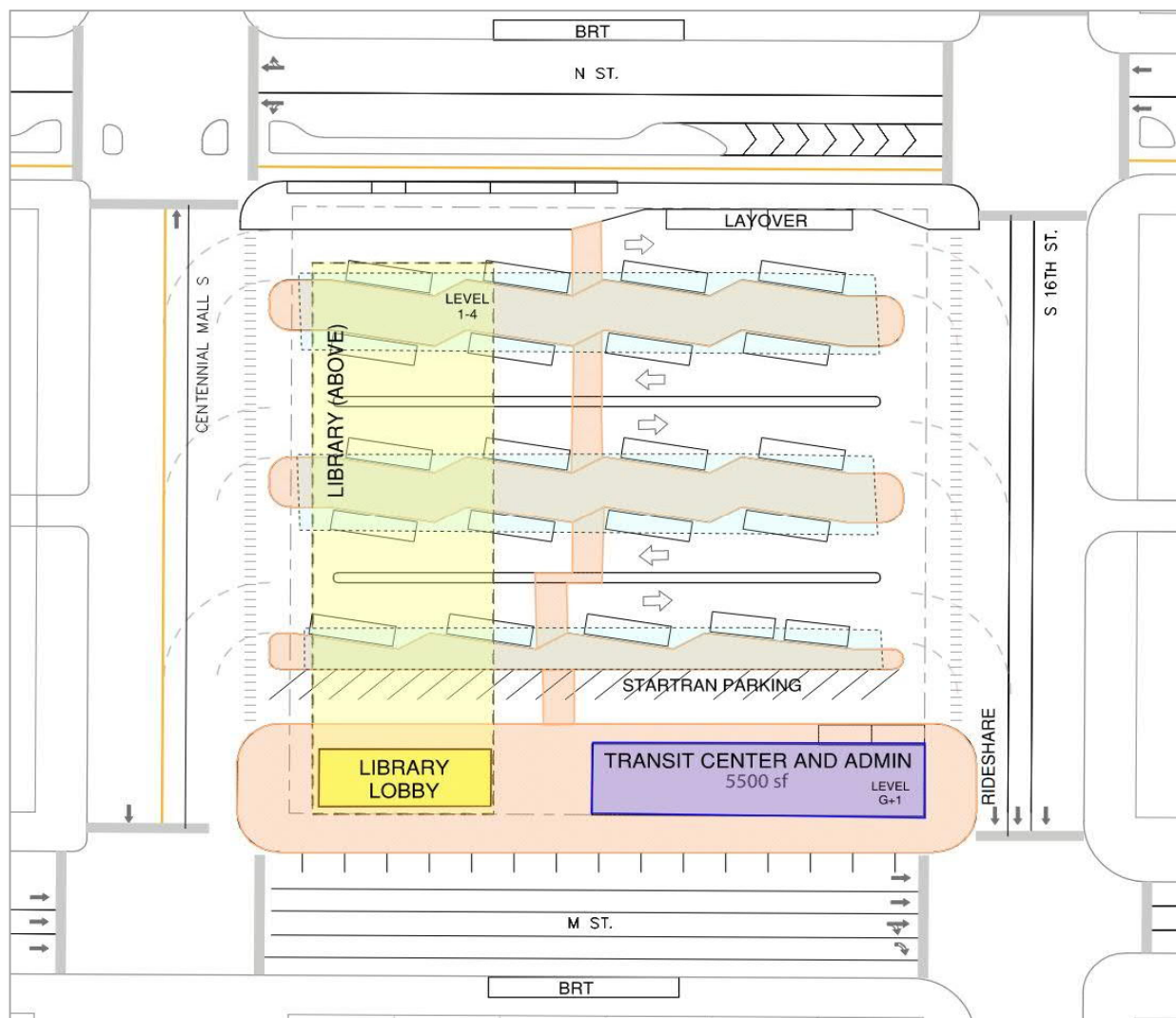
The first of the two preferred sites is known as the “Former Pershing” site and it defined as “Block 63”. This site is owned by the City of Lincoln and encompasses a full block site. Four configurations and various options were developed and reviewed with the key stakeholders in a design / planning workshop.

Figure 49: Block 63 Site



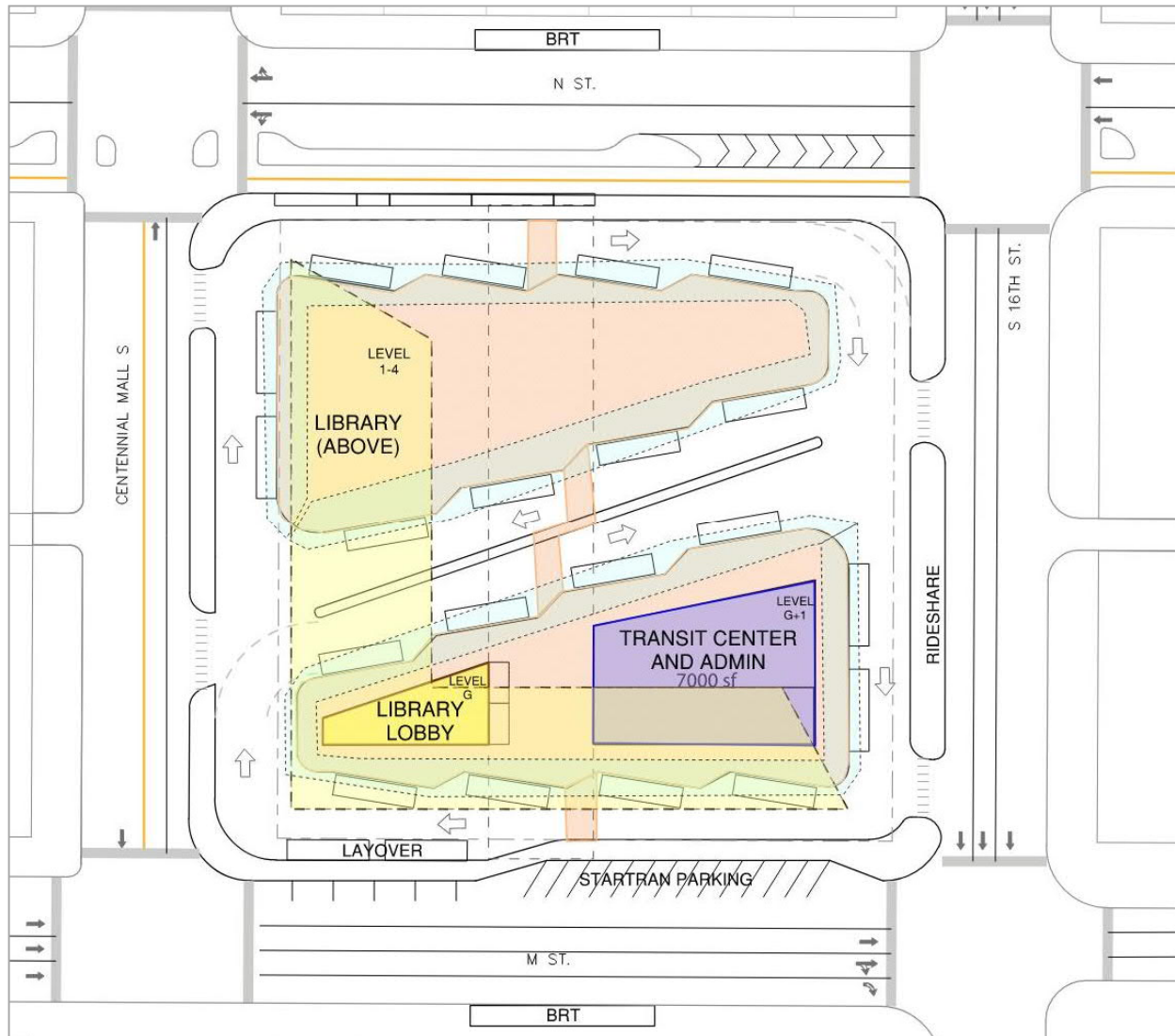
The Block 63 MTTC site scored well due to its full block size that would allow for nearly all of the transit center elements that were identified in the functional needs assessment, including significant opportunity for some form of joint use, or Transit Oriented Development. The Downtown Master Plan and other stakeholders in the past had proposed a concept for Block 63 to be a potential location for a new Downtown Library. Working from this proposal, the study team developed multiple transit center conceptual layouts to illustrate how a library, or other type of joint development could be integrated on the full Block 69 site.

Figure 50: Block 63 MTTC Layout Alternative A



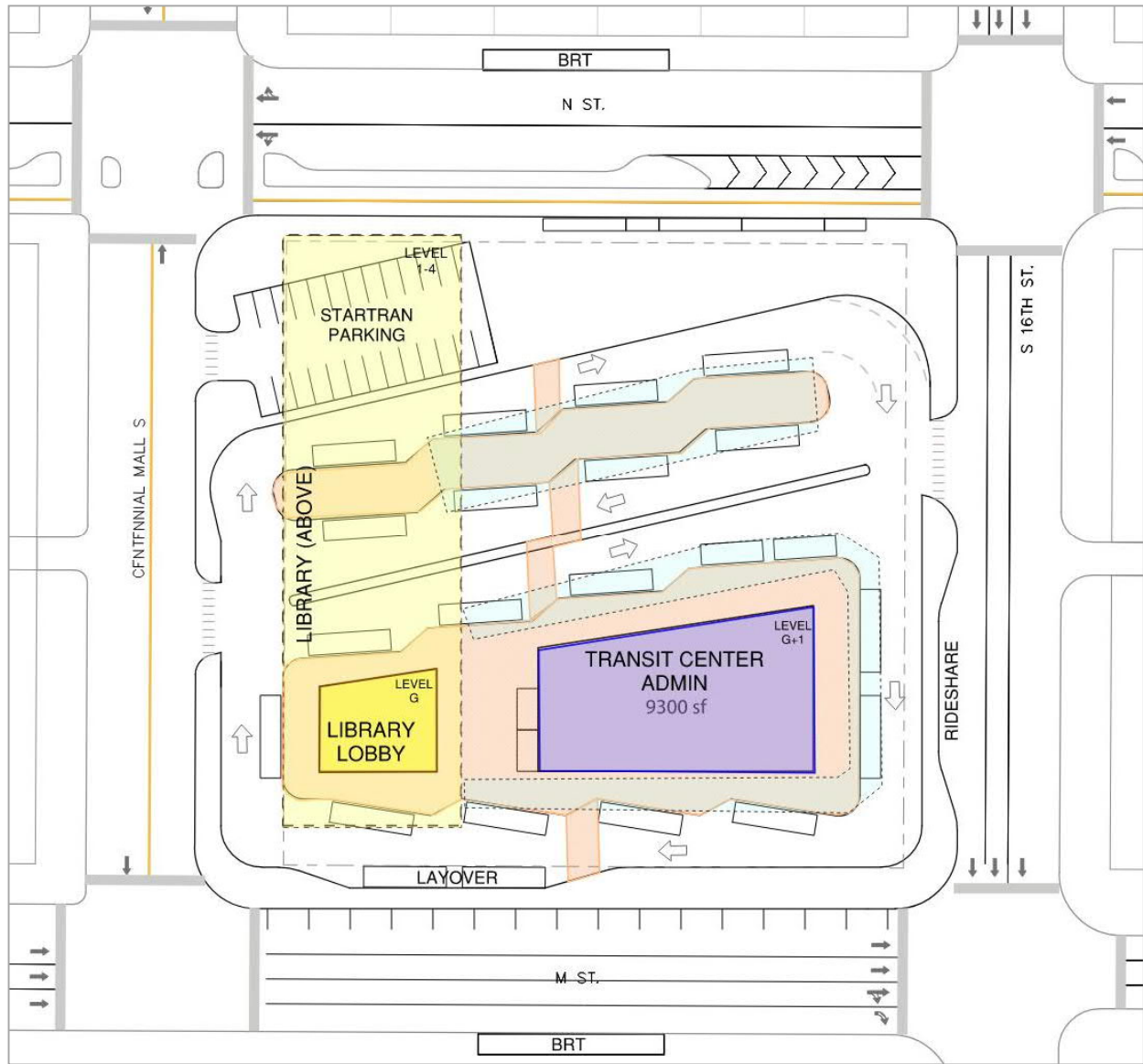
Alternative A (Figure 50) shows a concept with transit operations on the ground level with StarTran administrative functions and indoor waiting located along M Street and 16th Street. Transit vehicles would access the site from Centennial Mall and 16th Street. This configuration would have three covered boarding platform islands that could accommodate up to twenty-one buses. Future BRT stations could be constructed along M and N Street in the future if needed. A new three- to four-story library or other joint development would be constructed above the MTTC site, fronting Centennial Mall. The lobby entrance to this building would be located along M Street with stairs/escalators and elevators to access the floors above.

Figure 51: Block 63 MTTC Layout Alternative B



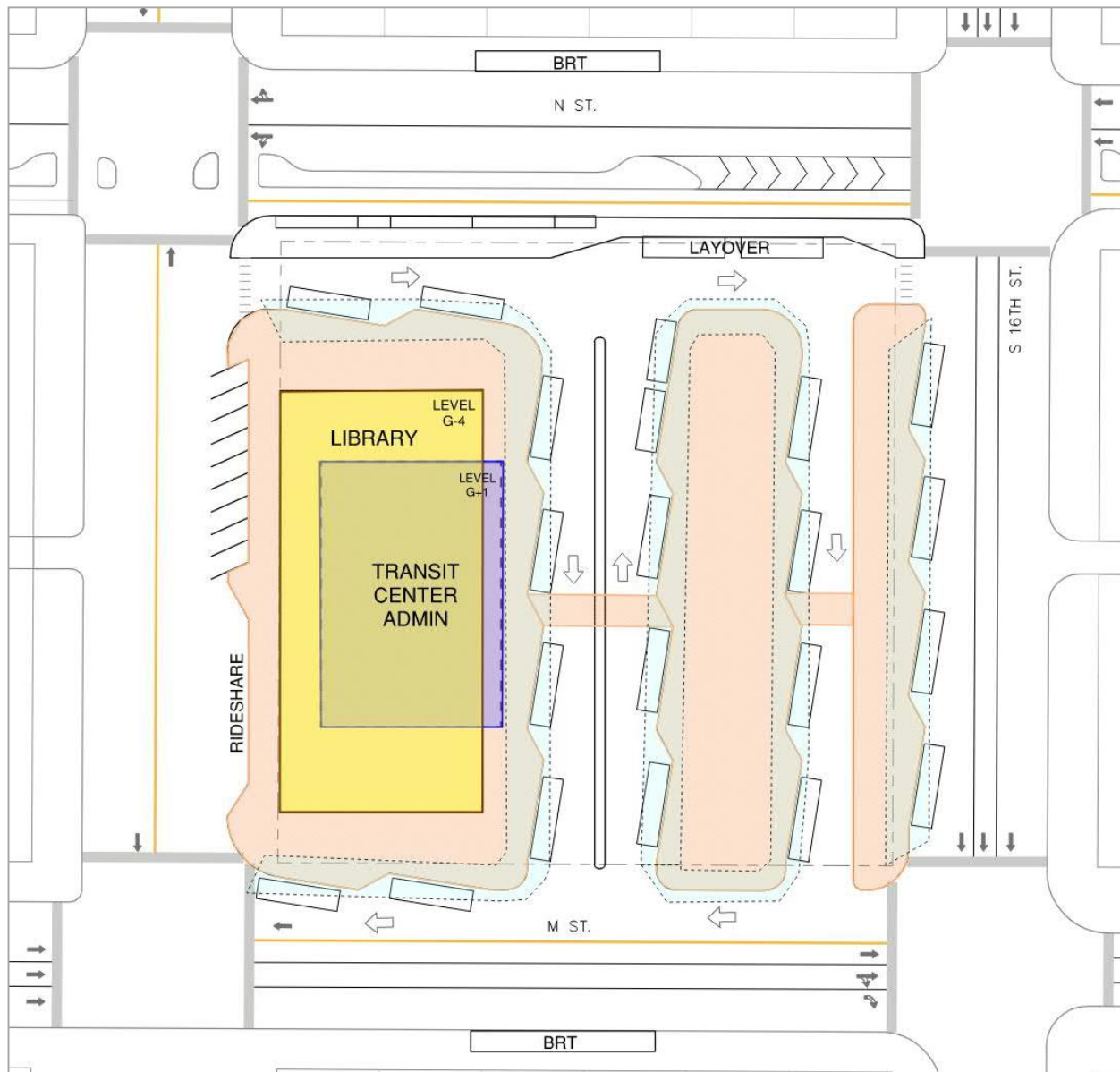
Alternative B (Figure 51) also envisioned a joint use of the Block 63 site with the Library or other use constructed above the MTTC that would front Centennial Mall and M Street with a three- to four-story structure. Transit operations, indoor waiting, and StarTran administration would all be located on the ground level. Boarding areas would be divided on to two islands that would have covered boarding platforms for up to twenty buses. Transit vehicles would access the site from either Centennial Mall or 16th Street. StarTran administrative parking would be located along M Street.

Figure 52: Block 63 MTTC Layout Alternative C



Alternative C (Figure 52) builds off the concept in Alternative B with the diagonal layout and joint development overbuild. In this alternative the joint development building would front Centennial Mall only and allow for a larger transit indoor waiting area and StarTran administrative office space. This alternative would accommodate up to twenty buses with covered boarding platforms. StarTran parking would be located on the northwest corner of the site.

Figure 53: Block 63 MTTC Layout Alternative D



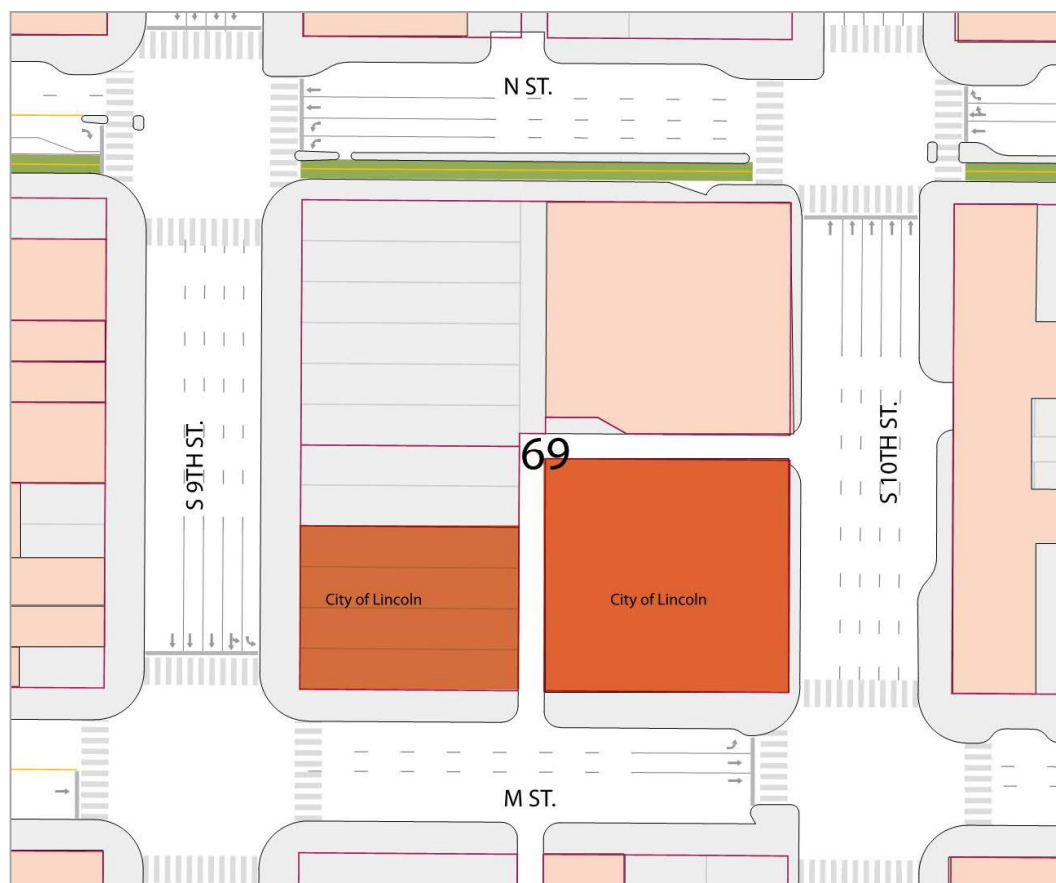
Block 63, Alternative D (Figure 53) rotates the MTTC layout to a north/south configuration with all bus access from M Street, Centennial, and 16th Streets. This concept would merge the overbuilt joint development structure on top of the transit center indoor waiting area and StarTran offices on the ground level. This four-story structure would front Centennial Mall and have transit operations facing 16th Street. The alternative would allow up to twenty-one buses but would not provide for StarTran staff parking. One block of M Street would also need to be converted to two-way traffic to allow buses to access the site.

In the design / planning workshop it was discovered that there are other uses that may be preferred for the Block 63 site and it may not be a viable candidate site to proceed. While the site has many benefits for a transit center application, it may not be the highest and best use for the block.

Block 69 – MTTC Conceptual Layouts

The next highest scoring site was Block 69 located one block southwest of the current Gold’s transfer location. Even though this is only ½ block in area, it still scored second highest overall due to its location in relation to population and employment density and limited impact on existing transit route alignments in Downtown. In addition, this is the same site used in the prior BUILD grant application, but only utilizing the southern half of Block 69, which is largely owned by the City of Lincoln.

Figure 54: Block 69 Site



Because this site is approximately one acre many of the elements noted in the functional needs assessment had to be reassessed, such as the minimum number of bus bays. The conceptual layouts that follow illustrate the impact of the smaller one-half block site size attempting to accommodate the maximum number of transit vehicles. To achieve this the site would need to expand beyond the current property boundaries into 9th, 10th and M Streets. This was not a viable solution, so the minimum bus accommodation was lowered to fourteen vehicles so the MTTC operations could fit within the property.

Also due to the constrained site size, integration of joint use or transit-oriented development were not able to be accommodated. The conceptual layouts only accommodate transit operations and passenger boarding.

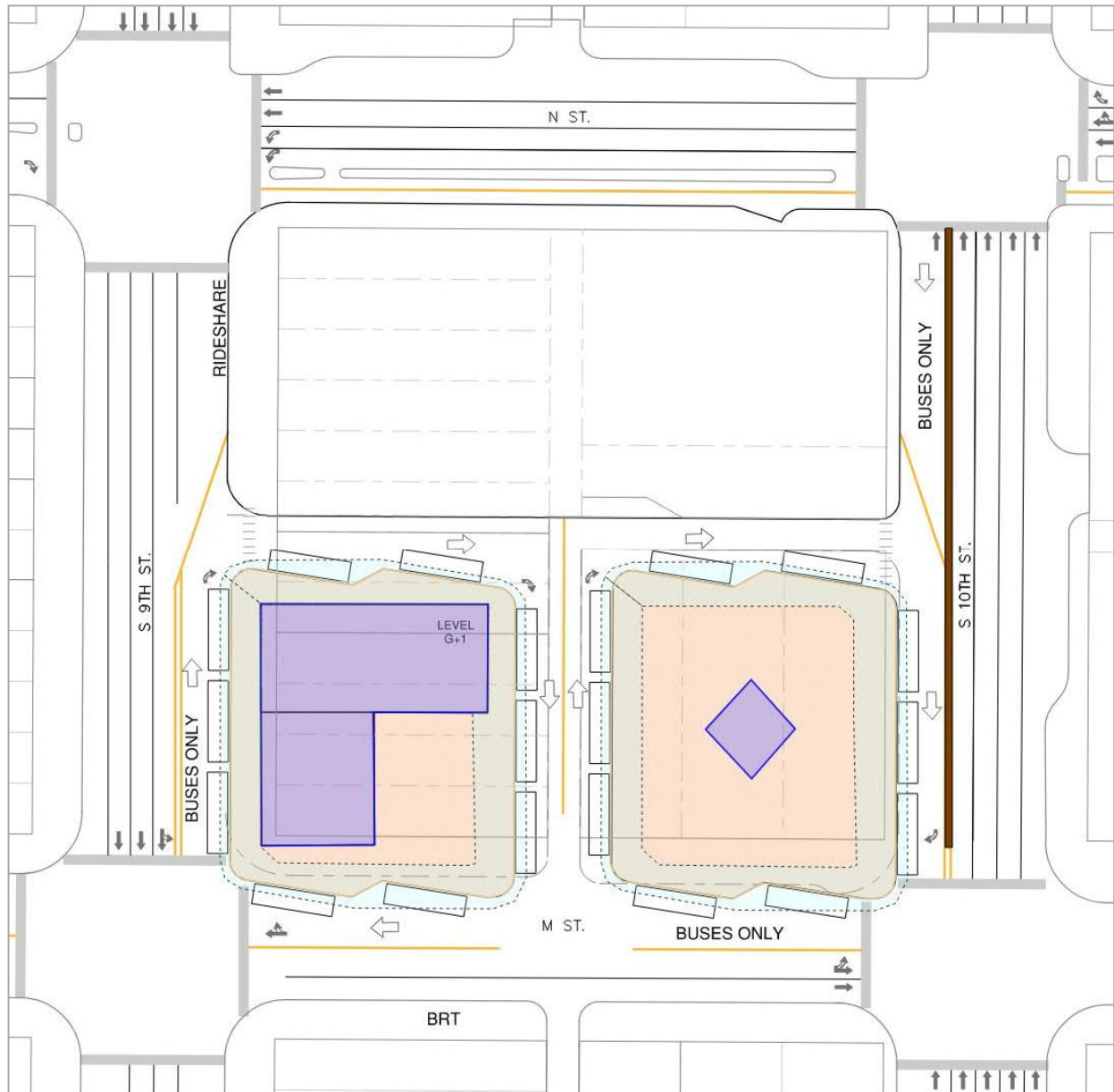
Three alternative layouts were presented to the Advisory Committee in the design workshop for Block 69 for discussion.

Figure 55: Block 69 MTTC Layout Alternative A



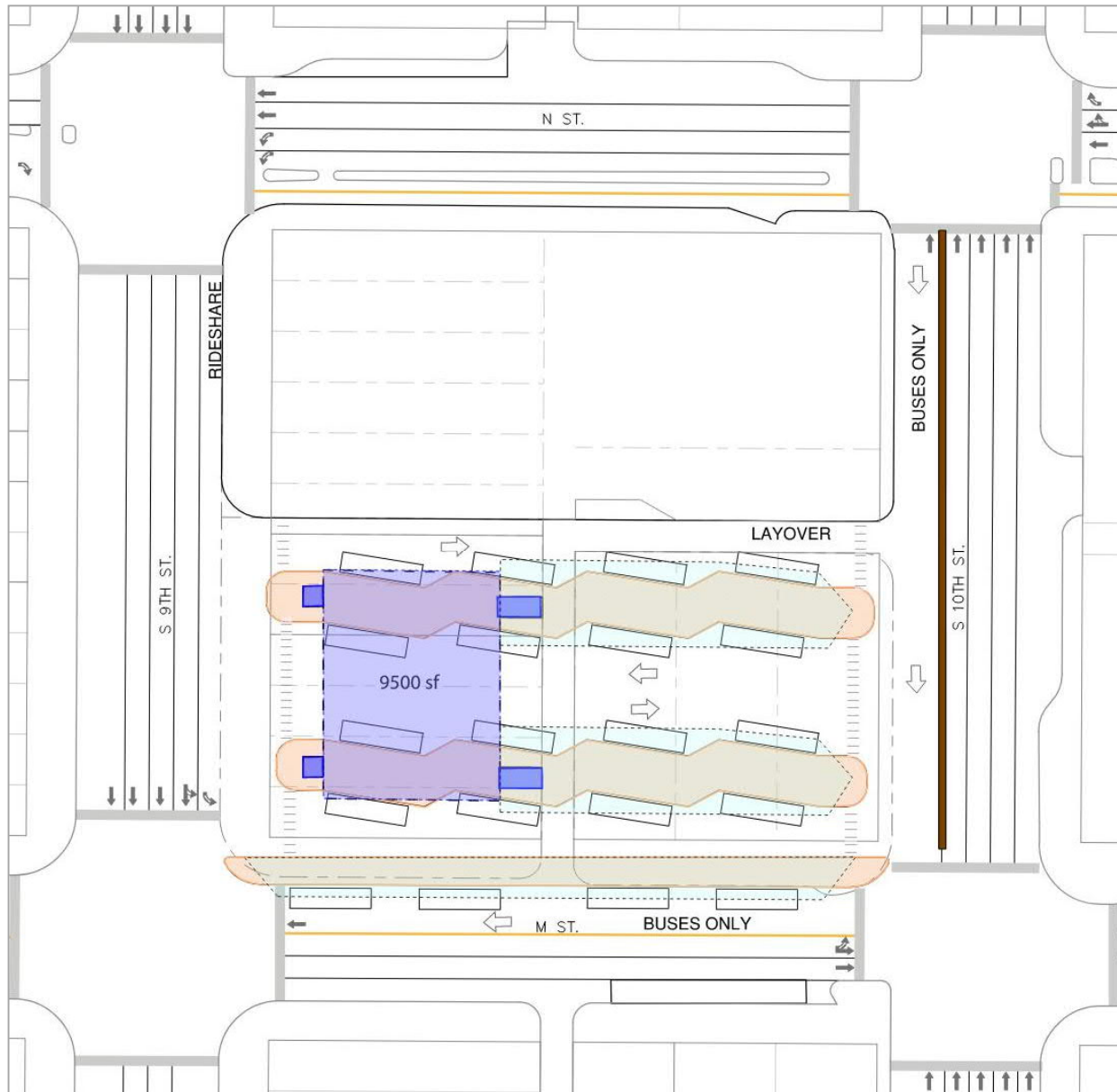
Alternative A (Figure 55) shows a double wedge configuration with an indoor waiting area on each of the islands. StarTran administrative offices or driver relief areas would be built above the waiting areas. Each of the two boarding islands would be fully covered and provide up to eighteen buses. Bus counter-flow lanes would need to be built along M, 9th and 10th Streets to allow bus operations against the existing one-way traffic.

Figure 56: Block 69 MTTC Layout Alternative B



Alternative B (Figure 56) envisioned two rectangular islands that could accommodate twenty buses. The western island would host the indoor passenger waiting area and StarTran administrative office in a two-story structure. The eastern boarding island would be covered around the perimeter with an open courtyard in the center. Bus counter-flow lanes would need to be built along M, 9th and 10th Streets to allow bus operations against the existing one-way traffic.

Figure 57: Block 69 MTTC Layout Alternative C



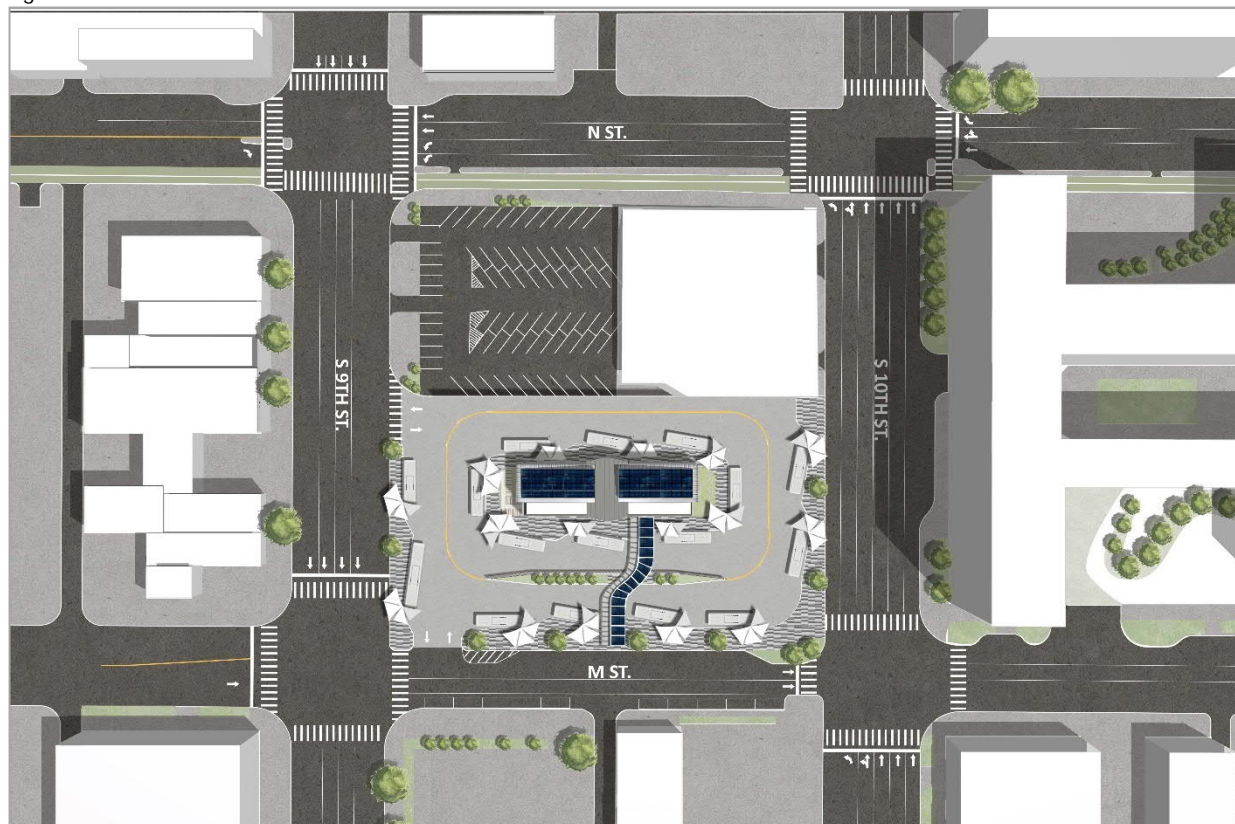
Alternative C (Figure 57) would orient the MTTC in an east/west direction with primary bus access from 9th and 10th Street. Bus counter-flow lanes would again need to be built along M, 9th and 10th Streets to allow bus operations against the existing one-way traffic. The M Street side of the site would also be used for boarding areas. Overall this alternative would accommodate twenty buses. The StarTran administrative offices would be built over the site with indoor passenger waiting area on each of the two boarding islands.

At the conclusion of the site selection process and workshops, it was a recommendation to move forward with a refined conceptual layout and design for Block 69 on the southern half of the site. The stakeholders agreed that this site offers the best opportunity for growth, service, and operations now and into the future.

4.8 MTTC Preferred Concept

The preferred MTTC site and layout concept was refined based on consultation with key stakeholders from the City of Lincoln staff including the Planning and Urban Development Department, Lincoln Transportation and Utilities (LTU) Department and others. The final MTTC preferred conceptual design was also refined based on comments received through public feedback gathered through the second MetroQuest survey. The MTTC conceptual site plan is displayed in Figure 58.

Figure 58: Preferred MTTC Site Plan



The MTTC preferred conceptual layout is designed to meet the goals defined at the outset of the MTTC Planning and Feasibility study. It will provide a centralized, off-street facility for all StarTran routes to meet and transfer passengers more efficiently. This preferred MTTC concept will construct a two-story building located on a central boarding island near the middle of the site. The ground floor of this structure will provide a climate-controlled passenger waiting area with restrooms, free public Wi-Fi, as well as a customer service area that would be staffed by StarTran to provide information and sell bus passes. The second story of this main structure would relocate StarTran's administrative offices from their current home located at 710 J Street.

In total the MTTC will provide sixteen bus bays and corresponding boarding locations. Each boarding location will provide an awning or other form of shelter from the elements as well as lighting for early morning and evening operations to improve visibility and safety. Real-time next bus arrival information will also be provided. This number of bus bays will accommodate all of StarTran's routes currently in operation and allow for modest route expansion in the future. The MTTC will operate with two general

boarding areas; one around a central island and the other around three sides of the site's perimeter. Access to and from the main center platforms from the perimeter would occur on a north/south-oriented, raised and covered pedestrian walkway. This covered walkway would also provide a protected median refuge island. The raised walkway would require buses to operate at very slow speeds within the MTTC drive areas to make this bus / pedestrian interface area safer.

The primary boarding island would host eight bus bays. These bus bays and boarding locations will be assigned to the most frequently arriving and departing bus routes. Buses accessing the center island bus bays would move through the driveways in a clockwise direction and enter and/or exit the MTTC from driveways on 9th Street or M Street depending on each route's specific alignment.

Routes with lower frequency that arrive and depart the new MTTC hourly, or less frequently would be assigned to one of the exterior boarding areas around the perimeter of the transit center along 9th Street, M Street, or 10th Street. The bus bay and loading platform located along 9th Street, closest to M Street will be reserved for an anticipated intercity commuter bus that will operate between Lincoln and Omaha.

Conceptual visualizations of the MTTC have been developed to help envision what the new facility could potentially look like and assist in describing the preferred concept. These conceptual visualizations are presented in the following figures.

Figure 59: MTTC Concept - View 1 (Looking from M Street and 10th Street to the Northwest)



Environmental sustainability was an important goal and consideration for the MTTC project. Figure 59 depicts the MTTC with solar panels on the roof of the main transit center and administration building as well as the covered walkway connecting the center boarding island to M Street. The project will also examine other sustainability features in the next level of detailed planning and engineering design such as the incorporation of native landscaping that requires little irrigation, collection or slowing of rainwater runoff, and incorporation of energy efficient LED lighting throughout the interior and exterior of the MTTC facility.

Figure 60: MTTC Concept - View 2 (Looking from M Street and 9th Street to the Northeast)



Figure 61: MTTC Concept - View 3 (Looking East from 9th Street)



Connections from transit to other modes of transportation was a central goal of the MTTC project. As envisioned in Figure 61, the MTTC will incorporate a bicycle-share station as well as designate parking spaces for electric scooters. The MTTC will provide good connectivity to the N Street Cycle Track that is located one half block to the north of the new transit center. Pedestrian crosswalks both inside the MTTC

area and at the intersections of M Street and 9th and 10th will be enhanced to assist with the safe crossing of pedestrians coming to and from the MTTC.

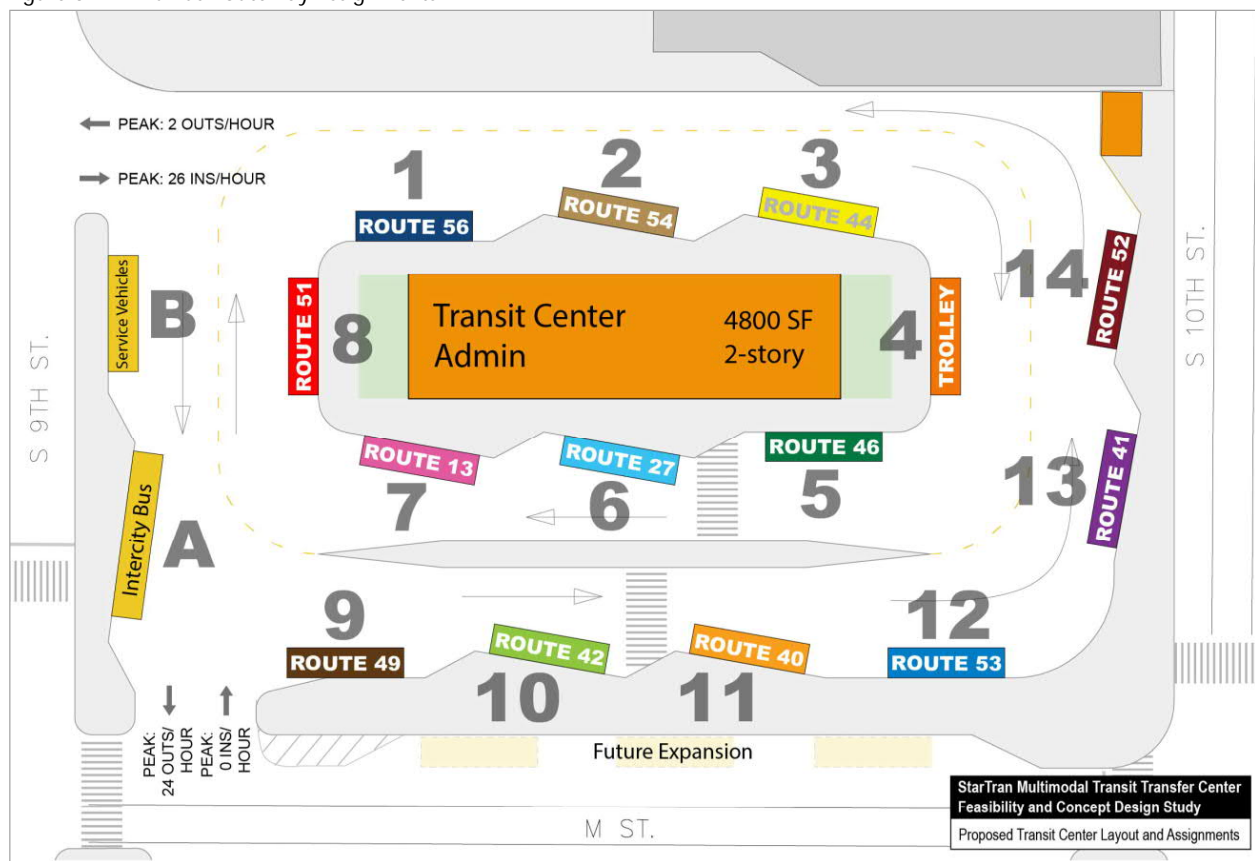
The Downtown Master Plan included catalyst projects to develop more green space in the downtown area. One of these catalytic projects was the creation of a Greenway along the M Street Corridor. Coordination and inclusion of the M Street Greenway plans and recommendations should be incorporated into the MTTC final plans and designs that will be developed in future project phases.

Figure 62 below illustrates the conceptual assignment of bus routes to bus bays and loading platforms at the future MTTC. Bus bays are arranged using a 'saw tooth' design that allows buses to safely and easily pull into and out of the bays without the need to back up. Bays around the center island are numbered one through eight. These routes currently have thirty minute or better schedule frequencies. Bays around the perimeter are numbered nine through fourteen along with an A and B location.

Currently the Nebraska Department of Transportation is developing plans for a new intercity commuter bus route that would connect Omaha and Lincoln, known as the 'Eastbound Express'. The MTTC will reserve the A boarding area of the exterior bus bays and loading platform to host this service and provide intercity transportation connectivity. The B location would be used for StarTran service or security vehicle parking but could be transitioned into an active boarding location for another transit route.

The MTTC will look for curbside space along 9th Street, 10th Street, or M Street to sign for a space for pick up / drop off for taxis, Uber, Lyft or other on-demand transportation services.

Figure 62: MTTC Bus Route Bay Assignments



M Street is planned to be converted from a one-way street to a two-way street in the coming years. When this occurs the M Street curbside area would initially be used for on-street parking. If the MTTC reached bus route capacity, this on-street space along M Street could be converted to additional boarding areas for up to three more routes.

Conceptual route adjustment for StarTran's current routes that will serve the MTTC were designed to understand how buses arrive at the transit center, enter, move through, and exit the MTTC. In the preferred site plan the majority of buses would enter from 9th Street traveling southbound and exit on to M Street traveling eastbound.

Proposed routing for all routes serving the MTTC are presented in the following figures.

Figure 63: Bay 1 - Route 56 Alignment

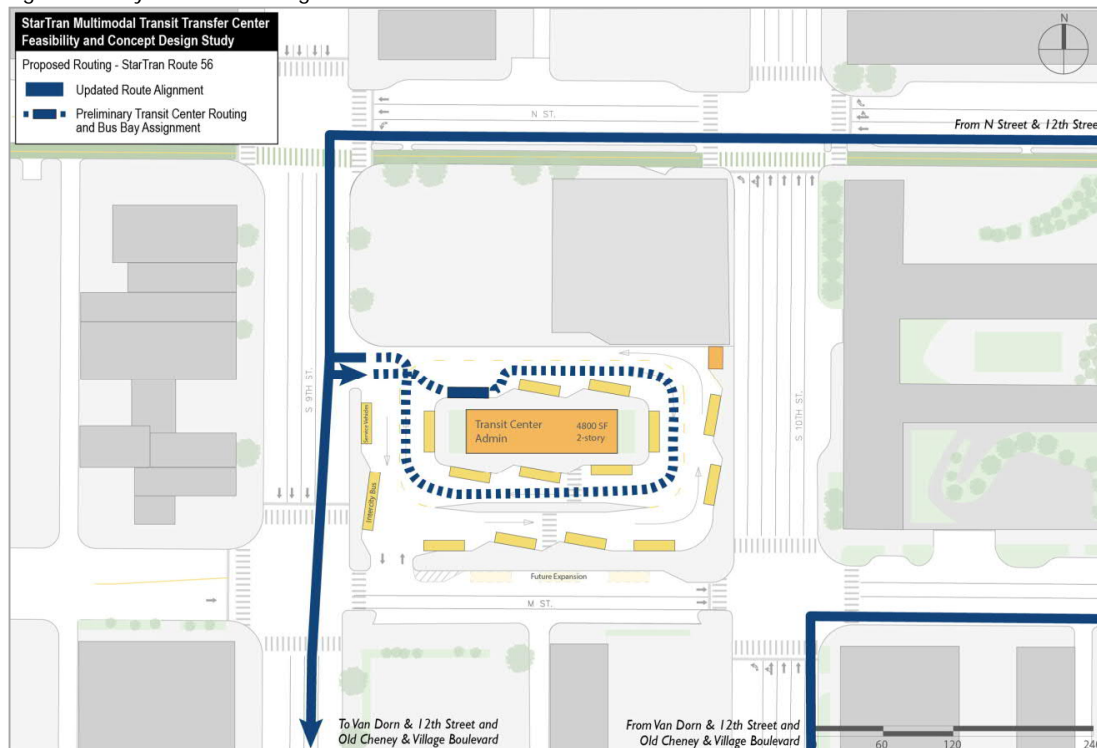


Figure 64: Bay 2 - Route 54 Alignment

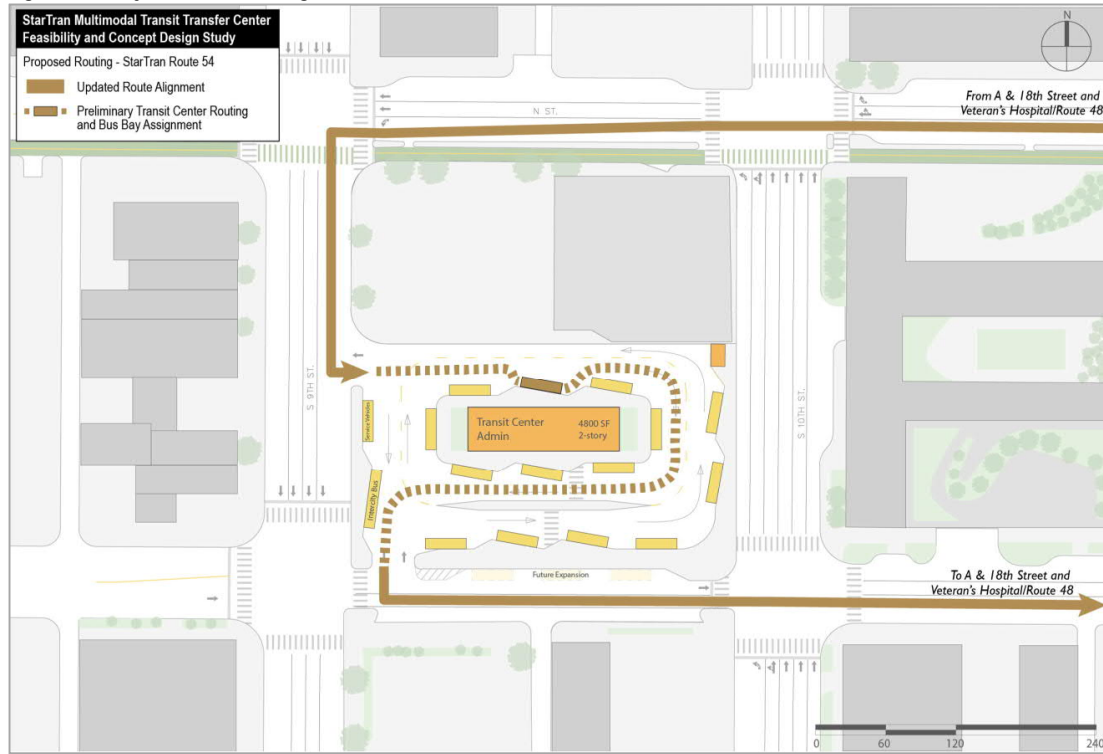


Figure 65: Bay 3 - Route 44 Alignment

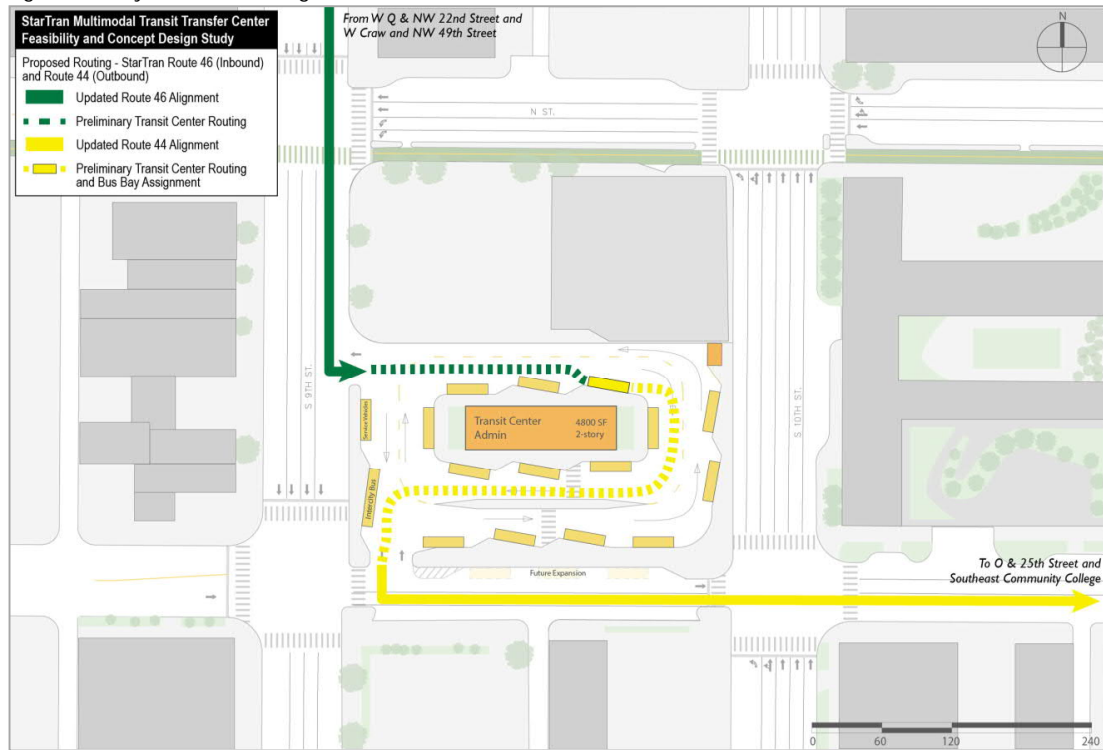


Figure 66: Bay 4 - Downtown Trolley Alignment

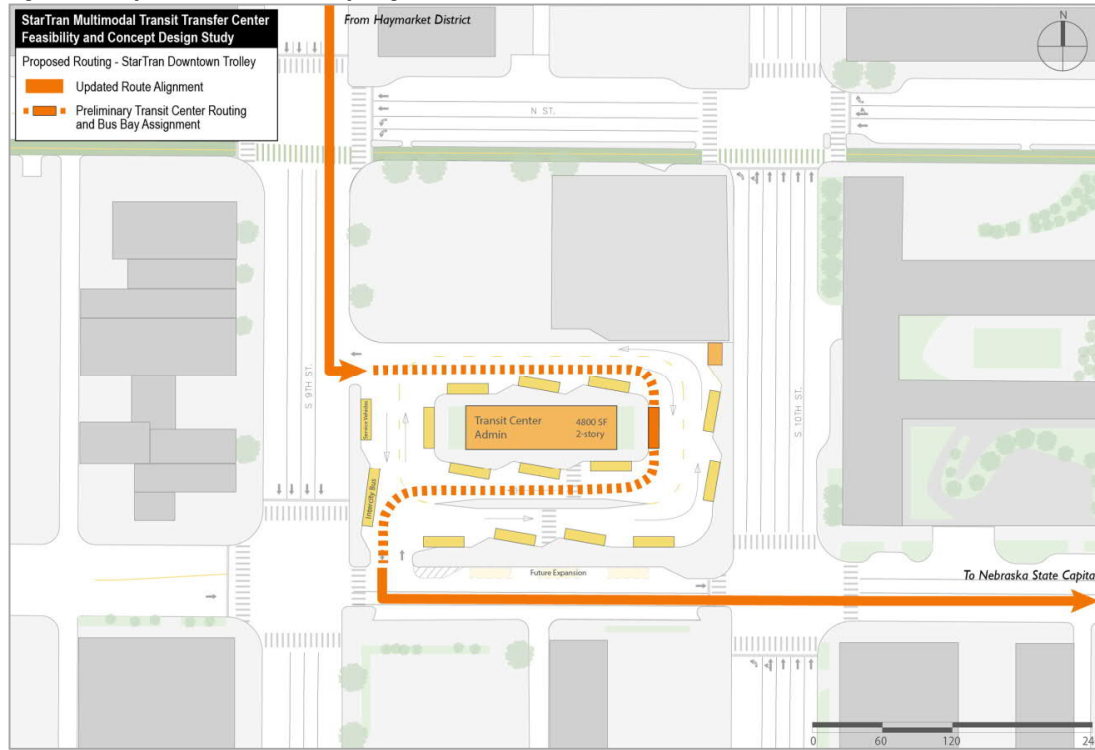


Figure 67: Bay 5 - Route 44 Alignment

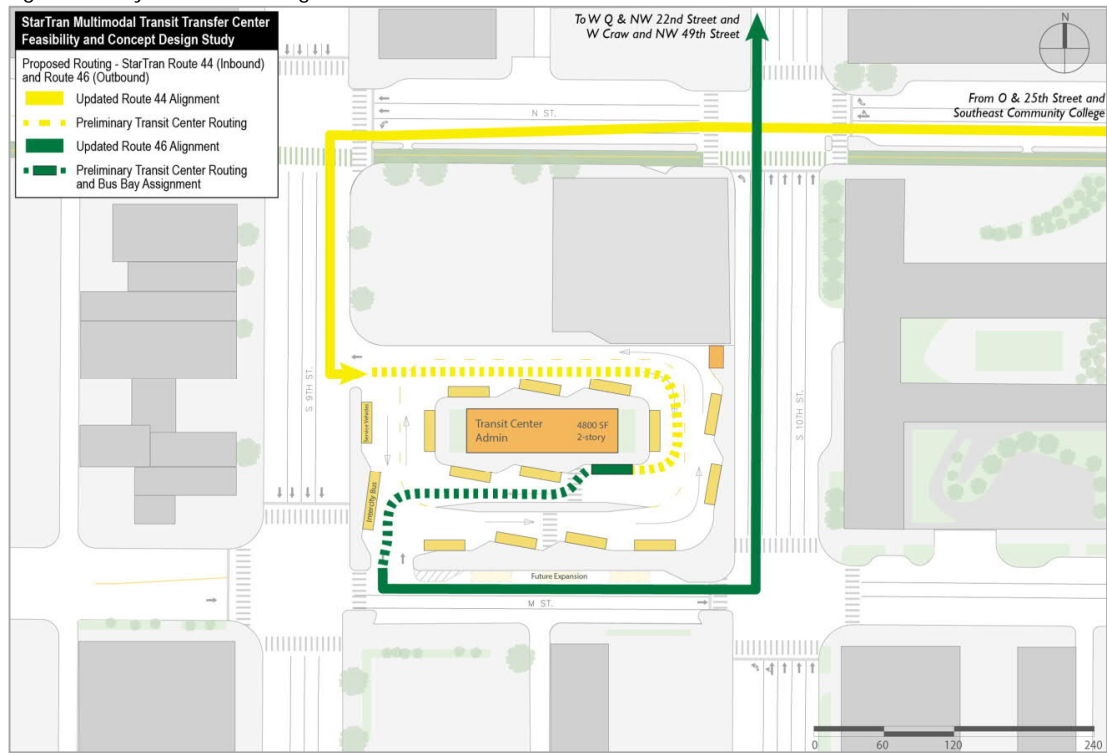


Figure 68: Bay 6 - Route 27 Alignment

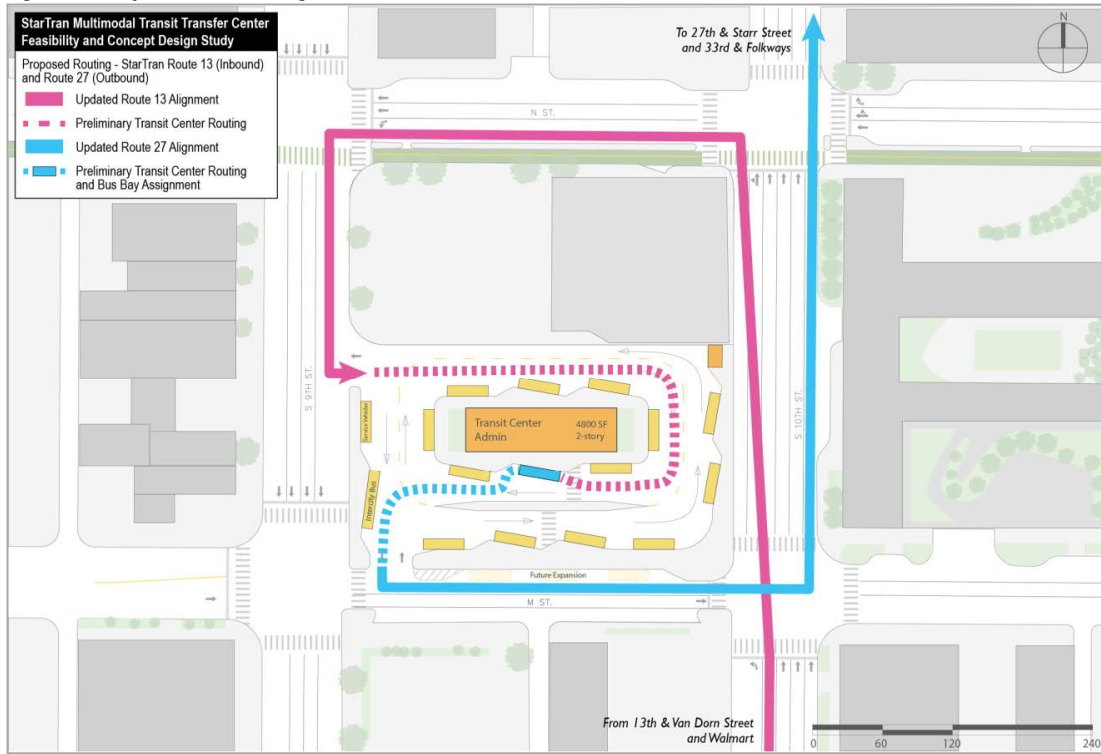


Figure 69: Bay 7 - Route 13 Alignment

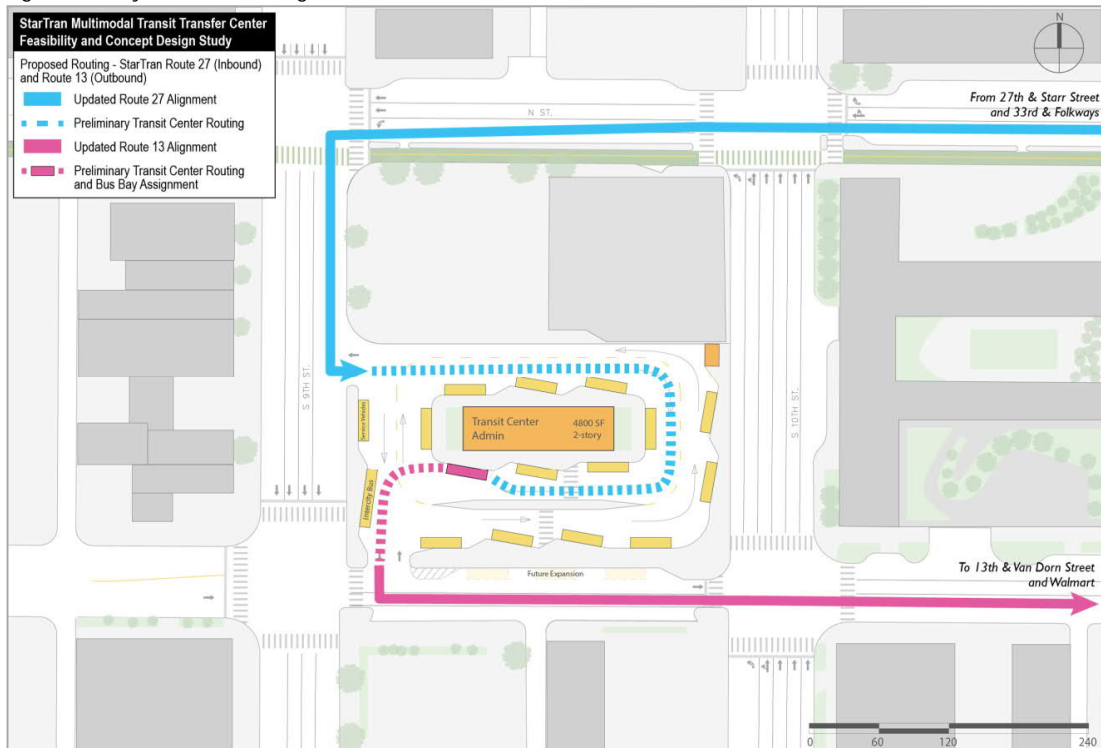


Figure 70: Bay 8 - Route 51 Alignment

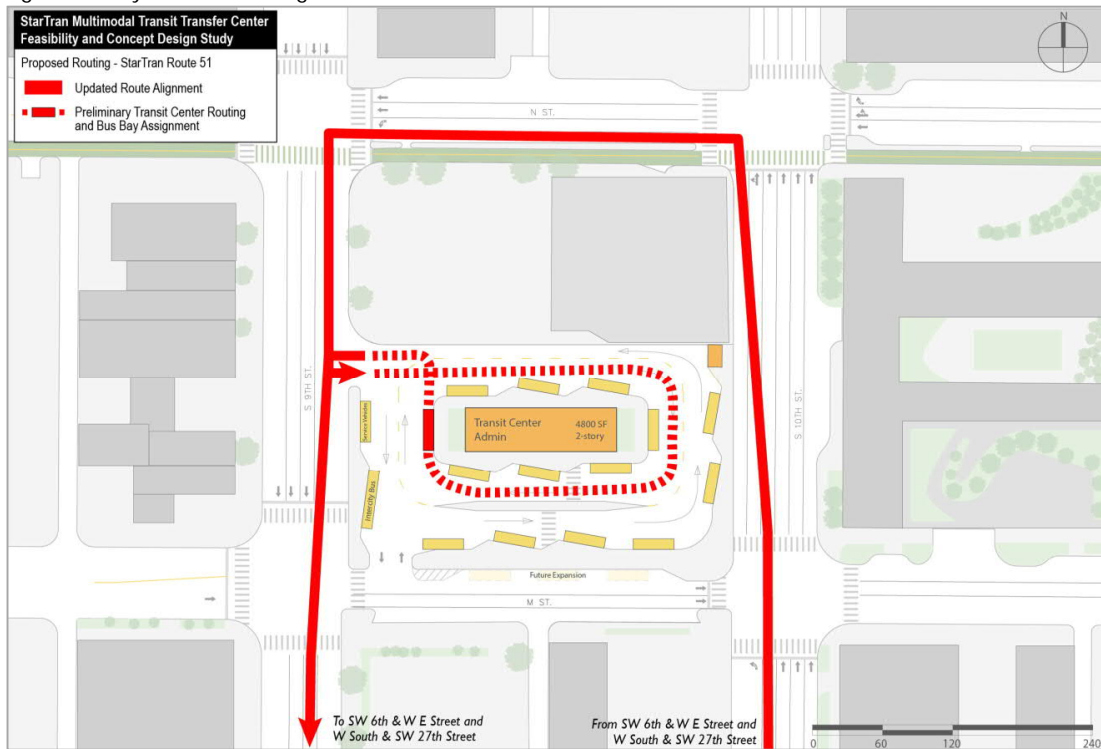


Figure 71: Bay 9 - Route 49 Alignment

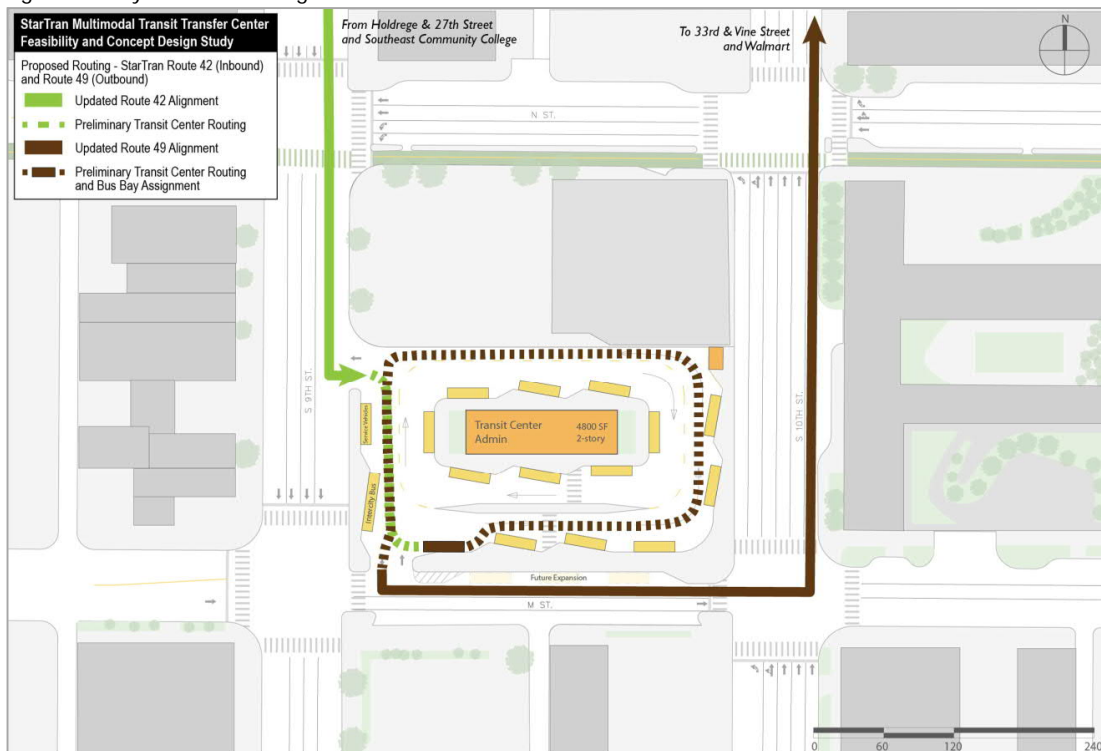


Figure 72: Bay 10 - Route 42 Alignment

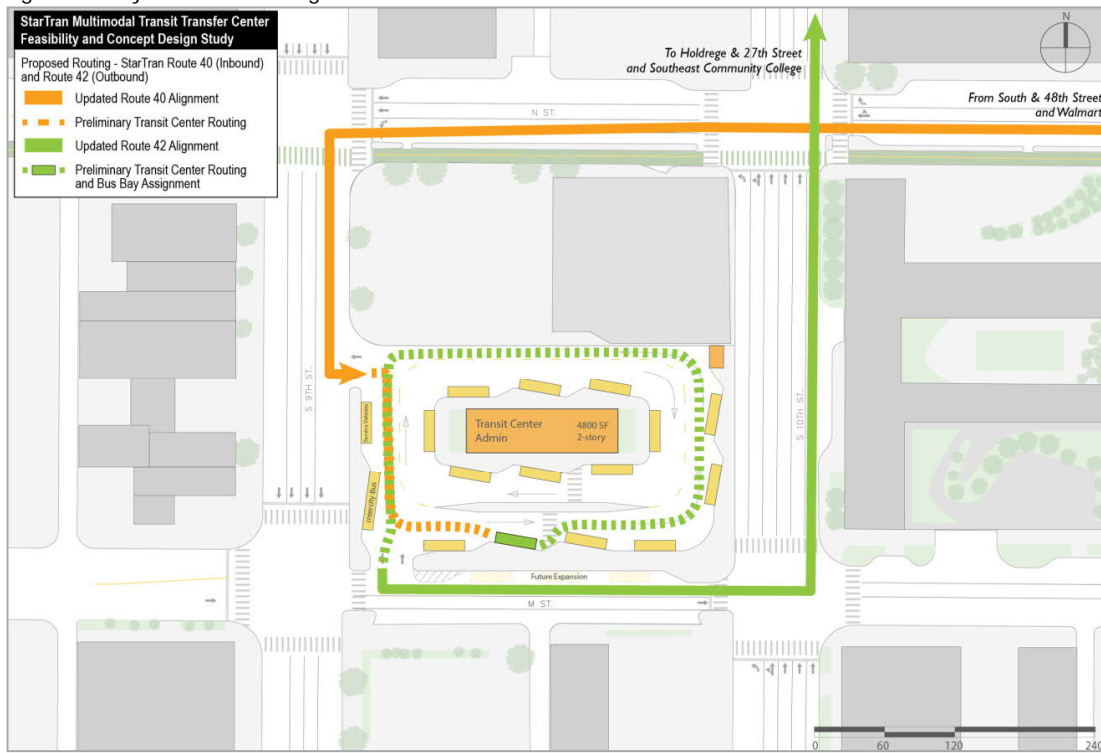


Figure 73: Bay 11 - Route 40 Alignment

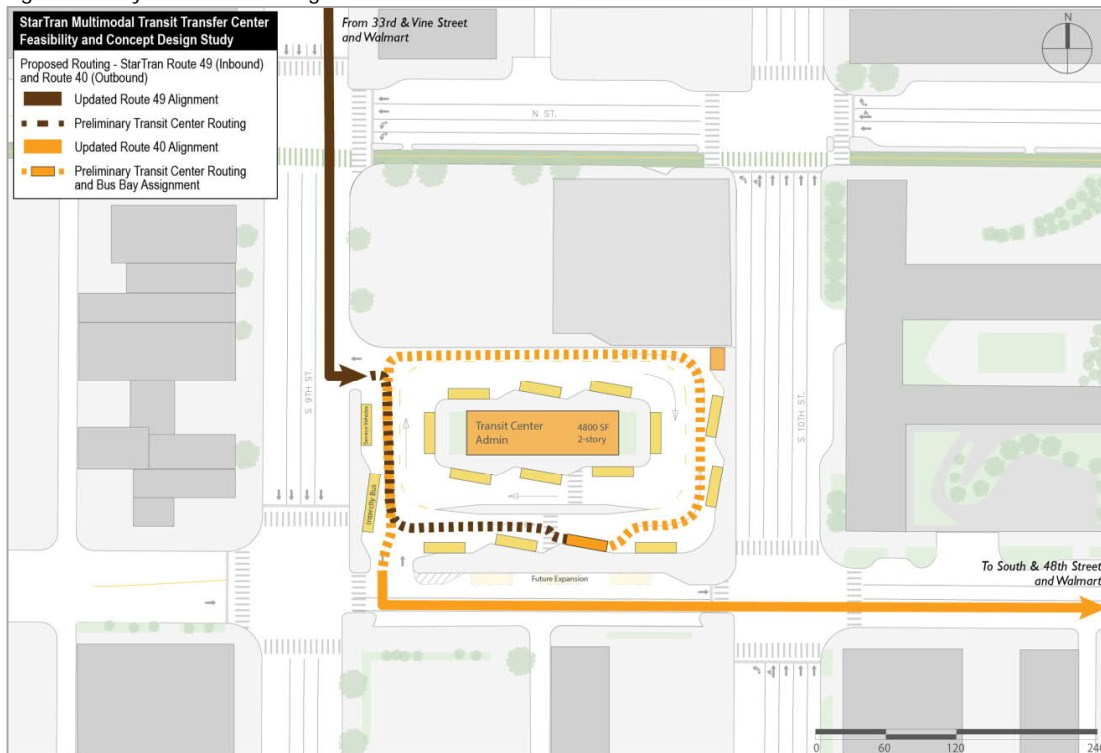


Figure 74: Bay 12 - Route 53 Alignment

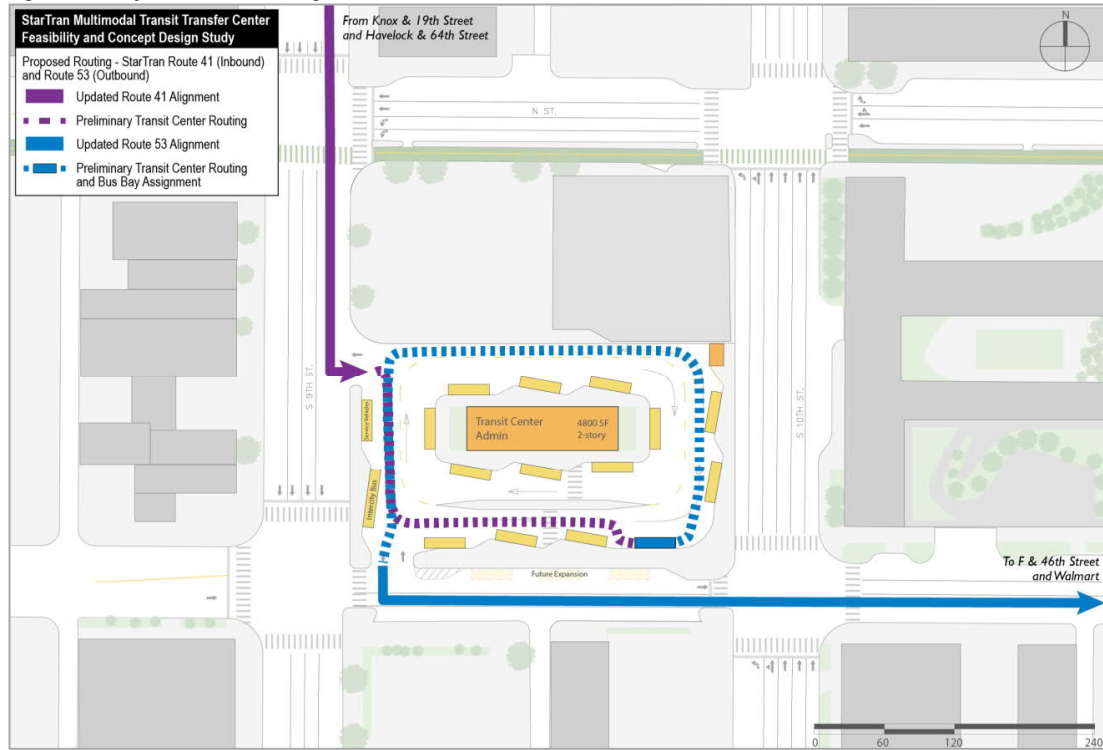


Figure 75: Bay 13 - Route 41 Alignment

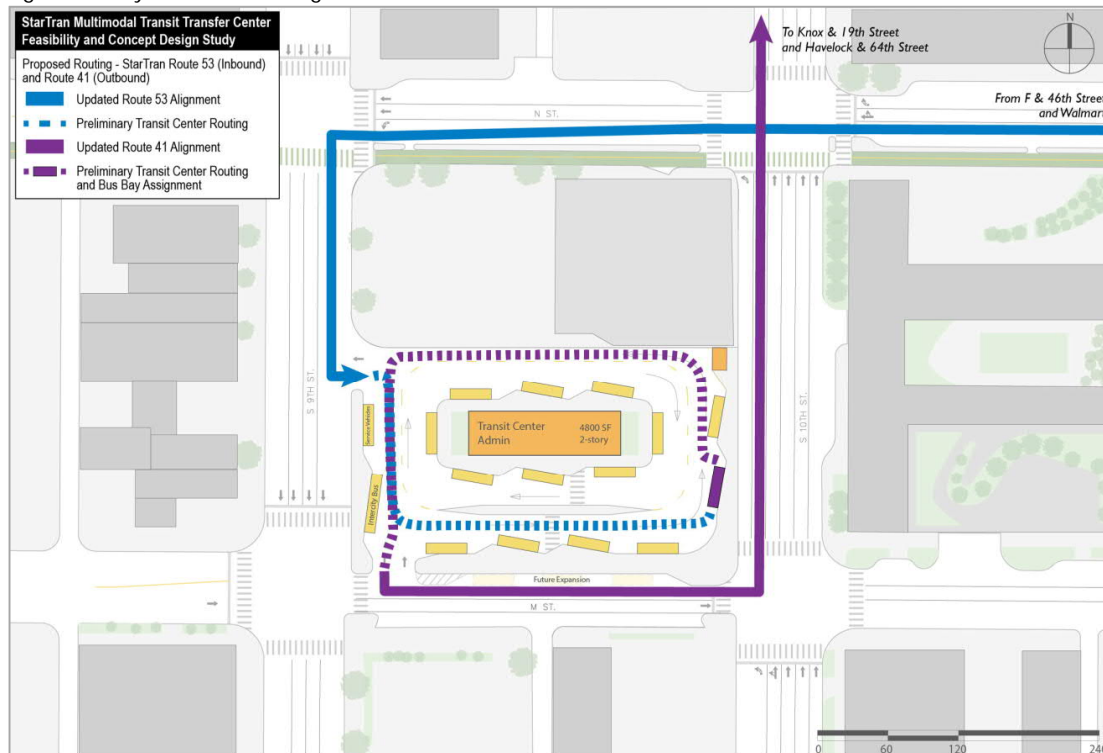
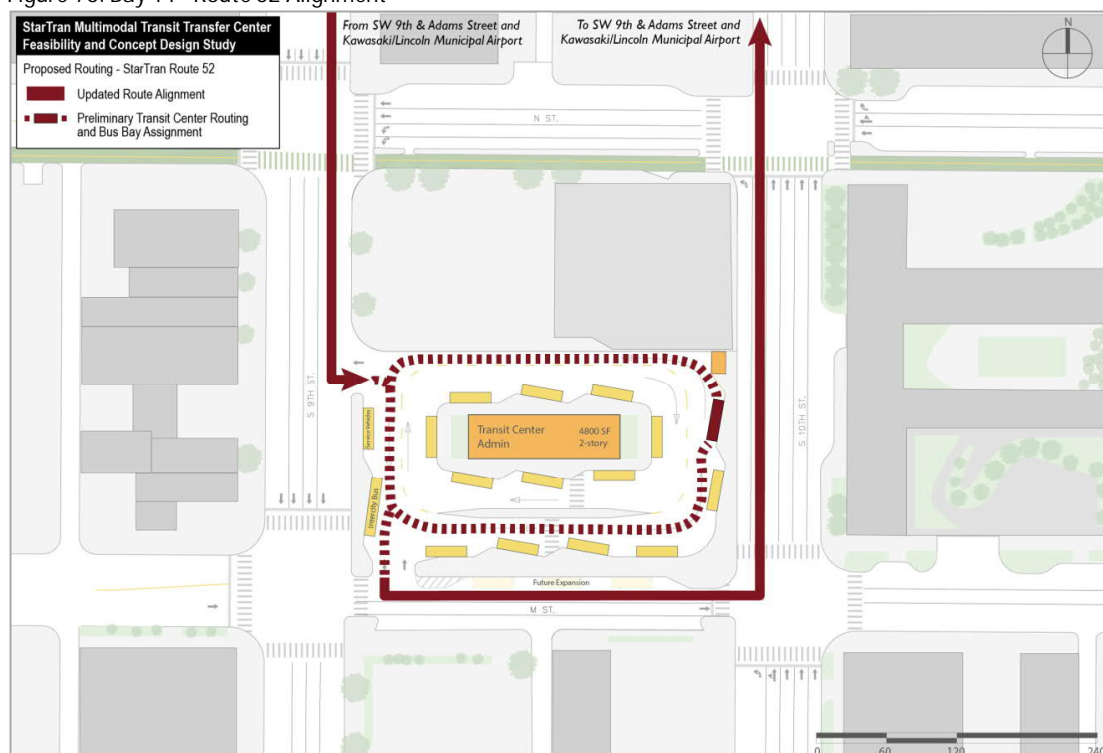


Figure 76: Bay 14 - Route 52 Alignment



This configuration and alignment plan would bring a total of twenty-six buses to the MTTC each hour throughout much of the day. Current traffic volumes were collected and assessed at the intersections surrounding the MTTC's location. All intersections were found to have excess vehicle capacity during both the AM and PM peak traffic periods, meaning that the addition of twenty-six additional vehicles per hour would not inhibit bus operations and bus operations would not cause additional traffic congestion in and around the intersections on 9th Street / M Street and 10th Street / M Street.

4.8.1 Preferred Concept Public Engagement

To collect input from StarTran riders, downtown stakeholders, and residents from across the City of Lincoln a public open house had initially been planned. Due to social distancing precautions from the COVID-19 pandemic, hosting an in-person public meeting at the time of this phase of the MTTC project was infeasible. In order to gather valuable feedback from the community a digital and online engagement method was used to communicate the preferred MTTC concept and other important preliminary findings of the study with the public. This was accomplished in two parts; first a prerecorded summary presentation of the MTTC preferred concept and supporting information was made available on the StarTran MTTC project webpage to provide a high-level overview of the project and preliminary conclusions that would help to inform transit riders and others wishing to provide feedback. Next the study team created a second MetroQuest survey, similar to what had been utilized to collect public input in an earlier phase of the project.

Second MetroQuest Survey Results

As described earlier, MetroQuest is an online survey tool that uses imagery and various respondent activities to collect public feedback. This MetroQuest Survey was accessible to the public through the project's webpage as well as through StarTran's social media platforms. The survey was open for three

weeks. Overall there were 181 MetroQuest surveys completed. The survey was available in English, Spanish and Vietnamese. Five screens were used to inform site visitors about the MTTC Study and to solicit input around preferences for the new facility. The five screens were: Welcome, Image Rating, Top Preference, Tradeoffs and Wrap-Up. The MetroQuest Survey was also adapted into a Survey Monkey format to better accommodate respondents with visual impairments which is described later. The following includes key takeaways from the input received.

Overview: Who Participated in the MetroQuest Survey?

Total participants: 181 (No Spanish surveys included in total). Participation spikes (more than 30) occurred on:

- May 4, 2020 (67 participants)
- May 6, 2020 (35 participants)
- May 7, 2020 (32 participants)

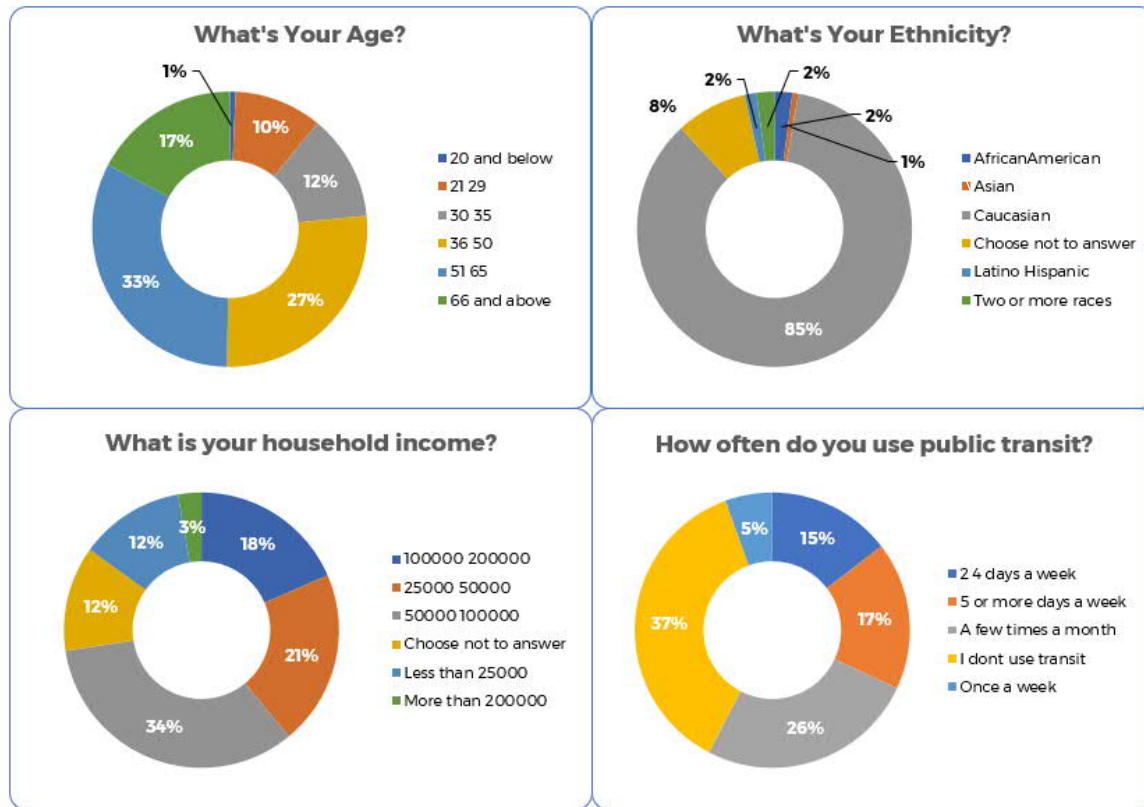
Participants indicated 19 various zip codes; the following were the highest concentration areas:

- 68502 (18% of zip codes entered)
- 68506 (13% of zip codes entered)
- 68508 (13% of zip codes entered)
- 68516 (12% of zip codes entered)

Figure 77: MTTC 2nd MetroQuest Survey Demographic Questions Screen

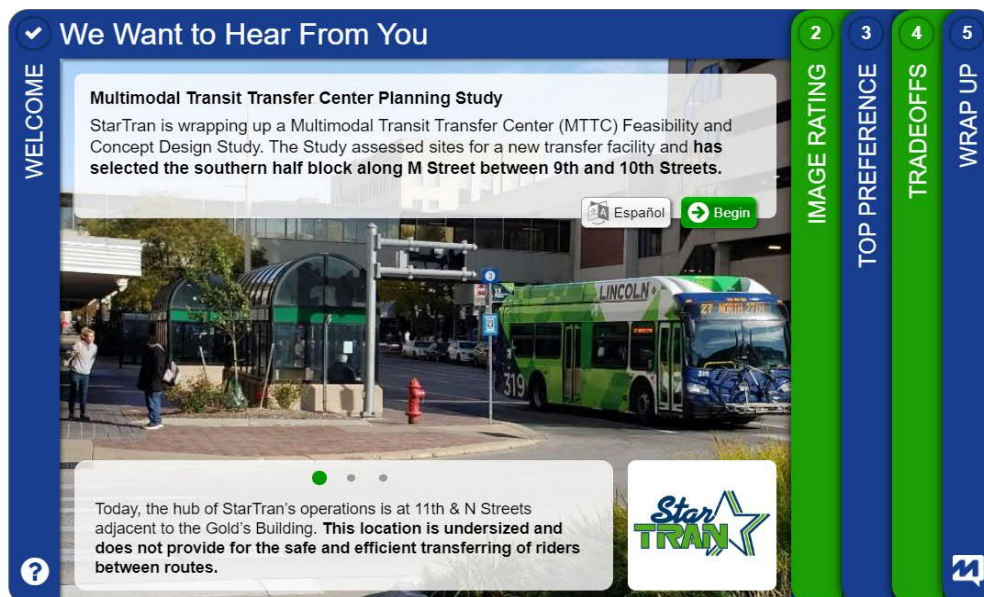
Demographics: The demographic details of the MetroQuest survey participants are displayed in the figure above. Sixty percent of respondents were between the ages of 36 and 65 years of age. Most (63 percent) survey participants ride transit in Lincoln at least a few times a month if not more frequently. Over fifty percent of survey participants reported annual household income at or above \$100,000. Eighty percent of survey respondents identified as being Caucasian.

Figure 78: MTTC 2nd MetroQuest Survey Demographics



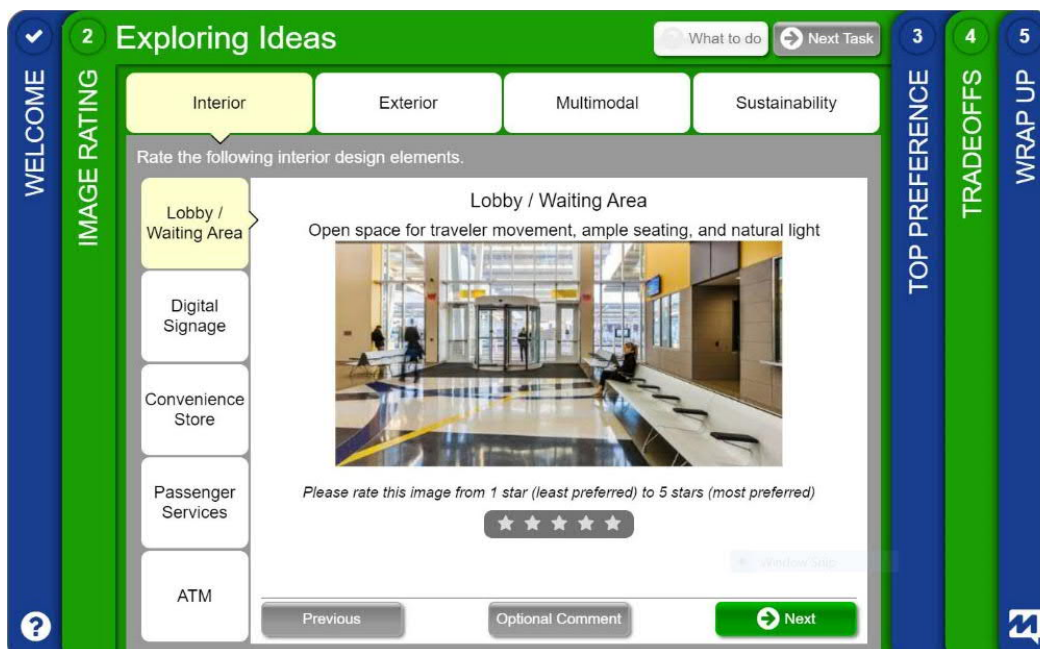
Welcome: The first survey screen provided information about the MTTC Study, the study's goals, and shared how input would be used to help guide the selection of a new transit center site as well as passenger amenities. There were 313 visits to the English version of the MTTC MetroQuest survey site. Visitors are those who may read information but do not provide input (participants).

Figure 79: MTTC 2nd MetroQuest Welcome Screen



Top Ranked Image Rating: The first interactive survey activity through MetroQuest was the ranking of design elements. Participants were asked to consider five design elements for the following areas: Interior, Exterior, Multimodal and Sustainability. They were then asked to rate each element on a scale of one (least preferred) to five (most preferred).

Figure 80: MTTC 2nd MetroQuest Survey Image Rating Screen



The highest ratings for Exterior Design Elements were:

- Covered Platforms
- Radiant Heaters, and
- Digital Displays

The highest ratings for Interior Design Elements were:

- Lobby/Waiting Area
- Digital Signage, and
- Passenger Services

The highest rated Multimodal options included:

- Bike racks
- City bike share, and
- Uber access

All Sustainability options ranked high with Solar being top ranked, followed by LED lighting.

The results of the Image Rating activity are displayed in Figures 81 through 84 below. The rating scale is one star being the lowest and five stars the highest rated for each item.

Figure 81: MTTC 2nd MetroQuest Survey Exterior Ranking (1-5 Stars)

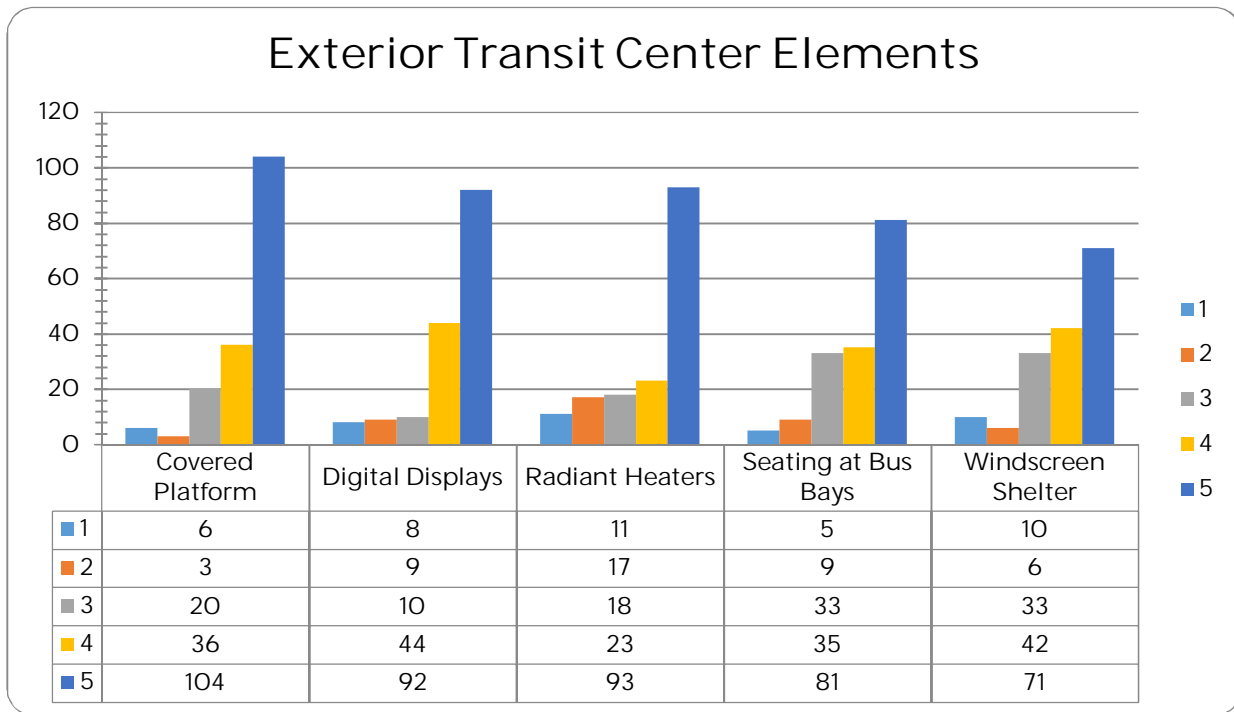


Figure 82: MTTC 2nd MetroQuest Survey Interior Elements Raking (1-5 Stars)

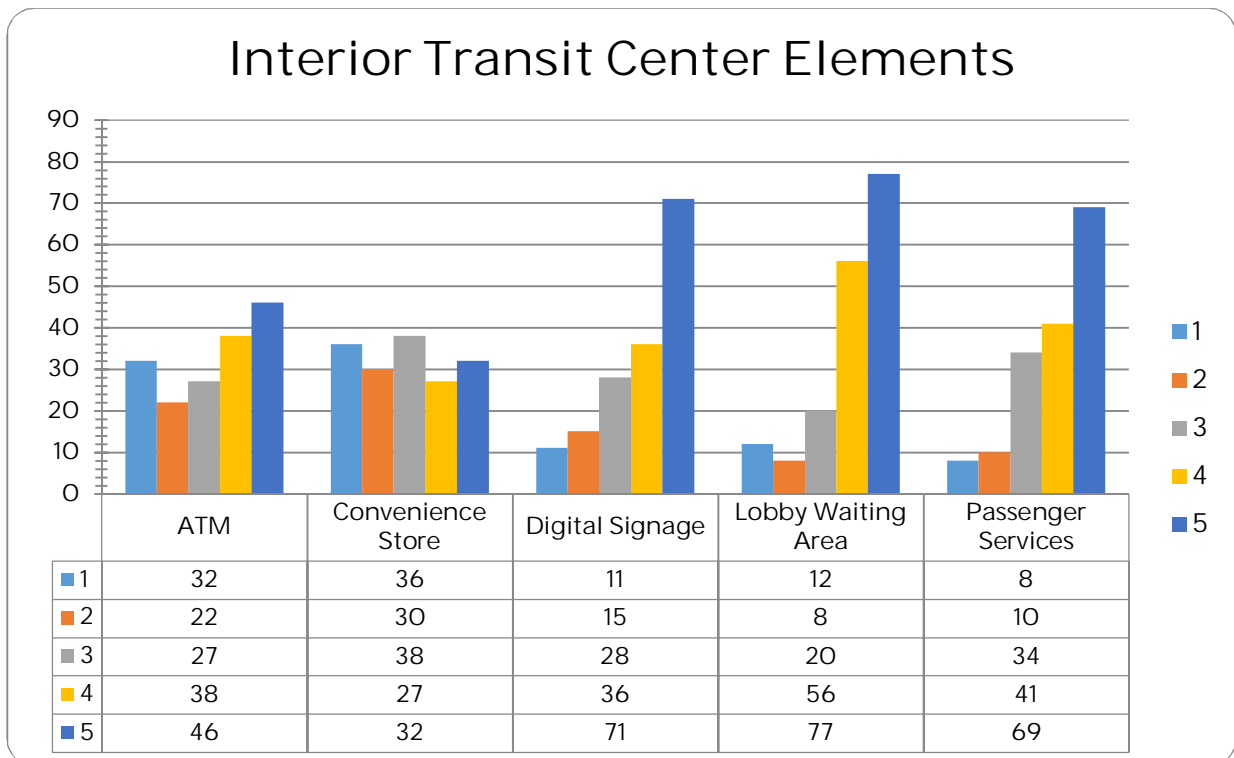


Figure 83: MTTC 2nd MetroQuest Survey Multimodal Elements Ranking (1-5 Stars)

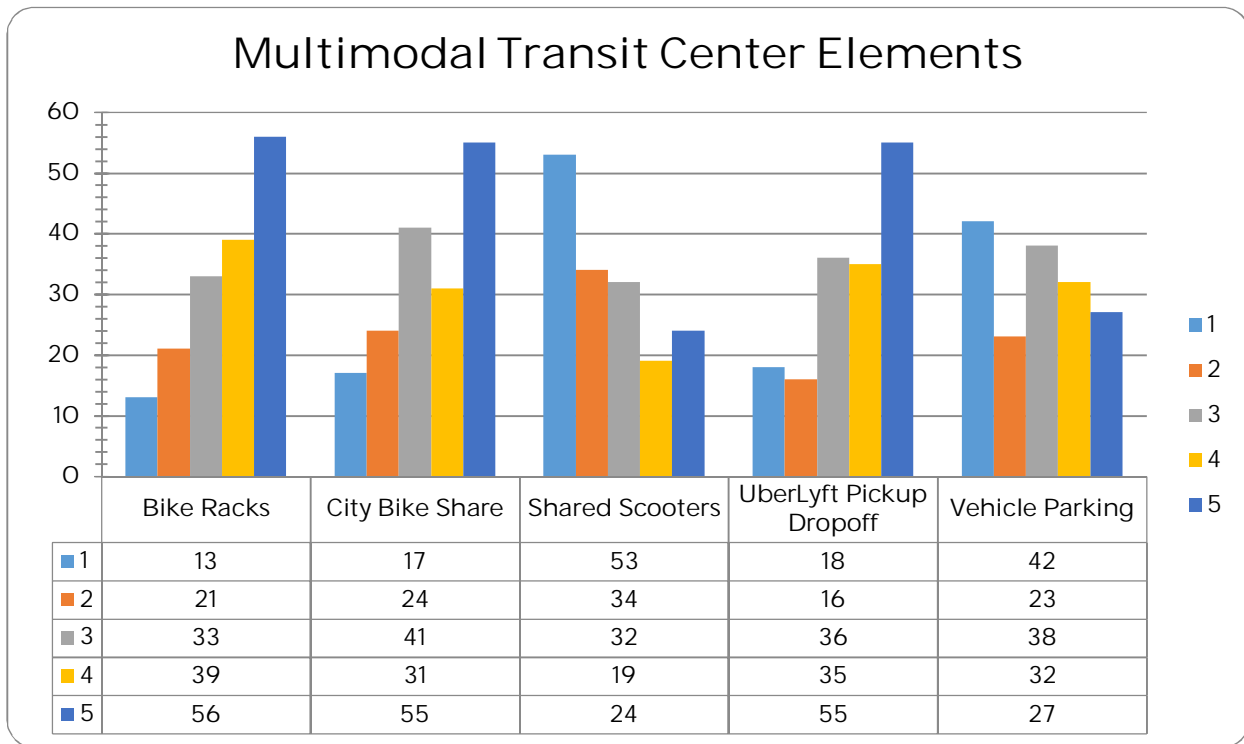
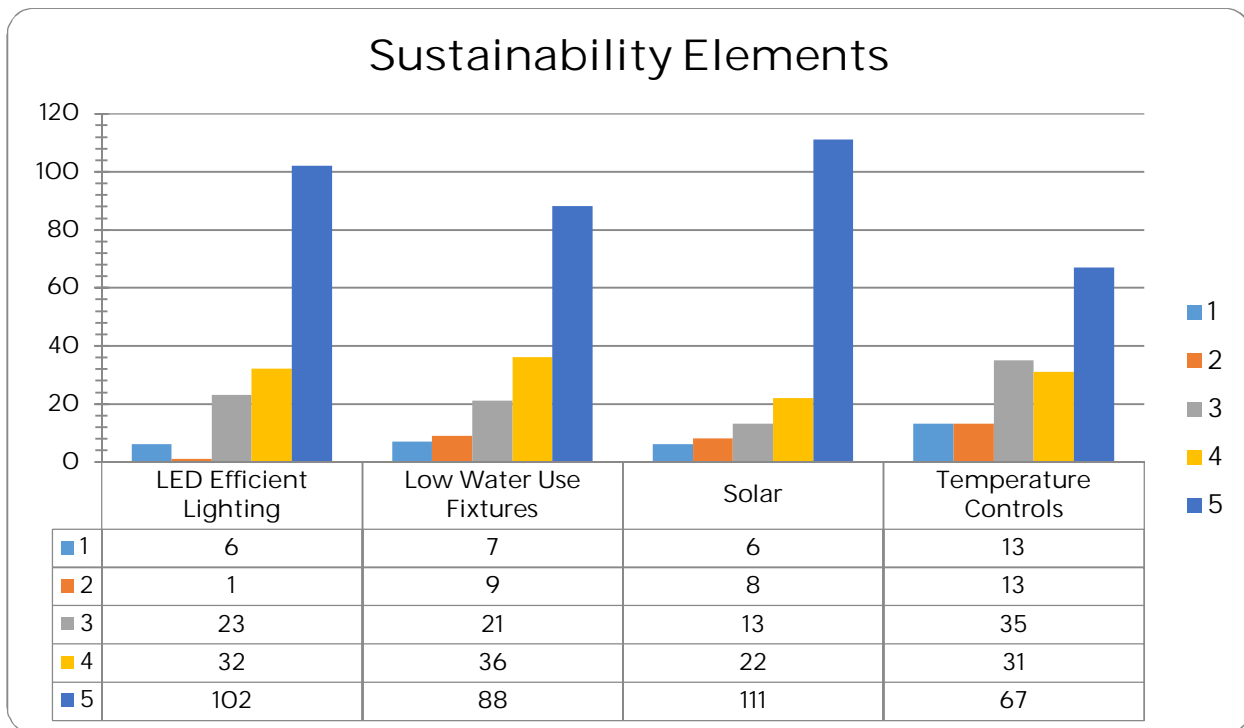


Figure 84: MTTC 2nd MetroQuest Survey Sustainability Elements Ranking (1-5 Stars)



Top Preference Transit Center Amenities: The second MetroQuest survey activity asked participants to select their top preferences in the categories of Seating, Shelters, Technology, Art, and Landscaping. The highest ranked option for Seating was a Standard bench style. A Modern shelter design was also most preferred. Digital Displays ranked highest in the Technology category while Integrated and Building Mural art were the top two art preferences. In the category of Landscaping, a Native/Low Maintenance option was most preferred.

Figure 85: MTTC 2nd MetroQuest Survey Seating Style Preference

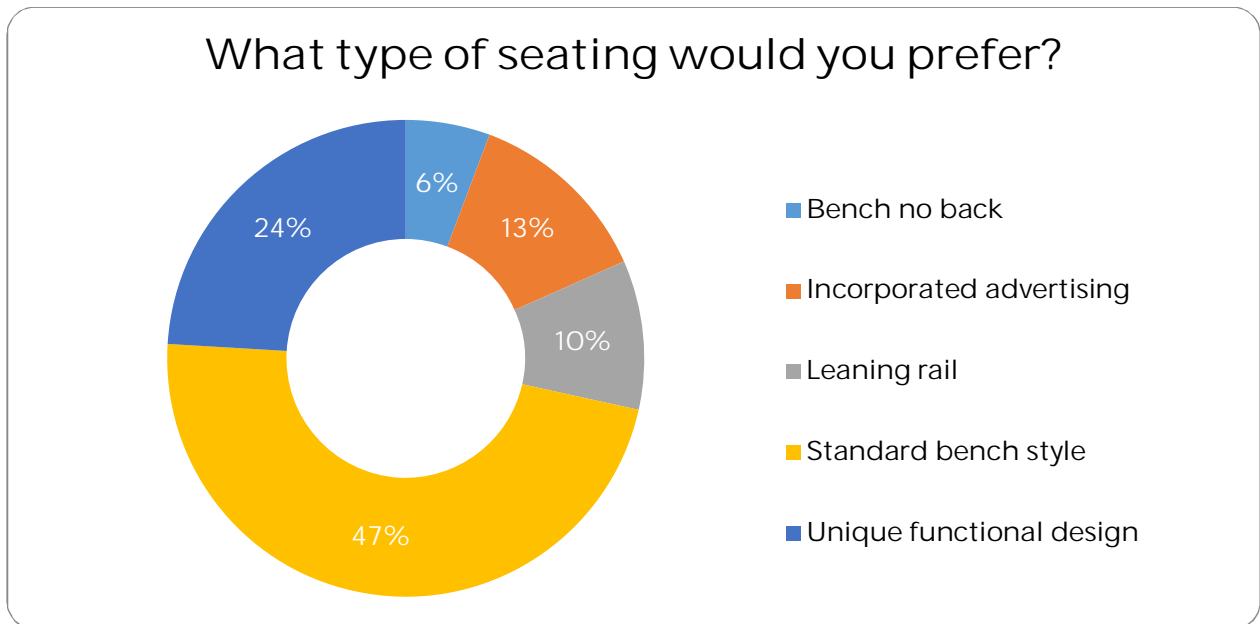


Figure 86: MTTC 2nd MetroQuest Survey Shelter Design Preference

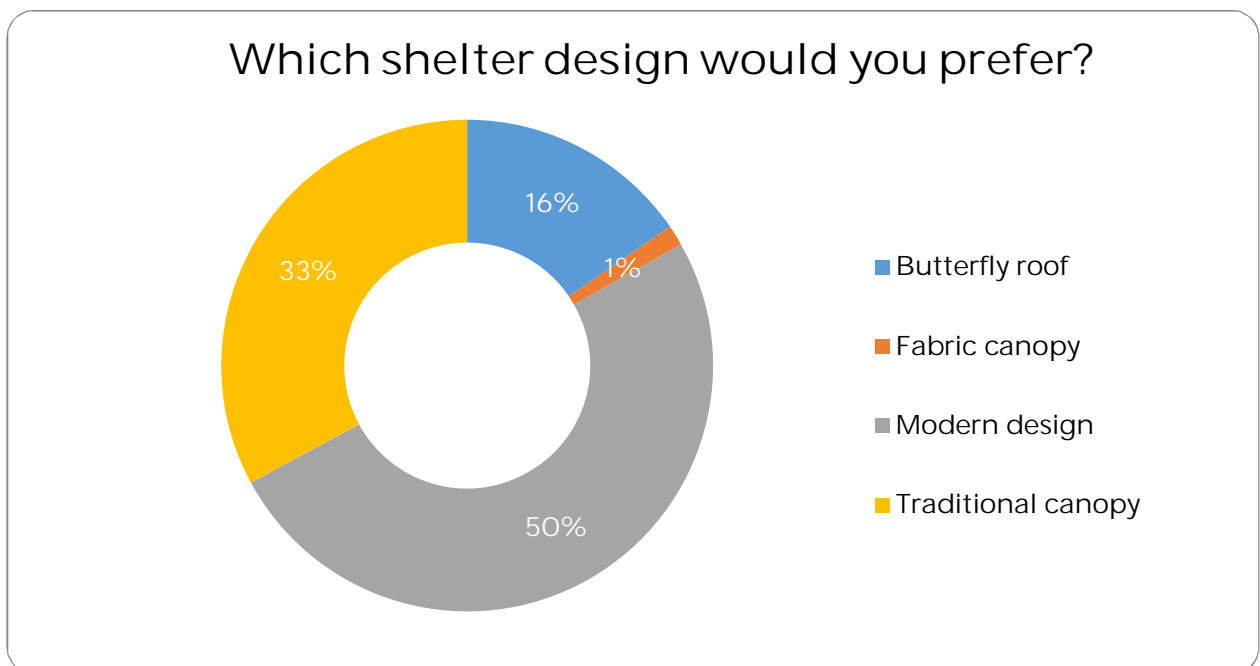


Figure 87: MTTC 2nd MetroQuest Survey Technology Preferences

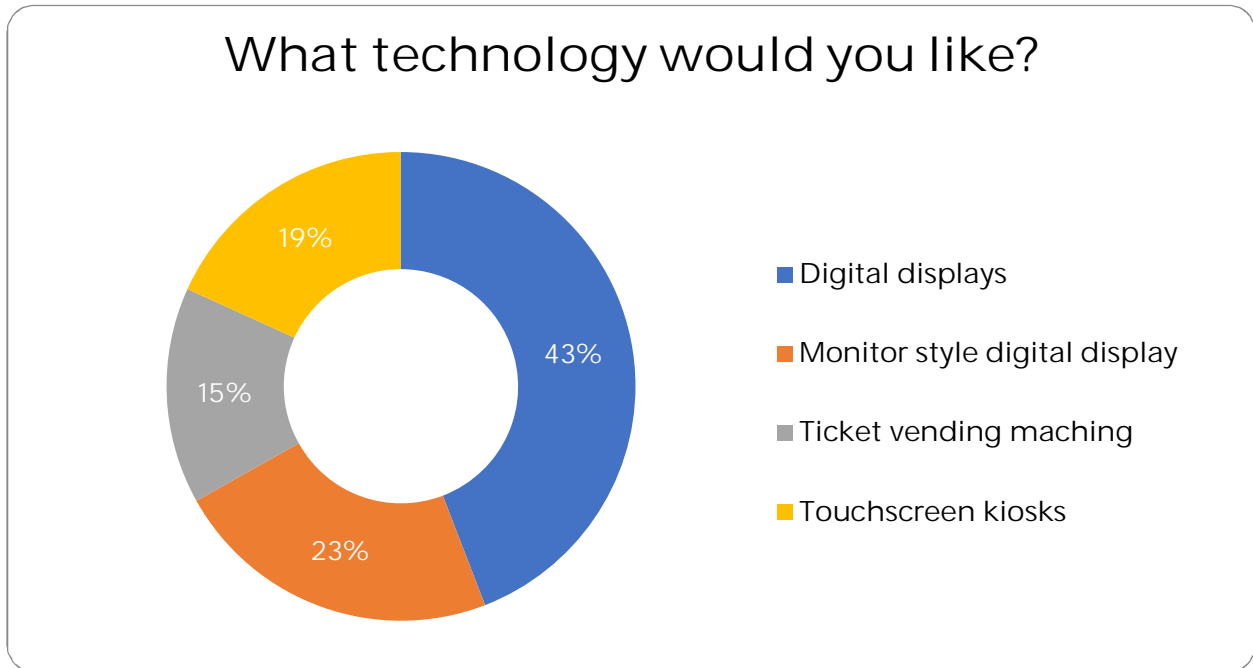


Figure 88: MTTC 2nd MetroQuest Survey Public Art Preferences

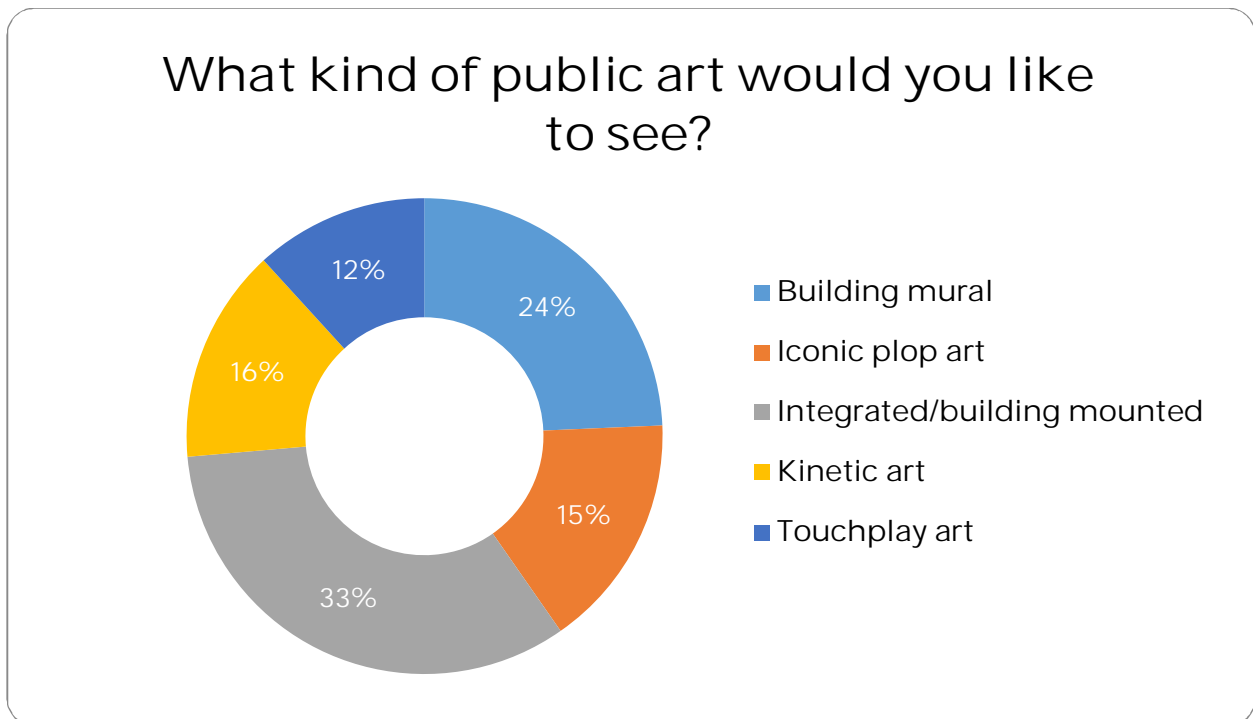
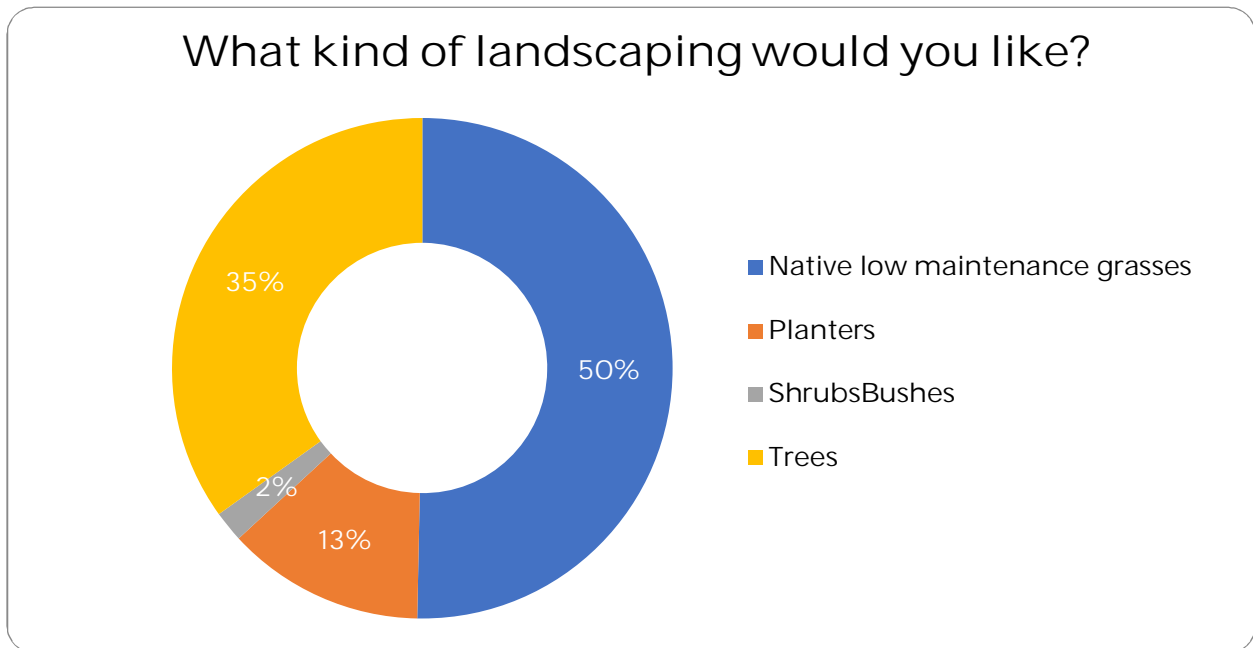
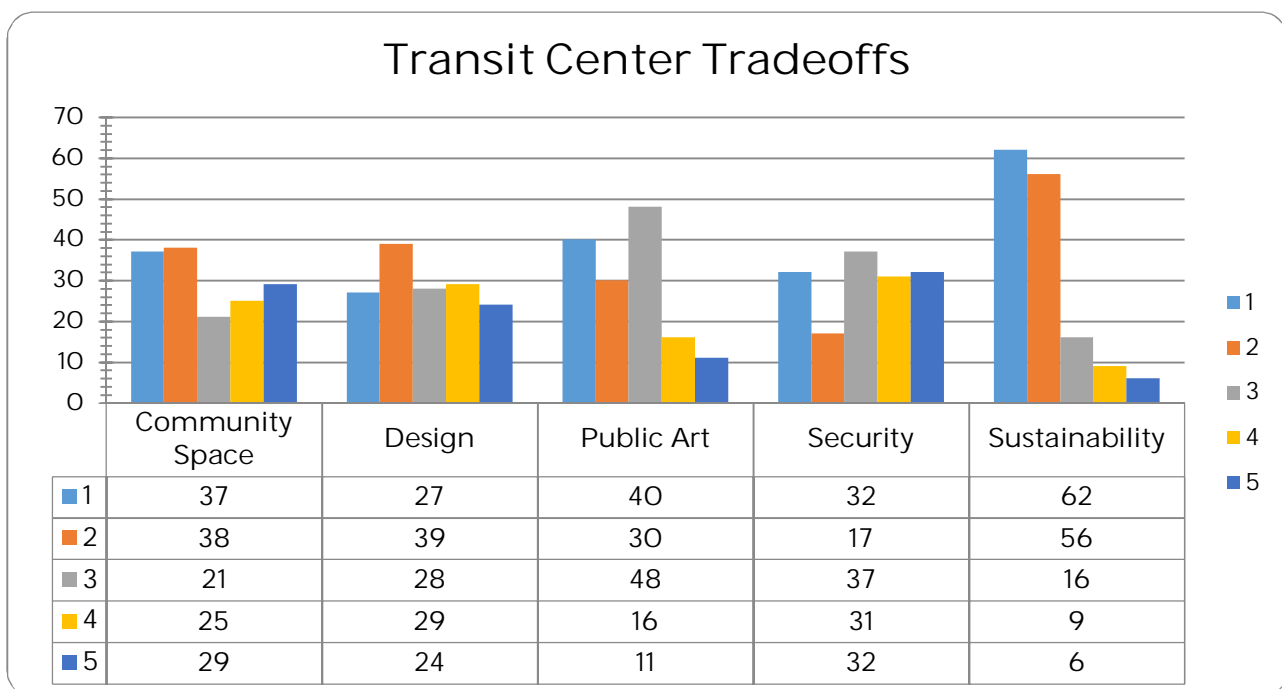


Figure 89: MTTC 2nd MetroQuest Survey Landscaping Preferences



Tradeoffs: The third MetroQuest survey screen asked participants to indicate their preferred tradeoff options. When we look at the overall most popular tradeoff category, a high-performance, sustainable site was the most strongly preferred option by participants. This indicates that respondents are interested in the long-term sustainability of the new transit facility.

Figure 90: MTTC 2nd MetroQuest Survey Facility Tradeoff Preferences



Above Legend

Community Space tradeoff spectrum:

1. Preserve space for community interaction & activity
2. Left of neutral
3. Neutral
4. Right of neutral
5. Maintain standard bus service areas

Design tradeoff spectrum:

1. Iconic design
2. Left of neutral
3. Neutral
4. Right of neutral
5. Traditional design

Public Art tradeoff spectrum:

1. Integrate art into the building design
2. Left of neutral
3. Neutral
4. Right of neutral
5. Reserve space for standalone art

Security tradeoff spectrum:

1. Security technology such as cameras
2. Left of neutral
3. Neutral
4. Right of neutral
5. On-site security guard personnel

Sustainability tradeoff spectrum:

1. High-performance site/building
2. Left of neutral
3. Neutral
4. Right of neutral
5. Traditional site/building

SurveyMonkey Summary

The second MTTC MetroQuest survey was also replicated specifically for blind and visually impaired stakeholders using the SurveyMonkey platform.

There were 23 MTTC SurveyMonkey surveys completed. The survey was conducted between April 26 - May 25, 2020. Much like the MetroQuest version, participants were asked 33 questions to solicit input around preferences for the new facility. The following includes key takeaways from the input received.

Overview: Who Participated in the SurveyMonkey Survey?

Participants indicated 8 various zip codes; the following were the highest concentration areas:

- 68508 (30% of zip codes entered)
- 68506 (25% of zip codes entered)

Most respondents indicated that they use public transit five (5) or more days a week (43%). The majority were between the ages of 51-65 (38%) and identified themselves ethnically as White or Caucasian (86%).

Highest-rated elements:

- Covered boarding/waiting and windscreen/shelters
- Interior lobby/waiting area
- Passenger services
- Digital signage (average rating 3.7/5)

Lowest-rated elements:

- Multimodal connections (scooters slightly less than bikes)

- Vehicle parking

Preferred tradeoff options (Scale: 0 to 100; score of 50, neutral):

- Facility Design: Blend in (40)
- Sustainability: Innovative (60)
- Security: Personnel (46)
- Public Art: Integrated (36)
- Dedicated Space: Bus service only (30)

These results indicate that these stakeholders are primarily concerned with facility usability and accessibility.

Combined MTTC 2nd Survey Comments Summary

The MTCC MetroQuest survey received 197 comments. The SurveyMonkey version received 113. An export of all comments is available in Appendix A; the below presents only a few of the comment highlights.

Combined survey comment highlights on the Priority Ranking and Preferences Exercises:

“Center Amenities” comments:

- As a blind individual, a platform/covering makes it easier to locate the bus stop.

“Passenger Services” comments:

- If the people there really know about the system, that could be helpful. Sometimes the people answering the phones don't know it and give misinformation. It would also be necessary to have a specific location that would make it easy to find such people rather than having them roam around wearing some color clothing or hat that many blind people wouldn't be able to identify in that way.
- That would give passengers a designated person(s) to answer questions about bus routes instead of holding up buses. Currently, passengers have to hold up buses to ask questions of the drivers. It would be great if bus passes could be purchased on site as well.

“Digital Signage comments:

- Digital signage needs to be accessible to blind people and people with other print-related disabilities, such as dyslexia.
- Lead an audio medium for those who cannot read text. A small store attached to the waiting area which is an excellent idea
- If the signage either is not accessible to blind people or if it is placed in a location that wouldn't be intuitive for us to find readily, that would be a problem. If it would connect to accessible smart phone apps that would be useful to many, but there are still people who don't use that technology, so it needs to be useable by those folks as well.
- An app or audible way for blind travelers to find out when busses and vehicles are arriving and leaving is important.

4.9 Environmental Review of Preferred Site

Throughout the site evaluation process, environmental considerations were researched and taken into account to identify any potential 'red flag' issues that could cause the MTTC project risks in the future. These environmental red flag issues included review of structures or properties on the National Registry of Historic Places (NRHP), floodplain boundaries, and hazardous waste sites. The preferred site for the MTTC does not have or is not adjacent to any properties or structures that are listed as historic properties in the NRHP. The site is not located in any floodplains according to flood maps produced by the Federal Emergency Management Administration (FEMA). The site does not have any past or active issues for hazardous waste or other contamination cited in data from the Nebraska Department of Environment and Energy¹³.

Through this high-level review, the preferred site for the MTTC at M Street, between 10th and 11th Streets appears to not have any obvious red flag environmental issues that could cause a significant risk to the project. More detailed research will be required in future phases of the project. As the MTTC project proceeds, it will need to coordinate closely with the Federal Transit Administration to conduct the analysis and reporting required for the appropriate approvals from the National Environmental Policy Act (NEPA) and determine the class of action need.

There are three classes of action:

1. Categorical Exclusions (23 C.F.R 771.117): Categorical Exclusions (CEs) are granted for actions that do not individually or cumulatively involve significant social, economic or environmental impacts. The projects listed in 23 C.F.R 771.117 require little or no construction and involve minimal or no effects off-site. The regulation gives a list of the types of projects that are categorically excluded. Once FTA has determined that a CE applies, it may act on the application for financial assistance.
2. Environmental Assessments (23 C.F.R 771.119): FTA may require an applicant for financial assistance to prepare an Environmental Assessment (EA) when the significance of the environmental impact is not clearly established. An EA can result in either a Finding of No Significant Impact (23 C.F.R. 771.121) requiring no further environmental evaluation, or identification of potentially significant impacts requiring the applicant to conduct an Environmental Impact Statement.
3. Environmental Impact Statements (23 C.F.R 771.123 et seq.): Depending on the nature of the proposed project, FTA may immediately require applicants to develop an Environmental Impact Statement (EIS), or request an EIS based on the outcome of an EA. In either case, an EIS requires that a substantial technical analysis and public review process be conducted to evaluate project alternatives, identify potential social, economic and environmental impacts of the project, and designate methods to avoid or mitigate these impacts. Successful completion of an EIS results in FTA signing a Record of Decision (ROD). Once FTA has signed a ROD, the applicant can proceed with the project having complied with NEPA and FTA may act on the application for federal assistance¹⁴.

It is likely that the MTTC project would have its NEPA class of action defined as either a Categorical Exclusion or an Environmental Assessment given the minimal impacts to the built or natural environment at the MTTC site.

¹³ <http://dee.ne.gov/NDEQProg.nsf/OnWeb/MapsData>

¹⁴ Federal Transit Administration. NEPA Overview. <https://www.transit.dot.gov/regulations-and-guidance/environmental-programs/national-environmental-policy-act>

5.0 Capital and Operating Cost Estimation

5.1 Capital Cost Estimation

Cost estimates for design and construction for the MTTC were developed under this study. The total cost for the MTTC that includes professional services and contingencies for cost unknowns at this level of project planning is estimated at just under \$12.36 million. This estimate is meant to be highly conservative and includes annual escalation of project costs. This estimate also includes land acquisition costs. Total MTTC project costs will be further refined as the project is advanced into more detailed design and engineering phases.

PRELIMINARY TOTAL PROJECT BUDGET

4/28/2020 15:41

1. This budget is based on construction dates as follows:			
Construction Contract Award Date:		1-Jul-21	
Final Completion Date:		30-Oct-22	
Construction Duration (Days):		486	
2. Escalation Rates:			
Annual Rate:		3.0%	
Mid-Point of Construction:		1-Mar-22	
Current Date:		28-Apr-20	
Years to Mid-Point:		1.84	
Escalation Rate (Current to Mid-Point):		5.6%	
3. Budget for Construction Contract Award Price (CCAP)			
CCAP		8,455,101	includes design contingency
Escalation	5.6%	472,882	
Total CCAP		\$ 8,927,983	
4. Construction Phase Contingency			
Percent of Item 3	10.0%	\$ 892,798	
5. Total Construction Budget		\$ 9,820,781	
(Line 3 plus Line 4)			
6. Professional Services		\$ 1,017,078	
Architecture / Engineering	10.0%	\$ 982,078	
Land Survey		\$ 10,000	
Geotechnical Investigation		\$ 15,000	
Specialty Consultants		\$ 10,000	
7. Other Costs		\$ 400,000	
A/E Expenses		\$ 10,000	
Bid Documents Print & Distribute		\$ 5,000	
Land Acquisition Cost		\$ 385,000	
Other Expenses			
8. TOTAL PROJECT COST		\$ 12,361,645	
Construction + Professional Services + Other Costs		\$11,237,859	
Owner's Contingency	10%	\$ 1,123,786	

5.2 MTTC Project Funding Opportunities Review

Planning, designing, engineering, and constructing a new MTTC is a significant investment in the future of public transit, improved personal mobility, and access to opportunities for the Lincoln metropolitan region. As is the case with many significant infrastructure projects, locating and securing all funds to deliver the project and make it a reality can be a challenge. To potentially assist in overcoming this challenge, multiple programs exist that could be targeted to share the cost to construct the MTTC. Those programs most likely to have the greatest impact on securing the capital funding needed for StarTran and the City of Lincoln to bring the vision of a new transit center in downtown Lincoln to reality are outlined below.

5.2.1 BUILD

Originating from the 2008 Great Recession, the US Congress began appropriating funds annually to the United States Department of Transportation (USDOT) for a competitive infrastructure spending program whose purpose was to inject federal dollars into transportation projects of local, regional, or national impact. Initially this competitive infrastructure grant program was known as Transportation Investments Generating Economic Recovery, or TIGER. As the economic effects of the Great Recession were seen to be in the past, the current presidential administration renamed the TIGER program Better Utilizing Investment to Leverage Development, or BUILD.

Eligible recipients for BUILD funding include cities, counties, states, transit agencies/authorities, and tribal governments. Since the inception of the BUILD / TIGER program, Congress and USDOT have funded nearly \$8.0 billion for multimodal infrastructure projects across the nation for highway, bridge, port, freight rail, and public transit projects.

StarTran and the City of Lincoln have submitted two previous applications to the USDOT for BUILD/TIGER funding in 2016 and 2018 to support the construction of a downtown transit center, but unfortunately neither application was selected for funding. The BUILD program has allocated \$1.0 billion for FY 2020 projects. Each year of the program's existence, competition for the limited nationwide funding is challenging with USDOT receiving billions more in grant application requests than funding available. The minimum BUILD grant size is \$5.0 million and maximum grant award is capped at \$25 million. BUILD grants can fund up to eighty percent of a project's capital construction cost with a minimum local matching contribution of twenty percent. In many cases, successfully selected projects commit more local matching funds beyond the minimum twenty percent. BUILD applications examine a project's merits on the following:

- **State of Good Repair:** An assessment of how the project will improve the condition of existing transportation facilities and systems, with particular emphasis on minimizing lifecycle costs.
- **Economic Competitiveness:** An assessment of how the project will contribute to regional economic competitiveness over the medium- to long-term by improving the transportation system while creating and preserving jobs.
- **Quality of Life:** An assessment of how the project will increase transportation choices and access to transportation services for local residents.
- **Environmental Sustainability:** An assessment of how the project will improve energy efficiency, reduce dependence on oil, reduce greenhouse gas emissions, and benefit the environment.

- Safety: An assessment of how the project will improve the safety of U.S. transportation facilities and systems.
- Innovation: An assessment of how the project uses innovative strategies, such as innovative technology, innovative funding and financing mechanisms, or innovative project delivery and management techniques.
- Partnership: An assessment of whether the project includes collaboration across a broad range of participants or an integration of other public service efforts or processes.

The BUILD program remains one of the most viable opportunities to secure federal funding for the construction of the MTTC. The program has remained popular with the US Congress and it is anticipated that it will continue to be funded annually for the foreseeable future. StarTran and the City of Lincoln should continue to submit applications to USDOT to fund MTTC construction and work to clearly identify committed local match funding that will be necessary to support the federal funds if appropriated prior to federal funds being awarded. Given the initial project cost estimate of approximately \$12.0 million would require a local match of roughly \$2.4 million to meet the minimum twenty percent local commitment.

5.2.2 FTA 5339 Bus and Bus Facilities Program

Another viable funding opportunity for the MTTC project is through the Federal Transit Administration's (FTA) 5339 (b) Bus and Bus Facilities Program. Grants for Bus and Bus Facilities program (49 U.S.C. 5339) makes FTA funding available to States and designated recipients of federal transit funds to replace, rehabilitate, and purchase buses and related equipment and to construct bus-related facilities such as transit centers. In FY 2020, FTA made nearly \$290 million available through the Bus and Bus Facilities competitive grant program. Applications for this program are generally made annually. Like BUILD, the funding split for projects request a minimum local funding match commitment of twenty percent.

While the overall program is significantly lower than the BUILD program, securing funding through the 5339(b) Bus and Bus Facilities could potentially be less challenging in that the MTTC's funding application would only be competing against like-transit facility projects, as opposed to highway, freight, rail, ports, or other modal projects that can make the BUILD program more challenging to be selected for funding award. StarTran should plan to apply to the 5339(b) program in FY 2021 if construction funding is still required at the time the next Notice of Funding Opportunity (NOFO) is published, likely in early 2021.

5.3 Benefit-Cost Analysis

A benefit-cost analysis (BCA) was conducted for the MTTC for submission to the US Department of Transportation (USDOT) as a requirement of the grant application for the BUILD 2020 program. A BCA is an evaluation framework to assess the economic advantages (benefits) and disadvantages (costs) of an investment alternative. Benefits and costs are broadly defined and are quantified in monetary terms to the extent possible. The overall goal of a BCA is to assess whether the expected benefits of a project justify the costs from a national perspective. A BCA framework attempts to capture the net welfare change created by a project, including cost savings and increases in welfare (benefits), as well as disbenefits where costs can be identified (e.g., project capital costs), and welfare reductions where some groups are expected to be made worse off as a result of the proposed project.

The BCA framework involves defining a Base or "No-Build" Case, which is compared to the "Build" Case, where the grant request is awarded, and the project is built as proposed. The BCA assesses the

incremental difference between the No-Build Case and the Build Case, which represents the net change in welfare. BCAs are forward-looking exercises which seek to assess the incremental change in welfare over a project lifecycle. The importance of future welfare changes is determined through discounting, which is meant to reflect both the opportunity cost of capital as well as the societal preference for the present.

The analysis was conducted in accordance with the benefit-cost methodology as recommended by USDOT in the 2020 Benefit-Cost Analysis Guidance for Discretionary Grant Programs.¹⁵ This methodology includes the following analytical assumptions:

- Defining existing and future conditions under a No-Build Case and under the Build Case;
- Estimating benefits and costs during project construction and operation, including 30 years of operations beyond the Project completion when benefits accrue;
- Using USDOT recommended monetized values for reduced injuries, travel time savings, and emissions, while relying on best practices for monetization of other benefits;
- Presenting dollar values in real 2018 dollars. In instances where cost estimates and benefits valuations are expressed in historical or future dollar years, using an appropriate inflation factor to adjust the values; and
- Discounting future benefits and costs with a real discount rate of 7 percent, consistent with USDOT guidance.

The evaluation period for this project includes a 3-year design and construction period, from 2020-2022, during which capital expenditures are undertaken, plus 30 years of operations beyond Project completion within which to accrue benefits, through 2052.

Dollar figures in this analysis are expressed in constant 2018 dollars (2018\$). Capital and O&M costs estimated in 2020 are conservatively assumed to reflect 2018 dollar values.

The real discount rate used for this analysis was 7.0 percent, consistent with USDOT guidance for 2020 BUILD grants and OMB Circular A-94.¹⁶

5.3.1 BCA Capital and Operating Costs

Capital costs for the Project professional services/design costs expected to equal \$1.1 million in undiscounted dollars. Construction, which is planned to start in July 2021 and last through October 2022, is anticipated to cost \$10.2 million in undiscounted 2018 dollars. Other capital costs, including right-of-way acquisition total \$44,000 in undiscounted 2018 dollars. Together, these capital costs equate to \$11.8 million in undiscounted 2018 dollars, or \$10.0 million when discounted at 7 percent. These costs do not include escalation and therefore may differ from those reported in the application narrative. In addition, costs developed in 2020 are conservatively assumed to reflect 2018 dollars and are not reduced further from the 2020 valuation.

Table 16 presents cost information by type of expense and year of expenditure.

¹⁵ U.S. Department of Transportation. Benefit-Cost Analysis Guidance for Discretionary Grant Programs. January 2020.

¹⁶ White House Office of Management and Budget, [Circular A-94, Guidelines and Discount Rates for Benefit-Cost Analysis of Federal Programs](#) (October 29, 1992).

Table 16: Project Costs by Category and Year, in Millions of 2018 Dollars

Cost Category	2020	2021	2022	Total
Construction	\$0.00	\$3.84	\$6.39	\$10.23
Professional Services	\$0.56	\$0.56	\$0.00	\$1.12
Other Costs	\$0.44	\$0.00	\$0.00	\$0.44
Total (Undiscounted)	\$1.00	\$4.40	\$6.39	\$11.79
Total (Discounted, 7%)	\$0.93	\$3.84	\$5.22	\$9.99

Source: StarTran, WSP 2020

The annual costs of operating and maintaining the transportation center are included in the analysis, calculated as the net costs between the Build and No-Build scenarios. As the project consists of new construction, operations and maintenance (O&M) costs are incurred when the project opens in 2023, continuing throughout the analysis period.

In the “Build” Case, the O&M costs include annual preventive maintenance, annual maintenance and replacement (M&R), and periodic replacements for the transportation center building, as well as the periodic repair and replacement of the pavement. O&M costs for the new canopies are excluded, as these are assumed to be comparable to the O&M costs associated with the existing transfer point’s bus shelters, thus resulting in no net-change in costs (while the transfer station’s canopies will have a larger surface area than the existing transfer point’s bus shelters, they will use lower-maintenance materials).

The schedule of net undiscounted O&M costs for the Project are shown for each year in Table 17. Total net O&M costs for the Project are estimated to be \$2.0 million in undiscounted dollars, or \$495,000 in present value using a 7 percent discount rate. Per USDOT guidance, these net O&M costs are included as a negative benefit in the numerator of the benefit-cost equation.

Table 17: Schedule of Operations and Maintenance Costs (in Undiscounted 2018 Dollars)

Year	Building			Pavement	Total
	Preventive	M&R	Replacement	Repair/Replacement	
2023	\$15,072	\$9,168	\$0	\$0	\$24,240
2024	\$15,072	\$9,305	\$0	\$0	\$24,377
2025	\$15,072	\$9,620	\$0	\$0	\$24,691
2026	\$15,072	\$14,145	\$0	\$0	\$29,217
2027	\$15,072	\$16,308	\$0	\$10,000	\$41,380
2028	\$15,072	\$9,757	\$0	\$0	\$24,828
2029	\$15,072	\$9,260	\$0	\$0	\$24,332
2030	\$15,072	\$14,333	\$49,680	\$0	\$79,085
2031	\$15,072	\$12,167	\$0	\$0	\$27,238
2032	\$11,506	\$19,920	\$6,242	\$10,000	\$47,669
2033	\$15,072	\$9,168	\$0	\$0	\$24,240
2034	\$15,072	\$16,154	\$0	\$0	\$31,226
2035	\$15,072	\$9,168	\$0	\$0	\$24,240
2036	\$15,072	\$9,397	\$0	\$0	\$24,469
2037	\$12,285	\$51,529	\$37,353	\$10,000	\$111,167
2038	\$15,072	\$14,333	\$49,680	\$0	\$79,085
2039	\$15,072	\$9,168	\$0	\$0	\$24,240
2040	\$15,072	\$12,304	\$0	\$0	\$27,375
2041	\$15,072	\$9,168	\$0	\$0	\$24,240
2042	\$8,921	\$259,456	\$27,404	\$10,000	\$305,782
2043	\$15,072	\$9,712	\$0	\$0	\$24,783
2044	\$15,072	\$9,305	\$0	\$0	\$24,377
2045	\$15,072	\$9,168	\$0	\$0	\$24,240
2046	\$15,072	\$16,342	\$49,680	\$0	\$81,094
2047	\$14,957	\$162,740	\$75,366	\$10,000	\$263,064
2048	\$15,072	\$9,305	\$0	\$0	\$24,377
2049	\$15,072	\$12,167	\$0	\$0	\$27,238
2050	\$15,072	\$14,237	\$0	\$0	\$29,309
2051	\$15,072	\$9,168	\$0	\$0	\$24,240
2052	\$8,720	\$50,693	\$408,924	\$10,000	\$478,336
Total	\$433,179	\$826,670	\$704,331	\$60,000	\$2,024,180

Source: WSP, 2020

5.3.2 MTTC Project Benefits

The MTTC Project generates several benefits primarily by:

- Increasing travel time savings of bus passengers
- Generating new transit trips and thereby decreasing automobile vehicle miles travelled and the consequent vehicle operating costs and emissions
- Enhancing the city's economic competitiveness
- Enhancing quality of life for city residents

These benefits are monetized and quantified. Details pertaining to the monetization and quantification of the MTTC Project benefits are included in the BCA Summary Report in Appendix B.

By far, the greatest benefit of the MTTC Project comes from significant reduction in passenger transfer waiting times. StarTran's current scheduling and infrastructure at the Gold's on-street transfer point hamper passengers' ability to seamlessly and quickly transfer between lines. The MTTC will provide more bus bays to increase efficiency of connections and transfers between routes. The current configuration has capacity for five buses at one time; demand reaches 15 buses at one time. To accommodate today's demand, bus schedules are offset by five minutes to stagger arrivals at the existing downtown transfer site. Transfers in the second and third wave of buses typically miss opportunities to transfer to buses that arrived in the earlier wave of buses. Because buses operate at 30- and 60-minute frequencies, riders that miss transfers to earlier buses can wait up to 50 minutes for the next bus.

Travel time savings were determined by calculating the difference between the current average transfer time at 11th and N Streets and the average transfer time under a new pulse operations system. These savings were calculated for StarTran's three schedule blocks: morning peak service, weekday off-peak service, and Saturday service, as shown on a per-trip basis in Table 18. In total, the project will save 1.8 million hours of travel time over the 30-year operations period.

Table 18: Travel Time Savings Assumptions and Sources

Variable	Unit	Value	Source
Value of Travel Time Savings – Personal (Wait-time)	2018\$ per person hour	\$30.40	US DOT Guidance, 2020
Value of Travel Time Savings – Business	2018\$ per person hour	\$27.10	US DOT Guidance, 2020
Personal Share of Total Person-Miles of Travel	%	88.2%	US DOT Guidance, 2020
Business Share of Total Person-Miles of Travel	%	11.8%	US DOT Guidance, 2020
AM/PM Peak Transfer Time Savings	Minutes	6.48	WSP Calculations, 2020
Weekday Transfer Time Savings	Minutes	6.21	WSP Calculations, 2020
Saturday Transfer Time Savings	Minutes	7.50	WSP Calculations, 2020

These benefits were monetized by multiplying the hours of benefits by the value of time for bus passengers. Per USDOT guidance, because the time savings is related to a reduction in waiting/transfer

time, a higher value-of-time assumption is used for personal travel. Travel time savings benefits total \$16.8 million in present value over the 30-year analysis period (see Table 19).

Table 19: Travel Time Savings Benefits, Millions of 2018 Dollars

Benefit	Project Opening Year		Project Lifecycle	
	Undiscounted	Discounted (7%)	Undiscounted	Discounted (7%)
Travel Time Savings - Bus Passengers	\$1.37	\$1.05	\$54.21	\$16.77

Source: WSP, 2020

5.3.3 BCA Results Summary

The BCA converts potential gains (benefits) and losses (costs) from the Project into monetary units and compares them. The following common benefit-cost evaluation measures are included in this BCA:

- **Net Present Value (NPV):** NPV compares the net benefits (benefits minus costs) after being discounted to present values using the real discount rate assumption. The NPV provides a perspective on the overall dollar magnitude of cash flows over time in today's dollar terms.
- **Benefit-Cost Ratio (BCR):** The evaluation also estimates the BCR; the present value of incremental benefits is divided by the present value of incremental costs to yield the BCR. The BCR expresses the relation of discounted benefits to discounted costs as a measure of the extent to which a project's benefits either exceed or fall short of the costs.
- **Internal Rate of Return (IRR):** The IRR is the discount rate which makes the NPV from the Project equal to zero. In other words, it is the discount rate at which the Project breaks even. Generally, the greater the IRR, the more desirable the Project.
- **Payback Period:** The payback period refers to the period of time required to recover the funds expended on a Project. When calculating the payback period, the time value of money (discounting) is not taken into account.

Table 20 presents the evaluation results for the Project. Results are presented in undiscounted values and discounted at 7 percent as prescribed by the USDOT. All benefits and costs were estimated in constant 2018 dollars over an evaluation period extending 30 years beyond project completion in 2023.

At a discount rate of 7 percent, the Project yields total benefits of \$17.0 million and total costs of \$10.0 million, yielding a BCR of 1.8 and an NPV of \$7.0 million. The IRR is 12 percent and the payback period is 16.6 years. These results indicate that the benefits of the Multimodal Transit Transfer Center far outweigh its costs.

Table 20: Benefit-Cost Analysis Results, Millions of 2018 Dollars

BCA Metric	Undiscounted	Discounted (7%)
Total Benefits	\$56.2	\$17.0
Travel Time Savings	\$54.2	\$16.8
Vehicle Operating Cost Savings (including Fuel)	\$1.5	\$0.5
Reduced Emissions	\$0.008	\$0.003
Reduced Agency O&M Costs	(\$2.0)	(\$0.5)
Residual Value	\$2.6	\$0.3
Total Costs	\$11.8	\$10.0
Net Present Value (NPV)	\$44.4	\$7.0
Benefit-Cost Ratio (BCR)	4.8	1.7
Internal Rate of Return (IRR)	12%	
Payback Period (Years)	16.6	

Source: WSP, 2020

6.0 MTTC Conclusions and Recommendations

MTTC Project Conclusions

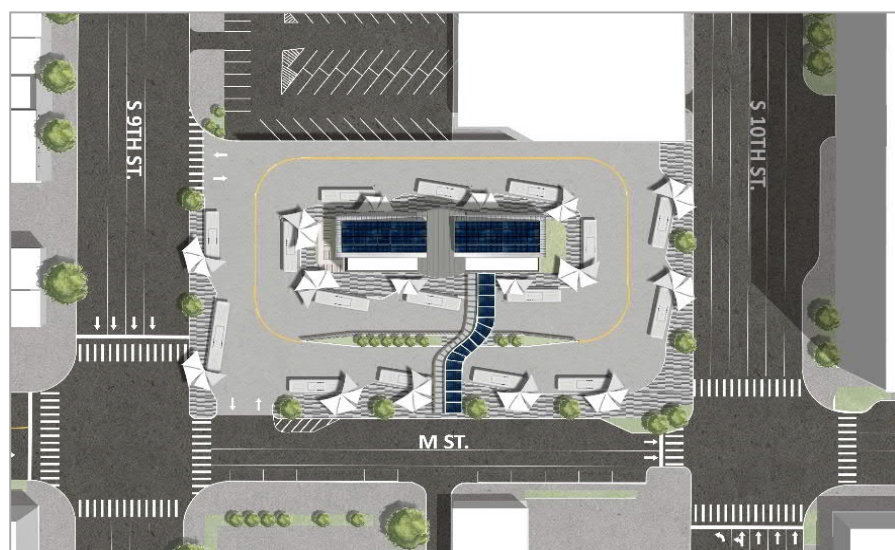
The construction of a new transit center in downtown Lincoln is a critical piece of infrastructure that will support improved mobility for residents and visitors for decades to come.

The MTTC Planning and Feasibility Study was initiated to investigate opportunities to enhance the transferring facilities and environment for StarTran bus riders for decades to come. The study identified several challenges that have made the current transfer location at the Gold's Building an unsustainable location for the long-term future of the StarTran transit system. The primary purpose and need for the study was to identify an optimal site for a new downtown transit center and to develop a conceptual layout and site plan for the new center that StarTran and its passengers can utilize as the hub of the transit system. To guide the MTTC study process, a number of goals were developed and prioritized through a public survey that identified improving transit system efficiency, accessibility to transit, and safety as the highest priorities for the MTTC.

The MTTC study conducted a thorough site selection process to locate the optimal location for the new MTTC. Overall this analysis reviewed nearly twenty properties in the downtown study area through a two-tiered process. The first level of site selection review involved prerequisites that a potential site must or must not include. If a site did not meet all the prerequisites it was not moved into the second tier of evaluation which scored approximately seven sites on a variety of metrics that tied back to the project goals and priorities. This process identified the best site for the MTTC located at the southern half of the block on M Street between 9th and 10th Streets which is largely owned by the city.

Following site selection the MTTC study worked through a process to create several alternatives for layout configuration of the site that would best integrate the functional needs of the transit center. This included indoor waiting space, StarTran administrative office areas, up to sixteen bus bays to accommodate current

Figure 91: MTTC Preferred Layout



and future StarTran operations, multimodal connections to bike/scooter share, and several other considerations. The layout and design process led to the development of the preferred conceptual layout of the MTTC shown in Figure 91.

The conceptual layout will provide StarTran a centralized, off-street facility for all bus routes to meet and allow passengers to transfer more efficiently.

The MTTC concept would construct a two-story building located on a central boarding island. The ground floor of this structure will provide a climate-controlled passenger waiting area with restrooms, free public

Wi-Fi, as well as a customer service area that would be staffed by StarTran to provide information and sell bus passes. The second story of this main structure would relocate StarTran’s administrative offices from their current home closer to the heart of the bus network’s operations.

The new MTTC will provide several benefits for multimodal transportation in the greater Lincoln metro area and beyond. The transit center will allow all StarTran routes to meet on a combined pulse that will shorten passenger’s transfer wait time and overall travel time to reach their destinations. This transit center will also greatly improve the comfort and convenience of using transit for future StarTran riders with climate-controlled waiting areas, on-site customer service, free public Wi-Fi, and restrooms. The MTTC will provide connectivity to bike share and scooter sharing as well as a connection to a new intercity commuter bus service between Omaha and Lincoln. Along with the mobility improvements, the MTTC will enhance safety and security for StarTran passengers and staff with improved lighting and lines of sight and other security measures that will be incorporated to the facility’s design and operation.

The preferred MTTC conceptual layout and design were utilized to develop capital construction costs as well as on-going operation and maintenance costs for the transit center facility. Using a conservative cost estimating process it is anticipated that the total capital cost, including engineering and detailed design would be approximately \$12.36 million. A benefit-cost analysis for this project was conducted and found that the MTTC project would result in a benefit-cost ratio of 1.8, meaning its benefits to the community would greatly outweigh the costs.

MTTC Project Next Steps

StarTran and the City of Lincoln should advance the MTTC project into the next phases of more detailed planning and engineering design that will further refine the project and estimated costs in the coming year. Table 21 presents a conceptual project schedule for the main task areas over the coming four years.

To advance this project there are several items that will be necessary to proceed. The preferred site for the MTTC is largely under the ownership of the City of Lincoln, but one parcel has yet to be acquired. StarTran and the City will need to work through the appropriate processes to acquire this small piece of property needed to support the MTTC.

Table 21: Conceptual MTTC Project Schedule for Next Steps

Project Task	2020		2021				2022				2023				2024			
	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Property Acquisition	█	█																
Funding Commitments	█	█	█															
NEPA Analysis			█	█	█	█												
Engineering / Design			█	█	█	█	█	█										
Federal Funding Applications			█	█														
Bidding									█									
Construction										█	█	█	█	█	█	█	█	
MTTC Open to Service																		█

Securing federal funds to design and construct the facility is another critical item to make the MTTC a reality. Having commitment of local funding is an important component to making the MTTC project competitive for securing discretionary federal capital funds. This funding should be able to be identified in an agency or city budget that is clearly committed to support the project. Projects that are typically

selected for highly competitive federal funds have low budgetary risks, and in many cases provide more local match than the minimum twenty percent. In recent years Notices of Funding Opportunity (NOFO) have been released for competitive federal funding programs in the first half of the year, and similar timing could be anticipated for 2021. If StarTran is unsuccessful in securing federal discretionary funding in 2020, it should target the next finding window in quarter one or two of 2021 to continue efforts to locate the funding needed to deliver the MTTC project.

The environmental analysis required by NEPA and preliminary/final engineering efforts could be undertaken simultaneously to accelerate the overall MTTC project timeline. StarTran will need to coordinate closely with the Region 7 Federal Transit Administration office in Kansas City to initiate and advance through the NEPA process. StarTran will also need to engage with other State of Nebraska agencies to obtain other needed approvals in the environmental process. It is anticipated that the MTTC project would be classified as a Categorical Exclusion or an Environmental Assessment. Generally, these levels of NEPA evaluation can take 12-18 months to conclude and receive appropriate approvals. Initiation or completion of the NEPA process will also make the MTTC a more competitive project if applying for federal funding in 2021 or beyond.

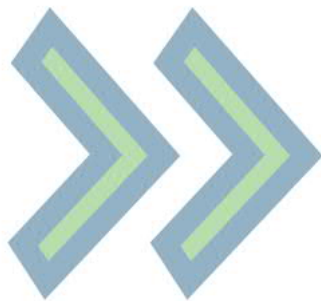
As the NEPA process is on-going, StarTran could also begin the preliminary design/engineering task that would develop engineering drawings to the 30% design level and continue to further develop drawings towards a final design targeted approximately 18 months from the start of the engineering task. Having preliminary designs will also help to inform the NEPA process.

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Prepared for StarTran and the City of Lincoln in partnership with:





STARTRAN MULTIMODAL TRANSIT CENTER

Feasibility & Concept Design Study
Summer 2020

Appendix A - Public Comments



MetroQuest Survey #1 Comments

Transit Center Topic	Comment
Project Goals Comments	
Create Adaptable Facility	In my mind, create an adaptable facility and create a sustainable facility are two pieces of the same puzzle. Planning for the future means thinking through the environmental mess we're in, too.
Create Adaptable Facility	These are not well enough explained.
Create Adaptable Facility	Cleanliness is a Huge... There should be portable trash cans available for the riders to discard their trash and to Not just throw trash in to the yards of the homes that have a Bus stop in front of or beside of their houses. Especially on both corners at NW 22nd and Q street. Its left a trashy mess at times.
Create Adaptable Facility	Who writes and designs these things?! I have a Master's degree, demonstrable writing skills, and sufficient sense to write to my audience. I'm a licensed healthcare professional and am tasked with writing letters to Medicaid recipients about their insurance benefits. Our accrediting bodies mandate that we write for individuals who have, at maximum, 6th grade reading comprehension. Do you really think a sixth grader could make adequate sense of your survey, so as to answer questions in a *meaningful* way? You have a responsibility to all our citizens to be inclusive, you can do better than this, in both site design and verbiage. All Lincolniters deserve the opportunity to participate. Thank you.
Create Adaptable Facility	Still would love to see trolleybuses here in Lincoln someday.....
Create Adaptable Facility	Need shaded bus stops and when snow/ice accumulates near bus stops, Bus Drivers can stop bus little further near Traffic Stop as Stepping on Ice/snow causes injury
Create Adaptable Facility	we could use more bus shelters around Lincoln on both sides of the street there are some people who can't stand while waiting for the bus!!!!
Economic development	How about restroom access for those waiting for a connection bus?
Economic development	None of those things about a deli or a coffee shop concern me at this point for
Economic development	If I struggle to get around town, I would really appreciate some resources collocates at my bus station especially if I have a 20 or 30 minute wait before my next bus. Prepared food to go, small grocery items and convenience items, much like what you might find at the airport.
Economic development	Absolutely
Economic development	I feel like what I pay for a bus pass is expensive compared to cost of living adjusted prices in other cities.
Improve Comfort of Riders	A public restroom would be one of the best offerings.
Improve Comfort of Riders	With Nebraska weather it would really help to increase the amount of covered or indoor waiting space.

Transit Center Topic	Comment
Improve Comfort of Riders	All bus stops should have at least a bench and if possible a shelter. A lot of the passengers are Elderly and cannot stand for 30 to 45 minutes waiting for a bus. Especially at Heart Hospital.
Improve Comfort of Riders	This is very important to me. The current waiting station has no heating or cooling. The A street bus is unbearably crowded.
Improve Comfort of Riders	It is very cold and there is no restrooms. Bus times could be up to an hour long.
Improve Comfort of Riders	I commute via Route#40 from Golds to Van dorn in evening. Older versions of Bus are not at all comfortable , In contrast , Routr#53 always gets newer version of StarTran Bus and always on time. Please fix that
Improve Comfort of Riders	restrooms are very important!
Improve Efficiency	Need longer hours and full service between East Campus and City Campus. Preferably from 6:00am-1:00am daily.
Improve Efficiency	Provide Later services and Sunday Services
Improve Efficiency	Improve efficiency with multiple transfer centers and more overlapping routes in the city. I don't or shouldn't need to go downtown to go to North 27th Walmart from the Highlands.
Improve Efficiency	My son rides the bus regularly and when it broke down a few weeks ago another bus was there and he got home only 20 minutes late. So good job! But I think this is a priority that always needs to be looked at.
Improve Efficiency	Perform maintenance on a regular basis to keep buildings in good condition
Improve Efficiency	Stop firing good bus drivers. We like having drivers we know. Lisa B was a great driver. We liked her. She was always on time and very dependable. She should not have been fired.
Improve Efficiency	Having a North/South bound only bus on 70th or 84th street would greatly improve transit times for those not wanting to go downtown first to change routes.
Improve Efficiency	There should be more than one transfer center with facilities.
Improve Efficiency	Transit center should be in center of city to increase efficiency and time for all passengers, avoid everything being downtown and at unl
Improve Safety	Why did you all take out the weather shelters at the bus stops?! People freeze outside, and get rained on. What were you thinking?!
Improve Safety	I don't know if the drivers are in a hurry usually or what but I'm usually afraid they're about to hit something.
Improve Safety	This is important!
Improve Safety	Need to have safety mechanism for early commute passengers as bus stops does not have light posts
Improve Safety	Yes
Improve Safety	I have felt creeped out at bus stations, bus stops, and on the bus.
Multimodal Connections	electric scooters
Provide Equitable Access	Accessible busses would be amazing!

Transit Center Topic	Comment
Provide Equitable Access	Make sure that people are not getting left just because they take a second to get to the door like a mother with a special needs child or a disabled person in a wheelchair.
Provide Equitable Access	When the routes were redrawn a couple years ago, they pulled buses out of the neighborhoods that they serviced and made it harder to effectively connect with the buses. Some neighborhoods, including several in the west Lincoln area have been excluded from the bus's new system due to the distance you have to walk to get to a bus stop.
Provide Equitable Access	Provide access and routes on Saturday and Sunday, especially to the Farmers Market and area Churches and Stores.
Provide Equitable Access	Equitable access needs to be provided to all city residents, not just focusing on downtown, low income and unl students
Suggest another	Better routes/ 24/7 run times
Suggest another	Please focus on improving the driving of bus operators. I'm surprised there are not more accidents. They get incredibly close to hitting parked vehicles. They do not follow driving guidelines.
Suggest another	Provide opportunities for higher density redevelopment, including affordable housing.
Suggest another	Turn a profit !!
Suggest another	Halt expansion plans, begin a cost/benefit study, assess if this is for the citizenry or image. Let's take care of basic citizen needs FIRST.
Suggest another	offer transportation to more than downtown
Suggest another	offer transportation to more than downtown run transportation after 5pm
Suggest another	Low cost few amenities
Suggest another	Develop efficient routes with connections between them to minimize time passengers have to spend commuting.
Suggest another	More routes and less waiting. Easier to figure out connections and timing for trip
Suggest another	Create multiple transfer centers in city
Suggest another	We're Soo glad that we have such awesome star Tran bus's and also the driver's
Suggest another	Allow for connections to potential other mass transit types like rail,etc.
Suggest another	More ways to ride North-South and transfer along that route more midtown rather than downtown.
Suggest another	Most of these seem to overlap?? People will use the bus if it's convenient and a nice environment!
Suggest another	Adding Bus Shelters Around Lincoln
Suggest another	Even though they didn't make my top 3, all other options except economic development are very important to me.
Suggest another	Amtrak Depot
Suggest another	Tourism guide
Sustainable Transit Center	New and Improved Transfer Center will also provide a environment

Transit Center Topic	Comment
Sustainable Transit Center	That is an ambitious plan. Definitely agree with incorporating what can be done with a reasonable return for the money. It should not be the main focus.
Sustainable Transit Center	Do not sink any more taxpayer dollars into the transit system that is already dependent on subsidies. No one uses the bus system or wants to. If you put wifi in it will only attract homeless people. A deli will not generate enough revenue to support itself. Stop funding bad ideas with taxpayer money.

MetroQuest Survey #2 Comments

Transit Center Topic	Comment
Image Rating Comments	
Seating	Keep disabled individuals in mind when planning seating areas.
Seating	Need handrails so elderly/inform can get out of seat.
Seating	advertising will support local businesses while lowering costs for the taxpayer
Shelters	whatever is cheapest for taxpayer dollars, they all look fine.
Shelters	whatever is cheapest for taxpayer dollars, they all look lovely.
Shelters	I like what we have!!! It gets you in and out of the rain and cold winter winds!!!
Shelters	Make sure it is large enough to actually provide cover for number of people expected to stand under it.
Shelters	Flat roof for solar
Shelters	Least expensive option that holds up to NE weather
Technology	Anything touch looks scared in covid era to come But more modern screen info attractive with photos/video/graphics than simple letter signs
Technology	touchscreen will be ruined and unusable within a year or two
Art	whatever is least likely to be destroyed by graffiti. In this day and age anything touch would seem to be wrong
Art	None necessary, unless donated privately. Functionality most important.
Art	Also, incorporate art into the building, the fencing, the roofing, handrails, etc.
Landscaping	Native, low maintenance and low water use.
Landscaping	I am allergic to most plants
Landscaping	native grasses show city commitment to our environment!
Visual Preference Comments	
Lobby Waiting Area	This whole concept is a joke. Why are we, the taxpayers of Lincoln being forced to pour even more money into an already failed system. It would actually be cheaper to just pay the Uber bills of every person that uses the bus system in this town. Another reason I cannot wait to retire and get out of Lincoln.
Lobby Waiting Area	I like that the chairs have backs and are not benches, but it would be better if they didn't have armrests to accommodate more people.
Lobby Waiting Area	The benches should not have arm rests to accommodate more people.

Transit Center Topic	Comment
Lobby Waiting Area	It would be preferable for the benches not to have armrests, so that the benches could accommodate more people.
Lobby Waiting Area	Benches should not have armrests in order to accommodate more travelers.
Lobby Waiting Area	Lots of empty space not being utilized. Second level of seating?
Lobby Waiting Area	Seems to be a very large space.
Lobby Waiting Area	Please have signs that state no alcoholic beverages. Plenty of Trash Cans. No loitering Signs.
Lobby Waiting Area	Does not need to be a Taj Majal
Lobby Waiting Area	I want it to feel safe enough for my LHS freshman to wait at alone.
Lobby Waiting Area	People sleeping in there, crime. Late to get on their buses.
Lobby Waiting Area	Good
Lobby Waiting Area	What are you thinking!?! All we need is what we had! Restrooms! To get something to eat or drink!!! Out of rain and hot sun and cold!!! What we have should stay the same!!! Stop spending money and enforce the around the bus stop!!
Lobby Waiting Area	Don't need to be fancy
Lobby Waiting Area	Nice lighting. Where are the socially distant seats?
Digital Signage	TOO SMALL. Too high up.
Digital Signage	Display is too small. People will need to crowd together closely to see it. It should be larger to people can keep walking while glancing at it
Digital Signage	You just need to make sure the font is large enough to see. Those are high up
Digital Signage	Let's get real!! What we have works just fine!!! People have your apps to do all that!!!
Digital Signage	Good
Digital Signage	the brick looks dated and trashy
Digital Signage	It seems like this should be standard; not something requiring a rating.
Digital Signage	Bigger, lower
Digital Signage	Blind and low vision people need to have access to the same information as other travelers. There will need to be an audio output feature for these devices.
Digital Signage	Blind and low vision people need to have access to the same information as other travelers. There will need to be an audio output feature for these devices.
Digital Signage	Blind and low vision people need to have access to the same information as other travelers. There will need to be an audio output feature for these devices.
Digital Signage	There should also be voice output in order to ensure that people who are blind and low vision have access to the same information.
Convenience Store	Please include some healthy snack options.
Convenience Store	Please include healthy snack options.
Convenience Store	Please include healthy options.
Convenience Store	This takes away from surrounding local businesses or opportunities for new business.
Convenience Store	Attendant should also be knowledgeable about area and business

Transit Center Topic	Comment
Convenience Store	Have fresh produce and coconut water
Convenience Store	trash cans are accessible in this area will be important.
Convenience Store	I like to eat fresher foods it's healthier for you and there is nothing to steal!!! Hot food not what you're thinking fast and cold.
Convenience Store	We don't need this we are not a city of a million or more
Convenience Store	Unstaffed 'convenience store' allows papers, etc. to be strewn about.
Convenience Store	This seems like a good start but consider leaving space to expand this to include more, serve more.
Passenger Services	Should have staff there
Passenger Services	Come on get real!!! We don't have the taxes to even take care of are roads!!! What you have works just fine.
Passenger Services	Color HD Video Cameras on the outside and inside of the help desk. Particularly if there is money transactions involved.
Passenger Services	San Francisco uses vending machines to dispense fare tickets. Why don't we do that instead of employing a person to do that?
Passenger Services	Am I rating the image or the service? This survey is confusing.
Passenger Services	That would be plus for us drivers. To have their questions answered and not taking up our time.
Passenger Services	Good
Passenger Services	Should be there from first bus to last bus
ATM	Would live this but my first thought is the people who hang out around sidewalk-facing ATMs downtown would love to intimidate us in the comfort of the transit center. Can you co-locate it with Passenger Services so staff see the people using it and prevent that?
ATM	Good
ATM	good chance for muggings
ATM	You do not need this at a bus stop!!!
ATM	If exact change required need it
Temperature Controls	Are these controls accessible to the public?
Temperature Controls	Duh
Temperature Controls	For real!?bump!!!
Temperature Controls	Junk
Temperature Controls	Who controls?
Seating at Bus Bays	middle bars are designed to prevent homeless sleeping. Sad, but probably a good idea
Seating at Bus Bays	We don't need this in my family, but I can see how this might be very important to many individuals.
Seating at Bus Bays	Might want to spread seating for distancing purposes

Transit Center Topic	Comment
Seating at Bus Bays	Seating as it appears in the image might not be adequate for people with mobility devices
Seating at Bus Bays	HD Video Recording Cameras should be a must in this area.
Seating at Bus Bays	More seats
Seating at Bus Bays	Benches should not have backs in order to accommodate more travelers.
Seating at Bus Bays	The benches should not have armrests in order to accommodate more people.
Seating at Bus Bays	The benches should not have armrests in order to accommodate more travelers.
Seating at Bus Bays	Would prefer if the benches did not have arm rests.
Seating at Bus Bays	Think you need to redo these for coronavirus social distancing.
Seating at Bus Bays	Common sense
Seating at Bus Bays	Good
Digital Displays	Good
Digital Displays	You need just one display!!!
Digital Displays	Helps
Digital Displays	too small. too high. Look to big metro areas on how they do things.
Digital Displays	Blind and low vision people need to have the same access to information as other travelers. There will need to be audible announcements as well that provide the same information.
Digital Displays	Blind and low vision people need to have access to the same information as other travelers. There will need to be an audio output feature for these devices.
Digital Displays	Blind and low vision people need to have access to the same information as other travelers. There will need to be an audio output feature for these devices.
Digital Displays	Blind and low vision people need to have access to the same information as other travelers. There will need to be an audio output feature for these devices.
Digital Displays	just in case the system malfunction, should have paper schedules available for passengers.
Digital Displays	Yes please
Digital Displays	Again, seems like this should be standard.
Windscreen Shelter	I don't quite understand how this option fits in - is this at bus stops across town or at the transit center.
Windscreen Shelter	The rules of loitering and must be enforce, otherwise this will be some home. NO SMOKING and NO Open Beverages of Alcohol signs should be present.
Windscreen Shelter	Benches should not have armrests in order to accommodate more travelers.
Windscreen Shelter	The benches should have backs.
Windscreen Shelter	It would be preferable for the benches to have backs.
Windscreen Shelter	You have covered platform no need for windscreen or free standing shelter
Windscreen Shelter	Nothing new
Windscreen Shelter	Need to just have the door open with four sides!!!
Windscreen Shelter	Good

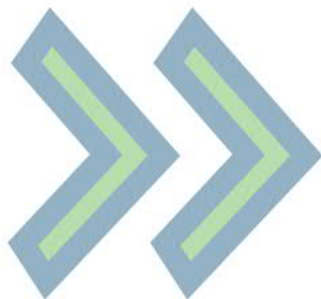
Transit Center Topic	Comment
Covered Platform	Good
Covered Platform	Dump!!! Keep it like it is!!
Covered Platform	Limited overhang doesn't appear to provide pedestrians and bus riders sufficient protection from the weather.
Covered Platform	Waste of money
Covered Platform	Pull in and back out? That doesn't seem efficient unless it's Greyhound.
Covered Platform	doesn't look very covered
Radiant Heaters	Better source and why are we heating the outdoors?
Radiant Heaters	That sounds lovely! Would never have thought of it.
Radiant Heaters	I give this 10 stars for the winter
Radiant Heaters	having a timer on these would be nice. Otherwise you will have people making this their home over night.
Radiant Heaters	As someone who has had to stand outside waiting for a bus in the winter these would be amazing. I'm just afraid our transient community would take over.
Radiant Heaters	Will draw homeless
Radiant Heaters	Dump!!! Bring it down so are feet can feel it!!! This is what gets the coldest on me for they get wet!!!
Radiant Heaters	Good
Radiant Heaters	warm is nice in winter
Vehicle Parking	Kiss and ride please. Plenty of garages in the area otherwise.
Vehicle Parking	How are you going to know if they are passengers who are parking here and not pedestrians who is looking for a place to park for football games or otherwise not connected at all to the out transit system.
Vehicle Parking	No unless it is underground and incorporated into a multiple use building
Vehicle Parking	At this point in time, I don't see Lincoln as a Park and Ride town, especially if the only parking is at the transit center. Why would I drive my car 20 minutes to downtown and not just drive the 20 minutes to work.
Vehicle Parking	Good
Vehicle Parking	Where??
Vehicle Parking	Why
Vehicle Parking	Depends on where the parking is in relation to the transfer station. Is this parking free?
Uber/Lyft Pickup Dropoff	Why
Uber/Lyft Pickup Dropoff	No need!!! I'm riding the bus!!!
Uber/Lyft Pickup Dropoff	Good
Uber/Lyft Pickup Dropoff	This may be helpful to some, but similar to vehicle parking, I imagine that if you're going to take an Uber, why wouldn't you just take it all the way?
Uber/Lyft Pickup Dropoff	GREAT idea!

Transit Center Topic	Comment
Uber/Lyft Pickup Dropoff	The more traffic in a bus area, the harder it is for us drivers.
Uber/Lyft Pickup Dropoff	Have to be clear away from the buses. So that the drivers wont get in the way of our buses.
Uber/Lyft Pickup Dropoff	This should be the whole system.
Solar	only if no added cost and can withstand NE hail storms
Solar	LOVE this!!!
Solar	And possible ground thermo as well
Solar	Only if cost efficient too.
Solar	Junk
Solar	Duh
Solar	will they pay for themselves before needing replaced? If not, waste of money just for the PR
Solar	Since there isn't a place to put comments anywhere else on a general nature. The proposed design is a waste of valuable real estate space in downtown Lincoln. And most other developments wouldn't allow the front facing of a parking lot on the street. Generally we want buildings facing the street. Also why can't you partner with a de eloped and go taller! I believe the building height limit there is close to 250 feet. This is an ugly bad design.
Solar	Whole area should be covered by those especially with electric buses coming online.
Shared Scooters	That looks like a lot of fun. :)
Shared Scooters	Junk
Shared Scooters	This image doesn't appear to provide racks or some other device to hold the scooters. Scooters may fall over or be placed at random.
Shared Scooters	Why not
Shared Scooters	Prefer not to see scooters, but I suppose a specific space is best. It will be necessary for staff to watch for ones laying around.
Shared Scooters	Cameras in this area will be a must.
Low Water Use Fixtures	Duh
Low Water Use Fixtures	be sure that they keep towels over air dryers. The cost is worth the benefit of improved sanitation! Air dryers blow germs all over the place!
Low Water Use Fixtures	Good
Low Water Use Fixtures	Good
Low Water Use Fixtures	Must have a custodian available to keep this area clean.
Bike Racks	What's this got to do with riding the bus??? I see so many bikes get messed up around the bus stop!!! Take it to the parking garage it will be safer thire!!!
Bike Racks	Can these hold a lot of bikes? Being able to lock up many bikes should be a consideration for the types of racks. They look nice though

Transit Center Topic	Comment
Bike Racks	These are dumb and how can they hold bikes. They also look like a nightmare to shovel snow around in the winter.
Bike Racks	These racks are not very useful. Need to choose a more universal design. The black racks in the Haymarket area are better.
Bike Racks	Duh
Bike Racks	Junk
Bike Racks	Make sure people with recumbent tricycles can use the bike racks
City Bike Share	My family is unlikely to utilize this; however, I can see how many people may find this important.
City Bike Share	Junk
City Bike Share	No way!!!
City Bike Share	Why not
LED Efficient Lighting	Yes
LED Efficient Lighting	Where???
LED Efficient Lighting	Good
Transit Center Tradeoffs	
Architecture: STAND OUT or BLEND IN	Don't do weird stuff.
Architecture: STAND OUT or BLEND IN	A combination of these two options would be my preference
Architecture: STAND OUT or BLEND IN	Leave things alone!!!
Architecture: STAND OUT or BLEND IN	A traditional enclosed design is preferred downtown
Design: INNOVATIVE or STATUS QUO	Dump
Design: INNOVATIVE or STATUS QUO	I like more modern, but this won't protect people from weather as well with the slanted roof.
Design: INNOVATIVE or STATUS QUO	whichever is least expensive
Security: TECHNOLOGY or PERSONNEL	I've worked at Gold's for years. I think you need both.
Security: TECHNOLOGY or PERSONNEL	Both!!
Security: TECHNOLOGY or PERSONNEL	Cameras are preferred but personnel available for immediate response should also be provided.

Transit Center Topic	Comment
Security: TECHNOLOGY or PERSONNEL	tech is good, but a visible reminder of security (person) does so much more for lowering crime (and creepers - few women comfortable riding city transport) also, security guard will create jobs!
Security: TECHNOLOGY or PERSONNEL	Both!
Security: TECHNOLOGY or PERSONNEL	both
Security: TECHNOLOGY or PERSONNEL	Technology as well as on site. The on site staff to back up technology. Local law enforcement already have enough to do. Park & Go also a lot to handle. Company contracted should be National not a Local with a multi year (3 year initial w/ opinional years.
Security: TECHNOLOGY or PERSONNEL	A combination of camera and personnel is desirable
Public Art: INTEGRATE ART or FEATURED ELEMENTS	Standalone art and building murals are desirable
Public Art: INTEGRATE ART or FEATURED ELEMENTS	Don't waste money on art, spend money on Makin functional and efficient
Public Art: INTEGRATE ART or FEATURED ELEMENTS	No one cares! We just want to get home.
Public Art: INTEGRATE ART or FEATURED ELEMENTS	save money
Public Art: INTEGRATE ART or FEATURED ELEMENTS	Art is NOT a significant feature!
Public Art: INTEGRATE ART or FEATURED ELEMENTS	Dump
Public Art: INTEGRATE ART or FEATURED ELEMENTS	Don't need art Keep it functional space
Public Art: INTEGRATE ART or	A combination of these two options would be my preference

Transit Center Topic	Comment
FEATURED ELEMENTS	
COMMUNITY SPACE or BUS SERVICE ONLY	Bus serve only.
COMMUNITY SPACE or BUS SERVICE ONLY	current "community interaction" is a lot of drug dealing and harassment of women
COMMUNITY SPACE or BUS SERVICE ONLY	Whatever the bus drivers want.



STARTRAN MULTIMODAL TRANSIT CENTER

Feasibility & Concept Design Study
Summer 2020

Executive Summary

A benefit-cost analysis (BCA) was conducted for the Multimodal Transit Transfer Center (MTTC) for submission to the U.S. Department of Transportation (USDOT) as a requirement of a discretionary grant application for the BUILD 2020 program. The analysis was conducted in accordance with the benefit-cost methodology as outlined by USDOT in the 2020 Benefit-Cost Analysis Guidance. The period of analysis corresponds to 33 years and includes 3 years of design and construction and 30 years of benefits after operations begin in 2023.

The project, located in Lancaster County in downtown Lincoln, Nebraska, will build a multimodal transportation center at the corner of Ninth and M Streets. This facility will provide indoor waiting areas, restrooms, and bicycle storage to passengers. It will also allow StarTran to establish administrative offices on site.

The current primary transfer location in downtown Lincoln, at the corner of 11th and N Streets, has suffered from traffic congestion, pedestrian circulation issues, and design challenges that delay bus trips by forcing operators to wait for the bus in front of them to depart. The location is undersized and is not conducive to the safe and timely transfer of passengers between bus lines.

The new transportation center will allow StarTran to expand on recent service enhancements implemented from its 2016 Transit Development Plan¹. This plan reconfigured many routes in the system, decreased headways and expanded operating hours for several key routes, and reconfigured interlined routes to maximize on-time performance. Additionally, StarTran eliminated flag stops in favor of only picking up passengers at designated stops in 2016, which improved on-time performance and safety for drivers and customers.

The transportation center will reduce bus passengers' travel times, encouraging additional transit trips due to the added safety of a dedicated, off-street facility. As a "pulse operations" facility, the transportation center will increase the efficiency of coordinated transfers of reduced duration. The transportation center will offer seating, protection from weather elements, and relief to bus operators.

In addition to promoting StarTran use due to enhanced wayfinding and system-wide efficiencies, the transportation center presents numerous additional benefits to the city of Lincoln. The facility will encourage economic development in the vicinity, including mixed-used and transit-oriented development (TOD).

The facility will accommodate a suite of mobility services, including, but not limited to; buses, pedestrians, cyclists, electric scooters, transportation network companies (i.e. Uber/Lyft), inter-city buses. Eventually, it would be conducive to bus rapid transit and autonomous vehicles. This will promote a network of non-automotive transportation in Lincoln, expanding access to employment, social and recreational opportunities to a broader swath of the regional population of all ages and abilities.

Transfer centers have successfully been implemented in several peer Midwestern cities, including Springfield, Missouri, and Des Moines and Sioux Falls, Iowa, allowing their bus networks to initiate efficient "pulse operations" with safer, element-protected transfer areas, while adding new businesses, community space, park-and-ride space and bicycle infrastructure to the community.

¹ City of Lincoln. April 2016. Transit Development Plan Study. <https://lincoln.ne.gov/city/ltu/startran/tdp/>

1.1 Costs

The capital cost for this Project is expected to be \$11.8 million in undiscounted 2018 dollars through 2022, as shown in Table ES-1. At a 7 percent real discount rate, these costs are \$10.0 million. These costs do not include escalation and therefore may differ from those reported in the application narrative.

Table ES-1: Project Costs by Category and Year, in Undiscounted Millions of 2018 Dollars

Cost Category	2020	2021	2022	Total
Construction	\$0.00	\$3.84	\$6.39	\$10.23
Professional Services	\$0.56	\$0.56	\$0.00	\$1.12
Other Costs	\$0.44	\$0.00	\$0.00	\$0.44
Total (Undiscounted)	\$1.00	\$4.40	\$6.39	\$11.79
Total (Discounted, 7%)	\$0.93	\$3.84	\$5.22	\$9.99

SOURCE: STARTRAN, WSP 2020

Operating and maintenance (O&M) costs are projected to total \$2.0 million in undiscounted 2018 dollars, or \$495,000 when discounted at 7 percent.

1.2 Benefits

In 2018 dollars, the Project is expected to generate \$17.2 million in discounted benefits using a 7 percent discount rate. These benefits are produced primarily via travel time savings for bus passengers, as well as reduced vehicle operating costs for drivers. This leads to an overall project Net Present Value (NPV) of \$7.7 million and a Benefit Cost Ratio (BCR) of 1.8. The overall project benefit matrix can be seen in Table ES-2.

Table ES-2: Project Impacts and Benefits Summary, Monetary Values in 2018 Dollars

Current Status/ Baseline & Problem to be Addressed	Change to Baseline	Type of Impact	Population Affected by Impact	Economic Benefit	Results Summary (7% Disc.)	Page Ref.
Bus transfers are not synced, and the on-street transfer point is haphazard, causing lengthy transfers and discouraging ridership.	New transfer center with pulse operations designed for the efficient, comfortable, simultaneous connections of passengers from multiple routes.	Decrease in transfer times	StarTran riders transferring between routes in downtown Lincoln	Travel Time Savings	\$16.8 Million	8
	New transportation center will streamline and simplify StarTran trips, encouraging a shift of passengers from automobile to bus.	Decrease in automobile vehicle operations costs	New StarTran riders	Vehicle Operating Cost Savings	\$0.5 Million	9
		Decrease in emissions levels	Residents of Lincoln	Emissions Reduction	\$2,701	9

SOURCE: WSP, 2020

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1 Introduction

A benefit-cost analysis (BCA) was conducted for the Multimodal Transit Transfer Center (MTTC) for submission to the U.S. Department of Transportation (USDOT) as a requirement of the grant application for the BUILD 2020 program. The following section describes the BCA framework, evaluation metrics, and report contents.

1.1 BCA Framework

A BCA is an evaluation framework to assess the economic advantages (benefits) and disadvantages (costs) of an investment alternative. Benefits and costs are broadly defined and are quantified in monetary terms to the extent possible. The overall goal of a BCA is to assess whether the expected benefits of a project justify the costs from a national perspective. A BCA framework attempts to capture the net welfare change created by a project, including cost savings and increases in welfare (benefits), as well as disbenefits where costs can be identified (e.g., project capital costs), and welfare reductions where some groups are expected to be made worse off as a result of the proposed project.

The BCA framework involves defining a Base or “No-Build” Case, which is compared to the “Build” Case, where the grant request is awarded and the project is built as proposed. The BCA assesses the incremental difference between the No-Build Case and the Build Case, which represents the net change in welfare. BCAs are forward-looking exercises which seek to assess the incremental change in welfare over a project lifecycle. The importance of future welfare changes is determined through discounting, which is meant to reflect both the opportunity cost of capital as well as the societal preference for the present.

The analysis was conducted in accordance with the benefit-cost methodology as recommended by USDOT in the 2020 Benefit-Cost Analysis Guidance for Discretionary Grant Programs.² This methodology includes the following analytical assumptions:

Defining existing and future conditions under a No-Build Case and under the Build Case;

Estimating benefits and costs during project construction and operation, including 30 years of operations beyond the Project completion when benefits accrue;

Using USDOT recommended monetized values for reduced injuries, travel time savings, and emissions, while relying on best practices for monetization of other benefits;

Presenting dollar values in real 2018 dollars. In instances where cost estimates and benefits valuations are expressed in historical or future dollar years, using an appropriate inflation factor to adjust the values; and

Discounting future benefits and costs with a real discount rate of 7 percent, consistent with USDOT guidance.

1.2 Report Contents

Section 2 of this Appendix contains a description of the Project elements, information on the general assumptions made in the analysis, and a description of the No-Build Case compared to the Build Case. Section 3 provides a summary of the anticipated Project costs. Section 4 reviews the expected economic benefits the Project would generate, including a review of the assumptions and methodology used to calculate the benefits. Section 5 reports the high-level results of the BCA, while Section 6 illustrates the results of a sensitivity analysis of key assumptions.

² U.S. Department of Transportation. Benefit-Cost Analysis Guidance for Discretionary Grant Programs. January 2020.

2 Project Overview

2.1 Description

A benefit-cost analysis (BCA) was conducted for the MTTC for submission to the U.S. Department of Transportation (USDOT) as a requirement of a discretionary grant application for the BUILD 2020 program. The analysis was conducted in accordance with the benefit-cost methodology as outlined by USDOT in the 2020 Benefit-Cost Analysis Guidance. The period of analysis corresponds to 33 years and includes 3 years of design and construction and 30 years of benefits after operations begin in 2023.

The project, located in Lancaster County in downtown Lincoln, Nebraska, will build a multimodal transportation center at the corner of Ninth and M Streets. This facility will provide indoor waiting areas, restrooms, and bicycle storage to passengers. It will also allow StarTran to establish administrative offices on site.

The current primary transfer location in downtown Lincoln, is an on-street transfer point at the corner of 11th and N Streets, has suffered from traffic congestion, pedestrian circulation issues, and design challenges that delay bus trips by forcing operators to wait for the bus in front of them to depart. The location is undersized and is not conducive to the safe and timely transfer of passengers between bus lines.

As a hub and spoke system, the transportation center is an integral replacement to the insufficient on-street transfer point at 11th and N Street. StarTran's ridership has grown steadily since 2011, owing to continued infill and fringe development in Lincoln that has expanded employment opportunities in all areas of the city³. Additionally, the University of Nebraska partners with StarTran to provide campus service with several routes.

The transportation center will allow StarTran to expand on recent service enhancements implemented from its 2016 Transit Development Plan⁴. This plan reconfigured the majority of routes in the system, decreased headways and expanded operating hours for several key routes, and reconfigured interlined routes to maximize on-time performance. This increased StarTran's viability as a commute option for all hours of the day. Additionally, StarTran eliminated flag stops in favor of only picking up passengers at designated stops in 2016, which improved on-time performance and safety for drivers and customers.

The transportation center will reduce bus passengers' travel times, encouraging additional transit trips due to the added safety of a dedicated, off-street facility. As a "pulse operations" facility, the transportation center will increase the efficiency of coordinated transfers of reduced duration. The transportation center will offer seating, protection from weather elements, and relief to bus operators.

In addition to promoting StarTran use due to enhanced wayfinding and system-wide efficiencies, the transportation center presents numerous additional benefits to the city of Lincoln. The facility will encourage economic development in the vicinity, including mixed-used and transit-oriented development (TOD).

The facility will accommodate a suite of mobility services, including, but not limited to buses, pedestrians, cyclists, electric scooters, transportation network companies (i.e. Uber/Lyft), and inter-city buses. Eventually, it would be conducive to bus rapid transit and autonomous vehicles. This will promote a network of non-automotive transportation in Lincoln, expanding access to employment, social and recreational opportunities to a broader swath of the regional population of all ages and abilities.

³ City of Lincoln. April 2016. Transit Development Plan Study, Final Report.

<https://lincoln.ne.gov/city/ltu/startran/tdp/pdf/tdp-final-report.pdf?april2016>

⁴ City of Lincoln. April 2016. Transit Development Plan Study. <https://lincoln.ne.gov/city/ltu/startran/tdp/>

Transfer centers have been successfully implemented in several peer Midwestern cities, including Springfield, Missouri, and Des Moines and Sioux Falls, Iowa, allowing their bus networks to initiate efficient “pulse operations” with safer, element-protected transfer areas, while adding additional community benefits such as new businesses, park-and-ride spaces and bicycle facilities.

2.2 General Assumptions

The evaluation period for this project includes a 3-year design and construction period, from 2020-2022, during which capital expenditures are undertaken, plus 30 years of operations beyond Project completion within which to accrue benefits, through 2052.

Dollar figures in this analysis are expressed in constant 2018 dollars (2018\$). Capital and O&M costs estimated in 2020 are conservatively assumed to reflect 2018 dollar values.

The real discount rate used for this analysis was 7.0 percent, consistent with USDOT guidance for 2020 BUILD grants and OMB Circular A-94.⁵

2.3 No-Build Case and Build Case

For the purposes of this BCA, the No-Build Case assumes that none of the proposed transfer station improvements described in Section 2.1 would be completed, and that the existing conditions of the StarTran network would remain in their current form.

The proposed project represents the Build Case.

⁵ White House Office of Management and Budget, [Circular A-94, Guidelines and Discount Rates for Benefit-Cost Analysis of Federal Programs](#) (October 29, 1992).

3 Project Costs

3.1 Capital Costs

Capital costs for the Project professional services/design costs expected to equal \$1.1 million in undiscounted dollars. Construction, which is planned to start in July 2021 and last through October 2022, is anticipated to cost \$10.2 million in undiscounted 2018 dollars. Other capital costs, including right-of-way acquisition total \$44,000 in undiscounted 2018 dollars. Together, these capital costs equate to \$11.8 million in undiscounted 2018 dollars, or \$10.0 million when discounted at 7 percent. These costs do not include escalation and therefore may differ from those reported in the application narrative. In addition, costs developed in 2020 are conservatively assumed to reflect 2018 dollars and are not reduced further from the 2020 valuation.

Table 1 presents cost information by type of expense and year of expenditure.

Table 1: Project Costs by Category and Year, in Millions of 2018 Dollars

Cost Category	2020	2021	2022	Total
Construction	\$0.00	\$3.84	\$6.39	\$10.23
Professional Services	\$0.56	\$0.56	\$0.00	\$1.12
Other Costs	\$0.44	\$0.00	\$0.00	\$0.44
Total (Undiscounted)	\$1.00	\$4.40	\$6.39	\$11.79
Total (Discounted, 7%)	\$0.93	\$3.84	\$5.22	\$9.99

SOURCE: STARTRAN, WSP 2020

3.2 Operating and Maintenance Costs

The annual costs of operating and maintaining the transportation center are included in the analysis, calculated as the net costs between the Build and No-Build scenarios. As the project consists of new construction, operations and maintenance (O&M) costs are incurred when the project opens in 2023, continuing throughout the analysis period.

In the “Build” Case, the O&M costs include annual preventive maintenance, annual maintenance and replacement (M&R), and periodic replacements for the transportation center building, as well as the periodic repair and replacement of the pavement. O&M costs for the new canopies are excluded, as these are assumed to be comparable to the O&M costs associated with the existing transfer point’s bus shelters, thus resulting in no net-change in costs (while the transfer station’s canopies will have a larger surface area than the existing transfer point’s bus shelters, they will use lower-maintenance materials).

The schedule of net undiscounted O&M costs for the Project are shown for each year in Table 2. Total net O&M costs for the Project are estimated to be \$2.0 million in undiscounted dollars, or \$495,000 in present value using a 7 percent discount rate. Per USDOT guidance, these net O&M costs are included as a negative benefit in the numerator of the benefit-cost equation.

Table 2: Schedule of Operations and Maintenance Costs (in Undiscounted 2018 Dollars)

Year	Building			Pavement	Total
	Preventive	M&R	Replacement	Repair/Replacement	
2023	\$15,072	\$9,168	\$0	\$0	\$24,240
2024	\$15,072	\$9,305	\$0	\$0	\$24,377
2025	\$15,072	\$9,620	\$0	\$0	\$24,691
2026	\$15,072	\$14,145	\$0	\$0	\$29,217
2027	\$15,072	\$16,308	\$0	\$10,000	\$41,380
2028	\$15,072	\$9,757	\$0	\$0	\$24,828
2029	\$15,072	\$9,260	\$0	\$0	\$24,332
2030	\$15,072	\$14,333	\$49,680	\$0	\$79,085
2031	\$15,072	\$12,167	\$0	\$0	\$27,238
2032	\$11,506	\$19,920	\$6,242	\$10,000	\$47,669
2033	\$15,072	\$9,168	\$0	\$0	\$24,240
2034	\$15,072	\$16,154	\$0	\$0	\$31,226
2035	\$15,072	\$9,168	\$0	\$0	\$24,240
2036	\$15,072	\$9,397	\$0	\$0	\$24,469
2037	\$12,285	\$51,529	\$37,353	\$10,000	\$111,167
2038	\$15,072	\$14,333	\$49,680	\$0	\$79,085
2039	\$15,072	\$9,168	\$0	\$0	\$24,240
2040	\$15,072	\$12,304	\$0	\$0	\$27,375
2041	\$15,072	\$9,168	\$0	\$0	\$24,240
2042	\$8,921	\$259,456	\$27,404	\$10,000	\$305,782
2043	\$15,072	\$9,712	\$0	\$0	\$24,783
2044	\$15,072	\$9,305	\$0	\$0	\$24,377
2045	\$15,072	\$9,168	\$0	\$0	\$24,240
2046	\$15,072	\$16,342	\$49,680	\$0	\$81,094
2047	\$14,957	\$162,740	\$75,366	\$10,000	\$263,064
2048	\$15,072	\$9,305	\$0	\$0	\$24,377
2049	\$15,072	\$12,167	\$0	\$0	\$27,238
2050	\$15,072	\$14,237	\$0	\$0	\$29,309
2051	\$15,072	\$9,168	\$0	\$0	\$24,240
2052	\$8,720	\$50,693	\$408,924	\$10,000	\$478,336
Total	\$433,179	\$826,670	\$704,331	\$60,000	\$2,024,180

SOURCE: WSP, 2020

4 Project Benefits

The Project generates benefits primarily by:

- Increasing travel time savings of bus passengers
- Generating new transit trips and thereby decreasing automobile vehicle miles travelled and the consequent vehicle operating costs and emissions
- Enhancing the city's economic competitiveness
- Enhancing quality of life for city residents

These benefits are monetized and quantified in the sub-sections that follow, and the assumptions used to calculate the monetary values of the benefits are also described. Non-quantifiable benefits are also described qualitatively.

The first portion of this section discusses the assumptions around travel demand under both the No-Build case and the Build alternative. The section then reviews the project's quantitative and qualitative benefits, and the assumptions behind them.

4.1 Demand Projections

To estimate the primary population anticipated to benefit from the Project, the analysis relies on StarTran ridership data for the weekday morning peak, weekday off-peak, and Saturday ridership in the September 2019 service period.⁶ Only those routes that will use the transfer center are included in the estimate. Furthermore, this ridership is adjusted based on share of riders estimated to transfer between routes – assumed to be 19.8 percent based on a 2014 StarTran study.⁷

Additionally, historical growth, as determined from StarTran's reporting to the National Transit Dataset, is used to estimate future baseline growth in system ridership. All assumptions used in the ridership project calculations are shown below in Table 3, while Table 4 shows the projected number of passengers that will benefit from the Project.

Table 3: Ridership Projection Assumptions and Sources

Variable	Unit	Value	Source
Annual Unlinked Bus Trips, 2013	Trips/Year	2,189,078	National Transit Dataset, 2013
Annual Unlinked Bus Trips, 2018	Trips/Year	2,395,752	National Transit Dataset, 2018
Compound Annual Growth in Trips	Percent	1.82%	WSP Calculations, 2020
Daily Trips on MTTC Routes, Weekdays	Trips/Day	7,340	StarTran, APC-Generated Ridership Analysis, Sept. 2019
Daily Trips on MTTC Routes, Saturdays	Trips/Day	2,412	StarTran, APC-Generated Ridership Analysis, Sept. 2019
Weekdays of Service (Excluding Six Holidays)	Days	254	Assumption
Weekend Days of Service (Saturday)	Days	52.5	Assumption
Share of Trips Transferring	%	19.8%	"StarTransfers," 2014
Time Elasticity of Demand	Factor	-0.129	Victoria Transport Policy Institute, 2019

⁶ StarTran. APC-Generated Ridership Analysis, September 1-31, 2019. Received October 14, 2019.

⁷ StarTransfers, 2014, A comprehensive look at the where, how and why of transfers related to 31-day pass users at the 11th and N Gold's Building downtown transfer site.

In addition to the baseline ridership growth anticipated, the Project is expected to attract new riders to the system due to the shorter transfer times and the amenities at the MTTC. The attraction of new riders is calculated using estimates of the time elasticity of demand associated with a reduction of bus travel time.⁸ Based on the elasticity of -.129 and an estimated change in total travel time of between 15 and 17 percent (reflecting off-peak/Saturday compared to peak), Build ridership is estimated to be approximately 2% higher than Baseline ridership. Table 4 shows the additional annual transfers anticipated under the Build scenario, which total approximately 360,000 new trips over the 30-year operations period.

Table 4: Ridership Projections

	2020	2023	2032	2042	2052	30-Year Total
Existing Transfers - AM Peak	244,312	257,901	303,374	363,362	435,212	10,920,115
Existing Transfers - Weekday	131,553	138,870	163,355	195,656	234,345	5,880,062
Existing Transfers - Saturday	25,529	26,949	31,701	37,969	45,477	1,141,092
Existing Transfers - Total	401,394	423,720	498,430	596,987	715,033	17,941,269
New Transfers - AM Peak	-	5,805	6,829	8,179	9,796	229,006
New Transfers - Weekday Off-peak	-	2,764	3,251	3,894	4,664	109,025
New Transfers - Saturday	-	543	639	766	917	21,437
New Transfers - Total	-	9,112	10,719	12,839	15,377	359,469

SOURCE: WSP, 2020

These trips are assumed to reflect shifts from automobile travel. Based on 2019 StarTran data, the average trip length per transferring rider is 6.46 miles on weekdays, and 7.13 miles on weekends. This length is multiplied by the number of new transfers shown in Table 4 and divided by average vehicle occupancy to calculate the change in vehicle miles of travel. These assumptions are shown in Table 5, and annual VMT reduction estimates are shown in Table 6.

Table 5: VMT Reduction Assumptions and Sources

Variable	Unit	Value	Source
Average Trip Length, Weekday	Miles	6.46	StarTran, APC-Generated Ridership Analysis, Sept. 2019
Average Trip Length, Saturday	Miles	7.13	StarTran, APC-Generated Ridership Analysis, Sept. 2019
Vehicle Occupancy, Weekday Peak	Occupants per vehicle	1.48	USDOT BCA Guidance, 2020
Vehicle Occupancy, Weekday Off-peak	Occupants per vehicle	1.58	USDOT BCA Guidance, 2020
Vehicle Occupancy, Weekend	Occupants per vehicle	2.02	USDOT BCA Guidance, 2020

Table 6: VMT Reduction Projections

	2020	2023	2032	2042	2052	30-Year Total
VMT Reduction - AM Peak	-	55,539	65,331	78,249	93,722	2,190,903
VMT Reduction - Weekday Off-peak	-	28,227	33,204	39,770	47,634	1,113,522
VMT Reduction - Saturday	-	7,825	9,205	11,025	13,206	308,701
VMT Reduction - Total	-	91,591	107,741	129,045	154,562	3,613,126

SOURCE: WSP, 2020

⁸ Victoria Transport Policy Institute, Understanding Transport Demands and Elasticities, 2019, Table 31 Travel Time Elasticities and Cross Elasticities, citing Dowling Asso. 2005, <https://www.vtpi.org/elasticities.pdf>

The annual ridership and VMT projections are utilized to calculate several benefits in this report.

4.2 Economic Competitiveness

This Project would contribute to increasing the economic competitiveness of Lincoln and the United States through improvements in the mobility of people in the study area. Two types of societal benefits are measured in the assessment of economic competitiveness: travel time savings and vehicle operating cost savings.

4.2.1 Travel Time Savings

As described in the Project Description, StarTran’s current scheduling and infrastructure at the on-street transfer point hamper passengers’ ability to seamlessly and quickly transfer between lines. The MTTC will provide more bus bays to increase efficiency of connections and transfers between routes. The current configuration has capacity for five buses at one time; demand reaches 15 buses at one time. To accommodate today’s demand, bus schedules are offset by five minutes to stagger arrivals at the existing downtown transfer site. Transfers in the second and third wave of buses typically miss opportunities to transfer to buses that arrived in the earlier wave of buses. Because buses operate at 30- and 60-minute frequencies, riders that miss transfers to earlier buses can wait up to 50 minutes for the next bus.

Travel time savings were determined by calculating the difference between the current average transfer time at 11th and N Streets and the average transfer time under a new pulse operations system. These savings were calculated for StarTran’s three schedule blocks: morning peak service, weekday off-peak service, and Saturday service, as shown on a per-trip basis in Table 7. Per-trip savings are multiplied by the estimated number of baseline transferring passengers, shown above in Table 4, to estimate the total hours of travel time saved each year. In total, the project will save 1.8 million hours of travel time over the 30-year operations period.

Table 7: Travel Time Savings Assumptions and Sources

Variable	Unit	Value	Source
Value of Travel Time Savings – Personal (Wait-time)	2018\$ per person hour	\$30.40	US DOT Guidance, 2020
Value of Travel Time Savings – Business	2018\$ per person hour	\$27.10	US DOT Guidance, 2020
Personal Share of Total Person-Miles of Travel	%	88.2%	US DOT Guidance, 2020
Business Share of Total Person-Miles of Travel	%	11.8%	US DOT Guidance, 2020
AM/PM Peak Transfer Time Savings	Minutes	6.48	WSP Calculations, 2020
Weekday Transfer Time Savings	Minutes	6.21	WSP Calculations, 2020
Saturday Transfer Time Savings	Minutes	7.50	WSP Calculations, 2020

These benefits were monetized by multiplying the hours of benefits by the value of time for bus passengers. Per USDOT guidance, because the time savings is related to a reduction in waiting/transfer time, a higher value-of-time assumption is used for personal travel. Travel time savings benefits total \$16.8 million in present value over the 30-year analysis period (see Table 8).

Table 8: Travel Time Savings Benefits, Millions of 2018 Dollars

Benefit	Project Opening Year		Project Lifecycle	
	Undiscounted	Discounted (7%)	Undiscounted	Discounted (7%)
Travel Time Savings - Bus Passengers	\$1.37	\$1.05	\$54.21	\$16.77

SOURCE: WSP, 2020

4.2.2 Vehicle Operating Cost Savings

The MTTC is expected to attract new transit riders to the system because of the transit system efficiencies and improved personal safety associated with the new facility. Those who shift travel mode from personal automobile (single occupant vehicle) to transit will reduce their personal vehicle operating costs. Vehicle operating cost savings are calculated by multiplying the reduction in vehicle miles traveled (shown above in Table 6) by operating costs per mile.

Average automobile operating costs per mile are assumed to be \$0.41 (2018 \$) per mile for light duty vehicles in accordance with USDOT’s 2020 BCA Guidance.

Total operating cost savings in the Build scenario over the analysis period are estimated at \$460,000 in present value, as shown in Table 9.

Table 9: Vehicle Operating Cost Savings Benefits, Millions of 2018 Dollars

Benefit	Project Opening Year		Project Lifecycle	
	Undiscounted	Discounted (7%)	Undiscounted	Discounted (7%)
Vehicle O&M Costs - Auto	\$0.04	\$0.03	\$1.48	\$0.46

SOURCE: WSP, 2020

4.3 Environmental Sustainability

The Project will generate environmental sustainability benefits related to reduction in air pollution associated with a reduction in Vehicle Miles Travelled (VMT) from passengers shifting from automobile trips to bus. This will result in lower fuel consumption and a reduction in the release of pollutants. For this analysis, six forms of emissions were identified, measured and monetized, including: nitrous oxide (NOx), particulate matter (PM2.5 and PM10), sulfur dioxide (SO₂), volatile organic compounds (VOC), and carbon dioxide (CO₂).

The emissions analysis follows a similar methodology as the vehicle operating cost savings, using avoided automobile VMT and per-mile emission rates to calculate the change in emissions under the Build scenario, relative to the No-Build scenario. The reduction in emissions between the two alternatives is then multiplied by the value of emissions reductions provided by USDOT.

The assumptions used in the estimation of environmental sustainability benefits are presented in Table 10.

Table 10: Environmental Sustainability Benefits Assumptions and Sources

Variable	Unit	Value	Source
Cost of NOx	2018\$ per short ton	\$8,600	US DOT, BCA Guidance 2020
Cost of PM	2018\$ per short ton	\$387,300	US DOT, BCA Guidance 2020
Cost of SO ₂	2018\$ per short ton	\$50,100	US DOT, BCA Guidance 2020
Cost of VOC	2018\$ per short ton	\$2,100	US DOT, BCA Guidance 2020
Cost of CO ₂	2018\$ per metric ton	\$1 through 2035, \$2 thereafter	US DOT, BCA Guidance 2020
Emissions per VMT	Metric tons of emissions per VMT	Varies by year, fuel type, and emission type	MOVES 2014b

Over the 20-year analysis period, the Project will result in nearly 747 fewer tons of emissions than under the No-Build alternative, valued at \$283 discounted 2018 dollars. Table 11 shows the amount and value of emissions savings as a result of the Project.

Table 11: Environmental Sustainability Benefits, 2018 Dollars

Benefit	Undiscounted	Discounted (7%)
CO ₂ Emissions Reduction	\$692.99	\$282.62
NOx Emissions Reduction	\$2,831.47	\$971.65
SOx Emissions Reduction	\$3,199.27	\$1,097.88
PM Emissions Reduction	\$31.40	\$12.23
VOC Emissions Reduction	\$1,208.89	\$337.02
Total Emissions Reduction	\$7,964.01	\$2,701.40

SOURCE: WSP, 2020

4.4 Residual Value

In addition, as the Project’s useful life exceeds the analysis period, a “residual value” is calculated to represent the remaining value of the Project at the end of the analysis period. The capital cost of construction, excluding design and land costs, is estimated to be \$10.2 million in 2018 dollars. This value is assumed to depreciate linearly over 40 years, such that at the end of the analysis, \$2.6 million remains as undiscounted value. When discounted using a 7 percent rate, this equates to \$274,270 in present value, as shown in Table 12.

Table 12: Residual Value Estimation of Benefits, Millions of 2018 Dollars

Benefit	Final Analysis Year	
	Undiscounted	Discounted (7%)
Residual Value	\$2.56	\$0.27

SOURCE: WSP, 2020

4.5 Safety

The transportation center is expected to promote customer safety while transferring between StarTran routes, by creating an indoor waiting area for transfer passengers, opposed to an informal, on-street transfer point. Additionally, the design of bus bays for pulse operations will enable safer operation of buses in and out of the facility, as it will add lanes to allow drivers to avoid incidents where drivers cannot navigate around other buses.

However, these benefits are difficult to quantify, and therefore have not been included in the benefit-cost analysis.

4.6 Quality of Life

The Project will create several non-quantifiable quality of life benefits:

- Improve safety, comfort, and convenience of StarTran passengers
- Improve StarTran's operational efficiency and reliability, making it a more enticing and useful service for Lincoln residents
- Establish a vibrant and modern facility that encourages StarTran ridership, as well as economic development in the surrounding vicinity, such as mixed-used development and other transit-oriented development (TOD) projects.
- Promote a network of non-automobile transportation in Lincoln (including buses, pedestrians, cyclists, electric scooters, and more), thereby expanding access to employment, social and recreational opportunities to a broader swath of the regional population of all ages and abilities.

5 Summary of Results

5.1 Evaluation Measures

The BCA converts potential gains (benefits) and losses (costs) from the Project into monetary units and compares them. The following common benefit-cost evaluation measures are included in this BCA:

- **Net Present Value (NPV):** NPV compares the net benefits (benefits minus costs) after being discounted to present values using the real discount rate assumption. The NPV provides a perspective on the overall dollar magnitude of cash flows over time in today's dollar terms.
- **Benefit Cost Ratio (BCR):** The evaluation also estimates the BCR; the present value of incremental benefits is divided by the present value of incremental costs to yield the BCR. The BCR expresses the relation of discounted benefits to discounted costs as a measure of the extent to which a project's benefits either exceed or fall short of the costs.
- **Internal Rate of Return (IRR):** The IRR is the discount rate which makes the NPV from the Project equal to zero. In other words, it is the discount rate at which the Project breaks even. Generally, the greater the IRR, the more desirable the Project.
- **Payback Period:** The payback period refers to the period of time required to recover the funds expended on a Project. When calculating the payback period, the time value of money (discounting) is not taken into account.

5.2 BCA Results

Table 13 presents the evaluation results for the Project. Results are presented in undiscounted values and discounted at 7 percent as prescribed by the USDOT. All benefits and costs were estimated in constant 2018 dollars over an evaluation period extending 30 years beyond project completion in 2023.

At a discount rate of 7 percent, the Project yields total benefits of \$17.0 million and total costs of \$10.0 million, yielding a BCR of 1.8 and an NPV of \$7.0 million. The IRR is 12 percent and the payback period is 16.6 years. These results indicate that the benefits of the Multimodal Transit Transfer Center far outweigh its costs.

Table 13: Benefit Cost Analysis Results, Millions of 2018 Dollars

BCA Metric	Undiscounted	Discounted (7%)
Total Benefits	\$56.2	\$17.0
Travel Time Savings	\$54.2	\$16.8
Vehicle Operating Cost Savings (including Fuel)	\$1.5	\$0.5
Reduced Emissions	\$0.008	\$0.003
Reduced Agency O&M Costs	(\$2.0)	(\$0.5)
Residual Value	\$2.6	\$0.3
Total Costs	\$11.8	\$10.0
Net Present Value (NPV)	\$44.4	\$7.0
Benefit Cost Ratio (BCR)	4.8	1.7
Internal Rate of Return (IRR)		12%
Payback Period (Years)		16.6

SOURCE: WSP, 2020

6 Sensitivity Analysis

This analysis relies on many assumptions that, while based on the best available knowledge, are uncertain. This sensitivity analysis evaluates the impact of adjusting key assumptions on the BCR and NPV. As Table 14 demonstrates, even if all key assumptions are adjusted at the same time, the Project's benefits still exceed the costs.

Table 14: Sensitivity Analysis

Changes	BCR	NPV
No Change to Assumptions	1.7	\$7.0
Travel Time Savings Decreases by 10%	1.5	\$5.3
Base Ridership Decreases by 10%	1.5	\$5.3
No New Transfer Trips (Elasticity = 0)	1.7	\$6.6
No Residual Value (MTTC Fully Depreciates by 2052)	1.7	\$6.7
Capital Costs Increase by 25%	1.1	\$2.0
O&M Costs Increase by 25%	1.7	\$6.9
All Adjustments Combined	1.0	\$0.5



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