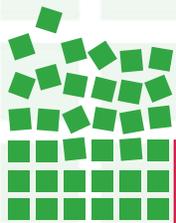


University of Nebraska
Lincoln, NE

Transit System Evaluation

September 2009

09-012



CHANCE
MANAGEMENT ADVISORS, INC.

TABLE OF CONTENTS

<u>Section</u>	<u>Page</u>
I. BACKGROUND AND METHODS	1
II. ROUTE COVERAGE AND BUS STOP RECOMMENDATIONS	2
Key Findings	2
Current Route Service Characteristics	3
Recommendations	7
Proposed Route Service Characteristics	8
III. TRANSIT SERVICE OPERATING TIMES, POTENTIAL SCHEDULES AND RIDERSHIP CAPACITY	11
Perimeter and Garage Route	11
StarTran Route 24 Intercampus (Clockwise)	11
UNL Route 24 Intercampus (Counterclockwise)	11
Projected Ridership Capacity	12
IV. TRANSIT SERVICE STAFFING AND SPECIAL EVENT SERVICE	14
Special Event Service Planning	14
V. CAPABILITIES OF THE CURRENT UNL BUS FLEET	16
Bus Fleet Replacement and Technology Options	17
Bus Fleet Recommendations	19
VI. FINANCIAL AND CONTRACTURAL CONSIDERATIONS	23
Operating and Capital Costs	23
Effectiveness Evaluation of the UNL City and East Campus	
Contract Service with StarTran	23
Comparison of Contract vs. In-House Operation	24
Role of UNL Transit Service to Support Campus Parking	25
VII. CONCLUSIONS	26
APPENDIX A: Perimeter and Garage Route Map	
APPENDIX B: Route 24 Intercampus Map	
APPENDIX C: Route 24 Intercampus Map (circulation around City Campus)	

TABLES AND FIGURES

<u>Table/Figure</u>	<u>Page</u>
TABLE 1: Perimeter and Garage Route	3
TABLE 2: 19 th /23 rd Streets Route	4
TABLE 3: StarTran Route 24	5
TABLE 4: East Campus Daytime Shuttle Express	5
TABLE 5: Intercampus Night Van Service	6
TABLE 6: Perimeter and Garage Route	8
TABLE 7: StarTran Route 24 (Clockwise) Intercampus Route	9
TABLE 8: StarTran Route 24 Intercampus: Counterclockwise	10
TABLE 9: Current Peak Service Capacity (9:30 a.m. – 1:00 p.m. Monday-Friday)	13
TABLE 10: Proposed Peak Service Capacity (9:30 a.m. – 1:00 p.m. Monday-Friday)	13
TABLE 11: Net UNL Transit System Driver Hours Saved	14
TABLE 12: Key RFP Requirements for Low Floor Transit Buses	18
TABLE 13: Comparative Features: Low Floor and Non-Low Floor Buses	20

I. BACKGROUND AND METHODS

CHANCE Management Advisors, Inc. (CMA) conducted a Transit System Evaluation of the transit services serving the University of Nebraska – Lincoln (UNL). *CMA's* evaluation examined three routes operated by UNL: the Perimeter Route, the 19th/23rd Streets Route and the Intercampus Night Van Route. Also examined was one route operated by the City of Lincoln's transit system: the StarTran Route 24 between East Campus and City Campus. UNL supplements the capacity of the Route 24 service with one bus operating in an express manner between East Campus – Burr/Fedde and City Campus – Henzlik from 10:30 a.m. to 4:30 p.m. These services are available to all UNL students, faculty and staff with the appropriate bus pass and University ID.

Key elements of the UNL Transit System Evaluation by *CMA* included identifying service and operations improvements, potential for reducing operating costs, optimizing route coverage and bus stop configurations and the capacity and capabilities of the current UNL bus fleet. A key requirement of this study was to develop improvements that can be accomplished within the existing University budget for campus shuttle bus services.

This study also sought to answer a key question for UNL: "Does UNL need a transit system?" As documented in this study the answer is "yes", because a number of transit needs were identified for UNL students, staff and faculty that can be served with improved transit service using existing UNL and StarTran resources.

Despite some of the concerns about the limitations of the current UNL transit service, the demand and need for the service has been strong enough to create an increase in ridership of over 16 percent since 2005-2006. The recommendations developed in this study are designed to continue ridership growth and to support UNL campus parking and master plans and the university's sustainability initiatives.



Boarding UNL East Campus daytime shuttle express at Burr-Fedde

II. ROUTE COVERAGE AND BUS STOP RECOMMENDATIONS

Key Findings

A summary of the key findings about route coverage and bus stops includes the following:

- The single direction of the UNL and StarTran route structures limits the usefulness of the service for passengers.
- None of the routes provides a link to travel from the 17th and R Garage to campus destinations along R Street.
- The Perimeter Route operates a significant portion of its service with few or no passengers on most trips throughout the day.
- Perimeter Route low ridership results in a poor utilization of UNL vehicles and budget resources.
- With the exception of the Perimeter Route, most bus passengers were not traveling to or from a UNL parking facility.
- Perimeter/Garage and the 19th/23rd Street routes do not operate on a scheduled basis, which creates waiting time uncertainty for passengers.
- The 19th/23rd Street area needs service to East Campus. Currently students are using a circuitous connection in the wrong direction via the City Campus and changing buses at Henzlik Hall.
- Passenger information and bus destination signs were not consistent or readily available at stops and onboard the buses.
- The route structure of the 19th/23rd Street Route and Route 24 creates an unbalanced pattern of bus congestion in a single direction at the Henzlik Hall stop. Only the Perimeter/Garage Route operates in the opposite direction.
- StarTran is a strong transit partner for UNL.
- Some StarTran Route 24 trips are overcrowded with standees.
- Buses stopping and buses laying over create congestion at Henzlik Hall.
- Bus destinations signs are not always clear and consistent.
- Transit operations leaving East Campus on 35th at Holdrege are slowed and delayed by vehicles attempting to turn left onto Holdrege at a stop sign



Perimeter/Garage Bus at the Stadium Garage stop

Current Route Service Characteristics

The tables below present the characteristics of the current UNL routes and the findings about them from the observations and analysis conducted.

University Of Nebraska – Lincoln
TRANSIT SYSTEM EVALUATION

TABLE 1: Perimeter And Garage Route

Characteristics	Findings
Circuitous, one way loop route operating from 6:30 a.m. until 6:30 p.m.	Best serves riders in a single direction; return trips require lengthy travel times
Operates without a specific schedule; buses and vans operate in a continuous cycle around the route	Creates uncertainty for waiting passengers
Utilizes a wide range of vehicles: vans, cut-away shuttles, school buses, transit buses	Creates confusing image and identity for passengers; comfort and reliability varies
Most trips carry few or no passengers	Low ridership results in poor utilization of UNL bus fleet and budget resources; creates perception among UNL staff and students that the buses waste fuel
Many passengers only use service in one direction	The route is serving only part of the demand
Many passengers boarding at the three garage stops do not appear to be parking patrons	The route does not appear to be providing park and ride trips from the garages
Most passengers seemed to originate or be destined to residences on New Hampshire and its parking lot	Route has very little ridership between Intercampus points such as the 16 th and Avery, 17 th and R and the Stadium Garage
Single direction operation requires loop around the Stadium Garage to make the stop	This operating constraint adds time that is undesirable for passengers
Single direction, lengthy route limits attractiveness of route	Most passengers are traveling from the New Hampshire Street area to Henzlik and from the Stadium garage to NH St.
Only the 14 th and Avery Garage has service in both directions	This usually creates empty buses approaching the 17 th and R and Stadium garage
Destination signs vary on shuttles	Creates confusing passenger information

CHANCE Management Advisors, Inc.

University Of Nebraska – Lincoln
 TRANSIT SYSTEM EVALUATION

TABLE 2: 19th/23rd Streets Route

Characteristics	Findings
Circuitous, one way loop route operating from 6:30 a.m. until 11:30 p.m.	Best serves riders in a single direction; return trips require lengthy travel times
Operates without a specific schedule; buses operate in a continuous cycle around the route	Creates uncertainty for waiting passengers
Utilizes large conventional and low-floor transit buses	Provides comfortable ride for passengers
Serves most destinations in a single direction	Creates some overlap of passengers and contributes to overcrowding
Single direction service along R Street to the 17 th and R Street Garage	Provides a popular service but only in one direction
Provides single direction service from 23 rd Street to Henzlik Hall and the heart of the UNL City Campus	Does not provide direct service to R Street or accessible return service from campus to 23 rd Street
Route and stops are concentrated on the east side of the City Campus	Does not provide a link between 23 rd Street and the stadium area of the City Campus
Significant number of passengers transfer at Henzlik Hall to travel to and from East Campus	Connections can be inconvenient; creates a slow, circuitous way to reach the East Campus

CHANCE Management Advisors, Inc.



19th/23rd Street Route at 17th and R Streets

University Of Nebraska – Lincoln
 TRANSIT SYSTEM EVALUATION

TABLE 3: StarTran Route 24

Characteristics	Findings
Circuitous route structure on City Campus	Requires time consuming loops around Henzlik Hall area
Operates on a published, fixed schedule from 7:00 a.m. until 6:00 p.m.	Helps passengers to coordinate activities with the bus schedule
Route and stops are concentrated on the eastside of the City Campus	Does not provide a link between the East Campus and the stadium area of the City Campus
Route loops around Henzlik Hall area	Creates longer trip times for passengers traveling to and from the R Street area of campus
Service ends at 6:00 p.m.	Requires passengers to use infrequent UNL Intercampus van service

CHANCE Management Advisors, Inc.

University Of Nebraska – Lincoln
 TRANSIT SYSTEM EVALUATION

TABLE 4: East Campus Daytime Shuttle Express

Characteristics	Findings
Direct, non-stop service between East Campus (Burr-Fedde) and City Campus (Henzlik)	Popular for a quick trip between each campus
Operates on a published, fixed schedule	Helps passengers to coordinate activities with the bus schedule
Operates every 30 minutes	Waiting time between buses is significantly longer than the actual travel time between campuses
Route loops around East Campus	Provides access to all East Campus stops
One bus operates twice per hour 10:30 a.m. until 4:30 p.m.	Requires bus to layover several minutes on each campus between runs adding to congestion at Henzlik; limited capacity results in crowded buses at peak class change times

CHANCE Management Advisors, Inc.

University Of Nebraska – Lincoln
 TRANSIT SYSTEM EVALUATION

TABLE 5: Intercampus Night Van Service

Characteristics	Findings
Direct route from East Campus (Burr/Fedde) to City Campus (Union)	Provides a quick travel time
Operates on a published, fixed schedule	Helps passengers to coordinate activities with the van schedule
Service operates every 45 minutes from 6:15 p.m. until 10:15 p.m.	Infrequent schedule, Wait time for van greatly exceeds the actual travel time

CHANCE Management Advisors, Inc.

StarTran Route 24 at Burr-Fedde



Intercampus Night Van at East Campus



Recommendations

Based on the UNL Transit System Evaluation, including onsite observations of current UNL transit services, *CMA* prepared the following recommendations:

- Restructure the Perimeter and Garage Route to link Henzlik Hall, 14th and Avery Garage area and the Stadium Garage area with the New Hampshire Street area.
- Operate the Perimeter and Garage Route as an on-call van service with two vans during the day: one van waiting on standby at the New Hampshire parking lot and one van at the Henzlik Hall; one van on stand by at night at Henzlik Hall until 9:15 p.m.
- Discontinue the 19th/23rd Street Route.
- Discontinue the East Campus Daytime Shuttle Express.
- Discontinue the Intercampus Night Van.
- Restructure the StarTran Route 24 to operate in a clockwise direction on the new proposed Route 24 Intercampus (East Campus – City Campus) route via 27th Street, Vine, 23rd, Q, 18th, R, 13th, Q, Stadium on 10th Street, Salt Creek, 14th and returning to East Campus via Vine St, 27th Street and Holdrege Street.
- Reassign the resources from the discontinued UNL services to operate a new counterclockwise service on the new proposed Route 24 Intercampus (East Campus – City Campus) route via 27th Street, Vine, 14th, Salt Creek, 9th, P, 12th, R, 18th, P, 23rd, Vine and returning to East Campus via 27th and Holdrege Street.
- Operate the new Route 24 services every ten minutes until 6:00 p.m. with four buses on each route then every 20 minutes after 6:00 p.m. until midnight with two buses on each route.
- Restructured Route 24 services can provide important service from both campuses to the new UNL Child Care Center on Vine Street.
- Restructured routes eliminate the need to construct a new bus stop on 16th Street.
- Restructured routes provide more frequent, convenient service to support a “park once” policy in perimeter garages and surface parking lots on both UNL campuses.
- Restructured Route 24 services provide excellent circulation around City Campus in both directions and new direct service to the Stadium area of campus
- Close the East Campus entrance at 35th and Holdrege to all vehicles except authorized transit and UNL vehicles; all other vehicles should use the signaled intersection at 38th Street. This is necessary to reliably operate the increase of buses departing East Campus every five minutes for City Campus.

Proposed Route Service Characteristics

The following tables described the proposed route service characteristics for each of the *CMA* recommended UNL transit service routes:

University Of Nebraska – Lincoln
TRANSIT SYSTEM EVALUATION

TABLE 6: Perimeter and Garage Route
(see APPENDIX A Map)

Characteristics	Findings
On-call operation: 6:30 a.m. – 9:15 p.m.	Reduce operating costs
Keep vans on standby at Henzlik Hall and New Hampshire Parking Lot during the day (6:30 a.m. – 6:00 p.m.) and at Henzlik at night (6:00 p.m. – 9:15 p.m.)	Maintains convenience at busiest stops
Smaller, restructured route	Reduces operating costs
Only use vans or cut-away vans	Reduces operating costs
Service via Henzlik Hall provides connections to all UNL campus points via Route 24	Provides easy to use, direct bus connections via the new Route 24 to and from all points on the City Campus and the East Campus

CHANCE Management Advisors, Inc.

University Of Nebraska – Lincoln
 TRANSIT SYSTEM EVALUATION

TABLE 7: StarTran Route 24 Intercampus Route (Clockwise)
 (see APPENDICES B and C Maps)

Characteristics	Findings
Operates with StarTran buses and drivers	Provides quick direct service from East Campus and 23 rd Street to City Campus along R Street to Stadium.
Buses operate around route in a clockwise direction	Provides quick direct service from City Campus (Stadium and Henzlik) to 23 rd Street and East Campus
Operates every ten minutes with four buses from 7:00 a.m. until 6:00 p.m. then every 20 minutes with two buses until 11:30 p.m.	In conjunction with the Route 24 Counterclockwise, route provides access to all UNL parking facilities encouraging a park once policy.
Route configuration eliminates circuitous routing of the current Route 24	Provides faster, more direct rides
Service every ten minutes, provides six buses per hour during peak times	With other Route 24, doubles capacity between East Campus and City Campus
Connects East Campus with the City Campus including the Stadium area	Bus destination signs: EAST CAMPUS; CITY CAMPUS via UNION
Provides connections to StarTran routes at 13 th and Q Streets	Provides easy transfers to most StarTran routes including the StarTran Shuttle to downtown Lincoln

CHANCE Management Advisors, Inc.

University Of Nebraska – Lincoln
 TRANSIT SYSTEM EVALUATION

TABLE 8: UNL Route 24 Intercampus Route (Counterclockwise)
 (see APPENDICES B and C Maps)

Characteristics	Findings
Operates with UNL buses and drivers	Provides quick direct service from East Campus and 23 rd Street to City Campus along Vine Street to Henzlik and Stadium.
Buses operate around route in a counterclockwise direction	Provides quick direct service from City Campus (Stadium and R Street) to 23 rd Street and East Campus
Operates every ten minutes with four buses until 6:00 p.m. then every 20 minutes with two buses until midnight	In conjunction with the Route 24 Clockwise, route provides access to all UNL parking facilities encouraging a park once policy.
Route configuration eliminates circuitous routing of the current Route 24	Provides faster more direct rides
Service every 10 minutes provides six buses per hour during peak times	With other Route 24, doubles bus capacity between East Campus and City Campus
Connects East Campus with the City Campus including the Stadium area	Bus destination signs: EAST CAMPUS; CITY CAMPUS via HENZLIK
Provides connections to StarTran routes at 11 th and P Streets	Provides easy transfers to most StarTran routes including the StarTran Shuttle to downtown Lincoln

CHANCE Management Advisors, Inc.



UNL Low Floor, Transit Style Bus

III. TRANSIT SERVICE OPERATING TIMES, POTENTIAL SCHEDULES AND RIDERSHIP CAPACITY

Perimeter and Garage Route

It is recommended that this route operate as an on-call service because of the low ridership demand. Using UNL vans or cutaway vans, service will operate from 6:30 a.m. until 9:15 p.m. Two vans (one stationed at the New Hampshire parking lot and the other at Henzlik) would be on-call from 6:30 a.m. until 6:00 p.m. and then one van would be on standby at Henzlik from 6:00 p.m. until 9:15 p.m. During the hours of operation passengers would board these vans to reach any of the stops along the route. At intermediate stops or when the van is not found at the layover locations, passengers can call the dispatcher to request a pick-up.

This plan also provides the framework to convert the route to a scheduled service with larger buses when UNL decides to expand perimeter parking at the state fairgrounds.

StarTran Route 24 Intercampus (Clockwise)

CMA recommends that the current StarTran Route 24 be converted to a single direction operation in the clockwise direction over the revised route as illustrated in the attached route maps (APPENDICES B and C). Operating from 7:00 a.m. to 6:00 p.m. with four buses, the revised service would provide a bus every ten minutes in each direction.

This high frequency is important to provide peak capacity for the sharp increase in demand that occurs on the East and City campuses during class changes. It also provides important convenience and capacity for access between UNL parking facilities and each campus for faculty, staff and students. This convenience of service is important to promote a “park once” policy on each campus with fast, frequent, easy-to-use transit service.

Since this service is proposed to replace the Intercampus Night Van Service and the 19th-23rd Streets Route, it is proposed that the StarTran Route 24 Intercampus (clockwise) service be extended from the current operating time end of 6:00 p.m. to 11:30 p.m. using two buses to provide service every 20 minutes.

UNL Route 24 Intercampus (Counterclockwise)

The recommended development of this route is designed to compliment the StarTran Route 24 Intercampus (clockwise) by offering service in the counterclockwise direction on the same route as illustrated in the attached route maps (APPENDICES B and C). Initially utilizing UNL buses and operating resources, it is intended that this route become part of StarTran service when an agreement on budget, service and vehicles can be developed. As such, the operating times and schedules will mirror the StarTran Route 24 Intercampus clockwise operation: every ten minutes 7:00 a.m. – 6:00 p.m. and every 20 minutes 6:00 p.m. until 11:30 p.m. Effectively, in conjunction with the StarTran Route 24 Intercampus clockwise operation, this provides a bus every five minutes between the East Campus and the City Campus during peak times.

Projected Ridership Capacity

Current operation of the busiest UNL bus routes, the 19th/23rd Streets route and the StarTran Route 24, are sometimes characterized by overloaded buses as students try to travel at peak times such as class changes. The recommended route and schedule changes are designed to create additional capacity, utilizing the same number of buses, for these peak demand times and travel directions. This is achieved by redeploys the buses on restructured routes to optimize running times, service coverage, access to UNL parking facilities and campus connections. Since the service and route recommendations will be creating new travel opportunities, especially direct service between East Campus and 23rd Street, subsequent analysis of monthly ridership counts during the first year of service should be conducted to identify opportunities to modify the service hours, service frequencies and bus fleet assignments. Anticipated ridership growth with the more convenient routes may require adding additional service on the Route 24 Intercampus. Most likely the operation of two buses during peak times on a City Campus Circulator from 23rd Street may be necessary to reduce potential overcrowding on the revised Route 24 Intercampus services.



Students boarding UNL bus on East Campus

As documented in the Tables 9 and 10 below, the recommended route and services changes will double ridership capacity between East Campus and City Campus. For the first time, ridership capacity will be more evenly distributed around the City Campus stops because of the reconfigured Route 24 Intercampus services. It will also provide ridership capacity and access between the Stadium area and the East Campus and all major UNL parking facilities on both campuses.

University Of Nebraska – Lincoln
TRANSIT SYSTEM EVALUATION

TABLE 9: Current Peak Service Capacity (9:30 a.m. – 1:00 p.m. Monday-Friday)

Route	Number of Buses/Vans	Approximate Passenger Seating Capacity per Bus	Average Peak Capacity per Hour per Direction
Perimeter/Garage	3(2 buses/1 vans)	32/10	222
19 th /23 rd Streets	4	32	384
StarTran Route 24	4	32	128
East Campus Daytime Shuttle	1	32	64
Total Peak Hour Capacity between East Campus and City Campus			192

CHANCE Management Advisors, Inc.

University Of Nebraska – Lincoln
TRANSIT SYSTEM CAPACITY EVALUATION

TABLE 10: Proposed Peak Service Capacity (9:30 a.m. – 1:00 p.m. Monday-Friday)

Route	Number of Buses/Vans	Approximate Passenger Seating Capacity per Bus	Average Peak Capacity per Hour per Direction
Perimeter/Garage	2 vans	10	On-Call Operation
StarTran Route 24 Intercampus	4 (clockwise)	32	192
UNL Route 24 Intercampus	4 (counterclockwise)	32	192
Total Peak Hour Capacity between East Campus and City Campus			384

CHANCE Management Advisors, Inc.

IV. TRANSIT SERVICE STAFFING AND SPECIAL EVENT SERVICE

No change in UNL staffing levels will be necessary until StarTran takes over UNL operation of the Route 24 Counter-Clockwise service. The reduction in service hours of one bus/van on the Perimeter/Garage route, elimination of the East Campus Daytime Shuttle, 19th/23rd Streets Route and the Intercampus Night Van Service will result in net labor hour savings that can be reassigned for the UNL operation of nighttime service on the Route 24 Counter-Clockwise from 6:00 p.m. until 11:30 p.m. As illustrated in TABLE 11 below, the net savings in UNL daily driver hours is 17 hours. However, StarTran will incur an additional 11 driver hours for the Route 24 clockwise route because they currently do not operate service after 6:00 p.m.

University Of Nebraska – Lincoln TRANSIT SYSTEM CAPACITY EVALUATION

TABLE 11: Net UNL Transit System Drivers Hours Saved

Route	Daily UNL Driver Hours Reduced	Daily UNL Driver Hours Added
Perimeter/Garage	12	3
East Campus Daytime Shuttle Express	6	0
19 th /23 rd Streets	53	0
Intercampus Night Van	4	0
UNL Route 24 (counter-clockwise)	0	55
Totals	75	58
Net UNL Driver Hours Saved	17 Hours	

CHANCE Management Advisors, Inc.

Special Event Service Planning

A key issue for UNL Special Event transit services is the configuration and characteristics of the UNL bus fleet. As described below, the current UNL bus fleet has a number of limitations that constrains its use. These limitations include variances in seating layout and door configurations of single or two doors.

At present, Special Event Services has operated on a self-supporting basis for Parking and Transportation by utilizing three costs components for special event charters: drivers by the hour, flat daily fee and mileage. The flat daily fee and mileage are based on a bus rate or van rate.

The mileage fee should be adjusted to cover the fully loaded operating costs including fuel, maintenance, insurance plus a small contribution to UNL Parking and Transportation to contribute to administration and supervision. The flat daily fee should cover the daily debt cost of the vehicle plus a percentage to cover future replacement costs.

It is recommended to improve the cost performance of special event services that UNL bus replacement plans include provisions to standardize the fleet of buses and vans. This will provide more consistent assignment of bus capacity and operating costs, particularly for remote parking shuttle operations. However, as discussed in *Section V. Capabilities of the Current UNL Bus Fleet*, if StarTran takes over the recommended daily Route 24 operations in both directions, the current UNL bus fleet would not need to be replaced for a number of years because of the light duty utilization of charter services.



*Special Event Charter Operation:
Job Fair Shuttles at Stadium
Garage stop*

*UNL Buses available for
Special Events*



V. CAPABILITIES OF THE CURRENT UNL BUS FLEET

The University's transit service is operated with a diverse fleet of buses and vans. In addition to the StarTran Gillig transit buses, operated under contract for the Route 24 service, the UNL fleet includes buses and vans from several manufacturers including Champion, Goshen, Supreme, Bluebird, Dodge and Chevrolet.

Because bus fleet manufacturers tend to have more specialized parts and maintenance requirements, the most important priority for the UNL fleet is to standardize the bus vehicles in future vehicle replacement decisions. With the implementation of the route recommendations of this study and the potential future operation of both of the recommended Route 24 services by StarTran, UNL would not need large buses for scheduled bus services. The existing UNL fleet could then be dedicated to UNL charter services.

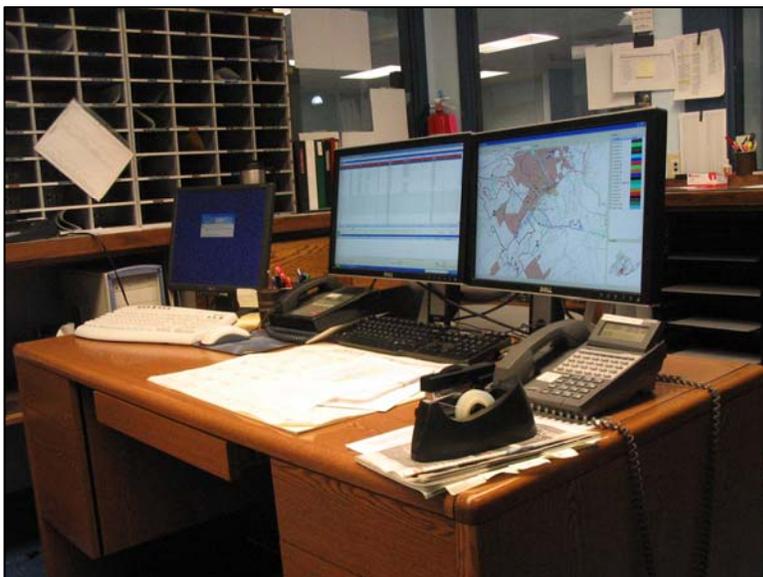
In addition to various parts and maintenance requirements, some additional limitations on the capabilities of the current UNL buses and vans include:

- various destinations signs are lacking;
- some buses are equipped with a single entry/exit door that slows passenger boarding and alighting significantly;
- limitations for ADA accessibility because some UNL buses are equipped with external wheelchair lifts that are slow to operate and difficult to maintain;
- only two buses are a low floor design with a front and rear door configuration, providing faster and easier passenger boarding, especially for wheelchair bound passengers who can use the quick flipout ramp to board the bus;
- seating configurations on the older Bluebird buses creates a narrow aisle that slows passenger flow on and off the buses;
- most of the existing fleet is not equipped with the diesel emissions technology mandated by the EPA for buses manufactured in the model year 2007 (reducing emissions by 95% with this technology) although UNL buses use a 10% bio-fuel mix; and
- none of the UNL buses or vans are equipped with a GPS tracking and passenger information system to enhance supervision, security and provide real-time bus locations for waiting passengers on computers, cell phones or PDAs.

Bus Fleet Replacement and Technology Options

With such a diverse fleet, *CMA* recommends that UNL postpone any bus replacement decisions in favor of a transition to an expanded contract with StarTran to supply, maintain and operate all buses on the recommended Route 24 services. The rising cost of buses, longer production times and the focus of manufacturers on larger orders from transit agencies nationwide gives UNL little purchasing leverage for the purchase of replacement buses. Currently, the annual UNL bus replacement funds of approximately \$200,000 a year would not keep pace with the number of buses needed to be replaced at one time to create a more standardized fleet for parts and maintenance purposes. The UNL bus replacement fund could be used to service debt in order to finance an order of several buses of the same design and manufacturing year. However, *CMA's* recommendations to restructure UNL bus services will allow UNL to negotiate with StarTran to operate the new Route 24 in both directions. This will provide UNL will have a number of advantages:

- At \$330,000 per bus for a 35 foot long, two-door, 32 passenger, low-floor bus, UNL faces significant capital decisions to replace the entire fleet. However, *CMA's* recommendations to discontinue the 19th/23rd Streets route, the East Campus Daytime Shuttle Express and transferring all Route 24 operations to StarTran will allow UNL to phase out the use of large buses for UNL bus service.
- UNL's current fleet of large buses could be retained for the operation of charter services. Because charter services require limited use of buses, the useful life of the existing UNL bus fleet could be extended significantly for future charter services.
- UNL should consider installation of a standard destination sign technology for buses and vans.
- To improve dispatching and security, UNL should consider installation of standard GPS technology to track bus and van movements and provide real time information for passengers on the Perimeter/Garage route. StarTran is planning to implement this technology on their buses.
- To support on-call requests for the revised Perimeter/Garage route, UNL vans and drivers should be equipped with communication devices to facilitate this method of operation. The GPS tracking will help confirm coverage and van locations for both passengers and dispatchers.



GPS Tracking for Bus Dispatching and Passenger Information

If negotiations with StarTran are unsuccessful or UNL would prefer to takeover direct operation of all Route 24 services, then the UNL bus fleet technology replacement decisions should consider the factors shown in TABLE 12 in the procurement of replacement buses.

University Of Nebraska – Lincoln
 TRANSIT SYSTEM CAPACITY EVALUATION

TABLE 12: Key RFP Requirements for Low Floor Transit Buses

Key RFP Requirements	Low Floor Transit Bus	Current UNL Fleet
Low Floor to eliminate steps at bus entry/exits	Yes	Only 2 buses
Front Door for passenger entry/exit	Yes	Not all buses
Rear Door on the side at center to speed entry/exits at bus stops	Yes	Not all buses
35 foot Bus Length	Yes	Not all buses
Air Conditioning	Yes	Yes
Air Suspension for Ride Comfort	Yes	Not all buses
Rear Engine to reduce noise, vibration and heat build-up	Yes	Not all buses
Wheelchair Access via passenger bus doors	Yes	Only 2 buses
Use Wheelchair spaces for seats when not in use	Yes	Only 2 buses
Wheelchair switches and controls must be in driver's area	Yes	Only 2 buses
Maintenance: Electronic Diagnostics System	Yes	Not all buses
Service Life: Designed and Tested for 12 years/500,000 miles	Yes	Not all buses

CHANCE Management Advisors, Inc.

Bus Fleet Recommendations

In order to assist the University of Nebraska - Lincoln with the optimum vehicle replacement options to provide service on the University's bus network, as a back-up to the recommended fleet and service negotiations with StarTran, *CHANCE Management Advisors, Inc.* has developed the following table for a comparative analysis of bus fleet recommendations by comparing low floor transit style buses with the majority of buses currently used by UNL. UNL currently operates two low floor buses in its fleet which also have most of the recommended low floor bus characteristics shown in TABLE 12.



Interior of UNL Low Floor Transit Style Bus with fold-down seats over wheelchair area

University Of Nebraska – Lincoln
 TRANSIT SYSTEM EVALUATION

TABLE 13: Comparative Features: Low Floor and Non-Low Floor Buses

Features:	Low Floor Transit Style Bus	Current UNL Non-Low Floor Buses
Length	30 - 35 feet	various
Low Floor Accessibility	Yes	No
Wheelchair Accessibility	Yes	Yes
Wheelchair Mechanism	Flip out ramp is faster to deploy	Most use a slower Lift System
Wheelchair System Reliability	Fewer moving parts	Lift Mechanism is less reliable
Seating Capacity	Up to 35	40 maximum with narrow aisles
Standee Capacity	Up to 26	Most not designed for standees
Door Configuration	Two doors: Front and Rear	Front only
Alternative Fuels	Optional Engine Types	Optional Engine Types
Engine Location	Rear = less noise	Front = more noise
Parts Availability	Wider use and Economy of Scale	Good
Headroom/Legroom	More comfortable	Limited
Aisle	Wider aisle	Limited unless bench style seats
Luggage and Package Space	Wheelchair spaces can be used	Limited aisle and storage space
Bike Racks	Yes – up to two bicycles	No
Ride Quality	Smoother ride quality	Stiffer, light weight suspension
Vehicle Durability/Design Life	12 years	5 – 6 years

CHANCE Management Advisors, Inc.

Some additional factors to consider include:

Fleet standardization: The flexibility of the low floor, transit-style bus capacity to efficiently serve light loads and absorb standee loads allows the UNL to use a single bus type for all routes and schedule demands. The limited standee capacity of most of the existing UNL bus fleet creates overloading situations on some routes or, during early closing weather conditions, requires higher capacity buses at certain times.

Ride Quality: Low floor, transit-style buses have a better quality ride and more headroom and legroom than most of the current UNL fleet.

Low Floor: This feature eliminates steps and makes it easier and faster for passengers to board and alight, which is important for short bus routes with frequent service, as well as passengers with limited mobility or injured athletes.

Low floor buses also greatly simplify wheelchair access because they use flip-out ramps that have fewer moving parts. This results in faster, more reliable operations and eliminates the weight of wheelchair lift mechanisms. This also allows the wheelchair spaces to be used for fold-down seats or luggage when not used by wheelchair passengers.

Fuel Economy/Maintenance/Pollution: The existing UNL fleet of buses can have less fuel economy than current model year transit style buses and can have less durability and parts availability because transit style buses are built on a standard platform with more off-the-shelf parts. Beginning with the 2007 model year, EPA regulations have reduced bus emissions by more than 95%. The Altoona Bus Research and Testing Center at the Pennsylvania State University has also tested transit style buses and found they meet conditions for heavy duty 12 year use.

Bike Racks: Transit style buses can be equipped with a bike rack on the front of the bus that can carry two bicycles. Most UNL bus designs are not equipped with this feature because of the front engine design and reduced driver visibility.

Aisle Width: Many of the UNL Bluebird buses are based on a school bus design that is equipped a typical 15 inch aisle width. This provides less space for passenger circulation than the typical 22 inch wide aisles on transit style buses. The aisle width is important for ease of passenger movement within the buses and to provide room for students who bring luggage, bags or packages.

Fleet Seating Capacity: Operating the UNL system with the current fleet of buses that has a seating capacity of about 35 passengers per vehicle will likely be adequate to provide a seat at most times, but because these bus designs do not have good standee capabilities, they will face chronic overcrowding during peak class change periods, special events and adverse weather.

Thirty-five foot, low-floor transit style buses provide a more cost-effective and reliable solution to serve ridership growth and peak period demand times because the greater seating/standee capacity that is at least 20 percent greater than most of the current UNL bus fleet. Transit style buses provide standee capacity for up to 26 additional passengers with a layout and extra door that is designed for standee conditions. This will provide extra capacity for special events, inclement weather or early school closings exactly when and where the additional capacity is needed.

Vehicle Durability: Transit style buses are designed and tested to provide service for at least 12 years. Most of the current UNL buses are designed and built to have a service life of five to six years on a light (twice a day) duty cycle, but operators have reported that maintenance and reliability problems can emerge in less than two years because of the daily wear and tear on the power train, chassis and body to provide bus high frequency use over long hours.

Low floor, transit style buses are becoming more commonplace on college campuses as well as in transit systems. In fact, this transit technology has emerged in the last ten years to become so successful that only low floor technology is expected to be offered for all bus orders except school buses by the end of this decade.

Some of the colleges that are using low floor, transit style buses include University of Kansas, Clemson University, University of Miami, University of Iowa, Emory University, University of Delaware and Princeton University.

Overall, low floor transit style buses can provide the students, faculty, staff and visitors with a more comfortable ride and the room for ridership growth, shopping bags, luggage and easier wheelchair access. The extra seats and standee capacity will provide reserve capacity on demand when and where it is needed. The greater comfort and smoother ride quality of the transit style buses could also help improve the perceptions of the students, faculty and staff that use the service. This will be essential for UNL to successfully promote a “park once” policy to improve the utilization of parking on both campuses and reduce traffic congestion.

If UNL does not secure a service and equipment agreement with StarTran, it is recommended that the UNL begin phasing in a fleet of service proven, Altoona tested, low floor transit buses. UNL should also consider lease options to maximize the number of vehicles that can be acquired to speed the replacement of the existing fleet utilizing the existing annual replacement funds generated by parking operations. This will also increase the number of vehicles replaced with each order to help standardize the UNL bus fleet parts and maintenance.



UNL Bluebird Buses at Henzlik Hall

VI. FINANCIAL AND CONTRACTURAL CONSIDERATIONS

Operating and Capital Costs

As described in the staffing levels of this report, the net savings of 17 UNL driver hours per day and the net increase of 11 StarTran driver hours per day is expected to result in little or no change in operating costs. Effectively, implementation of the *CMA* recommendations to convert the Perimeter/Garage route to an on-call route will reduce operating costs through reduced fuel consumption and the wear and tear maintenance costs of UNL buses and vans.

The recommended restructuring of the Route 24 will double the transit capacity between the East Campus and the City Campus for effectively the same UNL operating costs. This is achieved by reducing vehicle operations on the Perimeter/Garage Route and discontinuing service on the 19th/23rd Street Route, East Campus Daytime Shuttle Express and the Intercampus Night Van Service.

As addressed in the above sections on bus fleet technology options and *CMA*'s bus fleet recommendations, UNL faces a significant crossroads for capital costs. While most of the UNL bus fleet needs to be replaced at a cost of at least \$300,000 per bus, it would require the use of most of the funds raised each year through the University Program and Facilities Fee (UPFF). Currently the transit services share of the UPFF assessment per student per semester is \$8.94. This fee generates approximately \$400,000 per year.

CMA has recommended that UNL expand its partnership with StarTran to take over the recommended transformation and expansion of the Route 24 services that will eliminate the need for UNL to operate large buses. This recommendation will allow the existing UNL bus to continue to operate UNL charter services. As a light duty operation, the existing UNL bus service can provide charter services for years to come, reduce wear and tear maintenance and eliminate the near-term need for capital replacement expenditures.

Effectiveness Evaluation of the UNL City and East Campus Contract Service with StarTran

The StarTran/UNL Transportation Agreement, effective 21 August 2009, specifies that StarTran will operate the current Route 24 service during the UNL academic year from August to May. The agreement is one year in length with two one-year options for renewal.

Evaluation of the current contract identified a number of benefits for UNL including:

- The "No-Fare Program" allows all UNL faculty, staff and students access to all StarTran routes, year round, free of charge with the presentation of proper UNL identification. With additional UNL promotion, this can become an important TDM tool.
- StarTran provides a complete turnkey operation including drivers, buses, fuel and maintenance.
- UNL pays only for the service it uses during the academic year and avoids year-round overhead costs such as capital financing costs for buses.

- StarTran can acquire replacement buses at a lower cost and shorter lead time than UNL.
- StarTran can implement and operate a GPS bus tracking passenger information technology at a lower cost than UNL since StarTran is a larger network.
- StarTran is a division of the City of Lincoln's Public Works and Utilities Department. As such, the StarTran contract provides UNL with an opportunity to foster a strong "town/gown" relationship and political support with Lincoln civic officials.
- StarTran provide additional route promotion through its website and printed schedules.

The StarTran/UNL Transportation Agreement provides UNL with important access to transit resources including buses, drivers, fuel, maintenance, supervision and marketing that would otherwise pose significant financial and managerial requirements on UNL. In fact, with the expected growth of UNL ridership on the restructured Route 24 services, StarTran is uniquely capable of providing additional bus and driver resources within a relatively short lead time.

The current contract with StarTran, which provides UNL faculty, staff and students with a "No-Fare Program" to use the StarTran bus service system wide, can be promoted to provide UNL with an important TDM tool to reduce traffic congestion and parking demand on campus. This can also increase the University's stance on important environmental issues.

Comparison of Contract vs. In-House Operation

In addition to the unique program and resource advantages of the StarTran/UNL Transportation Agreement, the StarTran contract operation provides an important financial alternative for UNL transit services. The current operating contract provides Route 24 service with four buses during the academic year. The contract with StarTran includes the fully loaded costs of drivers, fuel, maintenance, overhead and the cost of capital for the buses.

Although UNL bus operating costs can be significantly lower than the StarTran contract, conversion to an all in-house operation would require significant commitment in capital requirements for UNL replacement buses, particularly to acquire the additional low floor, transit style buses needed to expand service in a short time frame. Given the uncertainty of UNL capital financing and the difficult delivery time for ordering replacement buses, *CMA* proposes that, in the near-term, UNL consider negotiating a lower cost contract with StarTran to reduce the differential between UNL and StarTran. With one year contract options, UNL will have an opportunity to evaluate its long-term capital funding capabilities to consider the financial feasibility of converting to a lower cost all UNL operation in the future.

Role of UNL Transit Service to Support Campus Parking

With the UNL Master Plan emphasis on perimeter parking, the recommend route and service changes are designed to support the UNL Parking and Transit Services mission to provide parking and transit for faculty, staff and visitors in an efficient and effective manner. A key factor in the development of CMA's recommendations is the improved utility and efficiency of UNL transit services for all UNL stakeholders. This is important to help sustain the planning directives for growth of the UNL Master Plan within the land-locked constraints of the City Campus.

The recommended UNL route changes are designed to reduce traffic and promote a "park once" policy that is important to improve parking use and reduce the parking constraints of UNL's existing parking supply. In fact, the proposed UNL routes provide a convenient link to all major UNL parking facilities. The expansion of service levels in the evening are important to encourage parking once in a UNL facility because the transit link will be running later into the evening, and the frequent evening service of every 20 minutes is not much longer than the alternative of driving between UNL lots and looking for another space.

The recommendations were also devised to help promote the pedestrian advantages of both campuses and to be the backbone service alternative for parking displaced by UNL growth.



*Perimeter/Garage Van stopping
at Stadium Garage Passenger
Waiting Area*

VII. CONCLUSIONS

As described and documented in this Transit System Evaluation, UNL's transit service represents an important asset for the daily function of both UNL campuses. The recommended service changes are expected to generate significant ridership growth, service efficiencies and improved campus access that will benefit faculty, staff, students, visitors and improve parking facility use and the overall mission of UNL Parking and Transit Services.



UNL Transit Services departing Stadium Parking Garage

In the near-term, the recommendations are designed to provide a level of transit service improvement that is within the range of the existing UNL budget – to provide the right service in an affordable manner to maximize the benefits for the entire UNL community. The recommendations are also designed to restructure service to reduce complaints and improve service as well as expand capacity and access between each campus. For example, accessibility to the Stadium area of the City Campus will be a major improvement and service capacity between the East Campus and City Campus will double during peak times.

It will also be important for UNL to renegotiate a new contract with StarTran to reduce operating costs and get commitments for expanding StarTran service into the recommended evening hours. If the negotiations can be successful, UNL may consider it financially advantageous to turn over all route operations to StarTran and redeploy the UNL fleet for charter service only.

In the long-term, UNL will need to monitor the increase in ridership and be prepared to add capacity on the restructured Route 24 Intercampus route as its popularity grows. In fact, CMA believes the need for a City Campus Circulator from 23rd Street will emerge.

UNL will also need to consider the long-term viability of a service contract with StarTran because it may offer significant capital financing advantages for eliminating the need for UNL to finance replacement buses. It will also be important for UNL to consider the financial contribution of the current UPFF fee as improvements including more service, new buses and GPS bus tracking technologies are introduced.

The recommended UNL transit service improvements will also compliment UNL's sustainability initiatives to encourage more UNL students, staff and faculty to use environmentally friendly UNL bus transportation and the free access to the StarTran bus network. The improved Route 24 Intercampus service and circulation will be especially important to convince students, faculty and staff to leave their cars at home, use a StarTran route to UNL and then connect with the new Route 24 Intercampus route and service frequencies to easily reach any point on both campuses throughout the day.



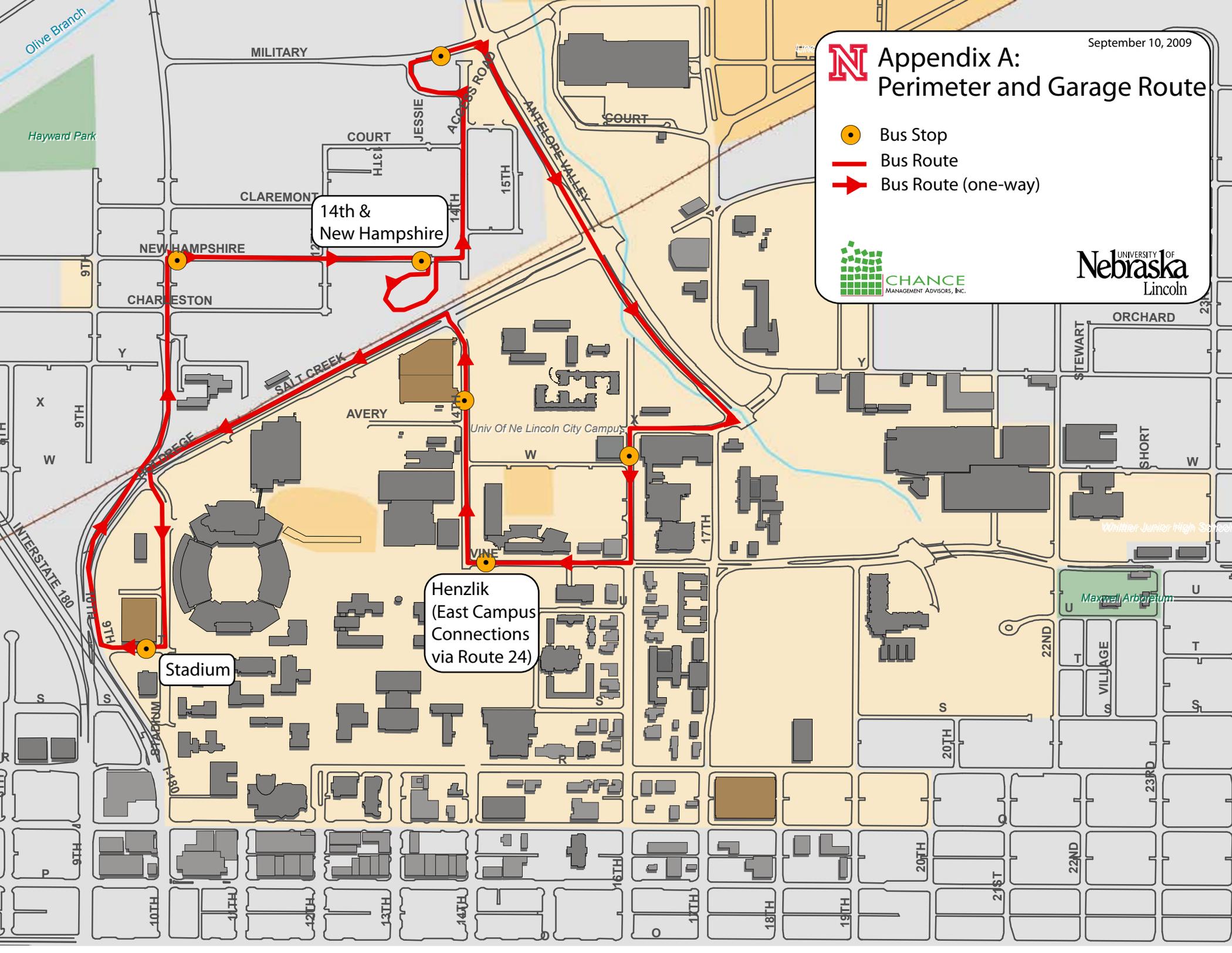
Appendices





Appendix A: Perimeter and Garage Route

- Bus Stop
- Bus Route
- Bus Route (one-way)



14th & New Hampshire

Henzlik
(East Campus
Connections
via Route 24)

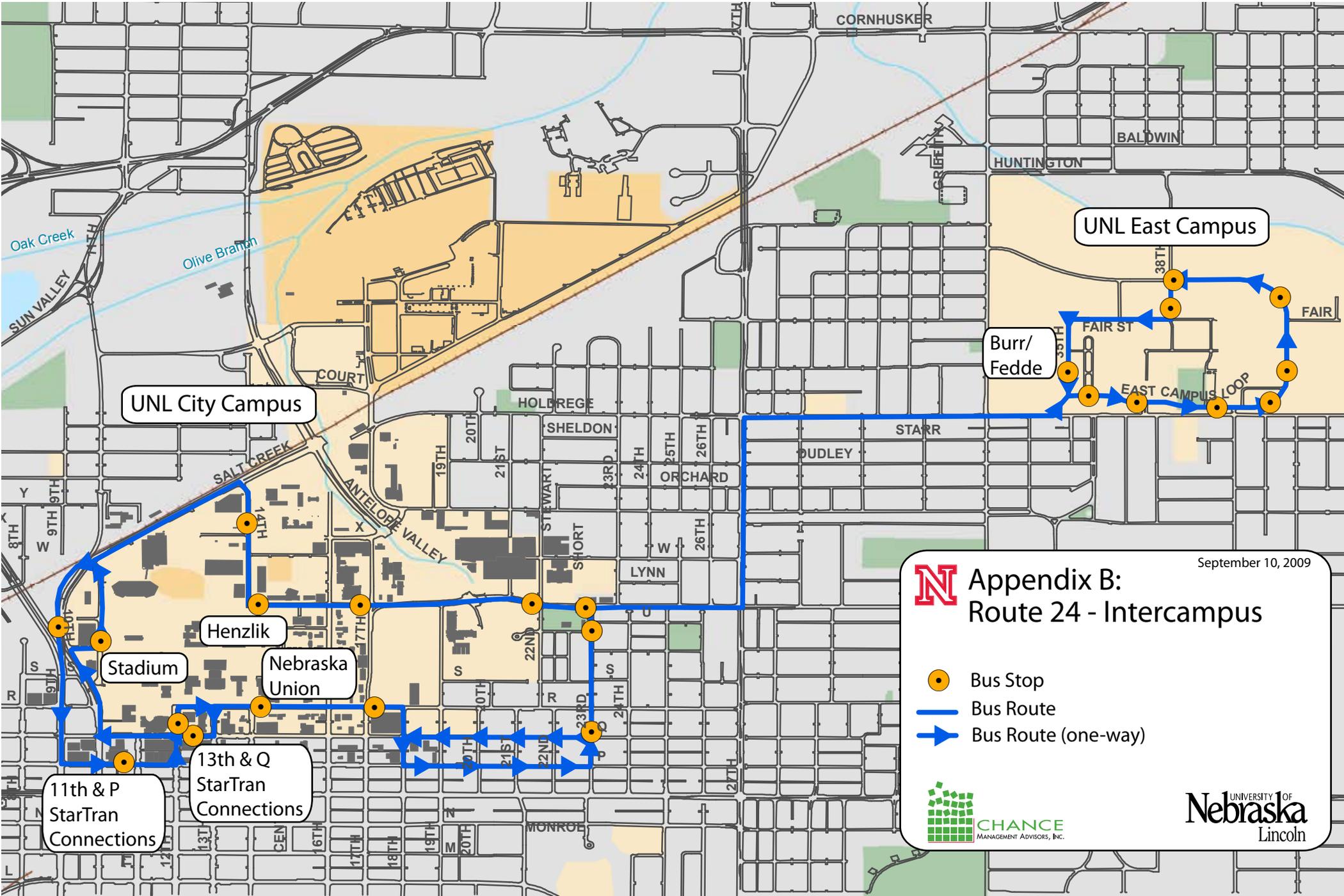
Stadium

Hayward Park

Maxwell Arboretum

Univ Of Ne Lincoln City Campus

Whittier Junior High School



UNL City Campus

UNL East Campus

Burr/
Fedde

Henzlik

Stadium

Nebraska
Union

13th & Q
StarTran
Connections

11th & P
StarTran
Connections



Appendix B:
Route 24 - Intercampus

September 10, 2009



Bus Stop



Bus Route



Bus Route (one-way)



CHANCE
MANAGEMENT ADVISORS, INC.

UNIVERSITY OF
Nebraska
Lincoln



Parking ■ Transportation ■ Access Management

1600 Market Street, 26th Floor, Philadelphia, PA 19103-7219 | 215-564-6464 | www.chancemanagement.com