From: Tony Marnell [mailto:tmarnell2@marnellcompanies.com]
Sent: Tuesday, August 8, 2017 12:28 PM
To: Jeremy Aguero <JAguero@appliedanalysis.com>
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Subject: Required Traffic Studies - Updated Drafts

Dear Jeremy,

Per our previous communications and your suggested direction, we submit to the Stadium Authority this e-mail and the attached Draft Traffic Studies and will copy cooperating and coordinating agencies, for the public record.

DesertXpress (dba XpressWest), submits these Drafts to the Stadium Authority per Senate Bill 1, Section 29 (J), for the August meeting, as it pertains to the XpressWest High Speed Train Station site at Frank Sinatra and Rio Drive, Las Vegas, Nevada, for compliance and consideration.

The Bill requires that “the Stadium Authority has taken into consideration the use of multimodal facilities that use alternative modes of transportation and do not have detrimental impacts on other permitted transportation projects”. Therefore, please consider these Drafts as XpressWest’s first step in its compliance with Senate Bill 1, and we look to the Authority’s direction in coordinating its station and traffic with respect to our project.

We are looking forward to receiving the needed information in respect to the attached Drafts so we may complete our work with the Authority, County Commission, RTC and NDOT.

Respectfully

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Review of Traffic Assessment for Las Vegas NFL Stadium Sites

Draft (Pending Sufficient Support Data)

July 21, 2017

17J18-0260| Prepared by **Iteris, Inc.**

DOCUMENT VERSION CONTROL

DOCUMENT NAME	SUBMITTAL DATE	VERSION NO.
Draft	July 17, 2017	1.0
Draft	July 21, 2017	1.1

TABLE OF CONTENTS

TABLES

EXECUTIVE SUMMARY

This memorandum details the findings of Iteris' review of the *Las Vegas NFL Stadium Sites Traffic Assessment Report* (Nevada Department of Transportation [NDOT], October 2016) (the "report"), which purports to represent a high level overview of traffic impacts on the state-maintained roadways surrounding the proposed construction of a 65,000-seat stadium within the Paradise area of Clark County, Nevada (the "Project"). The stadium would support a National Football League (NFL) team and host other major sporting and concert events.

The report identified two initial preferred sites for the new stadium – the Bali Hai Golf Course Site and the Russell Road Site. Following publication of the report, the Russell Road site was ultimately selected by the Developer as the preferred site.

Report Summary

The report presents a documentation of the peak traffic condition assessments on both a Sunday and Monday for segments of freeway mainline and surface streets maintained by NDOT in the vicinity of the preferred sites. Baseline traffic conditions for existing, opening year (2019) and long-term year (2035) were evaluated and compared with traffic conditions forecasted for Project scenarios to identify potential impacts.

The final sections of the report present a small list of improvements that are recommended for acceleration to help address adverse traffic effects caused by the stadium.

Review Highlights

- **Limited Study Areas:** The report provides only a nominal analysis of the traffic effects within the vicinity of the two proposed sites and for a very small sub-set of the roadway system which are maintained by NDOT. The study area does not provide enough geographic coverage to represent a balanced assessment of any stadium impacts on the surrounding regional roadway system or any associated impacts to the residents or local businesses along these roadways.
- **Inconsistency between Report Text vs. Actual Data Presented:** The text of the report repeatedly states various analyses have been performed, without documenting the actual analysis results. The report fails to provide any tangible information for readers to reach any definitive conclusions.
- **High Mode Split Assumptions:** The study assumes approximately 60% of the attendees will arrive at the proposed stadium via self-driven autos and park on-site. However, due to physical constraints at both sites, it is unlikely that there will be sufficient space to accommodate the associated parking demand on-site.
- **Unaccounted Vehicle Trips:** The trip generation provided in the report underestimates the number of auto trips generated, and does not account for employee trips and other ancillary trips. The trip generation also does not account for the doubling of trips for patrons being dropped off and picked up versus patrons driving and parking at the stadium.
- **Insufficient Support for Forecast Data:** The report states that future traffic forecasts were made for both Sunday afternoon and Monday PM peak periods using data extracted from the travel demand model maintained by the Regional Transportation Commission of Southern Nevada (RTC). However, Iteris verified the RTC traffic model only provides forecasts for a typical weekday. The report did not document the source and/or methodologies used to produce Sunday traffic forecasts or how the Stadium traffic was distributed.
- **Lack of Project Condition Analysis:** The only Project scenario analysis is presented in the form

congestion maps in Figures 2-8 and 2-9. These maps are stated as being a composite of both year 2019 and year 2035 traffic congestion conditions. This representation of traffic impact is highly unusual and very difficult to interpret in a meaningful way. It is also unclear whether these plots represent Sunday or Monday with Project conditions.

- **Lack of Alternative Transportation Analysis:** Contrary to report statement that the needs for transit, local street, pedestrian and bicycle facilities were addressed, no supporting analysis or commentary were provided to illustrate the issues.
- **Effectiveness of the Recommended Improvements:** The report documents a large number of previously identified infrastructure improvements projects in the vicinity of the two proposed stadium sites from a wide variety of sources. These improvements are then trimmed down to a sub-set of improvements which are recommended for acceleration, though it is not clear exactly how these final recommended improvements were selected nor the effectiveness they would have on addressing stadium-related traffic.
- **Improbable Recommended Improvements:** The recommended improvements boil down to five freeway projects, the Las Vegas Monorail extension to the Mandalay Bay Hotel, and the addition of pedestrian bridges across I-15. Of the five freeway projects, only three have definitive descriptions. It is highly unlikely that any of these three projects could be delivered prior to the stadium opening and possibly not for a number of years after that. The construction of pedestrian bridges over I-15 and to a lesser extent, the Monorail extension, are the only identified improvements that could be described as a direct Project mitigation measure with a nexus to the actual stadium development.

Review Conclusion

The report recommends four additional detailed studies which will be necessary for delivering a successful plan for the stadium (Transit Study, Traffic Impact Study, Parking Study and Traffic Management Plan), but fails to identify the following critical inputs that would govern each of these studies:

- Location and availability of any off-site parking areas
- The high likelihood of attendees arriving and parking in the industrial areas west of I-15 surrounding the Russell Road site

In summary, the report does not contain sufficient analysis to adequately identify and assess potential traffic impacts on the surrounding roadway system that would be generated by the proposed stadium on a game day. It also lacks supporting analysis to demonstrate the extent to which the recommended improvements would address any impacts associated with stadium-related traffic.

1 INTRODUCTION

This memorandum details the findings of Iteris' review of the *Las Vegas NFL Stadium Sites Traffic Assessment Report* (NDOT, October 2016), which purports to represent a high level overview of traffic impacts on state-maintained roadways of the proposed sports stadium complex to support an NFL team within the Paradise area of Clark County, Nevada. The NFL team announced to relocate to Las Vegas is the Oakland Raiders.

The stated "overarching goal" of the report is to "identify state highway improvements that can be accelerated or initiated to support a new stadium". The report also states that "other potential improvement needs (e.g. transit, local streets, pedestrian and bicycle facilities) are addressed as well."

1.1 Project Description

The proposed project includes the construction of a 65,000-seat NFL stadium that would also be suitable to host other major sporting and concert events. Two site locations within the Las Vegas metropolitan core were identified by the stadium developer in September 2016 to be the preferred sites, and they are:

- **Bali Hai Golf Course Site** - located west of Las Vegas Boulevard south of Russell Road at the existing Bali Hai Golf Course.
- **Russell Road Site** - bounded by I-15 to the east, Polaris Avenue to the west, Hacienda Avenue to the north and Russell Road to the south.

1.2 Scope of Traffic Assessment

The report documents the traffic assessment that included three (3) components as follows:

- Trip generation and mode choice
- Traffic assignment
- Determination of traffic effects

2 STADIUM RELATED TRAFFIC ASSESSMENT

2.1 Study Locations

The report was commissioned by NDOT and studies only a relatively small number of NDOT maintained freeway and arterials which were considered by the authors to be the "corridors most likely affected by either of the two stadium locations" as shown in Figure 1-1 of the report. Some NDOT-maintained roadways that are not too distant from the sites, such as Rainbow Avenue north of Tropicana Avenue and Jones Avenue north of Tropicana Avenue, are excluded from the analysis. All arterial streets maintained by Clark County and the City of Las Vegas, which covers the majority of the roadway system in the vicinity of the stadium sites, are also excluded. Freeway segment analysis is limited to freeway mainline segments; no analysis is provided for ramps, high-occupancy vehicle (HOV) lanes, or freeway-to-freeway connectors. Three (3) east-west arterial streets were included, and no north-south arterials were studied. Several of the freeway segments studied such as those on I-515/US 95 are far from the two preferred sites and may not be relevant when evaluating impact.

It is possible the study locations may have been selected for consideration before the initial seven (7) stadium sites (also shown in Figure 1-1) had been whittled down to the two (2) developer preferred locations.

In summary, while the locations chosen for analysis may be sufficient to help NDOT assess the effects on certain specific facilities, they do not provide enough geographic coverage to represent a balanced assessment of any stadium-related traffic impacts on the surrounding regional transportation system.

2.2 Trip Generation and Mode Choice

The report states that trip generation and mode choice assumptions were compiled based on studies of other NFL stadiums in similar urban environments. Mode choices assumed included automobile, transit/shuttles, walking/biking and others (taxis, limos, or ride-share services). The total number of vehicle trips were estimated using percentage split of transportation mode choice combined with number of persons assumed per mode.

Mode Choice Assumptions

The report notes that mode choice splits for the Russell Road site are assumed to be:

- 60% automobile
- 24% transit/shuttle
- 6% walk/bicycle and
- 10% taxi/ride-share

The 60% automobile mode choice could be a reasonable estimate if sufficient parking were available on-site to accommodate all vehicles. Using the assumptions in Appendix A, the estimated demand for stadium parking from attendees alone at the Russell Road site is:

- 65,000 x 60% (mode choice) / 2.9 (average auto occupancy) = 13,448 spaces (which does not include employees, teams, media, etc.)
- The corresponding figure for the Bali Hai site is slightly higher at 13,896 due to an assumed auto mode choice of 62%. (again not including employees, teams, media, etc.)

Neither of the two sites would appear to have sufficient space to accommodate the roughly 13,500+ attendee parking demand on-site. Due to the insufficient parking provided on-site, it is logical to assume that while there might be a 60% mode split by auto for the initial leg of the journey to the stadium, the final mode of arrival at each of the stadium sites by auto will likely be much lower than 60% while the proportion for walking

and shuttles would be higher. Though after leaving the stadium, many attendees would walk to cars parked off-site and then drive (as apparent via anecdotal observations of other urban stadiums in Los Angeles, San Diego, Arizona, and New Jersey).

For the purposes of assessing high-level stadium related effects on the regional highway network, a 60% automobile mode choice appears reasonable.

Trip Generation Assumptions

The assumed capacity of the stadium used for trip generation purposes was 65,000 seats. A footnote on page 4 states that while "65,000 seats was used for the analysis a modest increase (to 70,000 seats) would not have a material effect on the results and conclusions." No supporting analysis is provided to support this assertion.

Trip generation effects of employees and vendors, the team themselves, media, etc. are not included in the trip generation estimates. There is a statement that "ancillary trips such as deliveries, freight etc. are relatively minor compared to the anticipated special event trips" and therefore not accounted for. **In practicality, a typical NFL stadium may employ approximately 3,500 personnel on game day[1] which amounts to nearly 5% of the projected attendees and should not be excluded.**

Based on the assumptions shown Appendix A of the report, the Russell Road site was estimated to add approximated 16,000 one-way vehicle-trips in the vicinity of the stadium on game day.

Table 1 – Verification of Trip Generation and Mode Split Calculations from Appendix A

ID	Site	Capacity	Mode Choice Assumptions				Person Trips by Mode				Occupancy Rate		Vehicle Trips	Revised Veh Trips [1]	Total Veh Trips
			Auto	Transit/ Shuttle	Walk /Bike	Other	Auto	Transit/ Shuttle	Walk /Bike	Other	Person/ Vehicle	Person/ Transit Vehicle			
1	Bali Hai Golf Course	65,000	62%	24%	8%	6%	40,300	15,600	5,200	3,900	2.9	42	15,613	17,329	34,700
2	Russell Road	65,000	60%	24%	6%	10%	39,000	15,600	3,900	6,500	2.9	42	16,061	18,674	37,300
3	Fertitta Site	65,000	68%	22%	7%	3%	44,200	14,300	4,550	1,950	3	42	15,724	16,714	33,400
4	UNLV	65,000	66%	20%	10%	4%	42,900	13,000	6,500	2,600	3	42	15,476	16,652	33,300
5	Wynn Golf Course	65,000	57%	25%	13%	5%	37,050	16,250	8,450	3,250	2.8	42	14,780	16,327	32,700
6	MGM Rock in RIO	65,000	58%	25%	12%	5%	37,700	16,250	7,800	3,250	2.8	42	15,012	16,560	33,100
7	Cashman Field	65,000	76%	19%	1%	4%	49,400	12,350	650	2,600	3	42	17,627	18,788	37,600

[1] Accounts for Transit and Other modes (taxis, TNC's) making two trips - trip to drop off then trip to leave the area.
[ ] = Figure in Report incorrectly says 44,300

The calculations in Appendix A were verified as shown in **Table 1.** One (1) minor discrepancy was noted in the Bali Hai Site Auto trips, as highlighted in yellow above. In addition, the calculation of number of on-site vehicle trips underestimates the trips generated by "Other" vehicles such as taxis/limos/on-demand (e.g., Uber) and

[1] AECOM, 2015. *San Diego Stadium Replacement EIR, Traffic Impact Analysis Report. Retrieved from: https://www.sandiego.gov/sites/default/files/legacy/cip/pdf/stadiumeir/draftstadiumeir_appendix_j.pdf*

shuttles. These trips are only counted once in the study while in practicality, a taxi dropping someone off at the stadium should be counted twice: two (2) trips for drop-off and two (2) trips for pickup resulting four (4) total trips per event. Meanwhile, a vehicle parking at the stadium only makes one inbound and one outbound trip resulting two (2) total trips per event. Iteris revised the table in Appendix A to include two (2) additional columns, highlighted in green above, to account for the missing "Other" and shuttle trips. The final revised number of trips (in and out) generated from the Russell Road site is 37,300 trips, which is over 5,000 trips higher than the number projected in the report. The revised figure does not include employee or ancillary trips.

2.3 Traffic Assignment

Future Baseline Condition Forecasts

The report notes that baseline traffic conditions for existing (2015), opening year (2019) and long-term year (2035) were evaluated using a combination of historic traffic counts and traffic data extracted from travel demand model maintained by the RTC. The RTC model covers the entire Las Vegas Basin area. According to the *2016-2040 Regional Transportation Plan (RTP) Appendix E Model Technical Repor*t the RTC model was developed to represent typical weekday traffic conditions for the following seven time periods:

- 12AM to 7AM
- 7AM to 9AM
- 9AM to 2PM
- 2PM to 4PM
- 4PM to 6PM
- 6PM to 8PM
- 8PM to 12PM

In traffic models a "typical weekday" generally means a Tuesday, Wednesday or Thursday, since Mondays and Fridays typically exhibit different travel patterns. A Monday game may have slightly different pattern to that in the RTC model, as it would have different peak periods of activity than typical commuter and visitor travel patterns. Furthermore, Iteris verified that the RTC model is a weekday-only model and does not perform forecasts for a typical weekend. **It is therefore not clear how Baseline forecasts for Sunday afternoon conditions were obtained. It is possible that Sunday Baseline conditions were represented by an off-peak weekday time period such as 2PM to 4PM though the report provided no such documentation.**

Project Trip Distribution and Assignment

The report is silent on how the project generated trips were distributed and assigned to the surrounding roadway network. In a typical traffic study, a high-level distribution would be provided (e.g., 40% from the east or 30% from the north). The only reference made to trip distribution in the report is that the traffic segments for analysis were selected by considering likely origins for stadium traffic and the route they would most likely use. However, no criteria or documentation of such "considerations" are provided. As noted in the previous sections, several of the study segments appear to be a long way from the project site and many other segments close to the two preferred sites were not analyzed at all.

The report does provide discussion relating to the percentage of stadium attendees who would be residents versus visitors. The report estimates 40-50% stadium attendees would be visitors who would stay primarily in the Las Vegas Resort Corridor. The assumption is reasonable based upon comparison with the population and attendances of the Chargers at their previous location in San Diego. The AECOM report on the Qualcomm Stadium Reconstruction in 2015 estimated that well over 90% of Charger game attendees originated from

within San Diego County as their support is known to be relatively "localized" compared to other NFL teams[2]. Due to Las Vegas' relatively geographic isolation, its home team could develop a similar "localized" support for the Raiders. Since the Las Vegas Valley has roughly 60% the population of San Diego County, a figure of 50%-60% attendees from the local Las Vegas area residents appears to be reasonable.

Alternately, visitors are likely to make up a much larger proportion of stadium attendees than other NFL teams due to:

- A potentially large number of fans from opposing teams incorporating a weekend getaway trip to Las Vegas;
- The significant numbers of legacy Raiders fans travelling from the Bay Area and southern California (the average attendance of Oakland Raiders was 55,000 in 2015 and 2016)[3]; and
- The high number of conference and general Las Vegas visitors taking advantage of accessibility to an NFL game (or other special event).

In summary, the study does not provide sufficient data on trip distribution and assignment assumptions and readers are unable to verify the assumed travel pattern or if the project trips were appropriately assigned to the surrounding roadway network.

2.4 Determination of Traffic Effects

A typical traffic analysis of a project such as a new stadium goes through four stages:

1. Trip Generation – How many trips does the project generate?
2. Trip Distribution – Where do the project trips originate from?
3. Mode Split – Which mode of transport do people use to get from the origin to the project?
4. Traffic Assignment – Which route and roadways are taken to/from the project?

Traffic conditions under a project scenario are then evaluated and compared to a baseline scenario. The net difference is the impact of the project or "direct project impact "as it is referred to in the report.

Link-based volume/capacity (V/C) ratios for the study segments were utilized as a metric to evaluate traffic conditions for the purpose of the report. V/C ratios were calculated for 4 PM to 6 PM time periods for Monday (evening game or concert event inbound travel pattern) and Sunday (Sunday afternoon NFL game outbound travel pattern). The V/C analysis was performed for the following state-maintained corridors under Baseline scenarios for:

- 24 freeway mainline segments on I-15, I-515/US-95 and I-215

[2] AECOM, 2015. *San Diego Stadium Replacement EIR, Traffic Impact Analysis Report.* Retrieved from: *https://www.sandiego.gov/sites/default/files/legacy/cip/pdf/stadiumeir/draftstadiumeir_appendix_j.pdf*
[3] Retrieved from *http://www.espn.com/nfl/team/_/name/oak/oakland-raiders.*

- 11 arterial segments on Tropicana Avenue, Russell Road and Flamingo Road (all east-west streets)

Section 2.3.4 of the report states "the last step was to calculate the increased in V/C ratios associated with each of the two stadium sites" and that the results are presented in Section 2.4. Section 2.4 of the report provides Figures 2-8 and 2-9 which purport to show a visual representation of V/C ratios with the project in place based on "anticipated increases in the V/C for the defined roadway segments." However, the following is a summary of number of shortcomings with this this presentation, making it impossible to determine what the actual results of the analysis are:

- There is no documentation of the numerical increase in V/C between the Baseline and With Project conditions and no documentation of how the increase in V/C due to the project was calculated. **A table should be provided comparing With Project and No Project V/C ratios for each link.**
- Figures 2-8 and 2-9 purport to show a composite of 2019 and 2035 conditions and no explanation is provided on the steps involved in creating such a composite. Combining the results of two future forecast years is highly unconventional and almost impossible to interpret. **Separate plots should have been produced for Opening Year and Design Year.**
- The plot legends do not have any numerical scale making it impossible to determine actual V/C or compare to the Baseline Conditions plots shown in Figures 2-4 to Figure 2-7.
- The With Project plots do not state whether they are for Sunday or Monday conditions, though since the RTC model is a typical weekday model it is possible that they are neither.

Table 2-3 in Section 2.5 of the report is a matrix providing relative weights to be applied to the changes in V/C ratios between No Project and With Project V/C ratios. No source is provided for the development of the metrics and the values in the matrix appear to be highly judgmental. In addition:

- It is not clear why freeways, arterials and interchanges are weighted differently.
- Some weightings do not follow discernable logic. For example, a major arterial with a baseline V/C of 1.0 and a 10% increase in V/C would have a weighing of 0.

Section 2.6 then states that the weighting matrix in Table 2-3 was applied to the change in V/C between With Project and Baseline for each of the two project sites, although no data is provided showcasing the results. The text simply states that the results are identical between the two sites. The lack of information makes it impossible to verity this assertion. **A table showing the comparative weighted changes in V/C for the two sites should have been provided.**

3 IMPROVEMENT NEEDS ON THE REGIONAL TRANSPORTATION SYSTEM

Section 3 of the report describes a range of projects "in the pipeline" that could potentially be accelerated to "provide relief" in areas where the addition of stadium traffic will negatively affect traffic operational conditions. The report states that "the next step in the process was to determine the level of improvement needed on state maintained roads and other facilities to address the addition of event traffic."

Since the report does not specify the trip distribution of project trips or provide details of changes in volumes of V/C ratios caused by the project, it is not possible to determine any "Nexus" (i.e. direct connection) between the effects of the stadium on the roadway network and the need for any of the potential improvements.

The report provides a list of potential improvements that have been previously identified, and the only connection between these improvements and the project appear to be their geographic proximity. No analysis was conducted to evaluate the effectiveness of these potential improvements on the traffic operational conditions in the vicinity of the stadium sites.

3.1 Leveraging Planned and Programmed Projects

Section 3.1 of the report provides a series of figures showing currently planned or identified improvements from a number of potential sources. These projects include:

1. Projects funded by the State Transportation Improvement Program (STIP) and the projects in the RTP. The report refers to the 2013-2035 RTP, and the 2016-2040 RTP has been produced since the time of the initial report writing. Some of the regional improvements identified in the 2035 RTP are no longer included in the 2016-2040 RTP, particularly projects funded by the Fuel Revenue Index 2 Measure.
2. Fuel Revenue Index 2 (FRI-2) Projects – At the time of original report writing, the Clark County ballot box measure for a 10-year extension to the existing Fuel Revenue Funding had not been passed. The ballot "Question 5" subsequently passed voter approval in November 2016. There is a list of approved projects and an additional list of those authorized to proceed on the RTC website.
3. A series of 55 policy and infrastructure recommendations from RTC's Transportation Investment Business Plan (TIPBP). However, the report states that these recommendations have no current funding available.
4. Other proposed but unfunded improvements including the XpressWest High Speed Passenger Railroad.

3.2 Project Development Process

This section of the report discusses example costs for recently completed and on-going NDOT freeway projects, and remarks that freeway projects take a long time between planning and completion. **This section adds little detail relevant to the assessment of the stadium sites and their associated potential traffic impacts.**

4 RECOMMENDATIONS AND NEXT STEPS

The purpose of Section 4 of the report "was to assess the likely transportation needs" and identify specific mitigation measures to address any potential traffic impacts of the new stadium, at either preferred site.

4.1 NDOT Accomplishments

This section of the report discusses a sample of recently delivered and ongoing NDOT projects and describes some on-going NDOT planning efforts. The discussion provided appears to be tangential to the assessment of the potential stadium sites.

4.2 Leveraging Other Improvements

This section of the report recommends "leveraging" ongoing projects already in the planning stages. Though similar to Section 3, there is no assessment made whether they are directly related to stadium traffic or not.

This report states that "to determine the priorities for the next steps, the planned programmed and conceptual projects identified in Section 3.1 were reviewed in the light of the effects in Section 2. Then, assessment of the relative importance of each project were conducted using factors, such as the type of transportation facility, proximity to the site, baseline V/C ration, increased traffic due to the stadium and magnitude of potential improvements".

Despite the above statement, **there is no documentation of the criteria used or process developed for ranking or scoring each of the potential improvements.** The report simply extracts a sub-set of all the possible improvements shown in Figures 3-1 to Figure 3-4 and develops a shortlist provided in Figure 3-5, and the reader is not provided with any intermediate steps to show the final list of projects was developed. The reader has to rely on the author's assertion that "assessment of the relative of importance of each project was conducted."

Freeway Improvements

Five (5) freeway improvements in the vicinity of the stadium sites are included in the final recommendations for acceleration, as shown below. It seems highly unlikely that any of the listed improvements could be implemented prior to the stadium opening, due to the complexities and challenges of freeway improvement construction and the typical project lifecycle for NDOT.

1. Accelerate NEPA and preliminary engineering for a new I-15/Hacienda Avenue HOV Interchange (northbound off and southbound on) – This improvement is shown as a long-term improvement (between 2025 and 2035) in the South Nevada HOV Plan Update (July 2015). Upon initial evaluation, adding these ramps may conflict with the potential alignments of the proposed XpressWest High Speed Passenger Railroad as well as the pedestrian bridges across I-15 (recommended project improvements).
2. Accelerate NEPA and preliminary engineering for a new I-15/Harmon Avenue HOV Interchange (northbound on and southbound off) – This improvement is shown as a long-term improvement (between 2025 and 2035) in the South Nevada HOV Plan (July 2015).
3. Continue with NEPA analysis for I-15 Tropicana Avenue interchange project – The report states that this project will NOT be in-place before the stadium opening.
4. Continue next Phase of the I-15 South Corridor, including enhancements to the HOV and C-D road system – No specific improvements are identified.
5. Identify near-term freeway and interchange operations on I-15 and I-215 as part of the ongoing Southern Nevada Freeway Traffic Study – This is a very vague description and no specific

improvements are identified.

While the first three (3) listed improvements are associated with specific geographic locations, the remaining two (2) improvements are described in vague terms and appear to have yet to be fully identified**. There is no discussion regarding feasibility of accelerating these improvements or how funding might be advanced, nor is there any discussion of how these improvements would mitigate the potential traffic effects of the stadium.**

Non-Freeway Improvements

Two (2) non-freeway improvements are recommended which could both conceivably be implemented prior to the stadium opening and would provide tangible access improvements to the site:

1. Extension of the Monorail from the MGM Grand to Mandalay Bay – This project is in the 2016-2040 RTP and shows Las Vegas Monorail Company as the funding source.
2. Developer Funded Pedestrian Bridges across I-15 – These bridges would have to be coordinated to avoid conflict with the proposed HOV ramps at I-15 and Hacienda Avenue noted above.

The pedestrian bridges over I-15 and, to a lesser extent, the Monorail extension are the only identified improvements that could be described as a direct project mitigation measure with a nexus to the actual stadium development. Other recommendations for additional ongoing analysis are:

1. RTC to evaluate the need for additional **transit solutions**.
2. **Traffic Impact Analysis** to consider stadium traffic effects on non-NDOT facilities.
3. **Parking Needs Analysis** including pedestrian and shuttle access to off-site parking if required.
4. Comprehensive **Traffic Management Plan** for event-day management of assess and routing.

Subsequent to the report being published, it is understood that the stadium developer had determined the Russell Road site to be the preferred location. Given the obvious physical constraints at this site, it is clear that additional off-site parking will be required. The location of off-site parking needs should be determined as early as possible since it will affect each of the four (4) recommended technical analyses. Notwithstanding the identification of the off-site parking location(s), consideration should also be given to estimating how much parking and traffic is likely to be accommodated by on-street and off-street parking in the industrial areas to the west, north and south of the Russell Road site. Based on observations made at other venues with similar attendance (such as Qualcomm Stadium in San Diego), it is likely that significant numbers of stadium attendees, particularly local attendees, would park in this area and walk to the stadium.

5 CONCLUSIONS

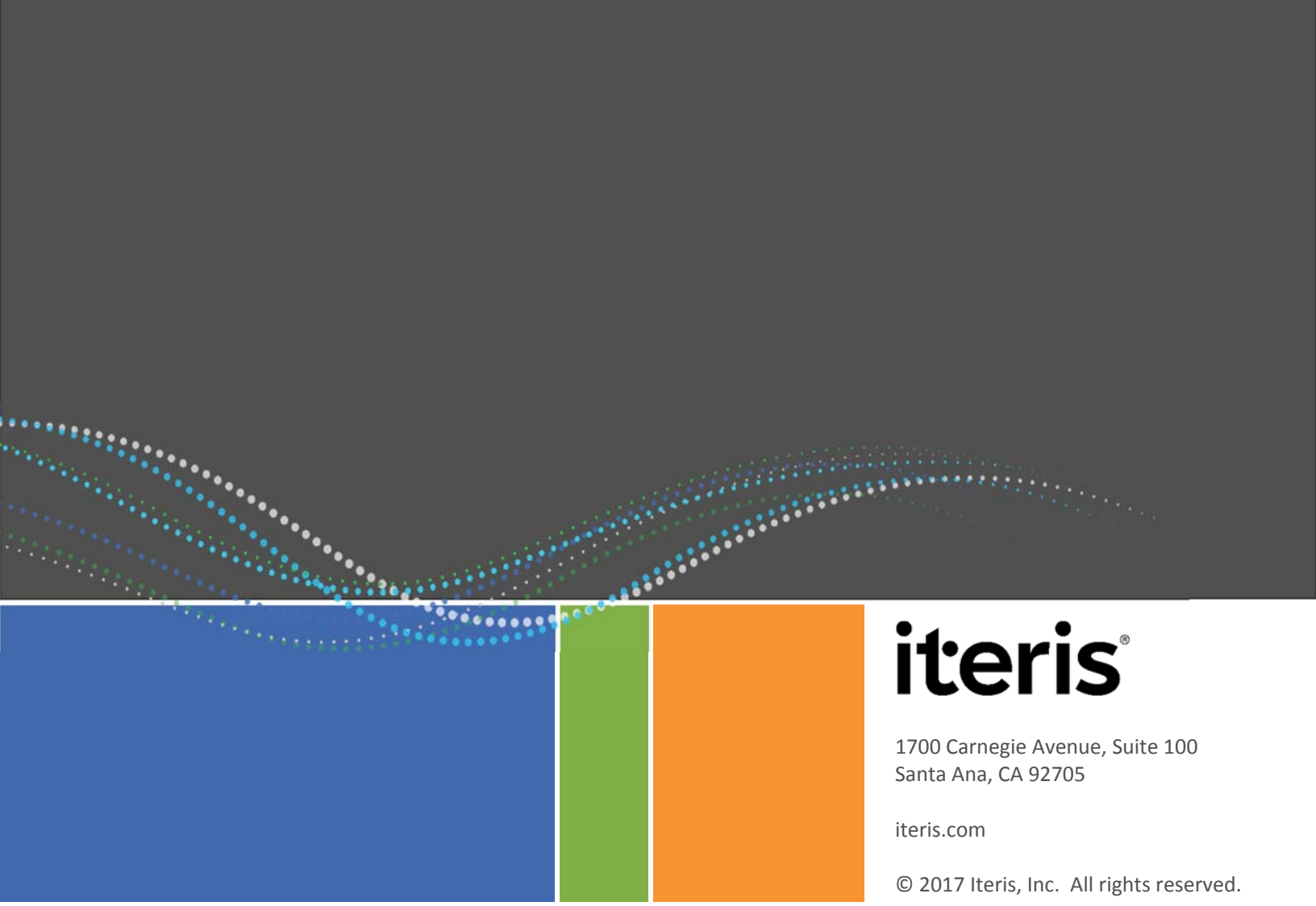
The report incorporates a study area which includes a very small sub-set of the roadway system maintained by NDOT. While the roadways chosen for analysis may be sufficient to help NDOT identify asses the effects on certain regional facilities, they do not provide sufficient geographic coverage to provide a representative or balanced assessment of any stadium impacts on the surrounding transportation system or any associated impacts to the residents or local businesses along these roadways.

The trip generation estimates provided in Appendix A are incomplete and contains errors. Some of the assumptions utilized to estimate project generated trips are unsupported and conflicts with other assumptions. One major inconsistency is the assumption that there would be sufficient space to accommodate all the forecasted parking demand.

Contrary to report statements, the study provides only a nominal analysis of the traffic effects on the surrounding roadway system in the vicinity of two proposed stadium sites. The report fails to provide any tangible information for readers to reach any definitive conclusions. While the report makes assertion that needs for transit, local street, pedestrian and bicycle facilities were addressed, no analysis or commentary was provided addressing these issues.

The report documents a large number of previously identified infrastructure improvements projects in the geographic area of the two proposed stadium sites from a wide variety of sources. The only apparently connection between these improvements are their geographic proximity to the preferred sites. No analysis was conducted to evaluate the effectiveness of these potential improvements on the traffic conditions in the vicinity of the stadium sites.

In summary, the report does not adequately address the effects of traffic generated by the proposed stadium on the surrounding roadway system. There are no clear connections between the recommended improvements to the traffic impacts that would potentially be triggered by stadium traffic. No evaluation was completed to measure the theoretical effectiveness of these recommended improvements.



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Review of Traffic Impact Study (Executive Summary)

For Las Vegas Raiders Stadium

Draft (Pending Sufficient Support Data)

July 21, 2017

17J18-0260| Prepared by **Iteris, Inc.**

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EXECUTIVE SUMMARY

This memorandum details the findings of Iteris' review of the Executive Summary of the report titled *Las Vegas Raiders Stadium Event Traffic Impact Study* (LV Stadium, LLC, May 2017) (the "report"). The purpose of the report is presented as an identification and evaluation of the potential pedestrian and vehicle traffic impacts to the surrounding street network associated with a proposed sports stadium complex to support a National Football League (NFL) team near the Las Vegas Resort Corridor (the "project").

The project includes the construction of a 65,000-seat NFL stadium. The Project site is bounded by I-15 to the east, Ploaris Avenue to the west, Hacienda Avenue to the north and Russell Road to the south. The proposed stadium would provide 2,400 on-site parking spaces. While off-site parking is recommended per the study, no specific off-site parking locations are identified as final in the report.

Study Summary

The report includes a high-level summary of findings for various analyses completed, including: parking, intersection vehicular level of service (LOS), and intersection pedestrian LOS. It also contains a flow chart detailing the mode choice assumptions utilized to forecast the number of trips that would be generated on a typical game day at the proposed stadium. Finally, an account of the recommended on-site and off-site mitigation measures were provided accompanied by maps illustrating the location of each recommended improvement.

Review Highlights

- **Insufficient Off-Site Parking Analysis:** Off-site parking analysis should be a significant part of the traffic study given that 85% of the required parking is stated to be offered off-site. The study lacks even basic information on these potential off-site parking areas which are imperative to complete a reliable and credible parking analysis and associated traffic analysis.
- **Unsupported Transportation Mode Choice Assumptions**: Several mode choice assumptions were introduced without supporting data. The assumption made by the study that 61% (or 19,693) of total non-resident attendees are to arrive to the stadium by foot from their hotels is likely optimistic and unsupported by any data.
- **Unaccounted Vehicle Trips:** The trip generation provided in the report did not account for employee trips and other ancillary trips, off-site parking shuttle trips, or for the doubling of trips for patrons being dropped-off and picked-up. Based on a high-level calculation, Iteris determined that the trip generation provided in the report is underestimated by approximately 3,000 to 4,000 vehicle trips.
- **Inadequate Study Area:** Study intersections do not adequately cover the likely reach of project trips. Only four (4) study intersections were included along Las Vegas Boulevard within the main Strip area. Considering a majority of the attendees are assumed to either walk, drive, or get a ride from their hotels to the Stadium, these study locations do not sufficiently capture the project impact at the other signalized and un-signalized intersections along Las Vegas Boulevard or the surrounding area.
- **Missing Trip Distribution Methodology or Assumptions:** The study lacks clearly defined trip distributions within the study area and it is unclear how the traffic analysis for the project scenario was completed, without the knowledge of trip origins and destinations.
- **No Verifiable Traffic Analysis Results: T**raffic volumes and LOS results for each individual intersection analysis were not included in the Executive Summary. Without quantitative analysis results, traffic impact to the area and the associated mitigation recommendation cannot be verified.

- **No Queuing Analysis:** 52% of total vehicle trips are projected to arrive pre-game during peak hour, while 73% are projected to depart post-game during peak hour. These arrival/departure rate equate to 3,000 to 4,000 vehicles per hour and could potentially result in significant back-ups on freeway on- and off-ramps, or cause a measurable impact to local businesses along Las Vegas Boulevard.
- **Other Missing Analysis:** Traffic analysis was not completed for a scenario to verify the proposed mitigations would adequately address project impacts. No freeway analysis was completed to measure the impact game day traffic would have on freeway traffic operations.
- **Inadequate Pedestrian Analysis:** The large number of pedestrians would likely cause impacts to private business driveways on Las Vegas Boulevard, as they would significantly reduce capacity for right-turning vehicles at intersections without pedestrian bridges. Additional consideration should also be given to the pedestrian generated from patrons parking on- and off-street parking within the industrial area west of I-15.
- **Effectiveness of the Recommended Improvements:** The report provides no discussion regarding the connection from the traffic analysis results to the determination of project improvements. The on-site improvements listed should be categorized as project design features while the off-site improvements were previously identified in regional improvement programs already. It is important to note that these off-site "mitigations" were developed to address existing or future forecast traffic conditions **without** the stadium.

Review Conclusion

The report contains limited information on the evaluation methodologies, analyses, and findings of the traffic effects a proposed NFL stadium would have on its surrounding roadway system within the Las Vegas Resort Corridor. The lack of supporting data on trip generation and off-site parking information cast doubts on the adequacy and completeness of the study area and traffic analysis. Furthermore, the recommended mitigations were developed based on existing and forecasted future traffic condition without the Project. No evaluation was completed to measure the effectiveness of these recommended improvements would have on mitigating any potential Project impact.

1 INTRODUCTION

This memorandum details the findings of Iteris' review of the Executive Summary of the report titled *Las Vegas Raiders Stadium Event Traffic Impact Study* (LV Stadium, LLC, May 2017). The purpose of the report is presented as an identification and evaluation of the pedestrian and vehicle traffic impacts to the surrounding street network associated with a proposed sports stadium complex to support a NFL team near the Las Vegas Resort Corridor. The Traffic Impact Study was prepared by Kimley-Horn and Associates, Inc. in support of the Clark County Entitlements for development.

1.1 Project Description

The Project includes the construction of a 65,000-seat NFL stadium. The project site is bounded by I-15 to the east, Polaris Avenue to the west, Hacienda Avenue to the north and Russell Road to the south. It is located near the Las Vegas Resort Corridor and is within proximity to 23,800 hotel rooms within a one-mile walking distance.

The proposed stadium would provide 2,400 on-site parking spaces. While off-site parking is recommended per the study, no specific off-site parking areas are identified.

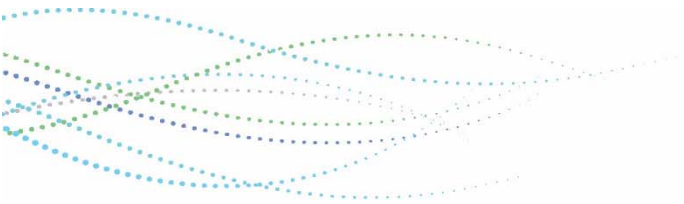
1.2 Scope of Traffic Impact Study

The Executive Summary to the Traffic Impact Study includes high-level summary of findings for the following:

- **Stadium Parking Analysis** consisted of determining parking demand based on the Clark County Parking Code requirements of 0.25 spaces per attendee. Off-site parking areas were recommended as part of the study, though specific locations and distributions were not identified.
- **Stadium Trip Generation** was developed based on mode choice and distribution assumptions within the context of a Sunday afternoon NFL game near the Las Vegas Strip. Surveys conducted by the Las Vegas Convention and Visitor Authority (LVCVA) were utilized in establishing mode choice by person trips. Mode choice percentages and vehicle trips were outlined in the flow chart included as Figure 1.2 in the Executive Summary.
- **Intersection Analysis** was completed for 44 intersections for two (2) opening year scenarios: 2020 background and 2020 background plus stadium. The study intersections are located mostly along Harmon Avenue, Tropicana Avenue, Russell Road, and Las Vegas Boulevard. LOS results for each individual intersection were not identified in the Executive Summary.
- **Pedestrian Analysis** considered the impacts of stadium generated pedestrian traffic will have on the walking routes to/from the stadium. Evaluation criteria consisted of Clark County's requirement of maintaining pedestrian LOS C or better within and adjacent to the Las Vegas Resort Corridor. Specific pedestrian routes and their associated LOS were not provided in the Executive Summary.
- **Special Event Traffic Control Plan** was identified as a required component for each of the event to be held at the stadium. Key elements of a traffic control plan were identified for stadium event ingress and egress, and a detailed plan was not included in the report.
- **On-Site Mitigations** are measures that either have already been or will be incorporated into the stadium site plans. Of the 27 on-site physical mitigations shown in Figure 1.3, approximately 11 mitigations are associated with the access points to the Project site while the rest are Project design features within the Project site. Eight (8) other additional mitigations related to on-site traffic management policies were listed.
- **Off-Site Mitigations** were identified for the surrounding street network serving the stadium. A total

of 12 mitigation measures relating to both physical and management plan improvements were provided. Three (3) additional Nevada Department of Transportation (NDOT) planned improvements on state facilities were listed as off-site mitigation. Eight (8) additional mitigations associated with regional circulation strategies, signal timing coordination, and other policy-related measures were included.

- **Event Management Plan** consisted of a list of 12 measures that should be considered for event-day overall traffic operation and management.



2 PARKING

Off-site parking analysis should be a significant part of the traffic study given that 85% of the required parking will be offered off-site. The study lacks even basic information on these potential off-site parking areas which are imperative to complete a reliable and credible parking analysis and the associated traffic analysis.

Insufficient Off-Site Parking Analysis

While Clark County Parking code requires 16,250 spaces for the proposed Project land use, only 2,400 parking spaces (or approximately 15%) are provided on-site. The report states that "no specific off-site parking areas have been finalized," though the report also stated that "the location of parking directly effects vehicle arrival and departure patterns, trip distribution, and traffic assignment." In addition, the study did not provide an estimate of the number of off-site parking areas nor the location or the availability of potential sites. The 13,850 off-site parking spaces to be provided effectively equate to 13,850 vehicle trips that could potentially introduce significantly more traffic impacts than just on-site at the stadium. It is unclear how traffic impacts on the surrounding roadway network could be determined given that 85% of the vehicle trips have unknown origins.

No Accounting of Employee Parking

The report did not mention how many (if any) of the 2,400 on-site parking spaces will be utilized by Stadium employees. A typical NFL stadium employs approximately 3,500 personnel on game day[1]. If a portion of these personnel will be parking on-site, the available on-site parking spaces could potentially be less than the stated 2,400 parking spaces.

No Analysis of On-street and Private Parking Lots

The report lists two (2) potential off-site parking scenarios including partnership with RTC to provide express bus services to park-and-ride facilities or with "Neighborhood Casinos" to provide direct shuttle bus services. However, it is common practice for attendees at large events to seek off-site parking within walking distance to the event which are usually available for free (on-street parking) or at a cheaper price point (commercial lots). Parking on nearby streets also allows the attendees to avoid traffic congestions that are typically associated with event inbound/outbound traffic at the Stadium access points.

The Project site is located within an industrial neighborhood with a significant amount of on-street parking and empty parking lots during the weekend. Potential Project-related pedestrian and vehicular traffic impact to the area west of I-15 will need to be addressed. Pedestrian safety is another concern that should be considered since these industrial areas may not be equipped to handle such high pedestrian traffic.

Mobility Impaired Accessible Parking Spaces

According to the Clark County parking code, the required number of accessible spaces where the total number of parking spaces exceeds 1,000 spaces is 20 spaces plus and additional space for each 100 total spaces over 1,000. Based on the required total of 16,250 spaces this results in 173 accessible spaces needing to be provided on-site.

[1] AECOM, 2015. *San Diego Stadium Replacement EIR, Traffic Impact Analysis Report.* Retrieved from: *https://www.sandiego.gov/sites/default/files/legacy/cip/pdf/stadiumeir/draftstadiumeir_appendix_j.pdf*

3 TRIP GENERATION

Figure 1.2 in the report includes a flow chart that depicts the trip generation and mode choice assumptions and calculations. Information in the flow chart is re-organized and summarized and included in **Table 1** and **Table 2** below for reference. Upon reviewing the trip generation and mode choice breakdown, it was concluded that several assumptions were introduced without supporting data while some calculations were incomplete or inaccurate.

Table 1 – Mode Choice (by %)

Attendee Breakdown			Mode Choice (%)						
Origin	%	Person	Auto	Shuttle /Bus	Taxi /TNC	Limos	Monorail	Walking	Total
Residents	**50%**	**32,500**	**83%**	**2%**	**13%**	**0%**	**2%**	**0**	**100%**
Non-Residents	**50%**	**32,500**	**27%**	**4%**	**8%**	**1%**	**0%**	**61%**	**100%**
By Air	9%	5,892	56%	10%	30%	4%	0%	0%	100%
By Car	11%	6,916	80%	8%	12%	0%	0%	0%	100%
Hotel Guests	30%	19,693	0%	0%	0%	0%	0%	100%	100%
Total	**100%**	**65,000**	**55%**	**3%**	**10%**	**0%**	**1%**	**30%**	**100%**

Source: Las Vegas Raiders Stadium Event Traffic Impact Study, Kimley-Horn, May 2017

Table 2 – Mode Choice (by Person-Trips)

Attendee Origin	Mode Choice (Person Trips)						
	Auto	Shuttle/Bus	Taxi/TNC	Limos	Monorail	Walking	Total
Residents	26,975	650	4,225	0	650	0	32,500
Non-Residents	8,832	1,142	2,598	235	0	19,693	32,500
By Air	3,300	589	1,768	235	0	0	5,891
By Car	5,533	553	830	0	0	0	6,916
Hotel Guests	0	0	0	0	0	19,693	19,693
Total	**35,807**	**1,792**	**6,823**	**235**	**650**	**19,693**	**65,000**

Source: Las Vegas Raiders Stadium Event Traffic Impact Study, Kimley-Horn, May 2017

Insufficient Supporting Data

- No source is stated for the 50/50 split assumed between Las Vegas Valley resident versus non-resident person trips. The split appears to be arbitrary.
- Of the vehicles required to park off-site, 8,710 vehicles (or 90%) are assigned to Tropicana Avenue Area and the remaining 1,000 vehicles (10%) are assigned to Las Vegas Boulevard Area. It is unclear how the vehicles are assigned or if the locations are related to potential off-site parking facilities. If there are potential off-site parking locations being considered, the report should clearly state so as the locations of these off-site parking governs the assumptions applied for trip distribution, trip assignment and arrival/departure timing and patterns.
- The footnote in Figure 1.2 of the report states "of the 23,800+ hotel rooms within the 20-25 minute walking radius of the stadium, between 20%-95% are considered to be potentially used by event patrons." The variability is too large to offer a credible representation of event day mode choice scenario. In addition, Iteris completed a high-level inventory of major hotels and was only able to identify approximately 15,000 rooms within 25-minute walking distance of the stadium (See **Table 3**).

The number of rooms would increase to approximately 30,000 if the parameter is extended to 35-minute walking distance. Regardless, the assumption made by the study that 61% (or 19,693) of total non-resident attendees are to arrive to the stadium by foot from their hotels is overly optimistic especially given the availability of casino shuttles, taxis, and ride-share services.

Table 3 – Mode Choice (by Person-Trips)

Resort[1]	Walking[2]		Number of Rooms[3]
	Distance (mi.)	Time (min.)	
Mandalay Bay	0.6	13	3,309
Delano at Mandalay Bay	0.6	13	1,117
Luxor	0.6	14	4,407
Hampton Inn Tropicana	0.7	13	322
Four Seasons	0.8	14	424
Excalibur	1.1	18	4,000
Tropicana	1.1	21	1,467
Total Rooms within 25-minute Walking Distance			**15,046**
New York-New York	1.3	26	2,024
MGM Grand	1.3	28	5,043
Hooters	1.5	27	657
Monte Carlo	1.5	29	3,002
Mandarin Oriental	1.5	30	392
Aria	1.7	35	4,004
Total Rooms within 35-minute Walking Distance			**30,168**

Note:
1. The table excludes small hotels with 300 rooms or less.
2. Resort distances and walking time retrieved from *maps.google.com*.
3. Resort room data retrieved from *www.hotels.com*.

Incomplete Trip Generation

- When converting person-trips to vehicle-trips for attendees arriving on-site via taxis, ride share services (e.g., Uber), or shuttle bus, the number of vehicle-trips need to be doubled. These vehicles will incur outbound trips after dropping off their passengers, and return to the stadium at the end of the event to pick up their passengers. These outbound trips during ingress period and inbound trips during egress period could amount to 3,100 additional vehicle trips, bringing the total event trips up to **17,011** (two-way) vehicle trips instead of the 14,658 trips shown in Figure 1.2 of the report. A revised mode choice summary (by vehicle-trips) is included in **Table 4** for reference.
- "Total Event Trips" listed in Figure 1.2 of the report does not include off-site parking shuttle bus trips. It also ignores patrons who choose to park at nearby on-street parking or commercial parking lots and need to walk to the Stadium to complete the final segment of the trip. Accounting for these trips will add approximately 12,000 pedestrian trips and 850 vehicle-trips to the overall number trips generated by a single Stadium Event (as shown in **Table 5**).

Table 4 – Revised Mode Choice (by Vehicle-Trips)

Attendee Origin	Mode Choice (Vehicle Trips)					
	Auto	Shuttle/Bus*	Taxi/TNC*	Limos	Monorail	Total Trip
Residents	8,430	34	2,642	0	3	11,106
Non-Residents	3,681	58	2,166	98	0	5,905
Total	**12,111**	**92**	**4,808**	**98**	**3**	**17,011**

*When converting person-trips to vehicle-trips for shuttle/bus and taxi/ride-share, the number of trips need to be doubled because these vehicles are likely to leave the Stadium after dropping off the patrons and return towards the end of the event to pick up more patrons.

Table 5 – Additional Trips Generated by Off-Site Parking

Off-Site Parking Needs 12,111 - 2,400 = 9,711	Off-Site Parking Demand (Veh)[1]			Walking (Person- Trips)	Shuttle (Veh Trips)[3]
	Total	< 1 Mile[2]	> 1 Mile		
Residents	6,759	2,784	3,975	8,910	636
Non-Residents	2,952	1,216	1,736	2,918	208
Total	**9,711**	**4,000**	**5,711**	**11,827**	**844**

1. Attendees of vehicle trips excess of the available 2,400 on-site parking will need to travel from off-site parking to the stadium generating additional walking / shuttle trips.
2. Assume 4,000 on-street or private lot spaces available within 1 mile walking distance west of the I-15.
3. The number of shuttle/bus trips were doubled because these vehicles are likely to leave the Stadium after dropping off the patrons and return towards the end of the event to pick up the patrons.

4 TRAFFIC ANALYSIS

While the study included intersection LOS analysis for opening year scenarios, traffic volumes and LOS results for each individual intersection were not included in the Executive Summary. Without quantitative analysis results, traffic impacts in the area and the associated mitigation recommendation cannot be verified. In addition, the lack of supporting data on trip generation and off-site parking information as mentioned in the previous sections cast doubts on the adequacy and completeness of the study area and traffic analysis.

Study Area Selection

- Study intersections do not adequately cover the reach of the project trips. There is a high concentration of intersections selected in the area north of McCarran Airport, which is nearly five miles away from the proposed Stadium Sites. It is unclear if the selection of study intersections is related to any potential off-site parking locations.
- Only four (4) study intersections were included along Las Vegas Boulevard along the Strip. Considering a majority of the attendees are assumed to walk, drive, or get a ride from their hotels to the Stadium, these study locations do not sufficiently capture the project impact at the minor signalized and un-signalized intersections along Las Vegas Boulevard. These intersections are mostly driveways into businesses such as casinos, shopping malls, and restaurants and do not have pedestrian cross bridges.
- A portion of the event attendees will likely arrive via Clark County Route 215 (CC 215) at Decatur Boulevard to avoid typical congestions on the I-15. The intersections along Hacienda Avenue and Russell Road west of the I-15 and Decatur Boulevard should be included in the study area.

Insufficient Vehicular Analysis

- Traffic analysis was not completed for a mitigated scenario to verify the proposed mitigations would adequately mitigate identified project impacts.
- No freeway analysis was completed to measure the impact game day traffic would have on freeway mainline, merge/diverge or weave operations. Freeway analysis is also needed to confirm the appropriateness of the three NDOT projects listed in mitigation section.
- No queuing analysis was completed. According to the report, 52% of total vehicle trips are projected to arrive pre-game during peak hour, while 73% are projected to depart post-game during peak hour. These arrival/departure rate equate to 3,000 to 4,000 vehicles per hour and could potentially result in significant back-up on freeway on- and off-ramps or cause measurable impact to local businesses along Las Vegas Boulevard.

Inadequate Pedestrian Analysis

- The study lacks clearly defined pedestrian trip distributions within the Las Vegas Resort Corridor. Roughly 20,000 pedestrians are assumed to access the stadium from the Strip though there is only one (1) pedestrian mitigation recommended for a 0.5-mile stretch on the west side of Las Vegas Boulevard. The influx of pedestrians will likely cause impact to business driveways on Las Vegas Boulevard as they would significantly reduce capacity for right-turning vehicles at intersections without a cross bridge.
- The pedestrian analysis neglects the potential traffic generated from potential on-street/private lot parking within the industrial neighborhood to the west of the Stadium, which could equate to up to 12,000 person-trips (see **Table 5**). While these trips are less likely to generate a significant traffic operational impact due to its distance from the Las Vegas Resort Corridor, it should be considered in establishing the overall event management plan for both operational and pedestrian safety reasons.

5 ON-SITE AND OFF-SITE MITIGATION

Mitigation measures developed to address the impacts of the stadium are characterized in the report as follows:

- On-site Mitigations
- Off-site/Area-wide mitigations
- Event Management Plan

5.1 Review of On-Site Mitigations

What the report identifies as on-site mitigations should be more appropriately described as project design features rather than mitigations, since they are necessary to provide functional access to and from the site and adequate internal circulation.

Iteris identified some discrepancies between the improvements listed in the bullet points in the text and those shown in Figure 1.3. These mitigations and discrepancies are noted in **Table 6** below. Two (2) of the improvements (bullet #8 and #9 in the text) do not appear to be stadium-related improvements and have possibly been programed already. In addition, the construction of the pedestrian bridge over I-15 on the south side of Hacienda Avenue could potentially conflict with a proposed off-site improvement at I-15 ramps at Hacienda Avenue as well as the preferred alignment of the potential XpressWest High Speed Passenger Railroad.

Table 6 – Comparison of On-site Mitigation Measures Shown in the Report Texts and Figure 1.3

Figure ID	Report ID	Description	Additional Comments
26	1	Widen Polaris Avenue from a 60' to an 80, right-of-way public street. Delineate with a 5- lane section that includes a continuous center left-turn lane.	None
1	2	Modify existing signalized intersection of Russell Road and Polaris Avenue (Intersection #1) to provide dual southbound left-turn lanes for event egress.	None
2	3	Modify existing right-in/right-out driveway to provide a 39' access drive on Russell Road. The access drive should be gated and closed during event ingress and opened to provide dual right-turn lanes during event egress.	None
3	4	Construct a 35' wide southern access drive onto Dean Martin Drive to provide dual right-turn lanes during event egress (Intersection #3).	None
4	5	Construct a full access drive onto Dean Martin Drive with a 155' southbound right-turn lane (Intersection #4).	None
5	6	Provide a 31' wide right-out/left-out exit drive on Dean Martin Drive for VIP Limo operations at the East VIP Entry (Intersection #5).	None
6	7	Provide a 31' wide right-in/left-in entry drive on Dean Martin Drive for VIP Limo Operations at the East VIP Entry (Intersection #6).	None
7	8	Maintain existing median island and unsignalized street intersection improvements at the Hacienda Avenue/Aldebaran Avenue-Connector Road Intersection (Intersection #7).	Pre-existing improvement?
Missing	9	Maintain existing unsignalized street intersection geometry and improvements at the Dean Martin Drive/Connector Road Intersection (Intersection #9).	Pre-existing improvement?

Table 6 – Comparison of On-site Mitigation Measures Shown in the Report Texts and Figure 1.3

Figure ID	Report ID	Description	Additional Comments
8	10	Construct new signalized intersection at Hacienda Avenue with widened 5-lane section of Polaris Avenue (Intersection #8)	None
9/10	11	Provide 10' wide and/or 15' wide sidewalks along the perimeter roadways of the stadium	None
11	12	Provide a 30' wide walkway with pedestrian barrier rail along the southside of Hacienda Avenue connecting the I-15 pedestrian bridge crossing to the Connector Road intersection. (Intersection #7).	None
12	13	Widen existing I-15 Hacienda Avenue overpass with an elevated 30-foot wide pedestrian walkway over I-15 along the south side of the Hacienda Avenue bridge. **Coordinate pedestrian bridge design with future NDOT HOV ramp connector to Hacienda Avenue Bridge**.	May conflict with off-site mitigation measure #15
13	14	Provide 500' of two lane VIP drop-off/pick-up curb spaces (31 limos) for the east VIP entry.	None
14	15	Provide 615' of one lane VIP drop-off/pick-up curb spaces (20 limos) for the west VIP entry	None
15	16	Provide 50 linear feet of curb space for an ingressing VVIP security check point before entering stadium Lot D parking.	None
16	17	Provide 33' wide access drives for VVIP (game day) and truck access (non-game day) into the stadium building.	None
17	18	Pedestrian containment fencing is to be provided along the public streets of Russell Road, Polaris Avenue, and Hacienda Avenue as shown in detail on Figure 1.3.	None
18	19	To accommodate off-site shuttle bus operations, provide a minimum of 30 on-site bus bays near the intersection of Polaris Avenue and Hacienda Avenue.	None
19	20	Provide on-site vehicle queuing for a minimum of 125 Taxi/TNC (rideshare) vehicles.	None
20	21	Obtain County approvals for all event days to use Polaris Avenue as a bus holding area for post-game shuttle buses. Three lanes of Polaris Avenue for a total of 87 buses	None
Missing	22	Coordinate with RTC to operate RTC express buses for pre- and post-game operations.	None
21	Missing	455' of curb space to accommodate 10 RTC Express lanes for pre-and post-game operations	None
22	Missing	42,700 SF of Shuttle bus Pedestrian Queuing area for loading / unloading	None
23	Missing	38,815 SF of taxi/TNC Pedestrian Queuing area for loading / unloading	None
24	Missing	Private 5 lane roadway section with flexible lane options for ingress and egress operations	None
25	Missing	Private 3 lane roadway section with flexible lane options for ingress and egress operations	None
27	Missing	Existing public street recommended to be vacated for routing closures. Open to public on non-event days.	None

Source: Las Vegas Raiders Stadium Event Traffic Impact Study, Kimley-Horn, May 2017

5.2 Review of Off-Site Mitigations

Fifteen (15) off-site mitigation measures are identified in Figure 1.4 and in the report text which can be characterized as follows:

- Operational Improvements (#1, #2, #3, and #4)
- Pedestrian Access Improvements (#7, #8, #9 and #10)
- Major Physical Improvements (#5, #6, #11, #12, #13, #14, and #15)

The report provides no discussion regarding the connection from the results of the traffic analysis to the determination of project improvements. As stated in the report text, "many of the street network improvements have been previously identified for construction within the Resort Corridor prior to the development of an NFL stadium in Las Vegas". These previously identified improvements should be categorized as background improvements rather than project mitigation measures since they were developed to address existing or future forecast traffic conditions **without** the stadium.

Operational Improvements

Special event signal timing plan (#1) – This is an appropriate measure, though the following two (2) intersections that were listed in the signal timing plan were not identified as study intersections and thus not part of the traffic analysis:

- Decatur Boulevard and Russell Boulevard
- Decatur Boulevard and Hacienda Avenue

The following three (3) intersections should be considered to be included in the special event signal timing plan to further improve access to/from the Stadium from the north:

- Decatur Boulevard and Tropicana Avenue
- Decatur Boulevard and Harmon Avenue
- Decatur Boulevard and Flamingo Boulevard

The proposed new traffic signal at Hacienda Avenue and Polaris Avenue (#3) and the modification of the existing signal at Russell Road and Polaris Avenue (#4) are included as both on-site and off-site mitigations, though they should be considered as project design features.

Pedestrian Improvements

- Pedestrian widening on Las Vegas Boulevard between Tropicana Boulevard and Hacienda Avenue (#7)
- Pedestrian widening on Hacienda Avenue between Las Vegas Boulevard (#8 an #9) and the stadium site includes constructing at 30-foot wide elevated walkway to the stadium site over I-15 along the south side of Hacienda Avenue (#10)

While these improvements will improve pedestrian safety and facilitate pedestrian flow they could contribute to increasing congestion at driveways particularly on the west side of Las Vegas Boulevard as already noted.

Major Physical Improvements

- Two (2) improvements are identified as being funded by Fuel Revenue Indexing (FRI) as listed below. Both of these projects would likely improve access to the stadium site, particularly the widening of Decatur Boulevard since it can be anticipated that significant numbers of attendees would use this

street to access the stadium form the west to avoid congestion elsewhere and/or park in the industrial areas surrounding the stadium.

1. A new southbound Flamingo Road off-ramp from I-15 to Dean Martin Drive (#5)
2. Completion of e Decatur Boulevard to full width right of way improvements from CC 215 westbound ramps to Oquendo Road (#6)

- Two (2) additional projects are also identified as being funded by Fuel Revenue Indexing though neither project could be located on the two most recent FRI project lists. It is therefore unclear if the improvements would be completed by stadium opening.
  1. Regional Transportation Commission of Southern Nevada Fuel Revenue Index Project List – Updated November 2015
  2. Regional Transportation Commission of Southern Nevada Fuel Revenue Index Project List – Approved Authorization to Proceed list - Updated June 2017
- A new grade separation on Valley View Boulevard over the Union Pacific Rail Road at Harmon Avenue is proposed. While this project has been on hold since 2010 due to lack of funding Clark County staff advised that this project is moving forward and construction is anticipated to commence in 2018. The completion of this grade separation would significantly improve access to the stadium, from the north.
- There are three (3) NDOT freeway projects included as mitigations though it is unlikely that these could be completed prior to the stadium opening:
  1. I-15 Tropicana Avenue interchange improvements (#13) – The report states that this project will not be in place before the stadium opening.
  2. New I-15/Hacienda Avenue HOV Interchange northbound off and southbound on (#14) – This improvement is shown as a long term improvement (between 2025 and 2035) in the South Nevada HOV Plan Update (July 2015). In addition, adding these ramps may conflict with the proposed pedestrian bridge on the south side of Hacienda Avenue across I-15 which are also recommended as improvements as well as the preferred alignment of the potential XpressWest High Speed Passenger Railroad.
  3. New I-15/Harmon Avenue HOV Interchange northbound on and southbound off (#15) – This improvement is shown as a long term improvement (between 2025 and 2035) in the South Nevada HOV Plan (July 2015).
- There is a proposed extension of the Monorail from the MGM Grand to Mandalay Bay (#12) – This project is in the 2016-2040 RTP and shows Las Vegas Monorail Company as the funding source. This improvement could conceivably be implemented prior to the stadium opening and would provide tangible access improvements to the site.

5.3 Review of Event Management Plan

The list of components in the proposed event management plan provides a set of 12 measures that will be necessary to ensure adequate on- and off-site circulation on game day. A major input to the plan will be the location of the final off-site parking agreement which have yet to be determined. Regardless of where these off-site parking spaces are located, the event management plan should also assess parking and circulation issues in the industrial areas immediately to the west, north and south of the stadium site. There is a substantial number of on- and off-street parking spaces available in these areas which has low existing traffic volumes on Sundays (based on a field check) and are accessible, including from CC 215 and Decatur Boulevard.

6 CONCLUSIONS

This memorandum documents Iteris' review of the Executive Summary of the Traffic Impact Study of the report titled *Las Vegas Raiders Stadium Event Traffic Impact Study*. While the executive summary to the traffic study contains limited information, it provides a glimpse to the methodologies adopted to evaluate the impact a proposed NFL stadium would have on its surrounding roadway network and provides a high-level description of the findings.

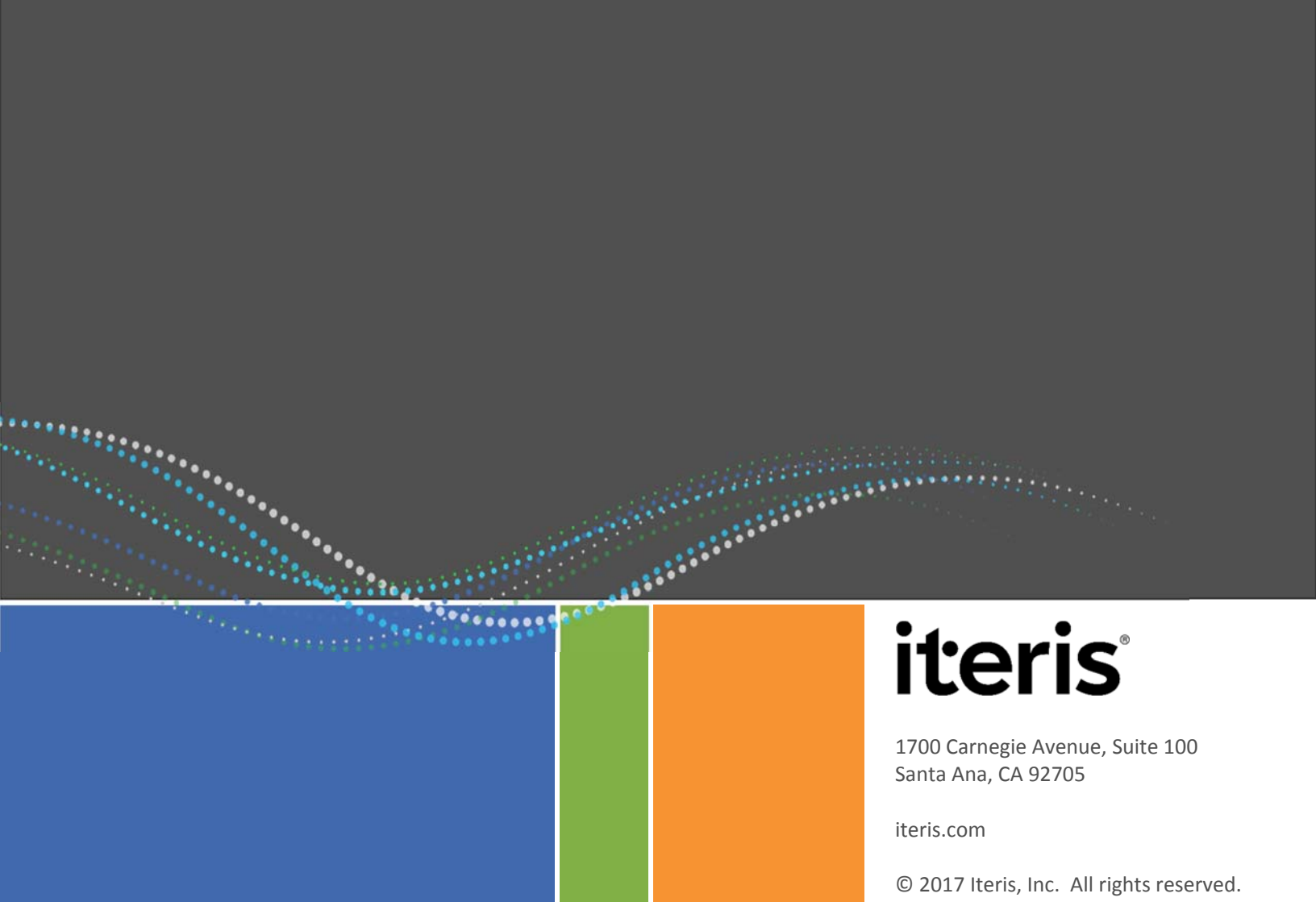
Given that 85% of the required parking is stated to be offered off-site, the study lacks the basic information on these potential off-site parking areas. The locations and nature of these off-site parking facilities are imperative to complete a reliable and credible parking analysis and the associated traffic analysis. It is unclear how the traffic analysis for project scenario was completed without the knowledge of trip origins and destinations.

The trip generation estimates provided in Figure 1.2 of the study are incomplete and contains errors. The assumption made by the study that 61% (or 19,693) of total non-resident attendees are to arrive to the stadium by foot from their hotels is overly optimistic. The trip generation also did not account for employee and other ancillary trips, off-site parking shuttle trips, or for the doubling of trips for patrons being dropped off and picked up on-site. Based on a high-level calculation, Iteris determined that the trip generation provided in the report is underestimated by approximately 3,000 – 4,000 vehicle trips during peak hour.

The report did not provide traffic volumes or quantitative analysis results and Iteris was unable to verify traffic impact to the area or any of the associated mitigation recommendations. It also appears that some analysis components were missing including vehicle queuing analysis, freeway operations analysis and additional pedestrian analysis.

The study area selected for the report does not seem to adequately cover the reach of potential project trips. In particular, additional intersections to the west of I-15 and along Las Vegas Boulevard should be considered. There is a high likelihood of event attendees utilizing on- or off-street parking within the industrial area west of the I-15.

In conclusion, the lack of supporting data on trip generation and off-site parking information cast doubts on the adequacy and completeness of the study area and traffic analysis. Furthermore, the recommended mitigations were developed based on existing and forecasted future traffic condition without the project. No evaluation was completed to measure the effectiveness of these recommended improvements would have on mitigating any potential project impact.



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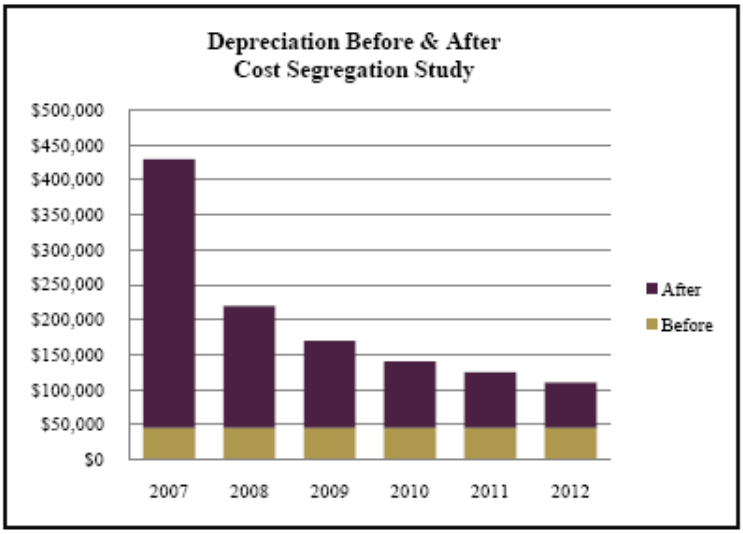
SCOTTSDALE, AZ 85254

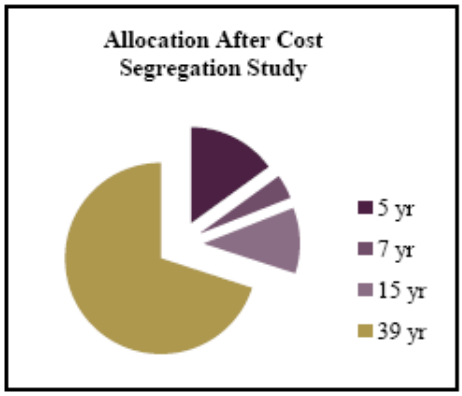
Sample Case Study – Proposal Summary

Cost Segregation Study Designed For:			
Property	ABC Promenade	Owner	ABC, LLC
Location	Phoenix, AZ	Tax Year	2007

Asset Class	MACRS Lives	Original Allocation		Allocation After Cost Segregation Study	
Personal Property	5 yr	$0	0%	$750,000	15%
Personal Property	7 yr	$0	0%	$200,000	4%
Land Improvements	15 yr	$0	0%	$550,000	11%
Real Property	39 yr	$5,000,000	100%	$3,500,000	70%
Depreciable Basis		$5,000,000	100%	$5,000,000	100%



Depreciable Basis	$5,000,000
Land Basis	$1,600,000
Total Basis	$6,600,000



Dollars Rescheduled (accelerated)	$1,500,000	Cash Savings for Year 1	$385,000

Problem with the "Do Nothing" Strategy

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MARK E. LACASSE
PRESIDENT / CEO

Mr. Jeremy Aguero

c/o Applied Analysis, 6385 S. Rainbow Blvd., Las Vegas, Nevada 89118

July 20, 2017

The issue of future water availability in Southern Nevada may not be a matter in need of Applied Analysis. But it is crucial to the viability of a region which, judging from your columns in the LVRJ chain of publications, is something in which you have a keen interest. Claims that we have completely recovered from the recession are belied by the attached article from Bloomberg listing Nevada among:

These US States Still Haven't Fully Recovered From Recession.

Cancellation of the Faraday plant in North Las Vegas is a setback on Nevada's road to recovery.

Another impediment are longstanding deficiencies of infrastructure, particularly with respect to **water.**

Also attached from the November 26th edition of the Review-Journal is an article headlined:

"Water use emerges as a decisive factor in Nevada's economic diversification"

It was a story of an increasing number of prospective employers discouraged from relocating to Southern Nevada by state and regional water authorities concerned about diminishing supplies, prompting me to include the following statement as Public Comment during the January meeting of the Southern Nevada Water Authority (SNWA).

QUOTE:

--------- *"The goal of water conservation is always admirable, and truly water-intensive industries cannot be sustained here. But it is not acceptable that any enterprise adding significant value and in the process generating good jobs and additional tax base is discouraged from locating in Nevada.*

New water supplies are needed, but withdrawing groundwater from the Snake Valley is neither ecologically tenable nor financially feasible. Touring Lehman Cave in Great Basin National Park the guide pointed out that normal drippage had ceased due to a decline in groundwater. There is no surfeit of water up there while there is too much water in the rising oceans."

----------UNQuote.

I went on to suggest as an alternative to SNWA's northeastern pipeline that they instead turn their "straw" 180 degrees around to draw seawater out of the Gulf of California or Pacific Ocean. Desalinization schemes replicated around the world financed by a carbon tax for climate mitigation could collectively buy humanity some time and sustain development in parched inland valleys such as Las Vegas.

Breaking the logjam over (or should I say **under**) Yucca Mountain about the centralized repository for spent nuclear fuels (SNF's) holds the key to financing a desalinization pipeline if Nevada accepts some infrastructure plums from the federal government in exchange for its cooperation on Yucca Mountain. Indeed, a Southwest Infrastructure Initiative funding desalinization, Interstate 11, Monorail extension to McCarran and high-speed rail to LA, as well as the repository and comprehensive cleanup of hazardous materials stored in and around the Nevada National Security Site (NNSS) addresses all of the economic and environmental factors constraining sustainable growth of the area.

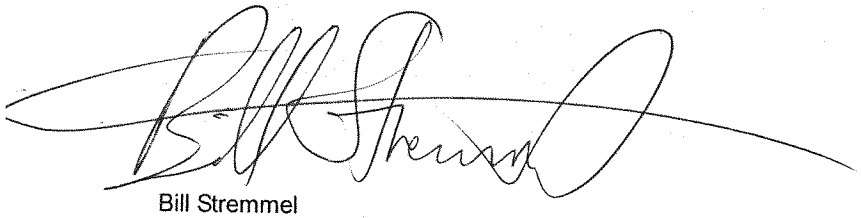
Harry Reid's retirement from the United States Senate reveals a disturbing picture of the status quo with high-level waste in temporary burial at NNSS, plutonium and radioactive isotopes of uranium at US Ecology near Beatty, and huge inventories of lower-level waste scattered across Southern Nevada. Any accidental spillage of low-level waste from the steady stream of trucks up the I-15 into the NNSS would severely disrupt tourist traffic up to the Strip. Only a project on the scale of Yucca Mountain, if

expanded into a comprehensive clean-up, could centralize the inventory all hazardous materials scattered in and around the NNSS, shifting all transportation via truck through and near Las Vegas onto new secure rail lines from the north with a guarantee that nothing would get closer than 100 miles to the Strip.

The unproductive diatribe over Yucca Mountain needs to quickly evolve into constructive discourse as to how the federal government can become a willing partner in surmounting the ominous environmental, transportation and water challenges confronting Southern Nevada. NDOT + RTC will need to spend hundreds of millions of $ for access into the new Raiders' stadium. At Tuesday's meeting of the Nevada High-Speed Rail Authority, funding was identified as the last hurdle to be surmounted for XpressWest to launch construction, as all of the myriad approvals are now in place.

I am sorry that I was unable to attend LVGEA's May 24th Economic Data, Analysis, and Forecasting "PERSPECTIVE" at which you were the keynote speaker. You are highly respected in the community and well-positioned to expand the regional vision of infrastructure solutions.

Sincerely,



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wjs / attachments

These US States Still Haven't Fully Recovered From Recession

*Jul 7, 2017*Bloomberg

As the U.S. economy enters its ninth year of expansion this month, many Americans feel the recovery has been incomplete -- and the numbers back them up.

Five states -- Arizona, Connecticut, Mississippi, Nevada and Wyoming -- still haven't regained their levels of gross domestic product from before the financial crisis, more than five years after the country as a whole hit that milestone. Eight states are below prerecession levels of employment. And 15 have home prices that have yet to rebound fully.

While each of the states has individual obstacles, they illustrate how growth has lagged outside of the nation's largest cities in New York, California and Florida. And though President Donald Trump won some of the states last November after highlighting sectors and regions that have lagged for years -- including, for example, coal mining in West Virginia and manufacturing jobs in the Midwest -- the pain hasn't been limited to Republican territory.

"The hallmark of the recovery is that it is being driven by the nation's largest metro areas," said Mark Zandi, chief economist at Moody's Analytics in West Chester, Penn. "Metro areas have attracted millennials and boomer empty-nesters and are globally oriented, benefiting from global capital inflows. Rural economies that are dependent on commodity-based activities have suffered."

Nevada Bust

Nevada has also had a tough road back, having failed to reach prerecession levels of GDP and home prices. It was among a handful of states, also including Florida, Georgia, California and Arizona, where the 2006 housing bust was particularly severe. Las Vegas hotels, restaurants and casinos suffered when consumers bolstered savings in the wake of the 2007-2009 downturn.

In northwestern Nevada, business at 600-employee Q&D Construction Inc. is growing again but hasn't returned to 2006 levels when it employed 1,100 people. The company builds roads, hospitals, schools and airport facilities as well as housing.

"Things are coming back," but Nevada "has not gotten back to where it once was," said Lance Semenko, Sparks-based Q&D's chief operating officer.

The 4.7% unemployment rate in Nevada, though below the 5.1% level when the recession began, remains above the housing-boom figure of 3.9% last seen in early 2006. Nevada, which voted for Clinton, had the highest percentage of homes with mortgages in excess of the value of homes, or negative equity, at 12.4%, followed by Florida, Illinois, New Jersey and Connecticut, according to real estate researcher CoreLogic Inc.

"Our recession was longer and deeper so naturally it will take us longer to recover," said Stephen M. Miller, director for the Center for Business and Economic Research at the University of Nevada at Las Vegas.

The regional disparities aren't holding back Federal Reserve policy makers from raising their benchmark interest rate and eyeing a reduction in their $4.5 trillion balance sheet. Central bankers, though mindful of the uneven circumstances, look at the country as a whole when making decisions and generally consider the 4.3% U.S. unemployment rate to be below the level consistent with full employment.

Recovery 'Complete'

"The national recovery is absolutely complete," said Stanford University economist Robert Hall, who heads the National Bureau of Economic Research committee that dates recessions.

Other issues plaguing the laggard states include slow growth in federal spending in New Mexico and below-average education levels in Mississippi and Alabama, economists said.

Connecticut is another story. In the New England state, which went for Clinton, General Electric Co. last year announced it was moving its headquarters to Boston, followed by Aetna Inc. deciding in June to relocate to New York City. Connecticut's bonds were downgraded in May after the state faced a widening deficit. Florida Governor Rick Scott even visited the state in June to try to persuade companies to move south.

"Taxes and spending that can't be sustained" are hurting the economy, said Don Klepper-Smith, chief economist at consulting firm DataCore Partners LLC in Durham, Connecticut. "Lack of fiscal discipline is creating an air of uncertainty. There is a loss of confidence in the business community."

"We are underperforming in a rather dramatic fashion," he said.

By Steve Matthews and Catarina Saraiva

Posted November 26, 2016 - 9:45pm**Updated** November 27, 2016 - 1:41pm

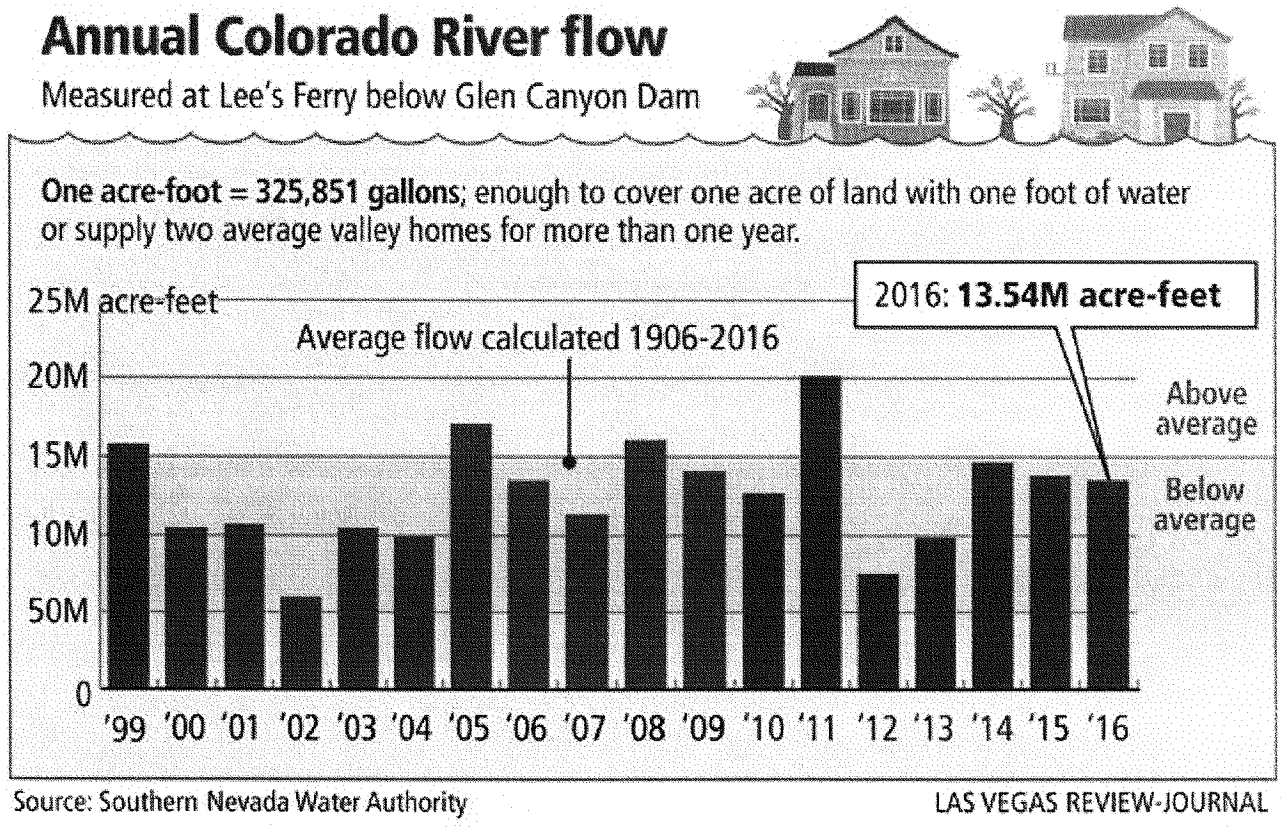
Water use emerges as a decisive factor in Nevada's economic diversification

Dr. Kumud Acharya, CTO for WaterStart and a research professor at the Desert Research Institute, discusses the incredible potential Nevada has for improving water technology and at the same time creating jobs. (Rachel Aston/Las Vegas Review-Journal)

Lake Mead's water level near Las Vegas Boat Harbor in Boulder City is seen Thursday, Nov. 17, 2016. (Jason Ogulnik/Las Vegas Review-Journal)

Pat Mulroy, a leading water industry expert, sits in front of the Desert Research Institute building Monday, Nov. 14, 2016. Nevada has become skillful in reconciling economic development with water conservation, she said. (Nicole Raz/Las Vegas Review-Journal)

Pat Mulroy, a leading water industry expert, stands in front of the Desert Research Institute building Monday, Nov. 14, 2016. Nevada has become skillful in reconciling economic development with water conservation, she said. (Nicole Raz/Las Vegas Review-Journal)



Annual Colorado River flow measured at Lee's Ferry below Glen Canyon Dam. (Gabriel Utasi/Las Vegas Review-Journal)

By NICOLE RAZ
LAS VEGAS REVIEW-JOURNAL

A company's potential water use, in some cases, is the deciding factor in whether Nevada will provide tax incentives.

"We have discouraged a couple of companies (considering relocating for tax abatements) that we felt were water users of such significance, particularly in comparison to the jobs and quality of jobs," said Steve Hill, director of the governor's office of economic development.

As state officials work to attract tech and advanced manufacturing companies, they have to reconcile economic development with water conservation. Water is a limited resource in Nevada, and state officials weigh a potential company's impact on the state's water supply against potential job creation and other economic benefits.

Nevada gets the majority of its water supply from the Colorado River basin. The U.S. Bureau of Reclamation allocates 300,000 acre-feet of water per year from the basin to Nevada. Hill said that because of credits for recycling water, Nevada functionally ends up with an annual amount of 475,000 acre-feet.

"That meets the needs of everything in the valley," he said. "When you get a company that's looking for (100,000), (200,000) or 300,000 acre-feet, that starts to be a significant enough portion of the water that's available that it really starts to be one of the top considerations in how we would view that conversation."

INVESTING IN CLEAN TECH

Data centers and manufacturing companies are the heavyweights in water use.

"People love to point to the hotels, but the hotels are the most miserly water users there are," said Pat Mulroy, a faculty adviser at the Desert Research Institute and a leading water industry expert.

"We are diversifying our economy, which is tremendous. But with that diversification we are also bringing in industries that are very heavy water users," Mulroy said. "A Tesla plant is going to use as much water as all of Carson City."

But those large water users, like Tesla and Switch, are also heavily investing in water technology.

Hill said Tesla, for example, has designed its facility to use direct electricity for heating, rather than using the production of steam to provide heat.

"When you provide steam, you get a lot of evaporation," he said.

Mulroy said she is convinced that Telsa will be part of a larger water reuse program in the Tahoe Reno Industrial Center.

Data centers are also making investments.

"Most of the water used in data centers, and to a large extent in the manufacturing process, is used on the cooling side," Hill said. "So several of those (water-saving) steps involve recapturing the steam that comes off those cooling systems."

Mulroy said that Switch, for example, is "heavily committed to being sustainable."

The idea of merging the tech sector with sustainability is gaining traction as a whole, said Kumud Acharya, a researcher at the Desert Research Institute as well as chief technology officer of WaterStart.

WaterStart is a public-private nonprofit founded in 2013 that works with state agencies and organizations to create quality job growth and diversify the region's economy through supporting innovation in water technology.

Bloomberg reported in October that U.S. venture investment in clean-tech companies jumped to its highest levels since in the third quarter of 2014; $741.1 million was invested across 65 deals, according to data provided to Bloomberg by PitchBook.

NEVADA'S WATER EDGE

"And Nevada is an ideal place to test water technology," Acharya said. "That is precisely the goal of WaterStart. We are trying to make Nevada the Silicon Valley of water."

Economic development and conservation are parallel conversations, Acharya said.

Companies of all types produce some type of toxic waste, for example, which is an opportunity for water researchers to develop technology to treat the water, he said.

Jonas Peterson, president and CEO of the Las Vegas Global Economic Alliance, said via email, "It's counter-intuitive, but Las Vegas actually has a regional competitive advantage in water. Not only do we have a reliable, long-term supply, but we also have lower costs and a globally recognized role in water innovation, leadership and sustainability."

Nevada has a long history of reconciling its need for economic development with water conservation. The very struggle itself gave birth to Nevada's second largest city, Henderson, said Michael Green, a historian and professor at UNLV.

"Water being here is the driver of economic development in the first place," Green said.

Water was pumped from Lake Mead into the Las Vegas Valley for the first time in 1941 to support the first "really heavy industry in Southern Nevada," which was magnesium mining in Henderson to support the World War II effort, he said. Mulroy said Southern Nevada had to embrace its relationship with water "more rapidly" than other parts of the country, which has given Southern Nevada an edge in becoming water experts.

Nevada's history in navigating its relationship with water has positioned the state to be a resource going forward, she said.

"You're going to see desert communities growing, not shrinking," Mulroy said, as population growth continues and as climate change takes a toll on coastal communities.

"Our water supply has given us an opportunity to turn our vulnerability into an asset," she said.

Contact Nicole Raz at nraz@reviewjournal.com or 702-380-4512. Follow @JournalistNikki on Twitter.

Kumud Acharya, chief technology officer for WaterStart, works in his lab at Desert Research Institute, Thursday, Nov. 17, 2016. (Bizuayehu Tesfaye/Las Vegas Review-Journal Follow @bizutesfaye)
Kumud Acharya, chief technology officer for WaterStart, poses for a photo in his lab at Desert Research Institute, Thursday, Nov. 17, 2016. (Bizuayehu Tesfaye/Las Vegas Review-Journal Follow @bizutesfaye)

Kumud Acharya, chief technology officer for WaterStart, speaks during an interview in his office at Desert Research Institute, Thursday, Nov. 17, 2016. (Bizuayehu Tesfaye/Las Vegas Review-Journal Follow @bizutesfaye)

Kumud Acharya, chief technology officer for WaterStart, speaks during an interview in his lab at Desert Research Institute, Thursday, Nov. 17, 2016, in Las Vegas. (Bizuayehu Tesfaye/Las Vegas Review-Journal Follow @bizutesfaye)

SPY Concerns

August 1, 2017

TO: Las Vegas Stadium Authority, Board Members

SUBJECT: African American Ongoing Participation in Raider's Stadium Project

This correspondence is directed to all the Board Members and others in the community affiliated or concerned with the Raiders stadium project. Over the past months members of the community have expressed concern about various board members. The intent is not to rehash these *"facts"* but rather to acknowledge and ensure that history does not repeat itself. The question of today is what the Board Members and Raider management can do to ensure that African Americans are involved in the building of the Raider Stadium and their participation in the long term opportunities that this stadium represents to our community.

The Board has the obligation, responsibility, authority and the power to make sure that minorities and specifically African Americans participate in this process. Our African American community is often left out of economic entrepreneurship opportunities. We have a high unemployment rate and a higher incarceration rate. It is excessive in comparison to the state's Black population. This is documented statistical information that's verifiably by data maintained by the state. This Board cannot solve all these problems but it has the power to make sure that this project doesn't participate in contributing to these dismal statistics.

Our proposed recommendations are: (1) African American contractors be given contracts at various levels of this project from overseeing projects, administrative and professional opportunities, to the actual building and support entrepreneurial opportunities. (2) That Local 872 request the approval from their National office to administer a special dispensation program that allows individuals (minorities but particularly African Americans) to join the union so that they can get the full benefits of the union. This can be done; it has been done in the past. (3) That there be an oversight group to ensure that the level of minority participation equals and remains at a percentage representative of the African American population here for the duration of the project . (4) That after completion of the project there is some guarantee or formal agreement that there is a representative participation of African Americans in the Raider stadium enterprises. (5) This project represents what can be done when a community works together. (6) That selected members of the African American community are involved in developing a program to ensure that this happens. (6) That the Raider organization be involved in this entire process as it relates to these recommendations. As African Americans we cannot speak for the other minority communities, nor is it our intent to speak for all African Americans; our specific concern is for our Black community. We do not have the knowledge, expertise or passion to attempt to speak on behave of other minority communities. It is debatable that the other minority communities have suffered to the same extent. We have been less represented and are arguably the most vulnerable population in the Las Vegas Valley.

We would welcome the opportunity to further discuss these suggested proposals with members of the diversity panel in more detail than what is allowed in the public opinion forum of the public stadium meetings. At the end of the day, our goal and objective is to ensure that history does not repeat itself. History is relevant, if history is ignored than the failures of the past are destined to be repeated. Finally, we have worked with various members of this Board in the past and know them to be concerned, fair and just individuals. This further supports that history is important and cannot be ignored. It is our hope that members of this Board have the courage to address these specific concerns of the African American community. We look forward to hearing from you prior to the August 17, 2017 meeting.

Sincerely,

Sjgsatt702 @gmail.com-702 883-0102:Rosephillips248@yahoo.com-702 238-8798:ydyess2014@yahoo.com-702 572-1113

Yolanda Dyess
Rosemary Phillips
Jacqueline Sattwhite

Cc: Steve Hill, Chairman Stadium Authority Board
Ike Lawrence Epstein, Vice Chairman Stadium Authority Board
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Steve Sisolak, County Commissioner
Applied Analysis
Lawrence Weekly, County Commissioner
Frank Hawkins, Businessman and Former Raider Player
Gene Collins, Community Activist
Raiders Community Relations Department
Raiders Public Affairs
Las Vegas Review Journal

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