

APPENDIX E

Ludlam Trail PD&E Traffic Study



Ludlam Trail PD&E

Traffic Study

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Executive Summary

Miami-Dade County (MDC) is conducting a Project Development and Environmental (PD&E) study to explore the potential impacts of converting an abandoned rail alignment to a shared use path trail, known as Ludlam Trail. This 5.6-mile long path will extend in a north-south direction between S.W. 80th Street and N.W. 7th Street, parallel to N.W./S.W. 70th Avenue (to the west) and N.W./S.W. 69th Avenue (to the east).

The purpose of this study is to explore the traffic implications of the proposed trail. This included analyzing existing conditions, forecasting future volumes, exploring the impacts of the trail on the crossing streets and estimating trail operation. To do so, turning movement counts were collected at 19 intersections and traffic volume counts were collected at 15 roadway locations which will be affected by the trail design.

Existing conditions were analyzed using Synchro microsimulation software. The analysis was based on existing collected data with a seasonal factor applied. It was observed that all of the intersections are performing under acceptable operational conditions during existing conditions.

To assess future conditions for the design year of 2040, growth factors were determined and applied to vehicular traffic and also pedestrian and bicycle trips. Historical data in the area and regional travel demand model (SERPM 7.0) growth were used to calculate future vehicular volume. To predict pedestrian and bicycle activity, a combination of surrogate trails data collection (M-Path in Miami-Dade County and Fred Marquis in Pinellas County), Strava application pedestrian and bicycle activity and regional model (SERPM) bicycle and pedestrian forecasts were used. According to this study, a total of 80 pedestrians and 47 bicyclists will be using the Ludlam Trail in opening year 2020 (in the peak hour) and it will increase to 108 and 63 by design year 2040 (in the peak hour), respectively. The FHWA method of estimating Level of Service for a Shared-Use Path was used to determine the operational performance of Ludlam Trail. It was concluded the trail will perform at LOS B in opening (2020) and interim (2030) year and which reach to LOS C at design year of 2040.

A safety analysis was also performed based on five years of FDOT's crash data (2012 to 2016) for the study area. It was observed that in the vicinity of study area there were a total of 3,810 crashes from which 489 were documented as injury crashes, with five (5) fatal crashes. In the five year period, 51 pedestrian and bicycle crashes were also reported.

MDC mid-block crossing spreadsheets and the Florida Department of Transportation's (FDOT's) Traffic Engineering Manual (TEM) were used to review various treatments for the trail crossings of east-west streets. A SimTraffic queue length analysis was also conducted. This study recommends using grade separated treatment at four locations (SR 968 / W. Flagler Street; US-41 / SR 90 / S.W. 8th Street; SR 972 / S.W. 24th Street; and SR 976 / S.W. 40th Street).

Any type of assembly recommended in this report, either RRFB or PHB or Signal should be coordinated and approved by Miami-Dade County Signal Division.

A set of comments were received from MDC for the original version of this report. The comments are addressed and responses to comments can be viewed in additional information section at the end of this report.

1. Introduction

The Ludlam Trail Project Development and Environmental (PD&E) study is being conducted by Miami-Dade County (MDC) in support of developing a multi-use trail through the heart of the county within the former Florida East Coast (FEC) railway Right of Way (ROW).

The corridor, named Ludlam Trail, is approximately 5.6 miles long, extending from approximately S.W. 80th Street to N.W. 7th Street, generally following the north-south alignment of a theoretical N.W. /S.W. 69th Avenue ROW. **Figure 1** shows the alignment of the planned trail in relation to the major roadways in the area. The corridor ROW is approximately 100 feet wide for most of its length and narrows to approximately 80 feet in some areas. The project corridor survey is presented in **Appendix A**. Ludlam Trail will provide a safe, dedicated and direct route for cyclists and pedestrians to schools, parks, work and shopping. With more than 30,550 people within a half-mile of the trail (which is considered the walkable service area), the trail will provide connections to five greenways, four schools, four parks and two transit hubs.

Ludlam Trail will provide area-wide network and system linkages within MDC. The improved mobility provided by Ludlam Trail is expected to result in lowered vehicular traffic volumes within the influenced area. The trail will enhance commuting in the area, as well as create an activity center for walking, cycling or running; both of which will increase area residents' health by improving air quality and offering a place for physical activity.

Based on the FDOT *Trends and Conditions Special Report* (dated February 2018), in 2016, the mode share for using bicycles to commute to work in Florida was 0.6%, which is equal to the US average. The mode share for walking to commute to work in Florida was 1.5%, which is lower than the US average of 2.7%. Regarding the use of transit to commute to work, the US average is 5.1%; the Florida average was only 2.1%; however, it is 5.3% within MDC (which is ranked first in Florida).

According to the MDC *Trail Benefits Study – Ludlam Trail Case Study*, development of the trail will improve mobility for walking and cycling to schools, parks, transit stations and conducting miscellaneous errands, which will result in a reduction of vehicle trips in the project vicinity. Having the trail as a transportation option will result in a mode shift, so that fewer vehicles will travel on the surrounding roadway network, which in turn will help to reduce traffic congestion on the major arterials in the area. The trail will improve residents' health in two ways; first, by

reducing the number of vehicles, and thus the use of fossil fuels, lowering the emission of greenhouse gases, which will ultimately result in cleaner air; and second, by providing a safe and reliable venue for regular, personal exercise. Furthermore, the trail will provide increased mobility and strengthen connections to neighboring communities which will encourage tourism and business development. Additional economic benefits will include: an increase in property values within a half-mile of the corridor; job creation through the establishment of trail-oriented development; and an increase in tax revenue for reinvestment into the community.

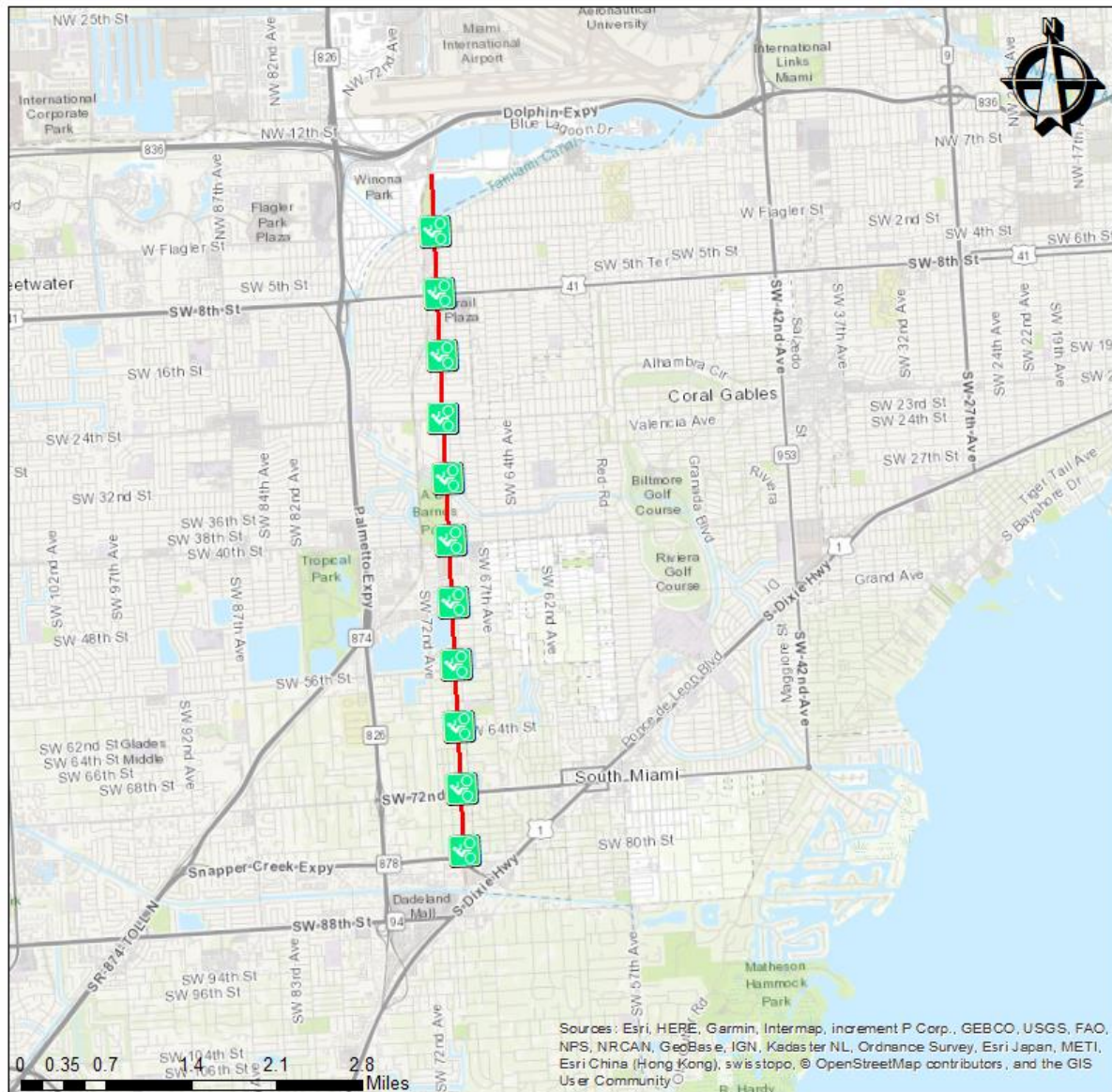


Figure 1. Ludlam Trail Approximate Alignment

A five-year crash data analysis (from January 2012 to December 2016) using both the FDOT's Crash Analysis Reporting System (CARS) and Signal 4 Analytics databases, indicated that more 3,810 crashes were documented within the half-mile buffer around the proposed trail alignment

(between N.W. 7th Street and S.W. 80th Street), including five (5) fatal crashes. In total, 51 pedestrian crashes were reported, which averages out to about one pedestrian crash each month.

Ludlam Trail is a part of a countywide network of future connected bicycle/pedestrian infrastructure and trails. This project supports the vision of the MDC Parks and Open Space System Master Plan, a primary element of which is to “provide an interconnected trail system which offers transportation alternatives and reduces traffic congestion”. The Master Plan provides a 50-year unifying vision for a livable, sustainable MDC which involves the development of a seamless system of greenways, trails and water trails. Ludlam Trail is a vital component of this proposed network, as it links open spaces and civic institutions to neighborhoods, while offering a reliable transportation alternative. From a regional perspective, Ludlam Trail will connect to the Metrorail Dadeland North Station at the south end; the proposed Metrorail Orange Line / N.W. 7th Street Station at the north end; and also will connect to other planned trails including the M-Path Extension, South Dade Trail, Snapper Creek Trail, East/West Trail and Merrick Trail.

This project evaluated the following potential types of improvements:

Capacity and Operation: Were reviewed to ensure the trail capacity and design are adequate for the future demand of bicycles and pedestrians, since walking and cycling will become more viable modes of transportation in the area through the implementation of this project.

Safety and Mobility: Were reviewed to provide continuous access along the trail for pedestrians and bicycles, as well as to recommend required modifications to existing crossings in order to provide a safe and convenient path for non-motorized users.

Design and Security: Were reviewed to develop and expand the physical pedestrian and bicycle facilities on the trail, in order to improve visibility and security, including facilities for parking, improved landscaping and pathway lighting.

This study also assessed the following alternatives:

Existing Conditions: This alternative evaluated the current traffic to establish a base condition during the peak travel demand hours. Seasonal adjustment factors and peak hour factors were applied to the data collected for this scenario.

No Build Alternative: This alternative obtained historical, background traffic trends, and applied a growth rate factor to the Existing Conditions data, corresponding to the number of years until the trail is built-out.

Build Alternative: This alternative evaluated the influence area of the trail for future conditions based on the No Build Alternative volume data with a reasonable percentage of pedestrian and

bicycles diverted off parallel roads to use the trail, using travel demand model data from the Southeast Regional Planning Model (SERPM).

An impact fee study (a study to demonstrate the potential to reduce vehicular delay on roadways resulting from the development of Ludlam Trail) was conducted for Ludlam Trail by Cathy Sweetapple & Associates which provided information on the schools affected by the trail. According to the report, the proposed Ludlam Trail will increase bicycle and pedestrian travel to and from the existing schools and parks due to their proximity to the trail. **Figure 2** shows student enrollment for schools located within the project corridor. Based on 2017 data, there were 4,569 students in the vicinity schools which are in the influence area of the proposed trail.

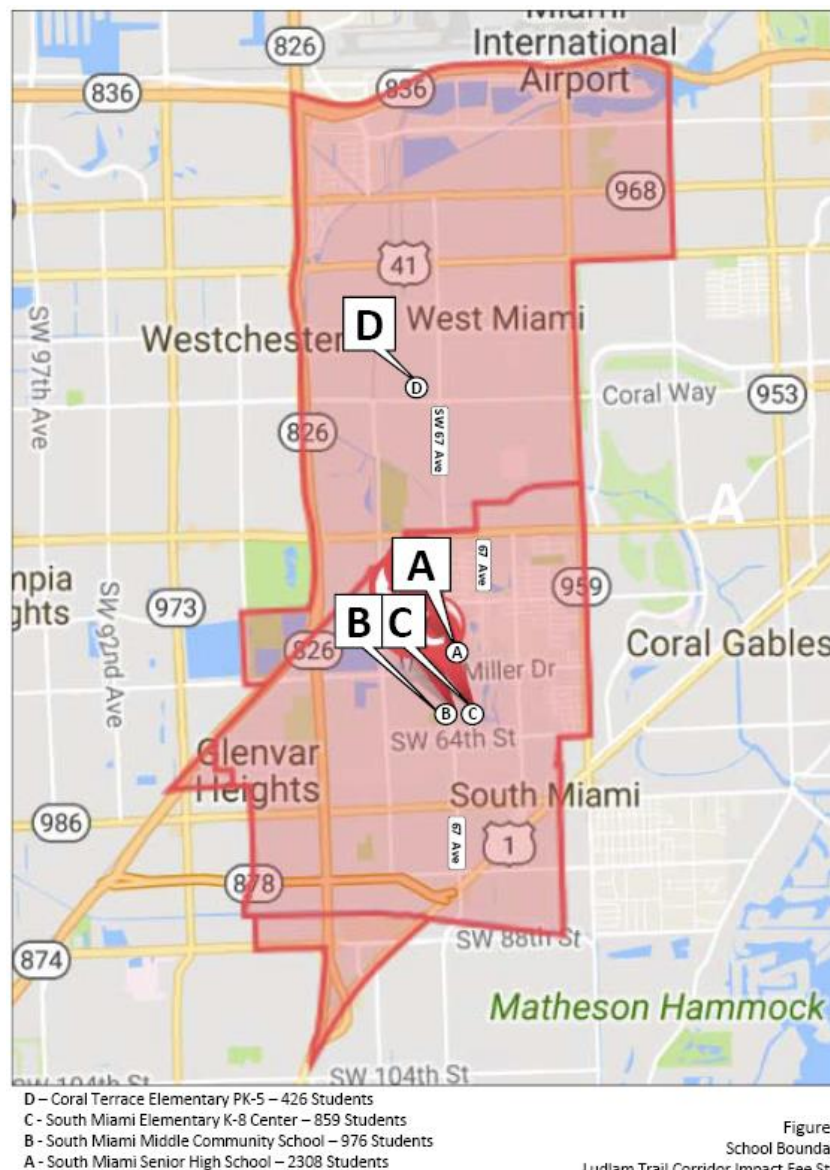


Figure 2 – School Enrollment around the Ludlam Trail Corridor (Source: Cathy Sweetapple & Associates, 2018)

2. Data Collection

The Ludlam Trail corridor links two important nodes of the Miami-Dade Community: the areas nearby the Miami International Airport (MIA) and the Downtown Kendall/Dadeland Mall. Currently, the northern terminus of the (existing) South Dade Trail is near the Dadeland North Metrorail Station at S.W. 85th Street, allowing a connection to the south end of the proposed Ludlam Trail. The Ludlam Trail corridor passes through historic neighborhoods, crosses major arterial roads and provides connections to employment centers.

The trail alignment crosses six major arterials with (year 2017) Annual Average Daily Traffic (AADT) of over 20,000 vehicles per day (vpd), as listed in **Table 1**:

Table 1. Major Arterials Crossing the Proposed Trail with AADT Higher than 20,000 vpd

Major Arterial	2017 AADT
SR 968 / W. Flagler Street	43,000
US-41 / SR 90 / S.W. 8 th Street / Tamiami Trail	52,500
SR 972 / S.W. 24 th Street / Coral Way	22,500
SR 976 / S.W. 40 th Street / Bird Road	75,000
S.W. 56 th Street / Miller Drive	22,500
SR 986 / S.W. 72 nd Street / Sunset Drive	40,500

Additional trail alignment crossings include ten local or neighborhood streets with annual daily traffic counts of less than 20,000 vpd, as follows:

- ✓ N.W. 7th Street
- ✓ S.W. 4th Street
- ✓ S.W. 12th Street
- ✓ S.W. 16th Street
- ✓ S.W. 21st Street
- ✓ S.W. 22nd Street
- ✓ N. Waterway Drive
- ✓ S.W. 60th Street
- ✓ S.W. 64th Street
- ✓ S.W. 80th Street

According to FDOT Florida Traffic Online (FTO) Portal data (for 2017), the highest existing AADT recorded for crossing streets within the project limits was 75,000 vpd at SR 976 / S.W. 40th Street. Many of the crossing streets have posted speed limits in excess of 30 miles per hour (MPH) which are not ideal for pedestrian and bicycle safety.

Traffic data, including 72-hour volume and speed data (at 15 stations) and intersection turning movement counts (at 19 stations), were collected for typical AM, Mid-day and PM peak periods (6-9 AM, 11:30 AM to 1:30 PM and 4-7 PM) in 15-minute increments during regular weekdays and active school periods (**Figure 3**). In addition to the eight hours of vehicle turning movement counts, the intersection traffic counts included pedestrian, bicyclist, and truck volumes. The 19 intersections at which turning movement counts were obtained are listed next:

1. N.W. 69th Avenue and SR 968 / W. Flagler Street
2. Robert King High Park and SR 968 / W. Flagler Street
3. S.W. 69th Avenue and S.W. 4th Street
4. S.W. 70th Avenue and US-41 / SR 90 / S.W. 8th Street
5. S.W. 69th Avenue and US-41 / SR 90 / S.W. 8th Street
6. S.W. 70th Avenue and S.W. 12th Street
7. S.W. 69th Avenue and S.W. 12th Street
8. S.W. 70th Avenue and S.W. 16th Street
9. Plaza Driveway, SR 972 / S.W. 24th Street
10. S.W. 69th Avenue and SR 972 / S.W. 24th Street
11. S.W. 70th Avenue and SR 976 / S.W. 40th Street
12. S.W. 69th Avenue and SR 976 / S.W. 40th Street
13. S.W. 69th Avenue and S.W. 56th Street
14. S.W. 69th Court and S.W. 56th Street
15. S.W. 69th Avenue and SR 986 / S.W. 72nd Street
16. S.W. 70th Avenue and S.W. 80th Street
17. S.W. 69th Avenue and S.W. 16th Street
18. SR 986 / S.W. 72nd Street and S.W. 70th Avenue
19. S.W. 69th Avenue and S.W. 60th Street

The speed and volume data were also collected by machine count at the 15 locations listed below:

1. SR 968 / W. Flagler Street; west of N.W. 69th Avenue
2. S.W. 4th Street; west of S.W. 69th Avenue
3. US-41 / SR 90 / S.W. 8th Street; between S.W. 69th Avenue and S.W. 70th Avenue
4. S.W. 12th Street; between S.W. 69th Avenue and S.W. 70th Avenue
5. S.W. 16th Street; between S.W. 69th Avenue and S.W. 70th Avenue
6. S.W. 21st Street; east of S.W. 70th Avenue
7. S.W. 22nd Street; west of S.W. 69th Avenue
8. SR 972 / S.W. 24th Street; west of S.W. 69th Avenue
9. N. Waterway Drive; west of S.W. 69th Avenue
10. SR 976 / S.W. 40th Street; between S.W. 69th Avenue and S.W. 70th Avenue
11. S.W. 56th Street; between S.W. 69th Avenue and S.W. 69th Court
12. S.W. 60th Street; between S.W. 69th Avenue and S.W. 69th Court
13. S.W. 64th Street; west of S.W. 69th Avenue
14. SR 986 / S.W. 72nd Street; between S.W. 70th Avenue and S.W. 69th Court
15. S.W. 80th Street; west of S.W. 70th Avenue

A summary of the collected data is shown in **Figure 4** and **Figure 5**, for AM and PM peak hours, respectively, with the raw collected data provided in **Appendix A**. The turning movement counts after application of seasonal factor is shown in **Figure 6** and **Figure 7**.

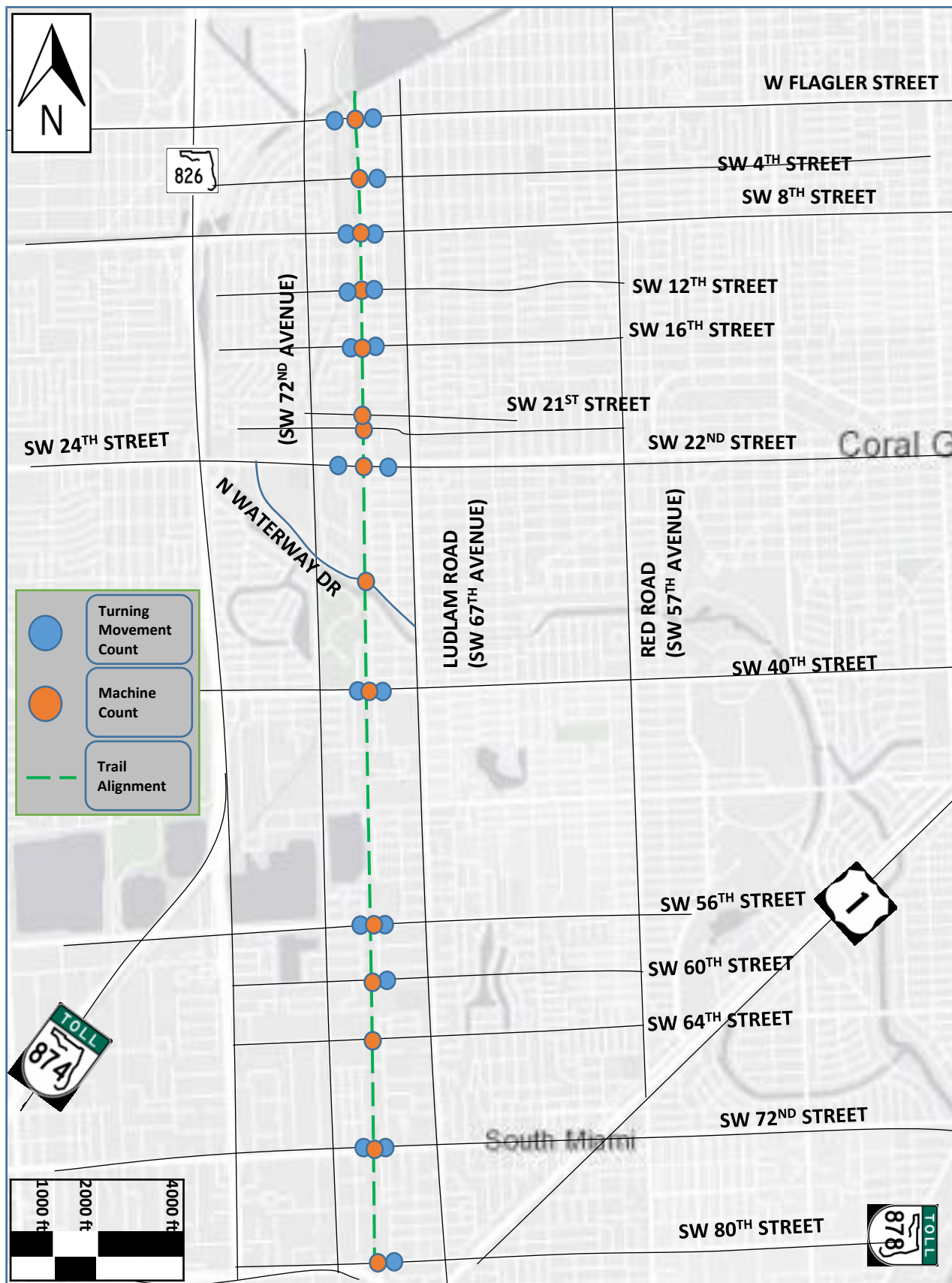


Figure 3. Area of Influence Map and Data Collection Stations

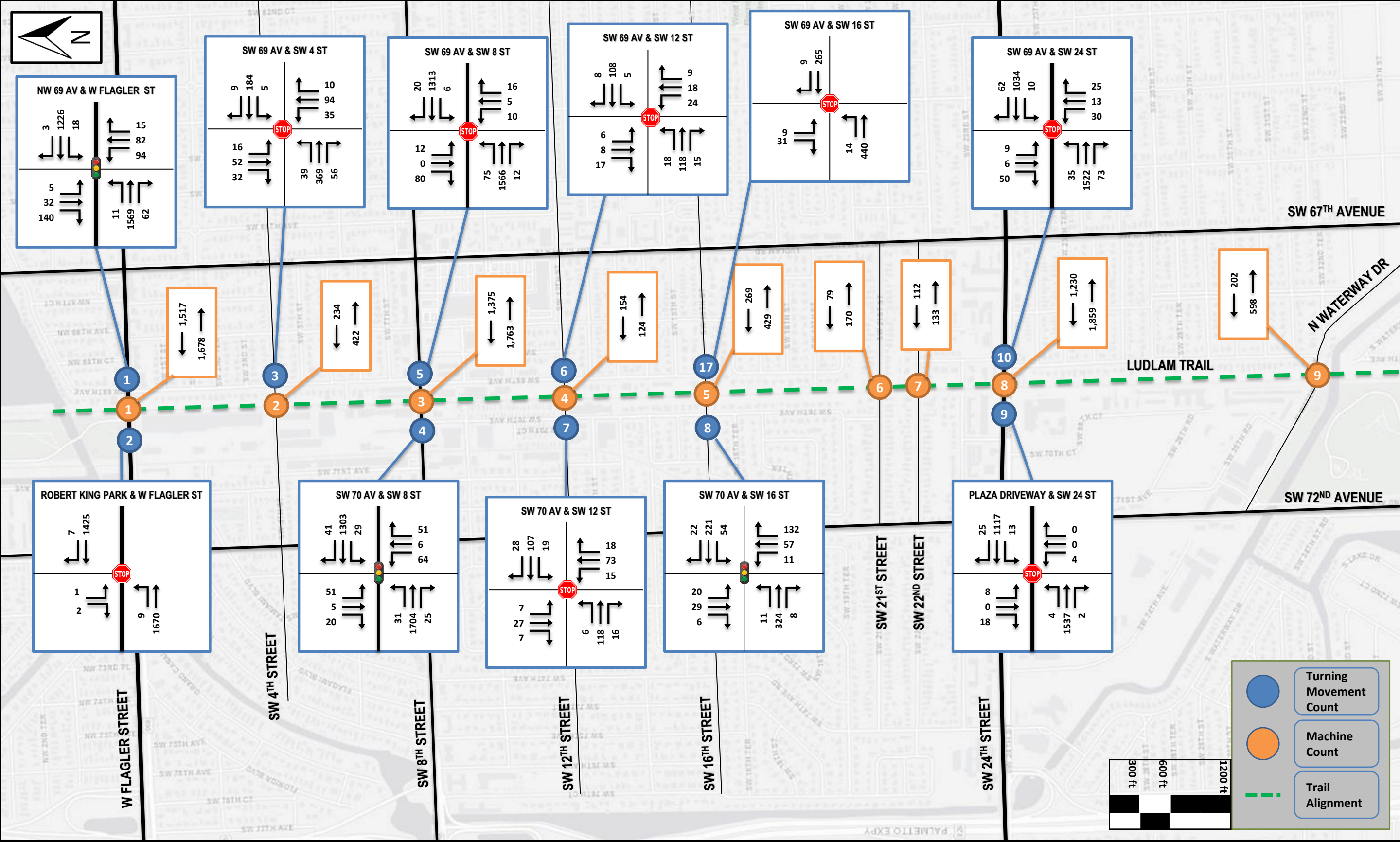


Figure 4.a. Data Collection Summary - AM Peak Period

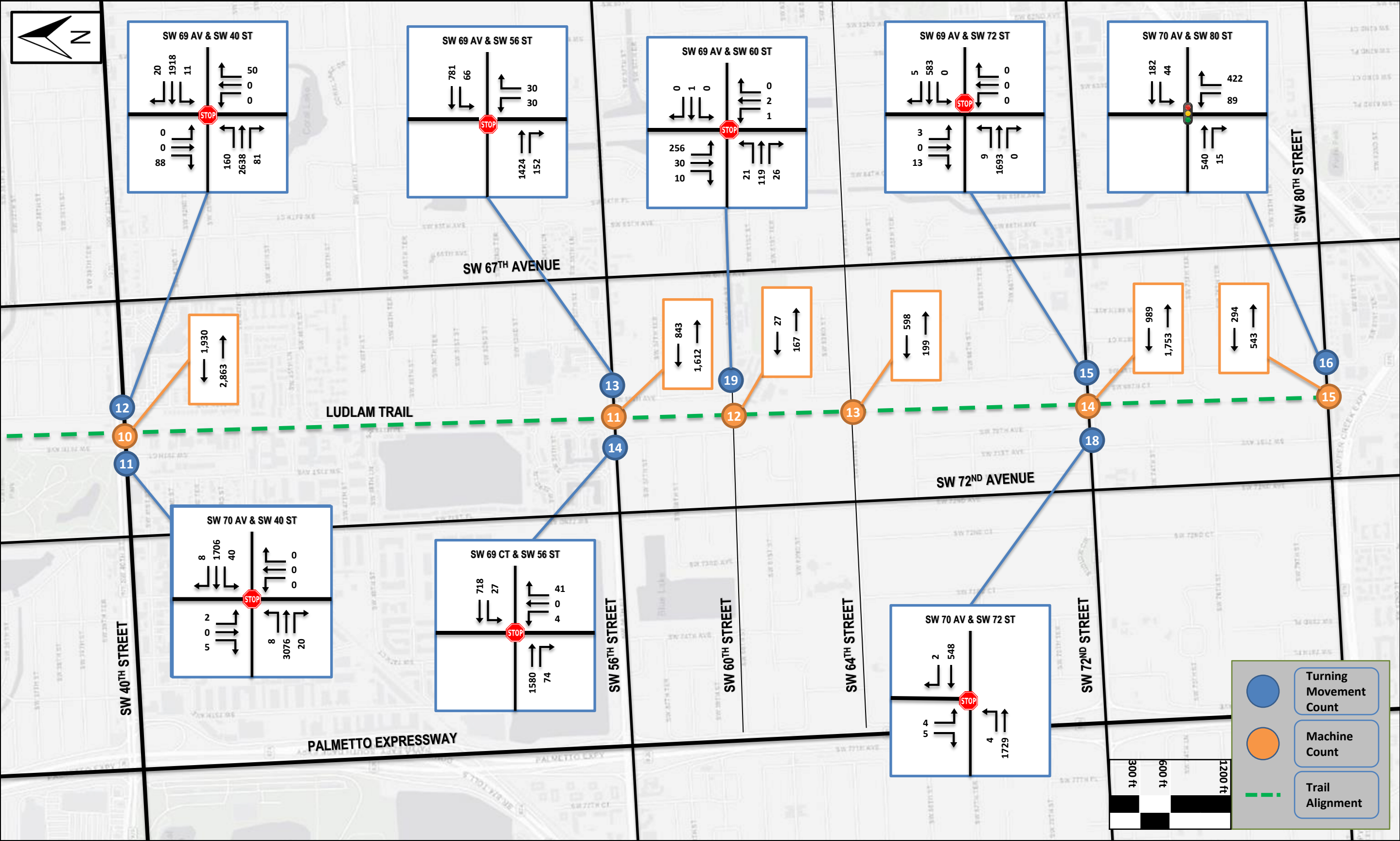


Figure 4.b. Data Collection Summary - AM Peak Period

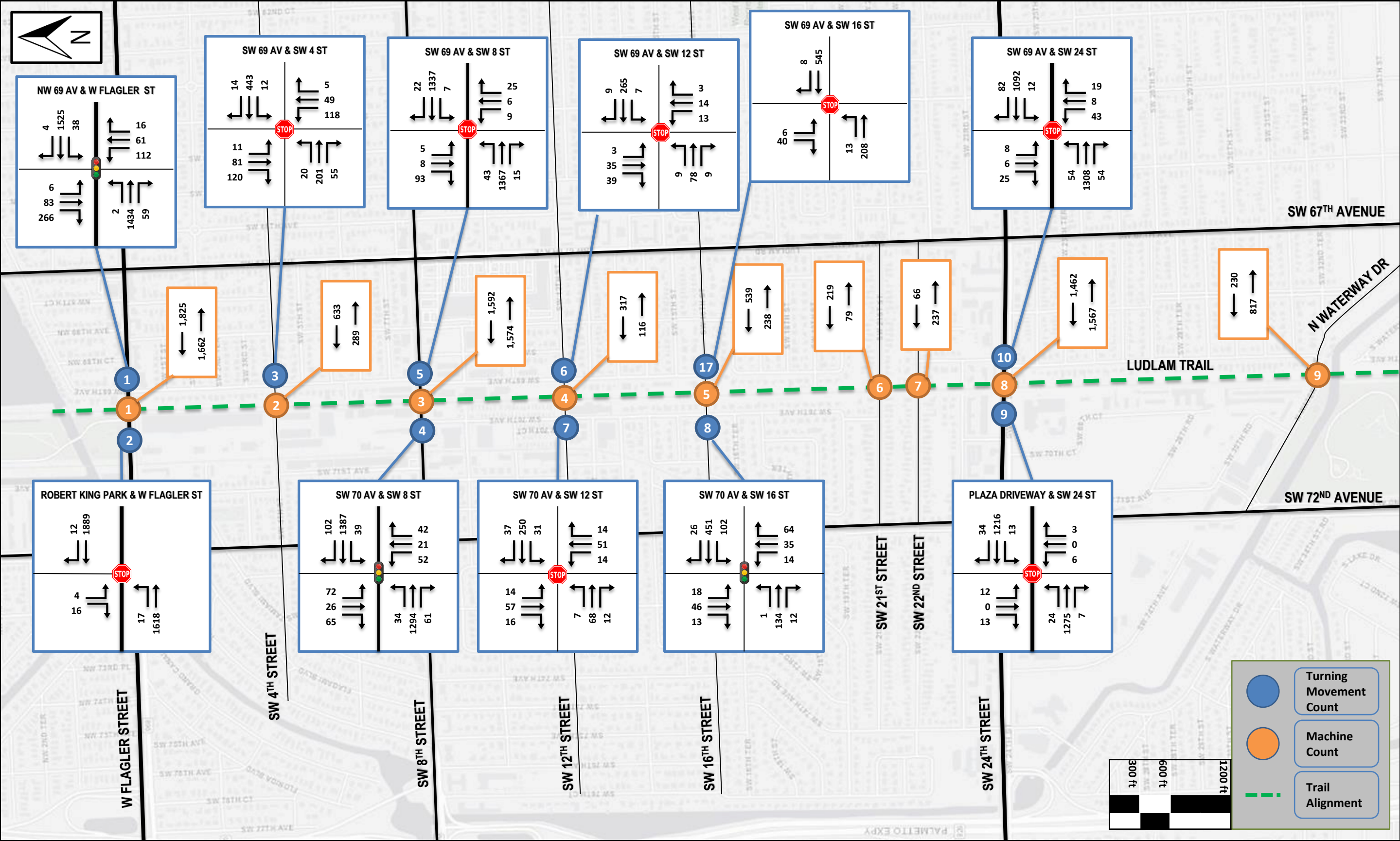


Figure 5.a. Data Collection Summary - PM Peak Period

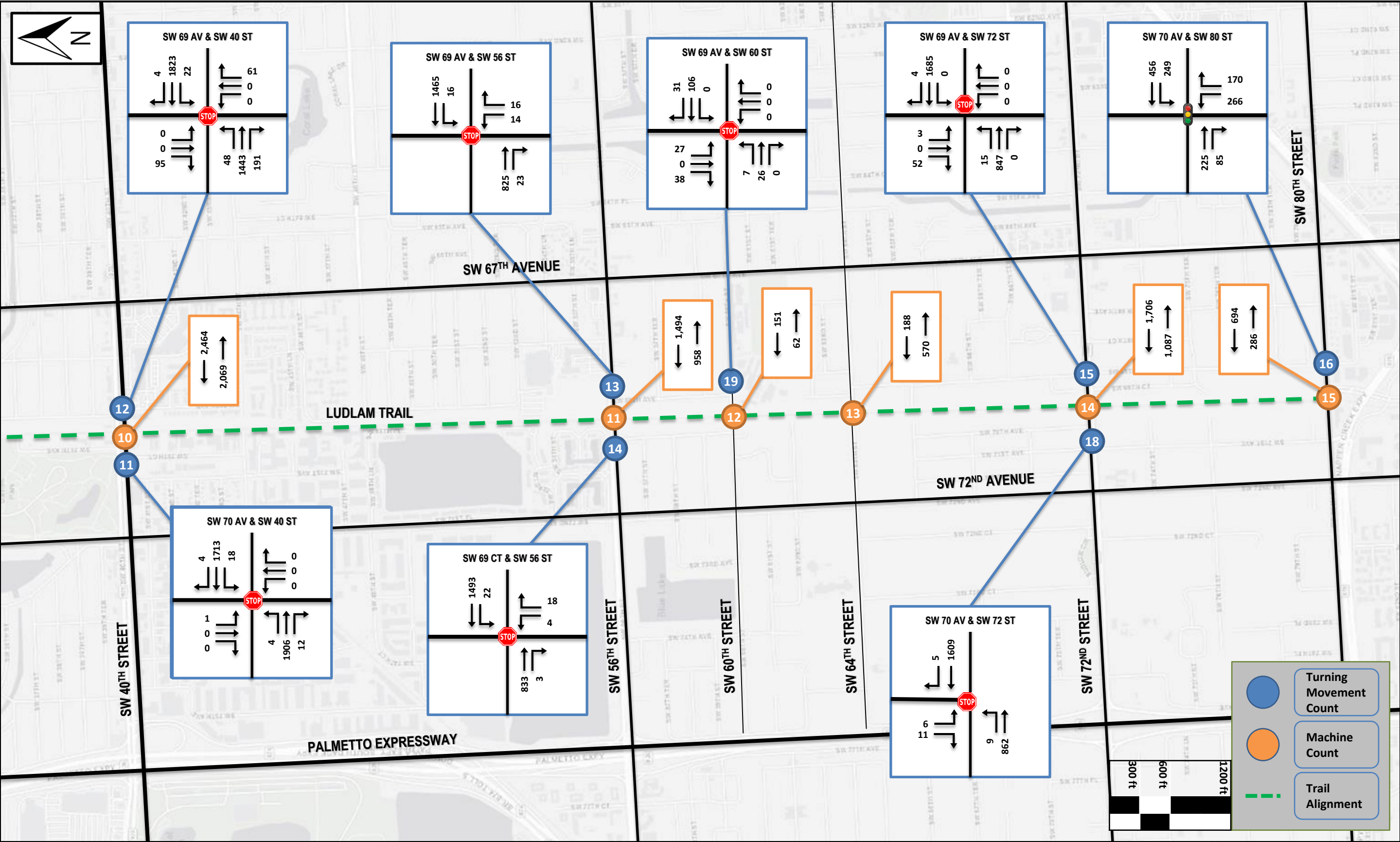


Figure 5.b. Data Collection Summary - PM Peak Period

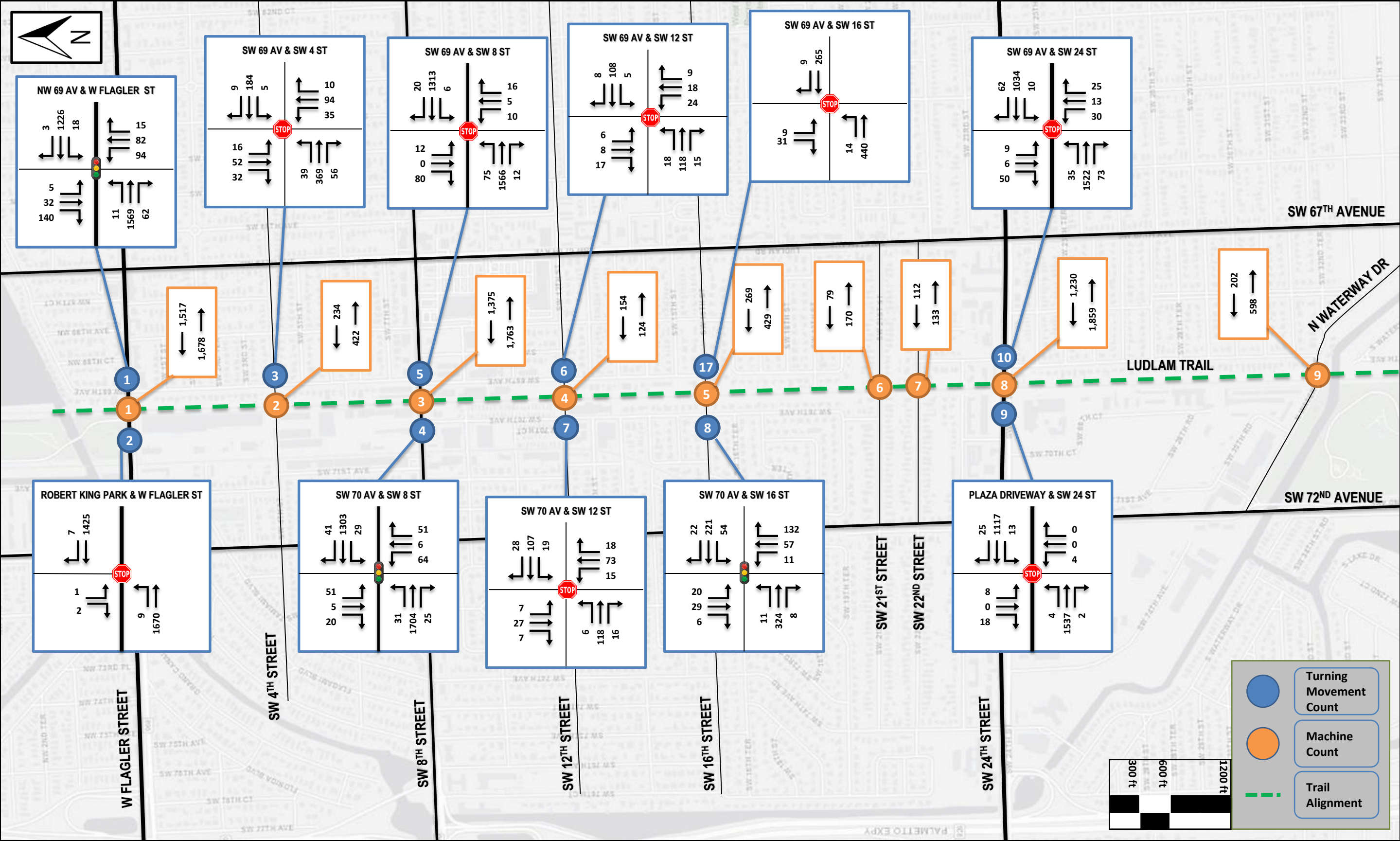


Figure 6.a. Data Collection Summary - AM Peak Period (After Applying Seasonal Factor)

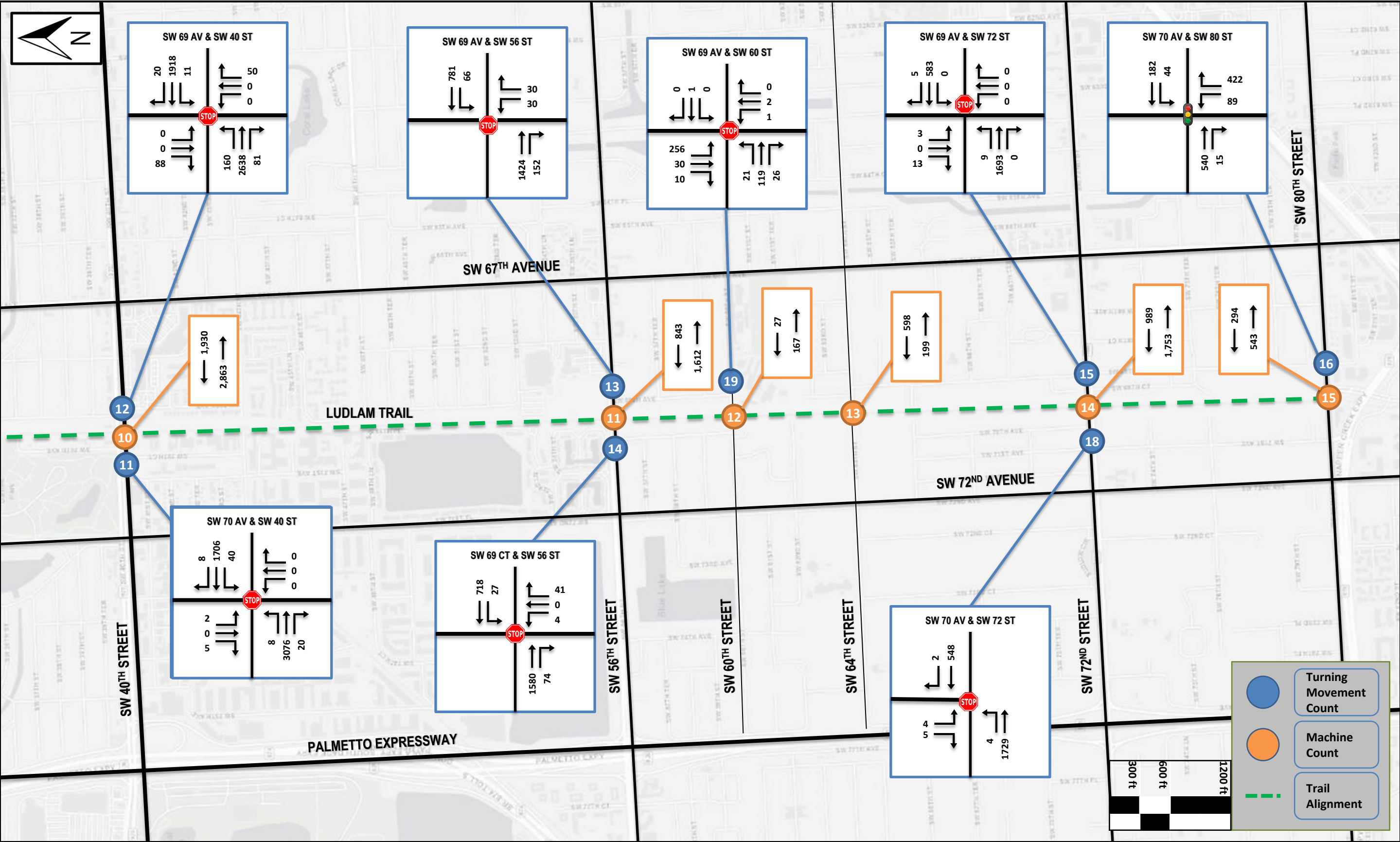


Figure 6.b. Data Collection Summary - AM Peak Period (After Applying Seasonal Factor)

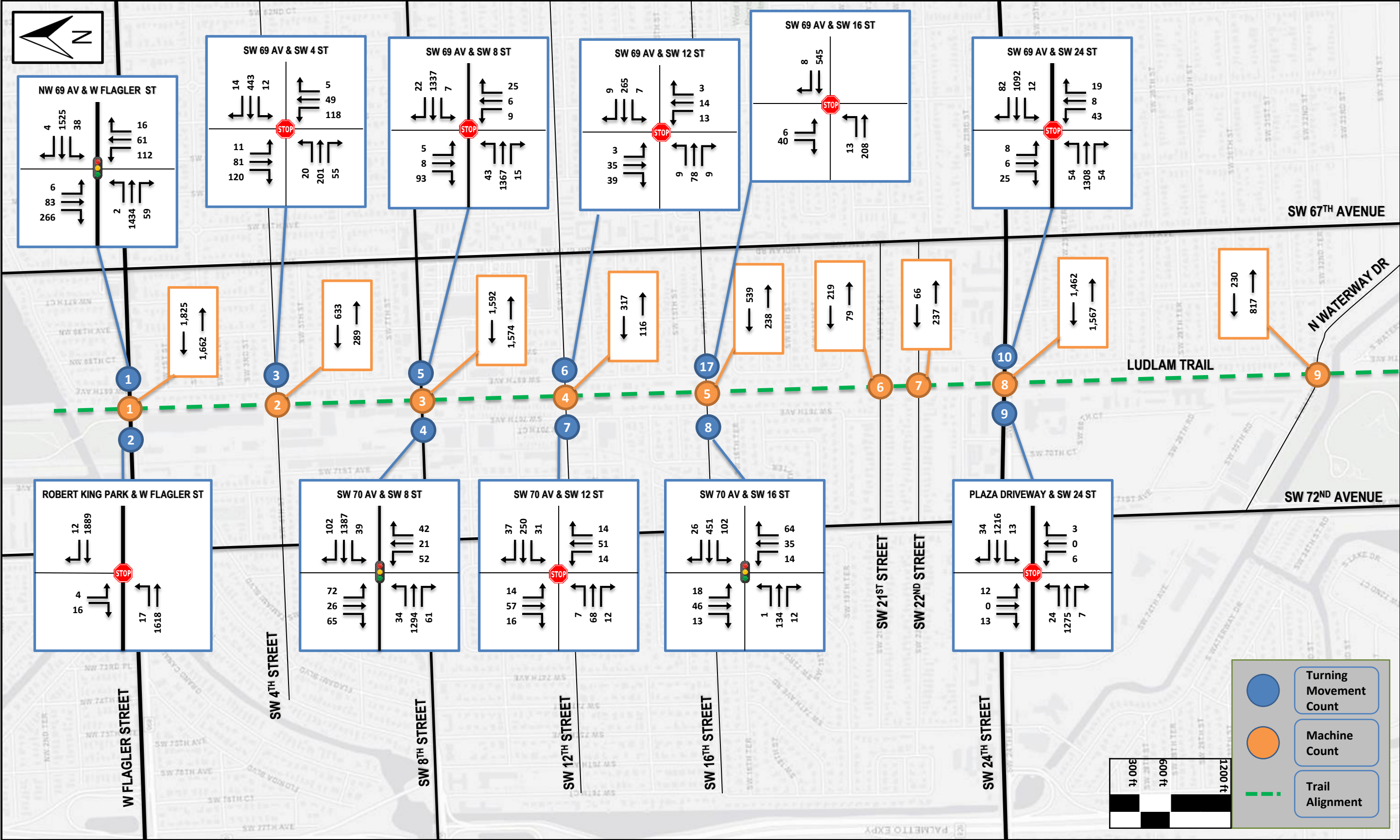


Figure 7.a. Data Collection Summary - PM Peak Period (After Applying Seasonal Factor)

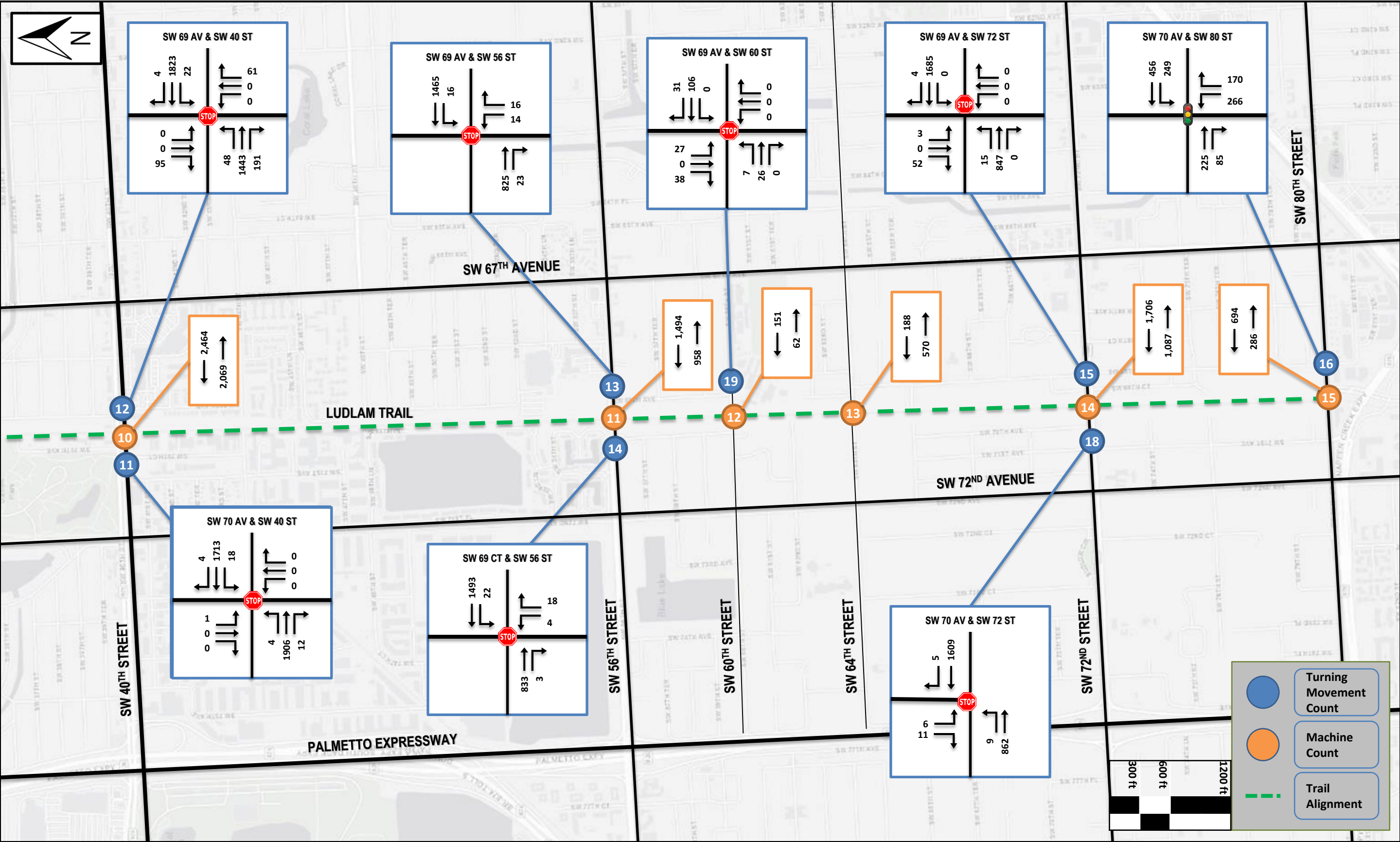


Figure 7.b. Data Collection Summary - PM Peak Period (After Applying Seasonal Factor)

3. Growth Analysis

This section documents the development of future year AADT, Turning Movement Counts and also bicycle and pedestrian volumes for the affected area. The growth factors determined in this section were applied to the existing counts in order to forecast future volumes.

Various traffic forecasting methodologies were evaluated and are listed as follow:

- Regression analysis of the most recent historical AADTs from FDOT count stations using FDOT trend analysis spreadsheets (For vehicular traffic)
- Regional model (SERPM) volume growth between years 2010 and 2040 (For both vehicular traffic and pedestrian and bicycle trips)
- Socioeconomic growth for SERPM Traffic Analysis Zones (TAZs) between base year 2010 and future year 2040 (For vehicular traffic)
- Strava bicycle and pedestrian growth (For bicycle and pedestrian trips)

3.1. Vehicular Traffic Growth

3.1.1. Regression Analysis of Historical Data

Based on the FTO Information Portal, the following ten Traffic Monitoring Sites (TMSs) were identified within the project limits:

- SR 968/W. Flagler Street, 200' E of S.W./N.W. 72nd Avenue
- S.W. 72nd Avenue, 200' South of SR 976 / S.W. 40th Street
- S.W. 72nd Avenue, 200' South of SR 986 / S.W. 72nd Street
- S.W. 72nd Avenue, 200' South of S.W. 56th Street
- S.W. 56th Street, 200' West of S.W. 69th Avenue
- S.W. 67th Avenue, 200' South of SR 976 / S.W. 40th Street
- S.W. 67th Avenue, 200' South of SR 972 / S.W. 24th Street
- S.W. 67th Avenue, 200' South of US-41 / SR 90 / S.W. 8th Street
- S.W. 67th Avenue, 200' South of SR 968 / W. Flagler Street
- S.W. 67th Avenue, 200' South of SR 986 / S.W. 72nd Street

The data obtained from the FTO Portal are provided in **Appendix A**. The obtained growth rates at each station are listed in **Table 2** with the full details of the growth analysis provided in **Appendix B**.

Table 2. Historical Growth Analysis on Stations in the Study Area

Station	Location	Historical Compound Annual Growth Rate
871139	SR 968/W. Flagler Street, 200' E of S.W./N.W. 72 nd Avenue	0.36%
878138	S.W. 72 nd Avenue, 200' South of SR 976 / S.W. 40 th Street	3.44%
878186	S.W. 72 nd Avenue, 200' South of SR 986 / S.W. 72 nd Street	-0.70%
878187	S.W. 72 nd Avenue, 200' South of S.W. 56 th Street	-4.15%
818279	S.W. 56 th Street, 200' West of S.W. 69 th Avenue	5.43%
878304	S.W. 67 th Avenue, 200' South of SR 976 / S.W. 40 th Street	1.82%
878305	S.W. 67 th Avenue, 200' South of SR 972 / S.W. 24 th Street	-0.56%
878306	S.W. 67 th Avenue, 200' South of US-41 / SR 90 / S.W. 8 th Street	-0.18%
878307	S.W. 67 th Avenue, 200' South of SR 968 / W. Flagler Street	1.75%
878308	S.W. 67 th Avenue, 200' South of SR 986 / S.W. 72 nd Street	-2.78%
Average (Compound Annual Growth Rate)		0.44%

Based on this methodology, a Compound Annual Growth Rate (CAGR) of 0.44% was recommended to be used on vehicular traffic volumes.

3.1.2. SERPM Volume Growth

The second approach which was used to analyze vehicular volume growth in the area affected by the proposed trail was the regional model. The SERPM Version 7 is the official model for the Florida's southeast region, with a 2010 base year and a 2040 horizon year. The 2040 scenario in this model has the Transportation Planning Organization (TPO)-approved, 2040 Cost Feasible Long Range Transportation Plan (LRTP) network, along with population and employment forecasts. The SERPM 7.071 model is an activity-based time of day model that is capable of forecasting traffic into future years for various highway and transit scenarios. Model links (roads) within a quarter-mile vicinity of the proposed trail alignment were selected and AADT growth between the 2010 model volumes and the 2040 forecast scenario volumes was used to estimate an average growth rate. The 2010 and 2040 AADT maps are shown in **Figure 8** and **Figure 9**, respectively, and the growth analysis can be found in **Appendix C**. Based on this methodology, a CAGR of 0.65% was estimated to be used on vehicular traffic volumes.

3.1.3. SERPM Socio-Economic and Demographic Growth

Similar methodology as used in previous section was used to explore the growth in population and the Socio-Economic and Demographic (SED) trend of the affected area. SERPM zones within a half-mile vicinity of Ludlam Trail alignment were selected and population and employment information between 2010 and 2040 were examined. The TAZ details can be found

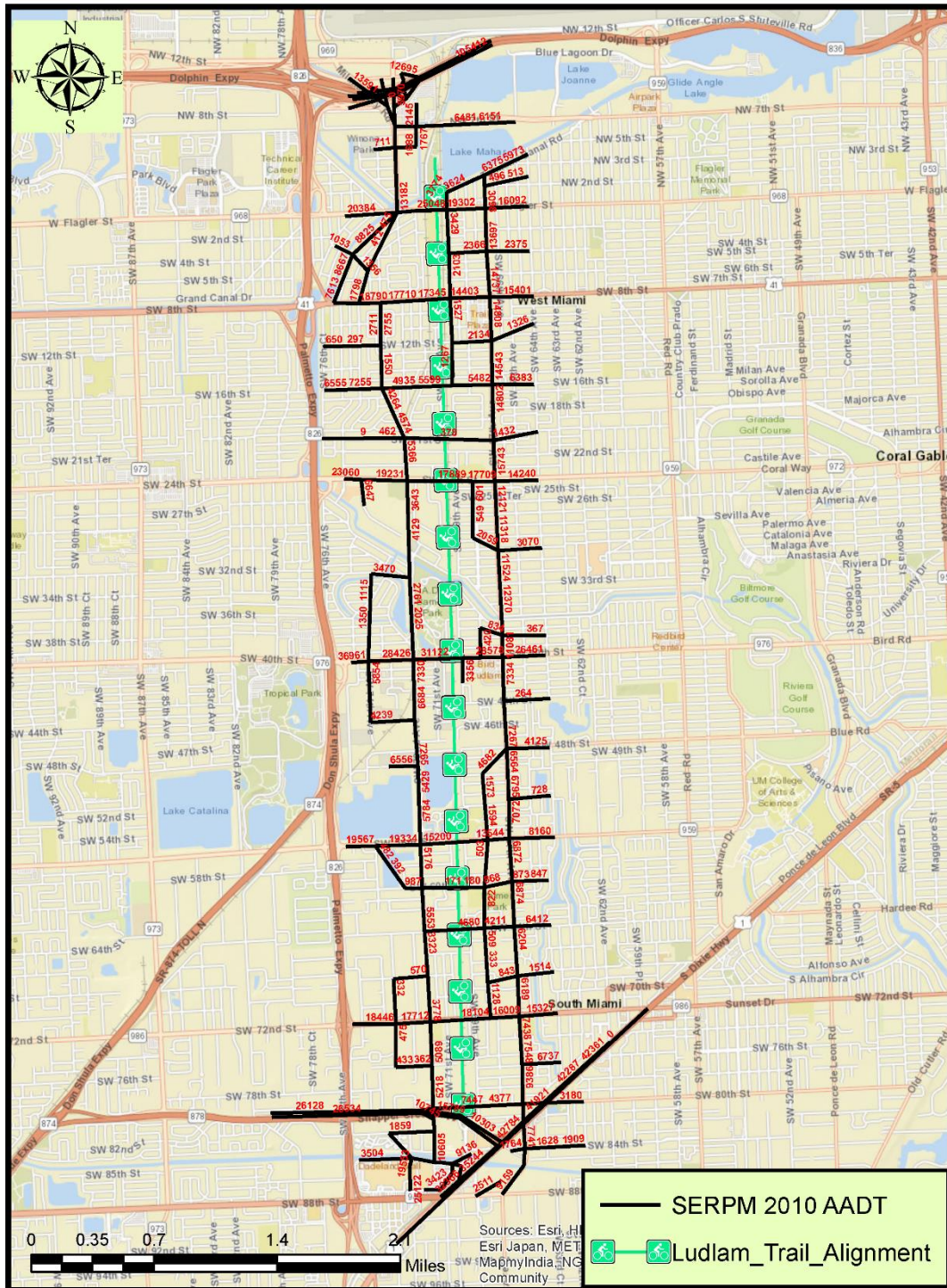


Figure 8. Estimated AADT (SERPM 2010) for Major Roads in the Vicinity of Trail

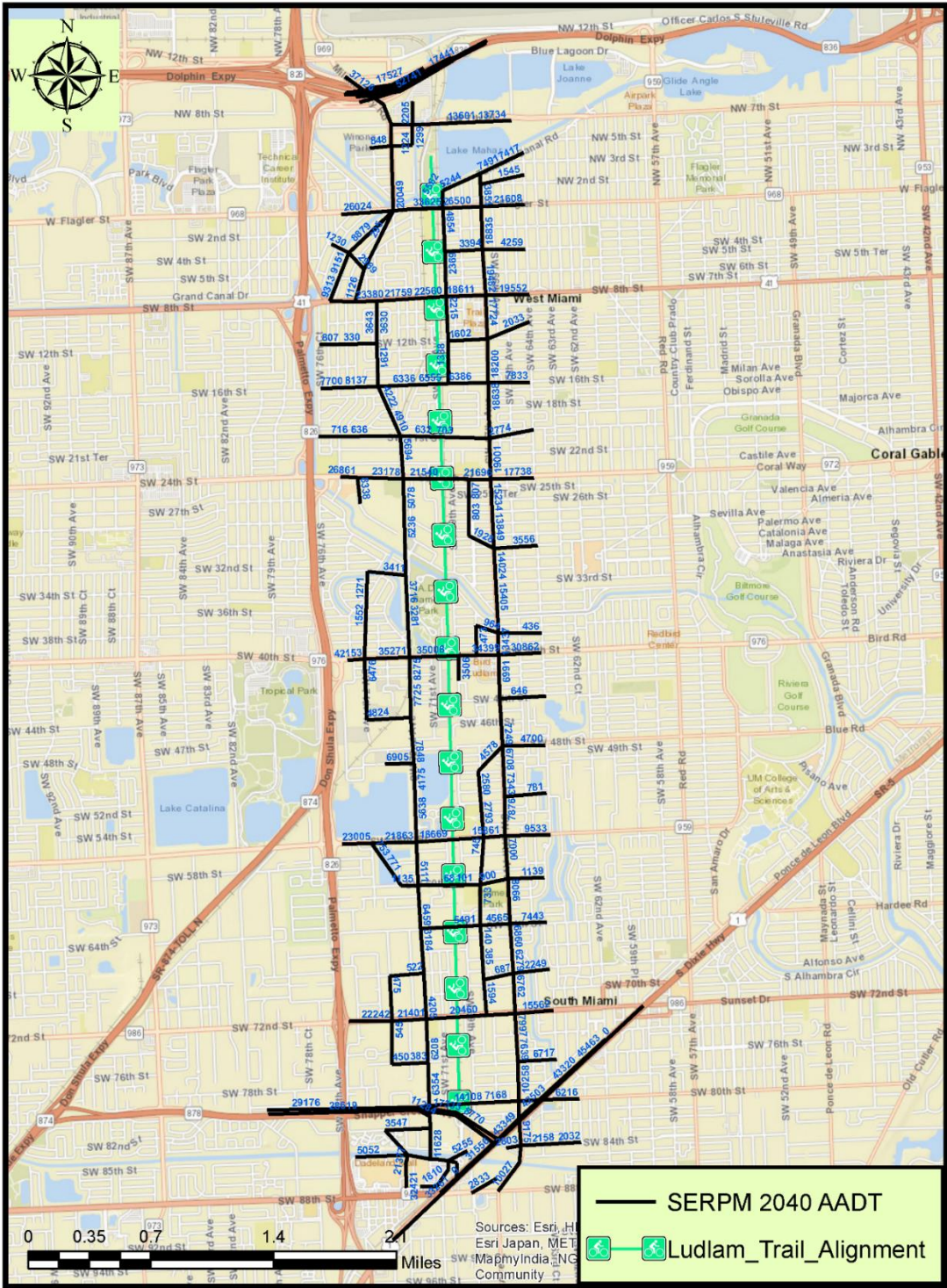


Figure 9. Estimated AADT (SERPM 2040) for Major Roads in the Vicinity of Trail

in **Appendix D. Figure 10** shows the TAZs which are located in the affected area. Based on this method, a CAGR of 0.96% was suggested to be used on vehicular traffic volumes.

Considering the three methods examined above, a **CAGR of 0.96%** (which is the most conservative rate) was adopted and applied to existing data in order to project future conditions. **Table 3** shows a summary of the growth analysis for vehicular volumes.

Table 3. Summary of Vehicular Growth Rates

Method	Compound Annual Growth Rate
Historical AADT (FTO Stations)	0.44%
SERPM AADT	0.65%
SERPM SED	0.96%

3.2. Bicycle and Pedestrian Growth

Two methods were used to assess pedestrian and bicycle growth: Strava bicycle and pedestrian data and SERPM non-motorized modes growth.

3.2.1. Strava Bicycle and Pedestrian Growth

The growth rate obtained in the previous sections was applied to vehicular traffic volumes to forecast future volumes. However, it is assumed that the trend of growth rate for pedestrian and bicycle modes is different from that of vehicular traffic. As a result, the growth rate obtained by assessing Strava data was used to forecast pedestrian and bicycle activity on the proposed trail for the build scenario. In order to do so, Strava data (2012 to 2016 which is the latest available year of this database) were obtained and FDOT trend analysis spreadsheets were used to identify a growth rate for each mode, separately. **Figure 11** shows the selected sample of Strava data from ArcGIS (within a quarter-mile vicinity) which was used in the growth analysis. **Table 4** shows the summary of the growth analysis; the detailed analysis is provided in **Appendix E**.

Table 4. Strava Data Growth Rate Analysis

Year	Ride (Bicycle Data)	Run (Pedestrian Data)
2012	20,498	906
2013	46,928	3,797
2014	120,229	9,377
2015	118,494	10,446
2016*	150,024	12,172
Compound Growth Rate (2016 to Design Year 2040)	2.93% (Decaying Exponential Growth**)	3.09% (Decaying Exponential Growth**)

* Since the Strava data for the year 2016 were available for only the first six months, volumes were multiplied by two in order to estimate annual volumes of bicycle and pedestrian activity

** The method with highest R-Square was selected

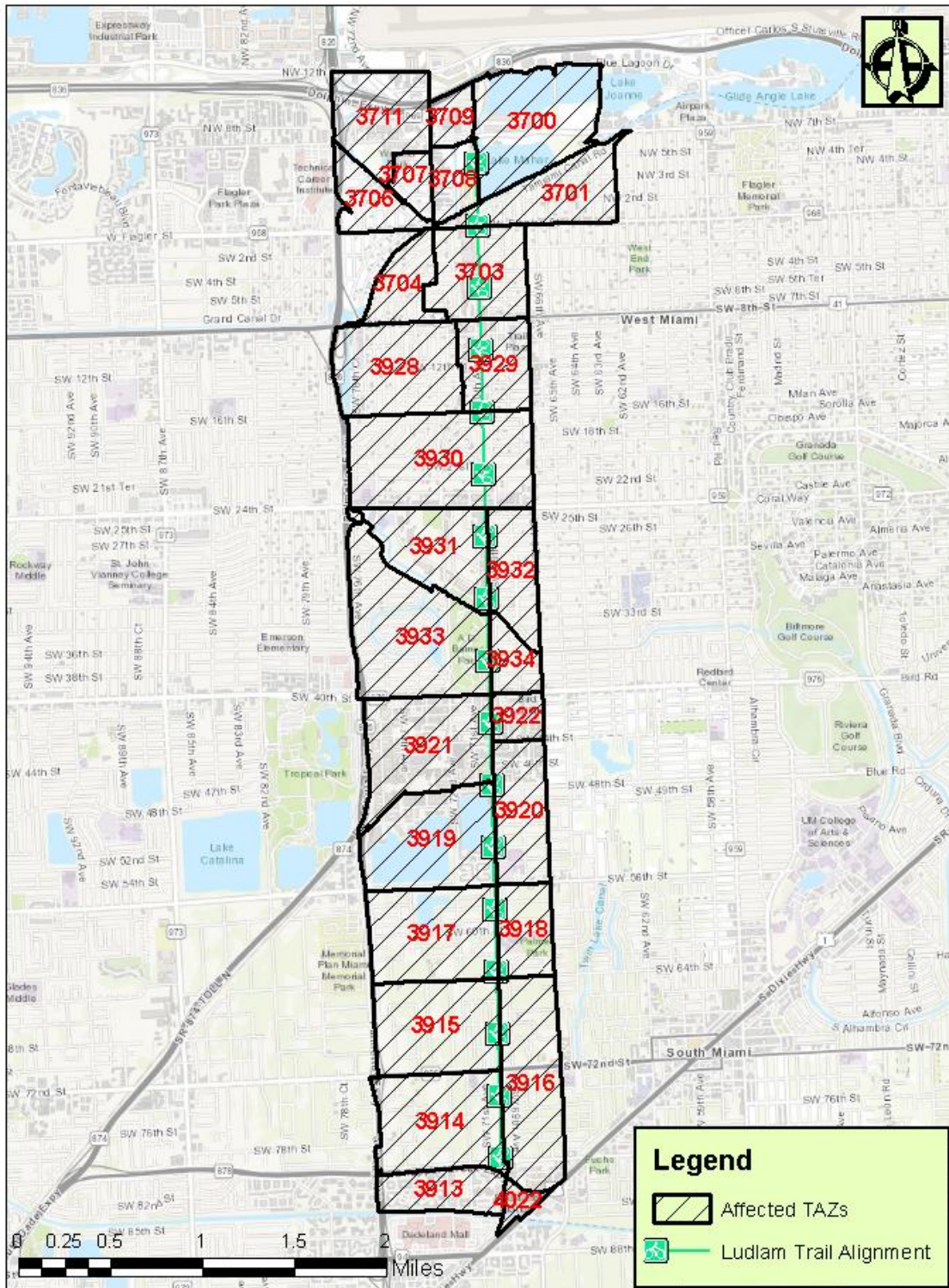


Figure 10. Model TAZs Located within a Half-Mile Vicinity of Proposed Trail Alignment

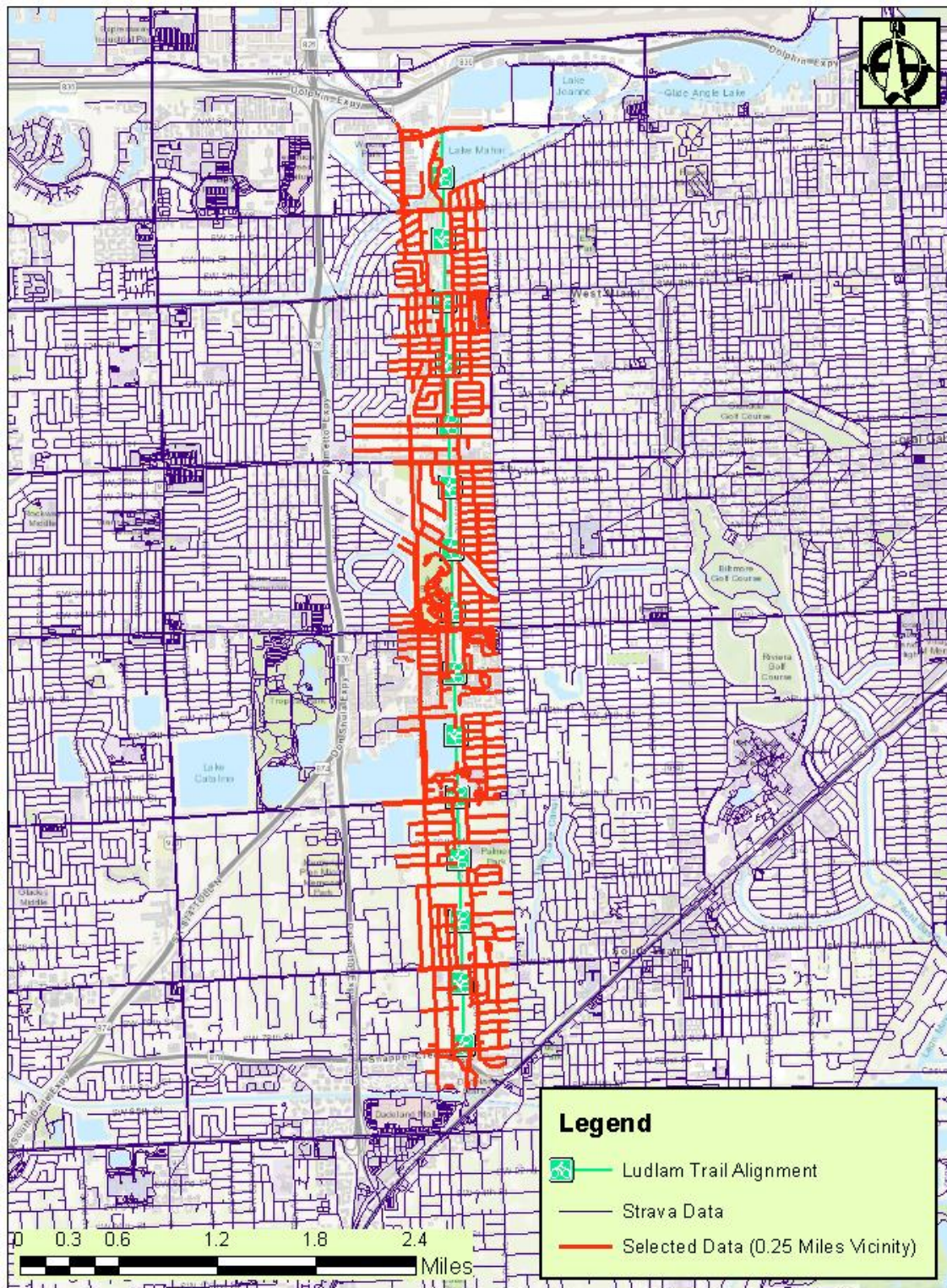


Figure 11. Strava Data Selected Sample for Growth Analysis in ArcGIS

3.2.2. SERPM Bicycle and Pedestrian Growth

The second method used in this study to analyze pedestrian and bicycle growth was reviewing regional model (SERPM 7) forecasts for non-motorized modes. According to the model (for a 25% sample rate, with three iterations run to determine convergence), the below results were obtained:

Pedestrian and bicycle trips in the affected TAZs - 2010 = 8,220 (See **Section 4.2.1** for the origin-destination matrix data summarized from **Figure 10**)

Pedestrian and bicycle trips in the affected TAZs - 2040 = 8,248 (See **Section 4.2.1** for the origin-destination matrix data summarized from **Figure 10**)

Compound Annual Growth Rate (CAGR) = 0.01%

The growth rate estimated by SERPM is less than the Strava estimated growth rate. The Strava growth rate indicates very high growth which may not be reasonable. One reason for high calculated growth rate from Strava could be that it is not showing growth for pedestrian and bicycle users in general, but rather growth in the subscribers of the Strava application. **As a result, a CAGR of 1.51% (average of two methods) was applied to the pedestrian and bicycle data.**

4. Traffic Analysis

Synchro and SimTraffic were used in this traffic study. A detailed operational analysis was performed for analysis years for both AM and PM peak hours. The following operational analyses were conducted utilizing the design traffic forecasts:

- ✓ Intersection Analysis (using collected data and Synchro simulation for existing, no build and build scenarios)
- ✓ Trail Crossing Analysis (using forecasted trail volumes and forecasted cross street volumes for the build scenario with the MDC midblock analysis spreadsheet)
- ✓ Trail Operational Analysis (using the Federal Highway Administration (FHWA) Shared Use Path (SUP) Level of Service (LOS) Calculator with forecasted trail volumes for the build scenario)

The Highway Capacity Manual (HCM) 6th Edition module in Synchro 10 was used for intersection LOS and queue length analyses. Synchro and SimTraffic models were calibrated in accordance with the guidelines provided in the FDOT's Traffic Analysis Handbook, March 2014 edition.

4.1. Existing Condition, Calibration Procedure

As mentioned, Synchro 10 and SimTraffic are used as traffic analysis software for this study. Basic inputs to the Synchro file including nodes, links and intersections were coded using aerial imagery background in order to minimize geometric mistakes. The lane width, length, tapers and speeds were collected using Google Earth and coded into the model. Signal timing, PHF and traffic demand were also collected and inputted.

The following guidelines are provided for Synchro model:

- ✓ Lost time adjustment factor are adjusted to replicate field observed queue lengths.
- ✓ In order to calculate reasonable queuing in the model, all link terminals are extended at least 1000 feet from the last node.

Simulation MOEs should include vehicles exited, 95th percentile queues, and travel times/speeds. The number of vehicles exiting the intersection should be within 5% of the input volumes. Calibration target for queues, speeds and travel time are presented in **Table 5** below based on the guidelines outlined in Chapter 7 of FDOT's Traffic Analysis Handbook.

Table 5. Calibration Targets

Parameter	Target
Speed	Modeled average link speed should be within the ± 10 mph of field measured speed on at least 85% of all network links
Queue length	Difference between simulated and observed queue lengths to be within 20%
Volume exiting the intersection	Volume exiting the intersection should be within 5% of the input volumes

4.1.1. Speed

The speed for existing condition scenario is verified with the collected speed data and the summary can be viewed in **Table 6** below. Speed outputs of Synchro file are presented in **Appendix H**.

Table 6. Speed Calibration

Link	Approach	Field Data Collection Speed (mph)	AM		PM	
			Synchro Speed (mph)	Within ± 10 mph	Synchro Speed (mph)	Within ± 10 mph
W FLAGLER ST / W OF NW 69TH AVE	Eastbound	25	40	N	40	N
	Westbound	27	32	Y	32	Y
SW 4TH ST W OF SW 69TH AV	Eastbound	22	18	Y	20	Y
	Westbound	21	22	Y	15	Y
TAMIAMI TRAIL / W OF SW 69TH ST	Eastbound	27	32	Y	33	Y
	Westbound	25	35	N	35	N
SW 12TH ST / E OF SW 70TH AVE	Eastbound	18	23	Y	23	Y
	Westbound	20	15	Y	14	Y
SW 16TH ST / E OF SW 70TH AV	Eastbound	26	24	Y	26	Y
	Westbound	27	18	Y	16	N
SW 24TH ST / W OF SW 69TH AV	Eastbound	28	28	Y	27	Y
	Westbound	28	30	Y	30	Y
SW 40TH ST / E OF SW 70TH AVE	Eastbound	36	40	Y	40	Y
	Westbound	36	34	Y	39	Y
SW 56TH ST / E OF SW 69TH CT	Eastbound	38	40	Y	40	Y
	Westbound	37	39	Y	40	Y
SW 60TH ST / E OF SW 69TH CT	Eastbound	16	23	Y	24	Y
	Westbound	18	22	Y	23	Y
SW 72ND ST / E OF SW 70TH AVE	Eastbound	36	40	Y	40	Y
	Westbound	36	40	Y	40	Y
SW 80TH ST / W OF SW 70TH AVE	Eastbound	22	19	Y	22	Y
	Westbound	28	26	Y	25	Y
Percentage of links within ± 10 mph			91%		86%	

Both AM and PM models are calibrated since more than 85% of the links are having speeds within the accepted values of data collection speed (10 mph).

4.1.2. Volume calibration

Another parameter which should be considered in Synchro and SimTraffic calibration is the volume exiting each intersection. **Table 7** below shows the volume input and output of each intersection. Volume outputs entering and exiting each intersection are provided in **Appendix H**.

Table 7. Volume Calibration

Intersection	AM Model			PM Model		
	Vehicles Exited (vph)	Input Volume (vph)	% of Volume	Vehicles Exited (vph)	Input Volume (vph)	% of Volume
1- N.W. 69th Avenue and SR 968 / W. Flagler Street	3,392	3,400	100	3,803	3,859	99
2- Robert King High Park and SR 968 / W. Flagler Street	3,244	3,238	100	3,656	3,702	99
3- S.W. 69th Avenue and S.W. 4th Street	937	928	101	1,218	1,162	105
4- S.W. 70th Avenue and US-41 / SR 90 / S.W. 8th Street	3,441	3,461	99	3,218	3,292	98
5- S.W. 69th Avenue and US-41 / SR 90 / S.W. 8th Street	3,377	3,380	100	2,988	3,024	99
6- S.W. 70th Avenue and S.W. 12th Street	366	373	98	514	496	104
7- S.W. 69th Avenue and S.W. 12th Street	439	457	96	599	588	102
8- S.W. 70th Avenue and S.W. 16th Street	952	923	103	916	948	97
9- Plaza Driveway, SR 972 / S.W. 24th Street	2,890	2,810	103	2,775	2,805	99
10- S.W. 69th Avenue and SR 972 / S.W. 24th Street	3,031	2,955	103	2,738	2,792	98
11- S.W. 70th Avenue and SR 976 / S.W. 40th Street	5,008	5,271	95	3,864	3,956	98
12- S.W. 69th Avenue and SR 976 / S.W. 40th Street	5,071	5,321	95	3,936	4,030	98
13- S.W. 69th Avenue and S.W. 56th Street	2,571	2,558	101	2,385	2,446	98
14- S.W. 69th Court and S.W. 56th Street	2,543	2,517	101	2,387	2,450	97
15- S.W. 69th Avenue and SR 986 / S.W. 72nd Street	2,450	2,406	102	2,673	2,691	99
16- S.W. 70th Avenue and S.W. 80th Street	1276	1,330	96	1,437	1,495	96
17- S.W. 69th Avenue and S.W. 16th Street	844	817	103	826	843	98
18- SR 986 / S.W. 72nd	2451	2,407	102	2,687	2,704	99

Intersection	AM Model			PM Model		
	Vehicles Exited (vph)	Input Volume (vph)	% of Volume	Vehicles Exited (vph)	Input Volume (vph)	% of Volume
Street and S.W. 70th Avenue						
19- S.W. 69th Avenue and S.W. 60th Street	499	481	104	246	242	102

4.2. Existing and Future No Build Conditions Traffic Operational Analysis

This section summarizes the operational analysis of existing conditions using Synchro and SimTraffic software. The existing conditions scenario includes inputting the 2018 collected data (**Appendix A** and **Figures 4** and **5**) and applying the Seasonal Factor of 1.03 which is based on the latest available FTO reports (**Appendix F** and **Figures 6** and **7**). The Time of Day (TOD) signal data and Signal Operational Plans (SOP) were obtained from the MDC online portal and input in the Synchro files. TODs and SOPs are provided in **Appendix G** and the Synchro inputs are provided in **Appendix H**. Complete Synchro and SimTraffic reports for existing conditions are provided in **Appendix H** and a summary is presented in **Table 8**.

The future no build scenario includes the application of the adopted growth factor (presented in **Section 3.1**, vehicular growth factors) to the existing condition scenario volumes. As previously noted, a CAGR of 0.96% was applied to the 2018 collected data to forecast future no build vehicular volumes for the design year 2040.

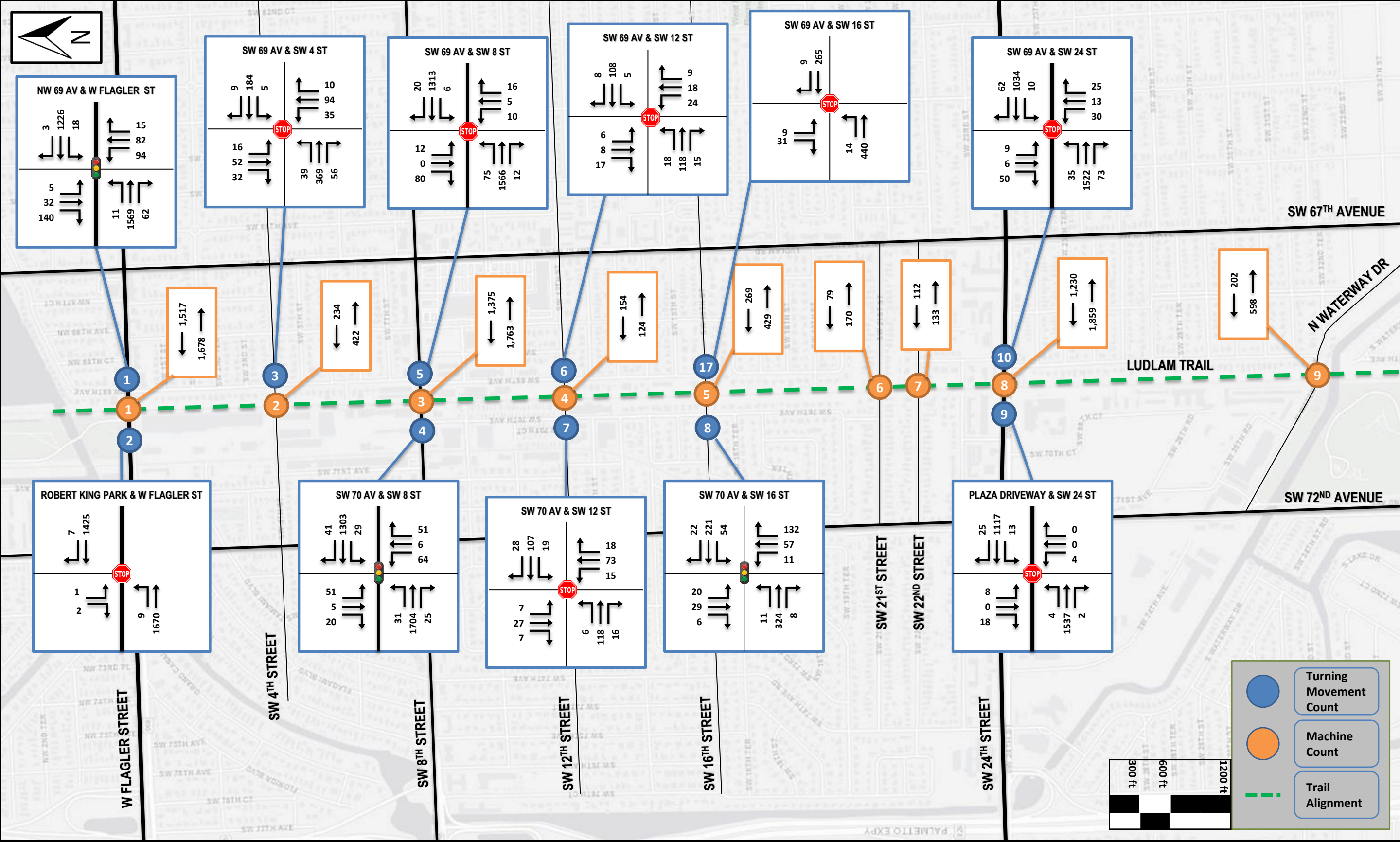


Figure 8.a. Data Collection Summary - AM Peak Period (Future No Build Scenario)

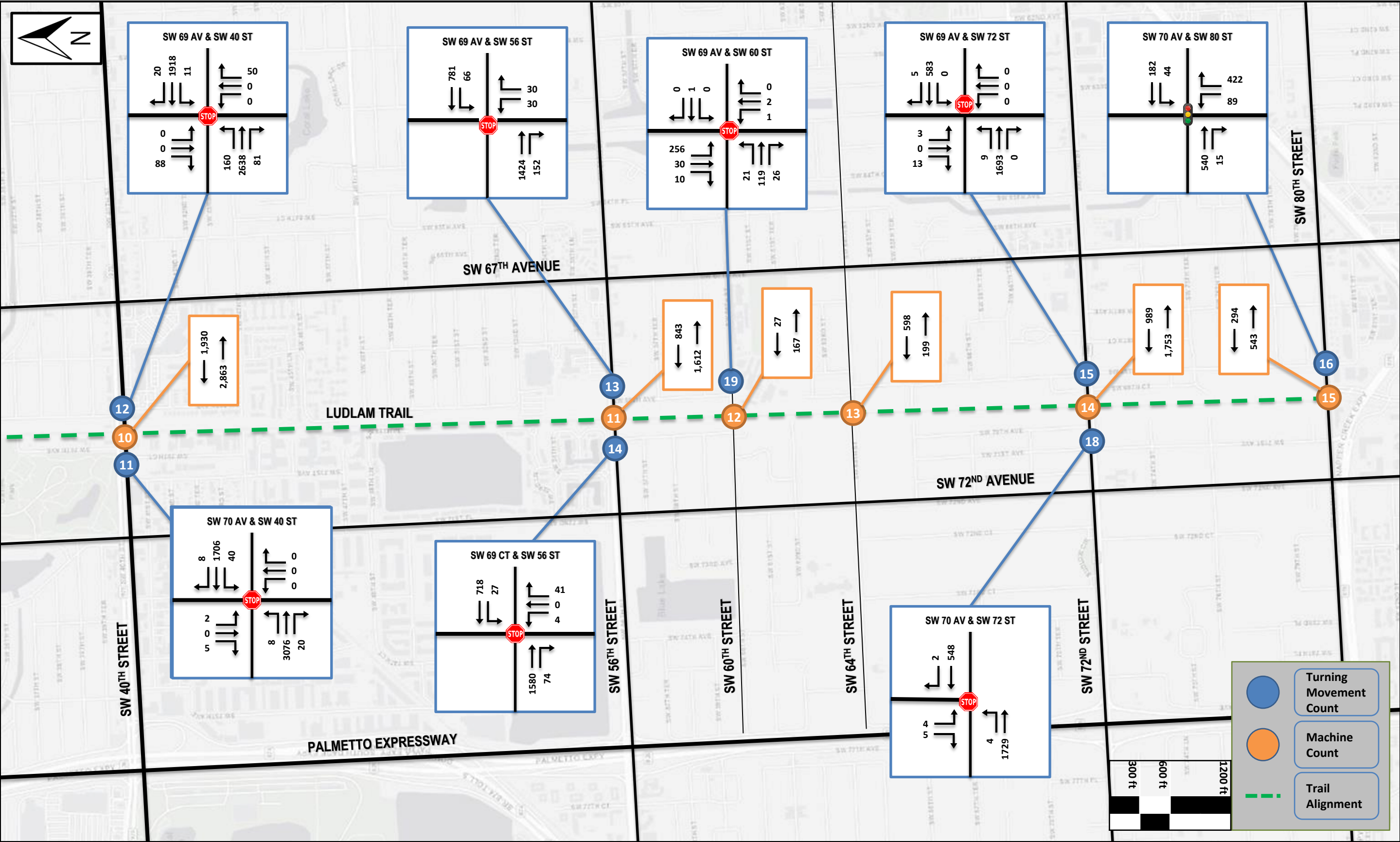


Figure 8.b. Data Collection Summary - AM Peak Period (Future No Build Scenario)

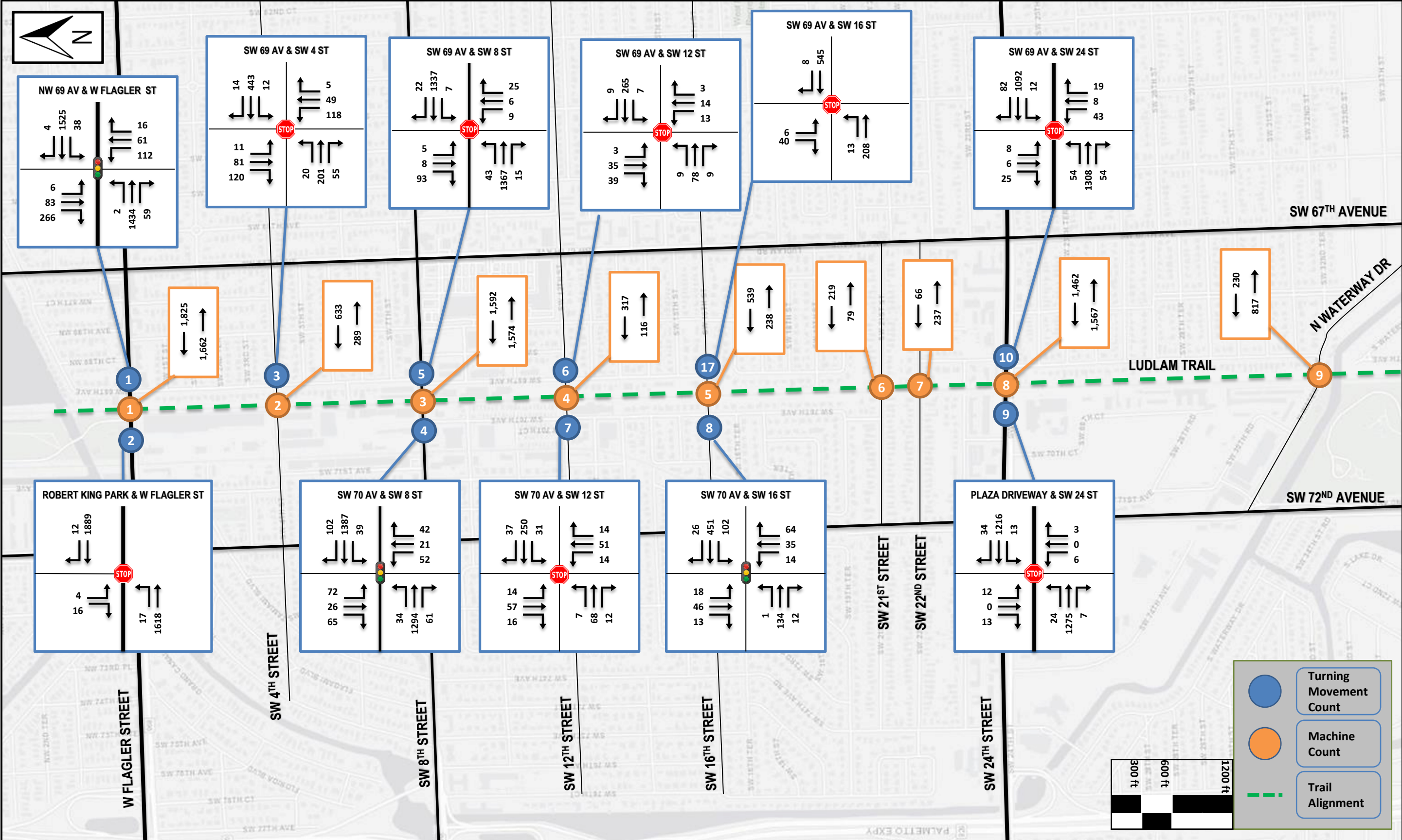


Figure 9.a. Data Collection Summary – PM Peak Period (Future No Build Scenario)

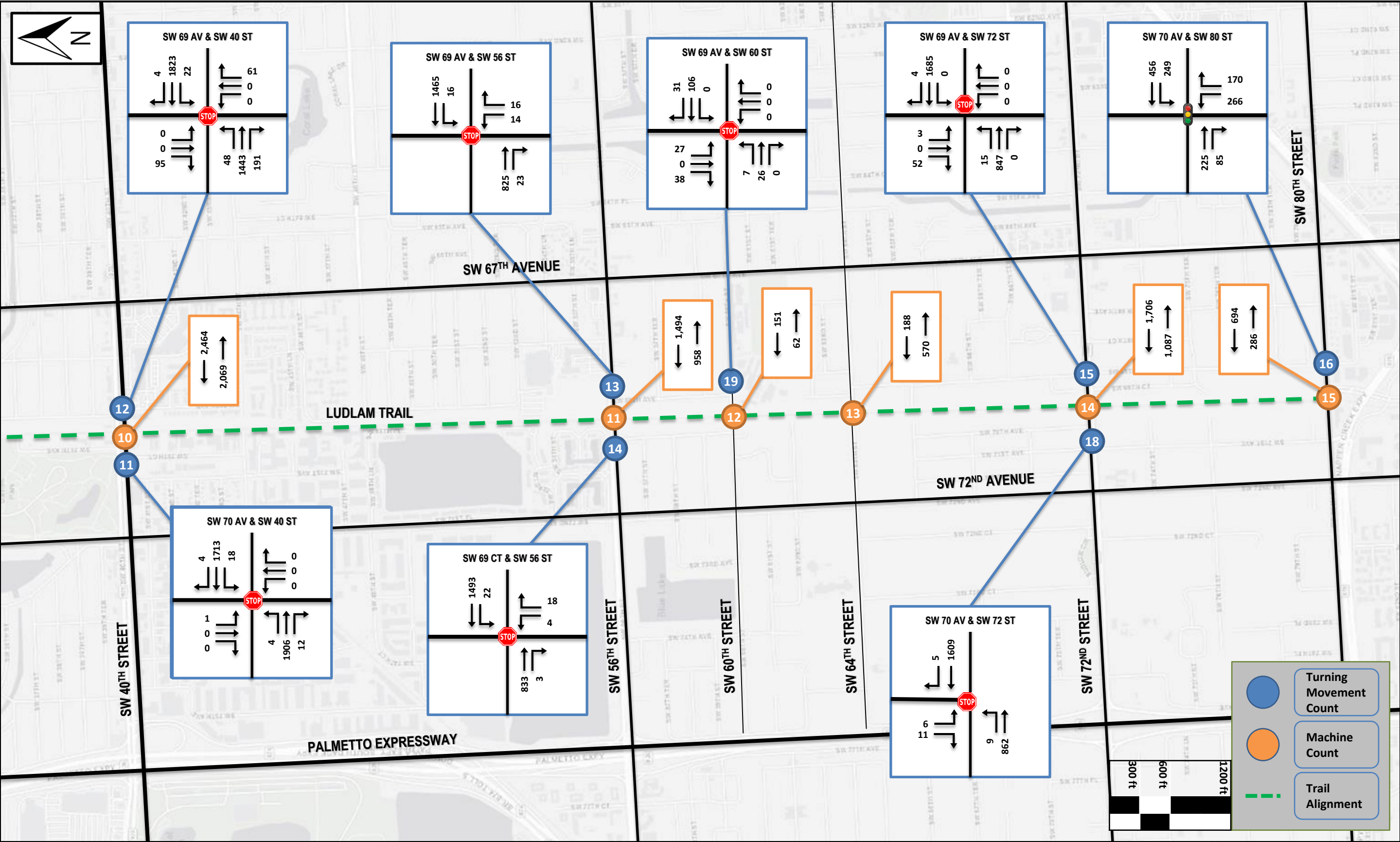


Figure 9.b. Data Collection Summary - PM Peak Period (Future No Build Scenario)

Table 8. Synchro Results Summary, Existing Condition, AM Peak

1- N.W. 69 th Avenue and SR 968 / W. Flagler Street												
Movement Summary												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Delay (s/veh)	26.0	0.0	27.0	24.2	13.6	13.5	65.5	0.0	59.5	61.8	55.9	64.1
LOS	C	A	C	C	B	B	E	A	E	E	E	E
Approach Summary												
Approach	Eastbound			Westbound			Northbound			Southbound		
Delay (s/veh)	26.4			13.7			62.5			62.5		
LOS	C			B			E			E		
Intersection Summary												
Delay (s/veh)	25.6											
LOS	C											

2- Robert King High Park and SR 968 / W. Flagler Street												
Movement Summary												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Delay (s/veh)	13.5									60.4		
LOS	B									F		
Approach Summary												
Approach	Eastbound			Westbound			Northbound			Southbound		
Delay (s/veh)	0.1			0						60.4		
LOS	A			A						F		
Intersection Summary												
Delay (s/veh)	0.1											
LOS	A											

3- S.W. 69 th Avenue and S.W. 4 th Street												
Movement Summary												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Delay (s/veh)	20.3			11.3			11.3			10.6		
LOS	C			B			B			B		
Approach Summary												
Approach	Eastbound			Westbound			Northbound			Southbound		
Delay (s/veh)	20.3			11.3			11.3			10.6		
LOS	C			B			B			B		
Intersection Summary												
Delay (s/veh)	15.9											
LOS	C											

Table 8. Synchro Results Summary, Existing Condition, AM Peak – Continued.

4- S.W. 70th Avenue and US-41 / SR 90 / S.W. 8th Street												
Movement Summary												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Delay (s/veh)	11.4	20.0		19.9	17.4			114.6			72.7	57.1
LOS	B	C		B	B			F			E	E
Approach Summary												
Approach	Eastbound			Westbound			Northbound			Southbound		
Delay (s/veh)	19.9			17.5			114.6			68.6		
LOS	B			B			F			E		
Intersection Summary												
Delay (s/veh)	23.4											
LOS	C											

5- S.W. 69th Avenue and US-41 / SR 90 / S.W. 8th Street												
Movement Summary												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Delay (s/veh)	13.9			14.6			873.9			1617.6		
LOS	B			B			F			F		
Approach Summary												
Approach	Eastbound			Westbound			Northbound			Southbound		
Delay (s/veh)	0.6			0.1			873.9			221.7		
LOS	A			A			F			F		
Intersection Summary												
Delay (s/veh)	15.3											
LOS	B											

6- S.W. 70th Avenue and S.W. 12th Street												
Movement Summary												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Delay (s/veh)	8.6			8.3			8.2			7.8		
LOS	A			A			A			A		
Approach Summary												
Approach	Eastbound			Westbound			Northbound			Southbound		
Delay (s/veh)	8.6			8.3			8.2			7.8		
LOS	A			A			A			A		
Intersection Summary												
Delay (s/veh)	8.4											
LOS	A											

Table 8. Synchro Results Summary, Existing Condition, AM Peak – Continued.

7- S.W. 69th Avenue and S.W. 12th Street												
Movement Summary												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Delay (s/veh)	7.6	0		7.6	0		13.0			12.0		
LOS	A	A		A	A		B			B		
Approach Summary												
Approach	Eastbound			Westbound			Northbound			Southbound		
Delay (s/veh)	0.3			1.0			13.0			12.0		
LOS	A			A			B			B		
Intersection Summary												
Delay (s/veh)	4.7											
LOS	A											

8- S.W. 70th Avenue and S.W. 16th Street												
Movement Summary												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Delay (s/veh)	5.7	0	0	5.0	0	0	23.7	0	0	20.3	0	0
LOS	A	A	A	A	A	A	C	A	A	C	A	A
Approach Summary												
Approach	Eastbound			Westbound			Northbound			Southbound		
Delay (s/veh)	5.7			5.0			23.7			20.3		
LOS	A			A			C			C		
Intersection Summary												
Delay (s/veh)	10.4											
LOS	B											

9- Plaza Driveway, SR 972 / S.W. 24th Street												
Movement Summary												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Delay (s/veh)	24.9	28.7			44.7	33.7		60.3			84.5	
LOS	C	C			D	C		E			F	
Approach Summary												
Approach	Eastbound			Westbound			Northbound			Southbound		
Delay (s/veh)	28.7			44.5			60.3			84.5		
LOS	C			D			E			F		
Intersection Summary												
Delay (s/veh)	36.0											
LOS	D											

Table 8. Synchro Results Summary, Existing Condition, AM Peak – Continued.

10- S.W. 69th Avenue and SR 972 / S.W. 24th Street												
Movement Summary												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Delay (s/veh)	11.5	5.5		14.9	0.6							
LOS	B	A		B	A							
Approach Summary												
Approach	Eastbound			Westbound			Northbound			Southbound		
Delay (s/veh)	5.4			0.7								
LOS	A			A								
Intersection Summary												
Delay (s/veh)	3.3											
LOS	A											

11- S.W. 70th Avenue and SR 976 / S.W. 40th Street												
Movement Summary												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Delay (s/veh)	29.2			523.9						23.1		
LOS	D			F						C		
Approach Summary												
Approach	Eastbound			Westbound			Northbound			Southbound		
Delay (s/veh)	0.1			11.9			0					
LOS	A			B			A					
Intersection Summary												
Delay (s/veh)	4.4											
LOS	A											

12- S.W. 69th Avenue and SR 976 / S.W. 40th Street												
Movement Summary												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Delay (s/veh)	361.9			128.2			79.2			41.4		
LOS	F			F			F			E		
Approach Summary												
Approach	Eastbound			Westbound			Northbound			Southbound		
Delay (s/veh)	20.1			0.7			79.2			41.4		
LOS	C			A			F			E		
Intersection Summary												
Delay (s/veh)	13.5											
LOS	B											

Table 8. Synchro Results Summary, Existing Condition, AM Peak – Continued.

13- S.W. 69th Avenue and S.W. 56th Street												
Movement Summary												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Delay (s/veh)				18.5			412.7					
LOS				C			F					
Approach Summary												
Approach	Eastbound			Westbound			Northbound			Southbound		
Delay (s/veh)	0			1.4			412.7					
LOS	A			A			F					
Intersection Summary												
Delay (s/veh)	10.5											
LOS	B											

14- S.W. 69th Court and S.W. 56th Street												
Movement Summary												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Delay (s/veh)				17.6			39.1					
LOS				C			E					
Approach Summary												
Approach	Eastbound			Westbound			Northbound			Southbound		
Delay (s/veh)	0			0.6			39.1					
LOS	A			A			E					
Intersection Summary												
Delay (s/veh)	0.9											
LOS	A											

15- S.W. 69th Avenue and SR 986 / S.W. 72nd Street												
Movement Summary												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Delay (s/veh)	8.8									16.2		
LOS	A									C		
Approach Summary												
Approach	Eastbound			Westbound			Northbound			Southbound		
Delay (s/veh)	0			0						16.2		
LOS	A			A						C		
Intersection Summary												
Delay (s/veh)	0.1											
LOS	A											

Table 8. Synchro Results Summary, Existing Condition, AM Peak – Continued.

16- S.W. 70th Avenue and S.W. 80th Street												
Movement Summary												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Delay (s/veh)		18.2		7.4	5.5		29.0		25.8			
LOS		B		A	A		C		C			
Approach Summary												
Approach	Eastbound			Westbound			Northbound			Southbound		
Delay (s/veh)	18.2			5.9			26.3					
LOS	B			A			C					
Intersection Summary												
Delay (s/veh)	19.3											
LOS	B											

17- S.W. 69th Avenue and S.W. 16th Street												
Movement Summary												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Delay (s/veh)	7.9									11.5		
LOS	A									B		
Approach Summary												
Approach	Eastbound			Westbound			Northbound			Southbound		
Delay (s/veh)	0.2			0						11.5		
LOS	A			A						B		
Intersection Summary												
Delay (s/veh)	0.7											
LOS	A											

18- SR 986 / S.W. 72nd Street and S.W. 70th Avenue												
Movement Summary												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Delay (s/veh)	8.7									25.3		
LOS	A									D		
Approach Summary												
Approach	Eastbound			Westbound			Northbound			Southbound		
Delay (s/veh)	0			0						25.3		
LOS	A			A						D		
Intersection Summary												
Delay (s/veh)	0.1											
LOS	A											

Table 8. Synchro Results Summary, Existing Condition, AM Peak – Continued.

19- S.W. 69th Avenue and S.W. 60th Street												
Movement Summary												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Delay (s/veh)	9.6			8.2			8.0			11.7		
LOS	A			A			A			B		
Approach Summary												
Approach	Eastbound			Westbound			Northbound			Southbound		
Delay (s/veh)	9.6			8.2			8.0			11.7		
LOS	A			A			A			B		
Intersection Summary												
Delay (s/veh)	10.9											
LOS	B											

Table 9. Synchro Results Summary, Existing Condition, PM Peak

1- N.W. 69 th Avenue and SR 968 / W. Flagler Street												
Movement Summary												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Delay (s/veh)	20.9	0.0	21.8	20.3	13.6	13.5	93.3	0.0	64.1	65.9	64.0	122.5
LOS	C	A	C	C	B	B	F	A	E	E	E	F
Approach Summary												
Approach	Eastbound			Westbound			Northbound			Southbound		
Delay (s/veh)	21.3			13.7			81.4			108.1		
LOS	C			B			F			F		
Intersection Summary												
Delay (s/veh)	29.6											
LOS	C											

2- Robert King High Park and SR 968 / W. Flagler Street												
Movement Summary												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Delay (s/veh)	18.9									135.7		
LOS	C									F		
Approach Summary												
Approach	Eastbound			Westbound			Northbound			Southbound		
Delay (s/veh)	0.2			0						135.7		
LOS	A			A						F		
Intersection Summary												
Delay (s/veh)	0.8											
LOS	A											

3- S.W. 69 th Avenue and S.W. 4 th Street												
Movement Summary												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Delay (s/veh)	16.1			32.2			14.3			14.4		
LOS	C			D			B			B		
Approach Summary												
Approach	Eastbound			Westbound			Northbound			Southbound		
Delay (s/veh)	16.1			32.2			14.3			14.4		
LOS	C			D			B			B		
Intersection Summary												
Delay (s/veh)	22.2											
LOS	C											

Table 9. Synchro Results Summary, Existing Condition, PM Peak – Continued.

4- S.W. 70th Avenue and US-41 / SR 90 / S.W. 8th Street												
Movement Summary												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Delay (s/veh)	20.3	15.8		12.9	17.9			120.9			82.2	61.5
LOS	C	B		B	B			F			F	E
Approach Summary												
Approach	Eastbound			Westbound			Northbound			Southbound		
Delay (s/veh)	16.0			17.8			120.9			73.9		
LOS	B			B			F			E		
Intersection Summary												
Delay (s/veh)	23.6											
LOS	C											

5- S.W. 69th Avenue and US-41 / SR 90 / S.W. 8th Street												
Movement Summary												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Delay (s/veh)	14.9			14.1						3774		
LOS	B			B						F		
Approach Summary												
Approach	Eastbound			Westbound			Northbound			Southbound		
Delay (s/veh)	0.4			0.1						585.5		
LOS	A			A						F		
Intersection Summary												
Delay (s/veh)	21.3											
LOS	C											

6- S.W. 70th Avenue and S.W. 12th Street												
Movement Summary												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Delay (s/veh)	8.2			9.8			8.3			8.3		
LOS	A			A			A			A		
Approach Summary												
Approach	Eastbound			Westbound			Northbound			Southbound		
Delay (s/veh)	8.2			9.8			8.3			8.3		
LOS	A			A			A			A		
Intersection Summary												
Delay (s/veh)	9.2											
LOS	A											

Table 9. Synchro Results Summary, Existing Condition, PM Peak – Continued.

7- S.W. 69th Avenue and S.W. 12th Street												
Movement Summary												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Delay (s/veh)	7.9	0		7.5	0		13.7			14.0		
LOS	A	A		A	A		B			B		
Approach Summary												
Approach	Eastbound			Westbound			Northbound			Southbound		
Delay (s/veh)	0.6			0.7			13.7			14.0		
LOS	A			A			B			B		
Intersection Summary												
Delay (s/veh)	4.5											
LOS	A											

8- S.W. 70th Avenue and S.W. 16th Street												
Movement Summary												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Delay (s/veh)	4.1	0	0	5.6	0	0	20.2	0	0	19.3	0	0
LOS	A	A	A	A	A	A	C	A	A	B	A	A
Approach Summary												
Approach	Eastbound			Westbound			Northbound			Southbound		
Delay (s/veh)	4.1			5.6			20.2			19.3		
LOS	A			A			C			B		
Intersection Summary												
Delay (s/veh)	8.3											
LOS	B											

9- Plaza Driveway, SR 972 / S.W. 24th Street												
Movement Summary												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Delay (s/veh)	40.3	40.9			35.1	25.2		50.5			74.5	
LOS	D	D			D	C		D			E	
Approach Summary												
Approach	Eastbound			Westbound			Northbound			Southbound		
Delay (s/veh)	40.9			34.9			50.5			74.5		
LOS	D			C			D			E		
Intersection Summary												
Delay (s/veh)	38.4											
LOS	D											

Table 9. Synchro Results Summary, Existing Condition, PM Peak – Continued.

10- S.W. 69th Avenue and SR 972 / S.W. 24th Street												
Movement Summary												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Delay (s/veh)	12.4	3.3		13.1	0.6		6365					
LOS	B	A		B	A		F					
Approach Summary												
Approach	Eastbound			Westbound			Northbound			Southbound		
Delay (s/veh)	3.5			0.7			6365.9					
LOS	A			A			F					
Intersection Summary												
Delay (s/veh)	166.3											
LOS	A											

11- S.W. 70th Avenue and SR 976 / S.W. 40th Street												
Movement Summary												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Delay (s/veh)	33.7			51.0			0			405.8		
LOS	D			F			A			F		
Approach Summary												
Approach	Eastbound			Westbound			Northbound			Southbound		
Delay (s/veh)	0.1			0.5			0			405.8		
LOS	A			A			A			F		
Intersection Summary												
Delay (s/veh)	0.4											
LOS	A											

12- S.W. 69th Avenue and SR 976 / S.W. 40th Street												
Movement Summary												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Delay (s/veh)	55.3			32.4			25.8			41.4		
LOS	F			D			D			E		
Approach Summary												
Approach	Eastbound			Westbound			Northbound			Southbound		
Delay (s/veh)	1.6			0.4			25.8			41.4		
LOS	A			A			D			E		
Intersection Summary												
Delay (s/veh)	2.4											
LOS	A											

Table 9. Synchro Results Summary, Existing Condition, PM Peak – Continued.

13- S.W. 69th Avenue and S.W. 56th Street												
Movement Summary												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Delay (s/veh)				9.9			35.4					
LOS				A			E					
Approach Summary												
Approach	Eastbound			Westbound			Northbound			Southbound		
Delay (s/veh)	0			0.1			35.4					
LOS	A			A			E					
Intersection Summary												
Delay (s/veh)	0.5											
LOS	A											

14- S.W. 69th Court and S.W. 56th Street												
Movement Summary												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Delay (s/veh)				9.9			20.1					
LOS				A			C					
Approach Summary												
Approach	Eastbound			Westbound			Northbound			Southbound		
Delay (s/veh)	0			0.1			20.1					
LOS	A			A			C					
Intersection Summary												
Delay (s/veh)	0.3											
LOS	A											

15- S.W. 69th Avenue and SR 986 / S.W. 72nd Street												
Movement Summary												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Delay (s/veh)	15.8									29.1		
LOS	C									D		
Approach Summary												
Approach	Eastbound			Westbound			Northbound			Southbound		
Delay (s/veh)	0.3			0						29.1		
LOS	A			A						D		
Intersection Summary												
Delay (s/veh)	0.7											
LOS	A											

Table 9. Synchro Results Summary, Existing Condition, PM Peak – Continued.

16- S.W. 70th Avenue and S.W. 80th Street												
Movement Summary												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Delay (s/veh)		13.0		5.7	6.5		33.5		20.0			
LOS		B		A	A		C		C			
Approach Summary												
Approach	Eastbound			Westbound			Northbound			Southbound		
Delay (s/veh)	13.0			6.2			28.2					
LOS	B			A			C					
Intersection Summary												
Delay (s/veh)	14.3											
LOS	B											

17- S.W. 69th Avenue and S.W. 16th Street												
Movement Summary												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Delay (s/veh)	8.7									13.4		
LOS	A									B		
Approach Summary												
Approach	Eastbound			Westbound			Northbound			Southbound		
Delay (s/veh)	0.5			0						13.4		
LOS	A			A						B		
Intersection Summary												
Delay (s/veh)	0.9											
LOS	A											

18- SR 986 / S.W. 72nd Street and S.W. 70th Avenue												
Movement Summary												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Delay (s/veh)	15.3									61.6		
LOS	C									F		
Approach Summary												
Approach	Eastbound			Westbound			Northbound			Southbound		
Delay (s/veh)	0.2			0						61.6		
LOS	A			A						F		
Intersection Summary												
Delay (s/veh)	0.5											
LOS	A											

Table 9. Synchro Results Summary, Existing Condition, PM Peak - Continued.

19- S.W. 69th Avenue and S.W. 60th Street												
Movement Summary												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Delay (s/veh)	7.5			7.8			7.4			7.5		
LOS	A			A			A			A		
Approach Summary												
Approach	Eastbound			Westbound			Northbound			Southbound		
Delay (s/veh)	7.5			7.8			0			7.5		
LOS	A			A			A			A		
Intersection Summary												
Delay (s/veh)	7.7											
LOS	A											

Table 10. Synchro Results Summary, Future No Build Condition, AM Peak

1- N.W. 69 th Avenue and SR 968 / W. Flagler Street												
Movement Summary												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Delay (s/veh)	59.9	0.0	60.3	53.4	17.1	17.0	70.9	0.0	61.2	64.3	56.3	68.1
LOS	F	A	F	D	B	B	E	A	E	E	E	E
Approach Summary												
Approach	Eastbound			Westbound			Northbound			Southbound		
Delay (s/veh)	60.1			17.6			65.9			65.8		
LOS	E			B			E			E		
Intersection Summary												
Delay (s/veh)	44.5											
LOS	D											

2- Robert King High Park and SR 968 / W. Flagler Street												
Movement Summary												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Delay (s/veh)	18.1									149.9		
LOS	C									F		
Approach Summary												
Approach	Eastbound			Westbound			Northbound			Southbound		
Delay (s/veh)	0.1			0						149.9		
LOS	A			A						F		
Intersection Summary												
Delay (s/veh)	0.2											
LOS	A											

3- S.W. 69 th Avenue and S.W. 4 th Street												
Movement Summary												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Delay (s/veh)	62.0			14.9			14.2			12.8		
LOS	F			B			B			B		
Approach Summary												
Approach	Eastbound			Westbound			Northbound			Southbound		
Delay (s/veh)	62.0			14.9			14.2			12.8		
LOS	F			B			B			B		
Intersection Summary												
Delay (s/veh)	38.9											
LOS	E											

Table 10. Synchro Results Summary, Future No Build Condition, AM Peak – Continued.

4- S.W. 70th Avenue and US-41 / SR 90 / S.W. 8th Street												
Movement Summary												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Delay (s/veh)	6.1	38.3		49.7	10.7			189.9			75.3	57.3
LOS	A	D		D	B			F			E	E
Approach Summary												
Approach	Eastbound			Westbound			Northbound			Southbound		
Delay (s/veh)	37.8			11.7			189.9			69.5		
LOS	D			B			F			E		
Intersection Summary												
Delay (s/veh)	46.5											
LOS	D											

5- S.W. 69th Avenue and US-41 / SR 90 / S.W. 8th Street												
Movement Summary												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Delay (s/veh)	21.2			20.8						27.9		
LOS	C			C						D		
Approach Summary												
Approach	Eastbound			Westbound			Northbound			Southbound		
Delay (s/veh)	1.0			0.1						27.9		
LOS	A			A						D		
Intersection Summary												
Delay (s/veh)	123.6											
LOS	F											

6- S.W. 70th Avenue and S.W. 12th Street												
Movement Summary												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Delay (s/veh)	8.9			8.5			8.4			8.0		
LOS	A			A			A			A		
Approach Summary												
Approach	Eastbound			Westbound			Northbound			Southbound		
Delay (s/veh)	8.9			8.5			8.4			8.0		
LOS	A			A			A			A		
Intersection Summary												
Delay (s/veh)	8.6											
LOS	A											

Table 10. Synchro Results Summary, Future No Build Condition, AM Peak – Continued.

7- S.W. 69th Avenue and S.W. 12th Street												
Movement Summary												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Delay (s/veh)	7.6	0		7.6	0		14.3			12.8		
LOS	A	A		A	A		B			B		
Approach Summary												
Approach	Eastbound			Westbound			Northbound			Southbound		
Delay (s/veh)	0.3			0.9			14.3			12.8		
LOS	A			A			B			B		
Intersection Summary												
Delay (s/veh)	5.0											
LOS	A											

8- S.W. 70th Avenue and S.W. 16th Street												
Movement Summary												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Delay (s/veh)	7.7	0	0	6.4	0	0	23.8	0	0	19.6	0	0
LOS	A	A	A	A	A	A	C	A	A	B	A	A
Approach Summary												
Approach	Eastbound			Westbound			Northbound			Southbound		
Delay (s/veh)	7.7			6.4			23.8			19.6		
LOS	A			A			C			B		
Intersection Summary												
Delay (s/veh)	11.6											
LOS	B											

9- Plaza Driveway, SR 972 / S.W. 24th Street												
Movement Summary												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Delay (s/veh)	63.2	56.0			12.3	8.2		60.4			84.7	
LOS	E	E			B	A		E			F	
Approach Summary												
Approach	Eastbound			Westbound			Northbound			Southbound		
Delay (s/veh)	56.0			12.2			60.4			84.7		
LOS	E			B			E			F		
Intersection Summary												
Delay (s/veh)	37.7											
LOS	D											

Table 10. Synchro Results Summary, Future No Build Condition, AM Peak – Continued.

10- S.W. 69th Avenue and SR 972 / S.W. 24th Street												
Movement Summary												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Delay (s/veh)	14.3	0		21.3	4.2		0					
LOS	B	A		C	A		A					
Approach Summary												
Approach	Eastbound			Westbound			Northbound			Southbound		
Delay (s/veh)	0.3			4.1			0					
LOS	A			A			A					
Intersection Summary												
Delay (s/veh)	1.8											
LOS	A											

11- S.W. 70th Avenue and SR 976 / S.W. 40th Street												
Movement Summary												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Delay (s/veh)	57.7			3,573			0			35.1		
LOS	F			F			A			E		
Approach Summary												
Approach	Eastbound			Westbound			Northbound			Southbound		
Delay (s/veh)	0.1			81.8			0			0		
LOS	A			F			A			A		
Intersection Summary												
Delay (s/veh)	29.6											
LOS	D											

12- S.W. 69th Avenue and SR 976 / S.W. 40th Street												
Movement Summary												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Delay (s/veh)	1473			579			368			149		
LOS	F			F			F			F		
Approach Summary												
Approach	Eastbound			Westbound			Northbound			Southbound		
Delay (s/veh)	81.8			3.3			368			149		
LOS	F			A			F			F		
Intersection Summary												
Delay (s/veh)	55.1											
LOS	F											

Table 10. Synchro Results Summary, Future No Build Condition, AM Peak – Continued.

13- S.W. 69th Avenue and S.W. 56th Street												
Movement Summary												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Delay (s/veh)				29.1			2,188					
LOS				D			F					
Approach Summary												
Approach	Eastbound			Westbound			Northbound			Southbound		
Delay (s/veh)	0			2.3			2,188					
LOS	A			A			F					
Intersection Summary												
Delay (s/veh)	53.5											
LOS	F											

14- S.W. 69th Court and S.W. 56th Street												
Movement Summary												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Delay (s/veh)				24.9			124.8					
LOS				C			F					
Approach Summary												
Approach	Eastbound			Westbound			Northbound			Southbound		
Delay (s/veh)	0			0.9			124.8					
LOS	A			A			F					
Intersection Summary												
Delay (s/veh)	2.6											
LOS	A											

15- S.W. 69th Avenue and SR 986 / S.W. 72nd Street												
Movement Summary												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Delay (s/veh)	9.5									25.8		
LOS	A									D		
Approach Summary												
Approach	Eastbound			Westbound			Northbound			Southbound		
Delay (s/veh)	0			0						25.8		
LOS	A			A						D		
Intersection Summary												
Delay (s/veh)	0.2											
LOS	A											

Table 10. Synchro Results Summary, Future No Build Condition, AM Peak – Continued.

16- S.W. 70th Avenue and S.W. 80th Street												
Movement Summary												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Delay (s/veh)		32.6		13.3	7.1		28.0		41.4			
LOS		C		B	A		C		D			
Approach Summary												
Approach	Eastbound			Westbound			Northbound			Southbound		
Delay (s/veh)	32.6			8.3			39.0					
LOS	C			A			D					
Intersection Summary												
Delay (s/veh)	30.9											
LOS	C											

17- S.W. 69th Avenue and S.W. 16th Street												
Movement Summary												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Delay (s/veh)	8.1									13.2		
LOS	A									B		
Approach Summary												
Approach	Eastbound			Westbound			Northbound			Southbound		
Delay (s/veh)	0.3			0						13.2		
LOS	A			A						B		
Intersection Summary												
Delay (s/veh)	0.9											
LOS	A											

18- SR 986 / S.W. 72nd Street and S.W. 70th Avenue												
Movement Summary												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Delay (s/veh)	9.3	0								43.2		
LOS	A	A								E		
Approach Summary												
Approach	Eastbound			Westbound			Northbound			Southbound		
Delay (s/veh)	0			0						43.2		
LOS	A			A						E		
Intersection Summary												
Delay (s/veh)	0.2											
LOS	A											

Table 10. Synchro Results Summary, Future No Build Condition, AM Peak – Continued.

19- S.W. 69th Avenue and S.W. 60th Street												
Movement Summary												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Delay (s/veh)	10.1			8.3			8.1			12.8		
LOS	B			A			A			B		
Approach Summary												
Approach	Eastbound			Westbound			Northbound			Southbound		
Delay (s/veh)	10.1			8.3			8.1			12.8		
LOS	B			A			A			B		
Intersection Summary												
Delay (s/veh)	11.8											
LOS	B											

Table 11. Synchro Results Summary, Future No Build Condition, PM Peak

1- N.W. 69 th Avenue and SR 968 / W. Flagler Street												
Movement Summary												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Delay (s/veh)	32.2	0.0	37.1	47.9	19.2	19.0	140.0	0.0	65.6	68.0	65.5	203.0
LOS	C	A	D	D	B	B	F	A	E	E	E	F
Approach Summary												
Approach	Eastbound			Westbound			Northbound			Southbound		
Delay (s/veh)	34.5			19.8			109.5			168.5		
LOS	C			B			F			F		
Intersection Summary												
Delay (s/veh)	45.1											
LOS	D											

2- Robert King High Park and SR 968 / W. Flagler Street												
Movement Summary												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Delay (s/veh)	31.4									992.9		
LOS	D									F		
Approach Summary												
Approach	Eastbound			Westbound			Northbound			Southbound		
Delay (s/veh)	0.3			0						992.9		
LOS	A			A						F		
Intersection Summary												
Delay (s/veh)	5.6											
LOS	A											

3- S.W. 69 th Avenue and S.W. 4 th Street												
Movement Summary												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Delay (s/veh)	34.5			169.7			22.6			24.8		
LOS	D			F			C			C		
Approach Summary												
Approach	Eastbound			Westbound			Northbound			Southbound		
Delay (s/veh)	34.5			169.7			22.6			24.8		
LOS	D			F			C			C		
Intersection Summary												
Delay (s/veh)	87.1											
LOS	F											

Table 11. Synchro Results Summary, Future No Build Condition, PM Peak – Continued.

4- S.W. 70th Avenue and US-41 / SR 90 / S.W. 8th Street												
Movement Summary												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Delay (s/veh)	75.9	19.7		25.5	24.6			168.1			93.1	63.6
LOS	E	B		C	C			F			F	E
Approach Summary												
Approach	Eastbound			Westbound			Northbound			Southbound		
Delay (s/veh)	22.1			24.6			168.1			81.4		
LOS	C			C			F			F		
Intersection Summary												
Delay (s/veh)	31.6											
LOS	C											

5- S.W. 69th Avenue and US-41 / SR 90 / S.W. 8th Street												
Movement Summary												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Delay (s/veh)	19.1			17.2						2,607		
LOS	C			C						F		
Approach Summary												
Approach	Eastbound			Westbound			Northbound			Southbound		
Delay (s/veh)	0.6			0.1								
LOS	A			A								
Intersection Summary												
Delay (s/veh)	>80											
LOS	F											

6- S.W. 70th Avenue and S.W. 12th Street												
Movement Summary												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Delay (s/veh)	8.8			11.6			8.7			8.9		
LOS	A			B			A			A		
Approach Summary												
Approach	Eastbound			Westbound			Northbound			Southbound		
Delay (s/veh)	8.8			11.6			8.7			8.9		
LOS	A			B			A			A		
Intersection Summary												
Delay (s/veh)	10.4											
LOS	B											

Table 11. Synchro Results Summary, Future No Build Condition, PM Peak – Continued.

7- S.W. 69th Avenue and S.W. 12th Street												
Movement Summary												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Delay (s/veh)	8.1	0		7.5	0		16.8			17.2		
LOS	A	A		A	A		C			C		
Approach Summary												
Approach	Eastbound			Westbound			Northbound			Southbound		
Delay (s/veh)	0.7			0.7			16.8			17.2		
LOS	A			A			C			C		
Intersection Summary												
Delay (s/veh)	5.4											
LOS	A											

8- S.W. 70th Avenue and S.W. 16th Street												
Movement Summary												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Delay (s/veh)	4.4	0	0	8.1	0	0	20.8	0	0	19.8	0	0
LOS	A	A	A	A	A	A	C	A	A	B	A	A
Approach Summary												
Approach	Eastbound			Westbound			Northbound			Southbound		
Delay (s/veh)	4.4			8.1			20.8			19.8		
LOS	A			A			C			B		
Intersection Summary												
Delay (s/veh)	10.2											
LOS	B											

9- Plaza Driveway, SR 972 / S.W. 24th Street												
Movement Summary												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Delay (s/veh)	61.6	70.2			18.6	11.7		52.6			76.7	
LOS	E	E			B	B		D			E	
Approach Summary												
Approach	Eastbound			Westbound			Northbound			Southbound		
Delay (s/veh)	70.1			18.4			52.6			76.7		
LOS	E			B			D			E		
Intersection Summary												
Delay (s/veh)	45.4											
LOS	D											

Table 11. Synchro Results Summary, Future No Build Condition, PM Peak – Continued.

10- S.W. 69th Avenue and SR 972 / S.W. 24th Street												
Movement Summary												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Delay (s/veh)	16.2	0		17.1	5		0					
LOS	C	A		C	A		A					
Approach Summary												
Approach	Eastbound			Westbound			Northbound			Southbound		
Delay (s/veh)	0.6			4.8			0					
LOS	A			A			A					
Intersection Summary												
Delay (s/veh)	2.4											
LOS	A											

11- S.W. 70th Avenue and SR 976 / S.W. 40th Street												
Movement Summary												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Delay (s/veh)	52.6			107.7			0			1,526		
LOS	F			F			A			F		
Approach Summary												
Approach	Eastbound			Westbound			Northbound			Southbound		
Delay (s/veh)	0.1			1.1			0			1,526		
LOS	A			A			A			F		
Intersection Summary												
Delay (s/veh)	0.9											
LOS	A											

12- S.W. 69th Avenue and SR 976 / S.W. 40th Street												
Movement Summary												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Delay (s/veh)	211.1			62.4			45.6			131.6		
LOS	F			F			E			F		
Approach Summary												
Approach	Eastbound			Westbound			Northbound			Southbound		
Delay (s/veh)	6.0			0.7			45.6			131.6		
LOS	A			A			E			F		
Intersection Summary												
Delay (s/veh)	7.2											
LOS	A											

Table 11. Synchro Results Summary, Future No Build Condition, PM Peak – Continued.

13- S.W. 69th Avenue and S.W. 56th Street												
Movement Summary												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Delay (s/veh)				11.4			113.1					
LOS				B			F					
Approach Summary												
Approach	Eastbound			Westbound			Northbound			Southbound		
Delay (s/veh)	0			0.1			113.1					
LOS	A			A			F					
Intersection Summary												
Delay (s/veh)	1.5											
LOS	A											

14- S.W. 69th Court and S.W. 56th Street												
Movement Summary												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Delay (s/veh)				11.4			38.3					
LOS				B			E					
Approach Summary												
Approach	Eastbound			Westbound			Northbound			Southbound		
Delay (s/veh)	0			0.2			38.3					
LOS	A			A			E					
Intersection Summary												
Delay (s/veh)	0.5											
LOS	A											

15- S.W. 69th Avenue and SR 986 / S.W. 72nd Street												
Movement Summary												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Delay (s/veh)	23.8									115.4		
LOS	C									F		
Approach Summary												
Approach	Eastbound			Westbound			Northbound			Southbound		
Delay (s/veh)	0.4			0						115.4		
LOS	A			A						F		
Intersection Summary												
Delay (s/veh)	2.6											
LOS	A											

Table 11. Synchro Results Summary, Future No Build Condition, PM Peak – Continued.

16- S.W. 70th Avenue and S.W. 80th Street												
Movement Summary												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Delay (s/veh)		15.1		8.3	8.1		34.3		19.8			
LOS		B		A	A		C		B			
Approach Summary												
Approach	Eastbound			Westbound			Northbound			Southbound		
Delay (s/veh)	15.1			8.2			28.6					
LOS	B			A			C					
Intersection Summary												
Delay (s/veh)	15.8											
LOS	B											

17- S.W. 69th Avenue and S.W. 16th Street												
Movement Summary												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Delay (s/veh)	9.3	0								17.0		
LOS	A	A								C		
Approach Summary												
Approach	Eastbound			Westbound			Northbound			Southbound		
Delay (s/veh)	0.6			0						17.0		
LOS	A			A						C		
Intersection Summary												
Delay (s/veh)	0.5											
LOS	A											

18- SR 986 / S.W. 72nd Street and S.W. 70th Avenue												
Movement Summary												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Delay (s/veh)	21.3									291.8		
LOS	C									F		
Approach Summary												
Approach	Eastbound			Westbound			Northbound			Southbound		
Delay (s/veh)	0.2			0						291.8		
LOS	A			A						F		
Intersection Summary												
Delay (s/veh)	2.1											
LOS	A											

Table 11. Synchro Results Summary, Future No Build Condition, PM Peak – Continued.

19- S.W. 69th Avenue and S.W. 60th Street												
Movement Summary												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Delay (s/veh)	7.6			8.1			7.5			7.6		
LOS	A			A			A			A		
Approach Summary												
Approach	Eastbound			Westbound			Northbound			Southbound		
Delay (s/veh)	7.6			8.1			0			7.6		
LOS	A			A			A			A		
Intersection Summary												
Delay (s/veh)	7.9											
LOS	A											

A summary (intersection level LOS) of existing and future no build scenarios can be seen in **Table 12** below:

Table 12. Synchro Results Summary

Intersection	Existing Condition		Future Condition	
	AM	PM	AM	PM
1- N.W. 69th Avenue and SR 968 / W. Flagler Street	C	C	D	D
2- Robert King High Park and SR 968 / W. Flagler Street	A	A	A	A
3- S.W. 69th Avenue and S.W. 4th Street	C	C	E	F
4- S.W. 70th Avenue and US-41 / SR 90 / S.W. 8th Street	C	C	D	C
5- S.W. 69th Avenue and US-41 / SR 90 / S.W. 8th Street	B	C	F	F
6- S.W. 70th Avenue and S.W. 12th Street	A	A	A	B
7- S.W. 69th Avenue and S.W. 12th Street	A	A	A	A
8- S.W. 70th Avenue and S.W. 16th Street	B	B	B	B
9- Plaza Driveway, SR 972 / S.W. 24th Street	D	D	D	D
10- S.W. 69th Avenue and SR 972 / S.W. 24th Street	A	A	A	A
11- S.W. 70th Avenue and SR 976 / S.W. 40th Street	A	A	D	A
12- S.W. 69th Avenue and SR 976 / S.W. 40th Street	B	A	F	A
13- S.W. 69th Avenue and S.W. 56th Street	B	A	F	A
14- S.W. 69th Court and S.W. 56th Street	A	A	A	A
15- S.W. 69th Avenue and SR 986 / S.W. 72nd Street	A	A	A	A
16- S.W. 70th Avenue and S.W. 80th Street	B	B	C	B
17- S.W. 69th Avenue and S.W. 16th Street	A	A	A	A
18- SR 986 / S.W. 72nd Street and S.W. 70th Avenue	A	A	A	A
19- S.W. 69th Avenue and S.W. 60th Street	A	A	B	A

As can be seen in this table, the microsimulation analysis shows all of 19 intersections are operating under acceptable LOSs during existing condition, while 15 of them will do the same in future no build. The following four intersections will fail (LOS F), or perform with LOS E (at capacity), in the future no build scenario, in at least one of the peak periods:

3- S.W. 69th Avenue and S.W. 4th Street

5- S.W. 69th Avenue and US-41 / SR 90 / S.W. 8th Street

12- S.W. 69th Avenue and SR 976 / S.W. 40th Street

13- S.W. 69th Avenue and S.W. 56th Street

These results are comparable to the *Ludlam Trail Corridor Impact Fee Report (2018)* which concluded that the intersection affected by Ludlam Trail will fail operationally during the PM peak (S.W. 67th Avenue and S.W. 56th Street was analyzed as part of the impact fee report).

Remediation strategies were explored for four intersections which are not performing under acceptable LOSs and below are recommended. The Synchro analysis for each scenario is documented in **Appendix H. Table 13** below shows the remediation strategies and results.

Table 13. Synchro Results Summary, Remediation Strategies

Intersection	Future Condition		Future Condition (Remediation Strategy 1)		Future Condition (Remediation Strategy 2)	
	AM	PM	AM	PM	AM	PM
3- S.W. 69th Avenue and S.W. 4th Street	E	F	B	C	C	F
The analysis of this intersections shows significant eastbound-westbound volume delay due to stop sign is the major issue, consequently: <ul style="list-style-type: none"> Remediation Strategy #1 for this intersection is to convert the existing all-way stop controlled intersection to a roundabout Remediation Strategy #2 for this intersection is to convert the existing all-way stop controlled intersection to a two-way stop controlled intersection 						
5- S.W. 69th Avenue and US-41 / SR 90 / S.W. 8th Street	F	F	A	A		
For the intersection of S.W. 8th Street with S.W. 69th Avenue, the major problem is significant eastbound-westbound volume which does not provide acceptable gap for SBL & NBL movements. Consequently a remediation strategy for this intersection can be proposed to make southbound and northbound approaches right turn only (now, all three movements can be performed).						
12- S.W. 69th Avenue and SR 976 / S.W. 40th Street	F	A	A	A	D	A
The analysis shows EBL volume is very high at this intersection (>200 vehicles in the AM peak). An analysis should be performed to see whether the volumes warrant a traffic signal in the future condition. Two below strategies are recommended: <ul style="list-style-type: none"> Remediation Strategy #1 for this intersection is to close the median to remove EBL and WBL turns and divert them to use next intersections Remediation Strategy #2 for this intersection is to convert the existing two-way stop controlled intersection to a signalized intersection (proposed timing in Appendix H) 						
13- S.W. 69th Avenue and S.W. 56th Street	F	A	A	A		
This intersection also has high eastbound-westbound volume which does not provide gap acceptance for NBL and SBL movements. The logical remediation strategy is to close the median and divert NBL and SBL traffic to use other adjacent intersections						

4.3. Future Build Condition Operational Analysis

This section analyzes different aspects of the future build scenario including Shared Used Path (SUP) Level of Service (LOS), mid-block crossing treatment and queue length analysis from conflicts with the trail alignment. The basis and assumptions to forecast number of pedestrian and bicyclists using Ludlum Trail is as below:

- 1) Strava data (bike and pedestrian activity data provided by FDOT) is used to estimate future Ludlam Trail volume.
- 2) Since Ludlam Trail does not exist now, the first step is to compare the Strava data with some surrogate trail actual volume data to find an adjustment factor to convert Strava data to real field data (section 4.3.1). This step will estimate actual pedestrian and bicycle activity around the Ludlam Trail alignment (0.5 miles vicinity). As explained in Section 4.3.1, analyzing Strava data (year 2016) shows a number of 297 bicyclists and 507 pedestrian are estimated to use the 0.5 mile vicinity (0.25 mile from each side) of the Ludlam Trail alignment.
- 3) Not every pedestrian and bicyclist in 0.5 miles vicinity will use the Trail in future condition. To estimate the percentage of all pedestrian and bicyclists in 0.5 miles vicinity which will use the Ludlam Trail, SERPM model is used (section 4.3.2). SERPM affected TAZs can be found in **Figure 10**. The assumption is that the trips which have origin in any of the zones north of TAZ 3922 and have destination zone south of TAZ 3920, or the reverse pair, will be diverted to use the proposed Ludlam Trail. The basis of this assumption is that for distances less than 1.0 mile, people will still use sidewalks and existing infrastructures and will not divert to use the Trail. Based on the assessment provided in Section 4.3.2, 14.84% of total pedestrian and bicycle activity in the area will use the Ludlam Trail.
- 4) After estimating the existing year Trail traffic, growth factor (section 3.2) is applied to estimate opening year (2020), interim year (2030) and design year (2040) pedestrian and bicycle traffic for Ludlam Trail.
- 5) This volume shows two-way pedestrian and bicycle traffic volume. To estimate directional volumes which will be used for LOS determination, directional distribution of 75% is assumed.

4.3.1. Strava Data and Surrogate Site Analysis

The first step is to forecast Ludlam Trail bicycle and pedestrian volume. To do so, since the trail does not exist, a combination of information from surrogate sites along with Ludlam Trail neighboring bicycle and pedestrian activity is used to estimate trail activity for future years.

Strava data in a quarter mile vicinity of the proposed trail alignment were collected. However, Strava does not represent an actual number of pedestrians and bicyclists. The dataset is

representative of Strava application users, providing general information regarding pedestrian and bicycle users in the area. Therefore, a conversion factor must be applied to the Strava volumes in order to determine the actual number of users. To do so, two surrogate trails were selected and actual pedestrian and bicycle volumes were counted. Then, the collected counts were compared with the Strava numbers and an average convergence factor was estimated.

The surrogate trails considered in this study are the **M-path in Miami-Dade County** and the **Fred Marquis Pinellas Trail in Pinellas County**, both of which present characteristics similar to those expected by Ludlam Trail. The pedestrian and bicycle activity data were collected on 09/18/2018 (via 12-hour video counts) on both trails; the data are provided in **Appendix I**. Additionally, the Ludlam Trail Strava data which were used for this analysis (2016 data) are provided in **Appendix J**. To determine the adjustment factor to be applied to the Strava data, the collected counts were compared with the Strava counts on both segments, as shown in **Table 14**:

Table 14. Strava Data and Field Count Conversion Rate Estimate

Trail	Strava Data			Field Data		Conversion Factor (Field / Strava)
	Year / Type	24 Hour Volume	Average Hourly Volume	Counts (12 Hour)	Average Hourly Count	
M-Path	2016 / Ride (Bicycle)	5,972	248.8	178	14.8	0.0596
	2016 / Run (Pedestrian)	660	27.5	60	5.0	0.1818
Fred Marquis	2016 / Ride (Bicycle)	2,112	88.0	138	11.5	0.1307
	2016 / Run (Pedestrian)	43	1.8	82	6.8	3.8140

$$\text{Ride data average conversion factor} = \frac{0.0596 + 0.1307}{2} = 0.095$$

$$\text{Run data average conversion factor} = \frac{0.1818 + 3.8140}{2} = 1.998$$

Consequently an average adjustment factor of 0.095 can be applied on RIDE (bicycle) Strava data and an adjustment factor of 1.998 is to be applied on RUN (pedestrian) Strava data in order to estimate bicycle and pedestrian activity around Ludlam Trail, respectively. According to the analysis (based on 2016 data) a total of 297 bicyclists and 507 pedestrians are expected every hour within the quarter-mile vicinity of the entire length of the proposed trail alignment. A percentage of these trips are anticipated to be diverted to use the proposed trail. The diversion factor was estimated using the regional travel demand model (SERPM).

4.3.2. Estimating Ludlam Trail traffic

For this purpose, the forecasted 2040 volumes of pedestrian and bicycle users within the affected TAZs (from **Figure 10**) were extracted. It was assumed that the trips which have origin in any of the zones north of TAZ 3922 and have destination zone south of TAZ 3920, or the reverse pair, will be diverted to use the proposed Ludlam Trail. Analysis of the forecasted trips

indicated the total number of pedestrian and bicycle trips in the 2040 model for the TAZs with one half mile of the proposed trail will be 8,248 trips, and the number of trips which will be diverted to use the trail based on the assumptions of this study will be 1,224 trips. Thus, 14.84% of the total forecasted trips for the area are predicted to be diverted to use Ludlam Trail. **Table 16** and **Table 17** show the forecasted 2010 and 2040 Origin – Destination matrices, respectively, of the affected zones (for pedestrian and bicycle modes), and **Appendix K** provides the analysis and tables summarizing the trips between zones which cross the proposed trail alignment. Consequently, it has been estimated that 44 bicycles and 75 pedestrians will use Ludlam Trail each hour.

$$507 \text{ (total pedestrian within Ludlam Trail)} \times 14.84\% \text{ (those diverting to use the Trail)} = 75$$

$$297 \text{ (total bicyclists within Ludlam Trail)} \times 14.84\% \text{ (those diverting to use the Trail)} = 44$$

Since 2016 Strava data were used, the growth factor estimated in **Section 3.2** of this study was applied to 2016 volumes to determine future trail demand. Applying 1.51% CAGR to the estimated 2016 volumes will result in 63 bicycles and 108 pedestrians to be using the trail in 2040.

Table 15 shows the forecasted pedestrian and bicycle traffic volumes on Ludlam Trail for the future analysis years:

Table 15. Build Year Pedestrian and Bicycle Volume of Ludlam Trail (Per Hour)

Mode	Volume per Hour (based on 2016 data)	Growth Factor	Forecasted Hourly Volume (Bi-directional)		
			Opening Year	Interim Year	Design Year
			2020	2030	2040
Pedestrian	75	1.51%	80	93	108
Bicycle	44		47	54	63
Total	119		127	147	171
Directional Volume (assuming 75% directional distribution)	89		95	110	128

Table 16. SERPM 2010 Forecasted Pedestrian and Bicycle Trips between TAZs within a Quarter-Mile Vicinity of Ludlam Trail

TAZ	3913	3914	3915	3916	3917	3918	3919	3920	3921	3922	3928	3929	3930	3931	3932	3933	3934	4022	3700	3701	3703	3704	3706	3707	3708	3709	3711
3913	48	8	8	8	4	16	24	16	16	12	0	4	8	0	4	12	0	76	0	8	8	0	0	0	0	0	0
3914	8	0	4	4	0	0	0	0	4	0	0	0	4	8	0	0	0	12	0	0	0	0	4	0	0	0	0
3915	8	8	8	0	4	4	0	8	4	12	0	0	0	4	4	0	0	4	0	0	4	0	0	0	0	0	0
3916	16	0	0	12	4	8	4	16	12	0	0	0	4	4	0	4	0	4	0	4	4	0	0	0	0	4	0
3917	4	0	0	0	12	16	16	12	12	8	0	4	12	4	4	4	0	4	0	4	0	0	4	0	0	0	0
3918	12	4	8	4	20	16	8	12	16	4	4	8	12	12	4	20	0	0	0	0	4	0	0	0	0	4	0
3919	20	0	0	8	12	8	104	36	112	16	20	4	40	24	12	44	24	24	0	16	20	0	0	0	0	4	0
3920	8	4	8	8	16	20	24	32	32	32	8	20	28	8	24	44	12	8	0	4	28	4	4	8	0	4	0
3921	8	4	4	0	36	8	80	40	124	40	36	16	68	36	32	44	20	12	0	8	16	32	4	8	0	16	4
3922	8	0	8	4	16	4	16	8	48	36	16	4	16	12	4	24	12	4	0	4	12	0	4	0	0	8	0
3928	0	0	0	0	0	4	12	8	32	16	56	28	100	32	16	12	4	8	0	24	32	44	16	4	12	0	0
3929	4	0	0	4	4	8	8	16	20	16	20	68	72	12	12	0	4	4	4	16	80	28	4	16	0	8	0
3930	8	0	4	0	8	16	52	44	64	16	84	64	296	104	36	48	8	12	0	28	64	32	16	4	4	12	4
3931	4	4	4	4	8	0	32	20	20	12	12	28	116	76	24	40	4	8	0	28	28	12	12	0	0	4	0
3932	4	0	4	8	4	4	12	16	28	12	20	8	44	20	28	16	8	0	4	4	16	0	4	0	0	4	4
3933	8	0	0	0	0	16	40	44	40	28	24	0	56	40	20	48	12	24	4	0	8	8	0	0	0	0	8
3934	0	0	0	4	4	0	16	20	20	8	4	0	8	4	4	12	0	8	0	0	4	0	0	0	0	8	0
4022	68	12	4	4	4	4	12	0	16	8	0	0	16	4	4	4	0	32	0	4	8	4	0	4	0	0	0
3700	0	0	0	0	0	0	0	0	4	0	0	0	4	0	0	4	0	0	0	0	0	0	4	0	0	0	0
3701	8	0	0	4	4	0	20	8	12	4	28	16	36	8	4	12	0	12	4	52	60	28	4	0	4	12	24
3703	4	0	0	8	0	8	20	36	28	8	52	88	56	24	16	8	4	8	0	68	148	28	24	16	8	12	20
3704	0	0	0	0	0	4	4	4	32	4	28	32	28	24	4	4	0	0	0	16	36	48	8	0	0	16	8
3706	4	0	0	0	0	0	4	4	4	4	8	12	8	0	0	0	0	0	0	8	16	4	8	12	4	12	0
3707	0	0	0	0	0	0	0	0	0	0	8	4	8	0	0	4	0	0	0	4	4	16	0	4	0	4	8
3708	0	0	0	0	0	0	4	8	12	4	8	8	20	16	0	0	4	0	0	8	20	12	8	20	8	8	16
3709	0	0	0	0	0	4	0	0	4	0	4	0	12	8	0	8	0	0	8	16	36	4	8	8	4	12	12
3711	0	0	0	0	0	0	4	4	0	4	4	4	16	4	0	4	0	0	0	4	12	8	4	4	8	12	4

Total Trips = 8,220

Table 17. SERPM 2040 Forecasted Pedestrian and Bicycle Trips between TAZs within a Quarter-Mile Vicinity of Ludlam Trail

TAZ	3913	3914	3915	3916	3917	3918	3919	3920	3921	3922	3928	3929	3930	3931	3932	3933	3934	4022	3700	3701	3703	3704	3706	3707	3708	3709	3711
3913	104	4	0	4	8	4	20	12	80	8	0	4	12	8	16	8	0	72	0	4	16	4	4	0	0	4	4
3914	16	0	0	4	4	4	0	4	4	0	0	0	4	4	4	0	0	8	0	0	4	0	0	0	0	0	0
3915	4	0	0	0	4	4	16	0	0	0	0	0	0	0	4	4	0	12	0	0	4	0	0	0	0	0	0
3916	12	4	0	12	0	4	12	12	20	4	0	8	4	8	0	4	0	8	0	0	0	0	0	0	0	4	0
3917	4	4	4	0	4	4	8	40	40	8	0	0	4	4	8	0	0	12	0	0	0	0	0	0	0	4	0
3918	12	0	4	4	0	24	12	12	16	0	4	4	8	4	4	8	0	0	0	0	4	0	0	0	0	0	0
3919	20	0	8	12	12	0	68	24	112	16	16	12	52	32	4	36	4	12	0	0	12	12	4	0	4	4	4
3920	12	0	0	8	16	20	40	172	68	20	8	12	64	40	24	16	28	8	0	16	24	16	8	8	16	4	0
3921	72	4	0	8	40	20	88	52	168	20	16	12	76	56	4	48	4	24	0	12	36	8	0	4	4	4	4
3922	8	0	0	0	12	0	20	24	24	24	8	0	20	8	4	16	0	8	0	4	12	8	4	4	0	0	0
3928	4	0	0	0	4	4	8	24	8	0	124	20	104	40	12	16	0	0	0	12	44	32	4	8	8	8	0
3929	0	0	0	4	0	12	12	8	16	8	36	88	64	32	0	12	0	0	0	24	72	24	4	0	12	0	4
3930	8	12	8	20	4	4	36	68	72	16	96	76	288	96	48	72	8	12	4	16	44	32	16	4	0	8	8
3931	28	4	0	16	20	4	32	28	24	16	20	28	132	88	16	56	4	4	4	8	20	12	4	4	8	8	4
3932	4	8	0	0	0	8	8	16	8	0	0	4	44	28	16	12	12	12	0	4	28	0	0	0	0	0	0
3933	8	0	4	4	0	12	24	8	48	12	12	0	68	52	12	52	8	0	4	20	12	16	8	4	4	0	4
3934	0	0	0	0	0	0	0	40	0	4	0	0	4	8	4	0	8	0	0	0	0	8	0	0	0	0	8
4022	28	4	12	8	8	4	12	32	8	4	0	0	12	0	4	8	0	28	0	0	0	0	0	0	0	0	0
3700	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3701	4	0	0	0	4	0	12	16	8	0	40	20	20	16	4	16	0	0	0	44	32	12	8	0	12	12	8
3703	4	0	0	4	4	4	20	44	24	12	48	88	32	20	20	12	4	0	0	32	172	36	12	4	16	16	8
3704	0	0	0	0	0	0	8	12	12	4	28	44	32	8	4	8	8	4	4	20	20	84	12	4	24	8	0
3706	4	0	0	0	0	0	0	12	4	0	4	8	12	4	0	4	0	0	0	4	8	8	20	4	12	0	0
3707	4	0	0	0	0	0	0	8	4	4	8	0	8	8	0	4	0	0	0	0	4	4	0	0	4	0	0
3708	0	0	0	0	0	0	0	0	8	0	8	20	12	8	0	4	0	0	0	8	16	28	12	4	16	8	8
3709	4	0	0	4	4	0	4	8	4	4	4	0	20	0	0	0	0	0	4	4	24	16	0	0	12	0	0
3711	0	0	0	0	0	0	0	0	0	0	0	4	0	8	0	0	4	4	0	0	16	4	0	0	12	4	12

Total Trips = 8,248

4.3.3. Shared Use Path Level of Service

The forecasted pedestrian and bicycle activity on Ludlam Trail was used to estimate the LOS. FHWA developed a formula and spreadsheets to estimate the LOS of SUPs (Shared Use Paths) as below:

$$\text{SUPLOS} = 5.446 - 0.00809e - 15.68(\text{RW}) - 0.287(\text{CL}) - (\text{DPF})$$

Where:

e = Events = Meetings per minute + 10 (active passes per minute)

RW = Reciprocal of path width (i.e., 1/path width, in feet)

CL = 1 if trail has a centerline, 0 if trail has no centerline

DPF = Delayed pass factor

FHWA produced a spreadsheet to compute the LOS of a SUP. Based on the data provided in **Table 15** with an assumed 75% directional distribution for forecasted volumes and inputting the mode split based on the collected Strava data, Ludlam Trail is estimated to operate at LOS B for Opening Year 2020, Interim Year 2030, and LOS C at Design Year 2040, as shown in **Figure 14**.

4.3.1. Midblock Crossing Analysis

Miami-Dade County Midblock Treatment Spreadsheets

Another important topic for future year analysis is how the crossings of Ludlam Trail by east-west road corridors will be treated. For this analysis, Miami-Dade County mid-block crossing treatment spreadsheets were applied to each intersection. **Table 18** lists the 15 locations at which traffic volumes were collected. Raw data are provided in **Appendix A** as mentioned previously. Raw data were multiplied by a seasonal factor (**Appendix F**) and growth factor for vehicular vehicles (**Section 3.1**) to form future build volumes. Detailed analyses of each crossing are provided in **Appendix L**.

Shared Use Path Flow Analysis Tool

Trail Level of Service (LOS) Calculator

Draft Spreadsheet Based on Federal Highway Administration Shared Use Path Study
North Carolina State University and Toole Design Group

Trail LOS Scale	
LOS Score	LOS Grade
≥ 4.0	A
$3.5 \leq < 4.0$	B
$3.0 \leq < 3.5$	C
$2.5 \leq < 3.0$	D
$2.0 \leq < 2.5$	E
< 2.0	F

Segment Name	Path Width	Centerline	Volume (users per hour in 1 direction) and Mode Split							User Perception		Delayed Passings Adjustment				Pre-Trail LOS Score	Trail Level of Service	
	Closest 0.5 ft.	0-1/4 Centerline	Volume	Mode Split (%)*								Adj. Factor (subtract from User Percep. score)						
Name	Width (ft)	1/4 Centerline	One-Way (per hour)	Adult Bicyclists	Pedestrians	Runners	In-Line Skaters	Child Bicyclists	All Modes	Score	Grade	Percent	# Per Hr	Pre Adj Fac	Fin Adj Fac	Post-Trail LOS Score	LOS Score	LOS Grade
Ludlam Trail (2020)	18.0	1	95	27.0%	48.0%	10.0%	10.0%	5.0%	100.0%	4.00	A	28.67%	41.19	0.34	0.34	3.66	3.66	B

*Default mode split is 55% adult bicyclists, 20% pedestrians, 10% runners, 10% in-line skaters, and 5% child bicyclists.

[Click Here for Default Mode Split](#)

ROW #2

Segment Name	Path Width	Centerline	Volume (users per hour in 1 direction) and Mode Split							User Perception		Delayed Passings Adjustment				Pre-Trail LOS Score	Trail Level of Service	
	Closest 0.5 ft.	0-1/4 Centerline	Volume	Mode Split (%)*								Adj. Factor (subtract from User Percep. score)						
Name	Width (ft)	1/4 Centerline	One-Way (per hour)	Adult Bicyclists	Pedestrians	Runners	In-Line Skaters	Child Bicyclists	All Modes	Score	Grade	Percent	# Per Hr	Pre Adj Fac	Fin Adj Fac	Post-Trail LOS Score	LOS Score	LOS Grade
Ludlam Trail (2030)	18.0	1	110	27.0%	48.0%	10.0%	10.0%	5.0%	100.0%	3.96	B	32.14%	53.48	0.45	0.45	3.51	3.51	B

*Default mode split is 55% adult bicyclists, 20% pedestrians, 10% runners, 10% in-line skaters, and 5% child bicyclists.

[Click Here for Default Mode Split](#)

ROW #3

Segment Name	Path Width	Centerline	Volume (users per hour in 1 direction) and Mode Split							User Perception		Delayed Passings Adjustment				Pre-Trail LOS Score	Trail Level of Service	
	Closest 0.5 ft.	0-1/4 Centerline	Volume	Mode Split (%)*								Adj. Factor (subtract from User Percep. score)						
Name	Width (ft)	1/4 Centerline	One-Way (per hour)	Adult Bicyclists	Pedestrians	Runners	In-Line Skaters	Child Bicyclists	All Modes	Score	Grade	Percent	# Per Hr	Pre Adj Fac	Fin Adj Fac	Post-Trail LOS Score	LOS Score	LOS Grade
Ludlam Trail (2040)	18.0	1	128	27.0%	48.0%	10.0%	10.0%	5.0%	100.0%	3.90	B	36.02%	69.74	0.58	0.58	3.32	3.32	C

*Default mode split is 55% adult bicyclists, 20% pedestrians, 10% runners, 10% in-line skaters, and 5% child bicyclists.

[Click Here for Default Mode Split](#)

MODEL ASSUMPTIONS

Trail volume represents the actual number of users counted in the field (the model adjusts this volume based on a peak hour factor of 0.85).
Bicyclists will pass all trail users that are traveling less than 12.8 miles per hour (average bicyclist speed)

Figure 14. FHWA SUP LOS Calculator Input and Output

Table 18. Required Treatments for Design Year Forecasted Vehicle Volumes at Crossings

Crossing	Roadway ID	Speed (MPH)	Design Year Volume (vph)		Required Treatment (For Peak Period)
			AM Peak	PM Peak	
1- SR 968 / W. Flagler Street; west of N.W. 69 th Avenue	87053000	40	4,061	4,432	Signal
2- S.W. 4 th Street; west of S.W. 69 th Avenue	NA	30	834	1,171	Active / Enhanced
3- US-41 / SR 90 / S.W. 8 th Street; between S.W. 69 th Avenue and S.W. 70 th Avenue	87120000	35	3,988	4,023	Signal
4- S.W. 12 th Street; between S.W. 69 th Avenue and S.W. 70 th Avenue	NA	30	353	550	Crosswalk
5- S.W. 16 th Street; between S.W. 69 th Avenue and S.W. 70 th Avenue	87000562	30	887	988	Crosswalk
6- S.W. 21 st Street; east of S.W. 70 th Avenue	NA	30	317	379	Crosswalk
7- S.W. 22 nd Street; west of S.W. 69 th Avenue	NA	30	311	385	Crosswalk
8- SR 972 / S.W. 24 th Street; west of S.W. 69 th Avenue	87054503	30	3,926	3,850	Signal
9- N. Waterway Drive; west of S.W. 69 th Avenue	NA	30	1,016	1,331	Consider Traffic Signal
10- SR 976 / S.W. 40 th Street; between S.W. 69 th Avenue and S.W. 70 th Avenue	87044000	40	6,092	5,761	Signal
11- S.W. 56 th Street; between S.W. 69 th Avenue and S.W. 69 th Court	87045500	40	3,119	3,116	Signal
12- S.W. 60 th Street; between S.W. 69 th Avenue and S.W. 69 th Court	NA	30	246	271	Crosswalk
13- S.W. 64 th Street; west of S.W. 69 th Avenue	87000104	30	1,013	963	Active / Enhanced
14- SR 986 / S.W. 72 nd Street; between S.W. 70 th Avenue and S.W. 69 th Court	87055000	40	3,485	3,550	Signal
15- S.W. 80 th Street; west of S.W. 70 th Avenue	87000103	30	1,064	1,246	Active / Enhanced

FDOT Traffic Engineering Manual

The criteria in the FDOT Traffic Engineering Manual (TEM) were reviewed to determine the appropriateness of marked pedestrian crosswalks at midblock locations. **Table 11** shows the summary of recommended midblock crossing treatments based on the TEM.

- Based on section 3.8.5.3.(b), sufficient demand should exist that meets or exceed the thresholds for an average weekday period. Data collection should be based upon pedestrian volumes observed crossing the roadway outside a crosswalk at or in the vicinity of the proposed location, or at an adjacent (nearby) intersection. The following minimum thresholds should be met when considering a new marked crosswalk at an uncontrolled approach:
 - 20 or more pedestrians during a single hour (any four consecutive 15-minute periods) of an average day, or
 - 18 or more pedestrians during each of any two hours of an average day, or
 - 15 or more pedestrians during each of any three hours of an average day

Based on **Table 15**, it is expected that 171 pedestrian and bicycle crosses each street in the peak hour which is more than 20 (per hour), 38 (per 2 hours) and 45 (per three hours) for a regular average day, as the minimum threshold for providing a marked crosswalk.

- From **Table 15**, 171 pedestrian and bicycle users were calculated to use the trail during the design year peak hour (2040). Based on the TEM, Section 3.8.5.3.(c), since there will be more than 10 pedestrians, the minimum level of pedestrian demand threshold will be met.
- A minimum of 2,000 Average Daily Traffic (ADT) along the roadway segment (TEM Section 3.8.5.4.(a)); this threshold will be met for all the intersecting roadways except S.W. 60th Street, between S.W. 69th Avenue and S.W. 69th Court.
- Minimum distance to nearest alternative crossing location is 300 feet per the FDOT's Plan Preparation Manual, Vol 1, Section 8.3.3.2. Also the proposed location for a crosswalk should be outside the influence area of the adjacent intersections. The design must ensure that the ends of standing queues from intersections do not extend to the proposed marked crosswalk location. These three criteria were checked for each proposed crosswalk, separately.
- At uncontrolled approach locations with vehicular volumes greater than 12,000 ADT or where crossing distances exceed 60 feet, a refuge island or raised median should be considered. This condition was explored separately for each proposed crosswalk.
- For locations where signal warrants are met, consideration may be given to providing a pedestrian bridge or tunnel in lieu of an at-grade marked crossing. This approach may be appropriate at trail crossings where high volumes of recreational pedestrians and cyclists conflict with high speed vehicular volumes, as grade separation would significantly decrease delay and conflict points for all users.

The TEM midblock crossing treatment guide is provided in **Figure 15**, to analyze the required treatment for each of the crossings. These charts already include the Manual of Uniform Traffic Control Devices (MUTCD) criteria for signal warrants based on pedestrian volume (171 pedestrians are assumed at each crossing based on **Table 15** for the design year 2040) and as well as TEM guidance for any other treatments such as PHB (Pedestrian Hybrid Beacon) or RRFB (Rectangular Rapid Flashing Beacon).

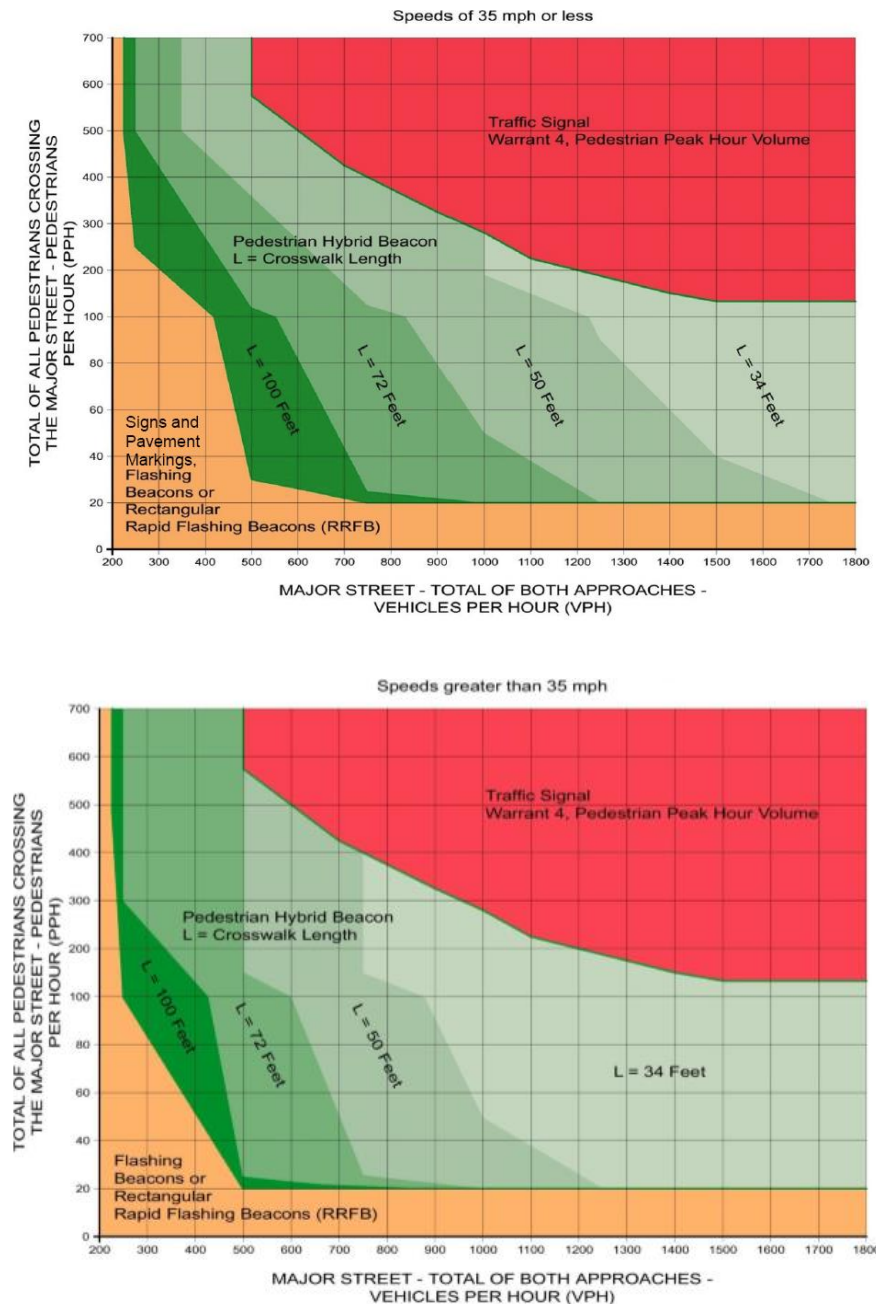


Figure 15. TEM Midblock Crossing Treatment Guide

Table 19. Midblock Crossing Treatment Based on FDOT TEM

Crossing	Roadway ID	Speed (MPH)	Existing Year AADT (vpd)	Design Year Volume (vph)		Distance to Nearest Alternative Crossing (feet)	Crossing Distance (feet)	TEM Required Treatment (For Peak Period)
				AM Peak	PM Peak			
1- SR 968 / W. Flagler Street; west of N.W. 69 th Avenue	87053000	40	47,716	4,061	4,432	130	55	Traffic Signal
2- S.W. 4 th Street; west of S.W. 69 th Avenue	NA	30	7,432	834	1,171	170	25	PHB
3- US-41 / SR 90 / S.W. 8 th Street; between S.W. 69 th Avenue and S.W. 70 th Avenue	87120000	35	50,491	3,988	4,023	130	55	Traffic Signal
4- S.W. 12 th Street; between S.W. 69 th Avenue and S.W. 70 th Avenue	NA	30	3,140	353	550	1,200	25	PHB
5- S.W. 16 th Street; between S.W. 69 th Avenue and S.W. 70 th Avenue	87000562	30	7,236	887	988	150	22	PHB
6- S.W. 21 st Street; east of S.W. 70 th Avenue	NA	30	2,385	317	379	30	24	PHB

Table 19. Midblock Crossing Treatment Based on FDOT TEM - Continued

Crossing	Roadway ID	Speed (MPH)	Existing Year AADT (vpd)	Design Year Volume (vph)		Distance to Nearest Alternative Crossing (feet)	Crossing Distance (feet)	TEM Required Treatment (For Peak Period)
				AM Peak	PM Peak			
7- S.W. 22 nd Street; west of S.W. 69 th Avenue	NA	30	3,004	311	385	1,300	20	PHB
8- SR 972 / S.W. 24 th Street; west of S.W. 69 th Avenue	87054503	30	46,969	3,926	3,850	680	78	Traffic Signal
9- N. Waterway Drive; west of S.W. 69 th Avenue	NA	30	7,052	1,016	1,331	1,900	18	Traffic Signal
10- SR 976 / S.W. 40 th Street; between S.W. 69 th Avenue and S.W. 70 th Avenue	87044000	40	67,282	6,092	5,761	1,100	88	Traffic Signal
11- S.W. 56 th Street; between S.W. 69 th Avenue and S.W. 69 th Court	87045500	40	31,382	3,119	3,116	350	60	Traffic Signal
12- S.W. 60 th Street; between S.W. 69 th Avenue and S.W. 69 th Court	NA	30	1,151	246	271	1100	22	Sign and Pavement Marking or RRFB

Table 19. Midblock Crossing Treatment Based on FDOT TEM - Continued

Crossing	Roadway ID	Speed (MPH)	Existing Year AADT (vpd)	Design Year Volume (vph)		Distance to Nearest Alternative Crossing (feet)	Crossing Distance (feet)	TEM Required Treatment (For Peak Period)
				AM Peak	PM Peak			
13- S.W. 64 th Street; west of S.W. 69 th Avenue	87000104	30	6,329	1,013	963	1000	24	PHB
14- SR 986 / S.W. 72 nd Street; between S.W. 70 th Avenue and S.W. 69 th Court	87055000	40	34,138	3,485	3,550	950	70	Traffic Signal
15- S.W. 80 th Street; west of S.W. 70 th Avenue	87000103	30	9,619	1,064	1,246	900	36	PHB

4.3.2. Crossing Queue Length Analysis

This section uses future forecasted traffic volume simulation results (from SimTraffic) to estimate the 95th percentile queue length in the east-west direction to determine whether queue lengths at any of the 19 adjacent roadway signals will extend into the trail alignment crossing or not. Detailed SimTraffic results are presented in **Appendix H** of this report and a summary is provided in **Table 20**. The approaches at which the vehicle queue length may extend from the intersection stop bar and cross the proposed trail alignment are highlighted in the table.

Table 20. SimTraffic Summary of 95th Percentile Queue Length Analysis

Intersection	Peak Period	Eastbound		Westbound	
		Queue Length (ft)	Storage (ft)	Queue Length (ft)	Storage (ft)
1- N.W. 69 th Avenue and SR 968 / W. Flagler Street	AM PM	268 236	125		
2- Robert King High Park and SR 968 / W. Flagler Street	AM PM			0 17	50
3- S.W. 69 th Avenue and S.W. 4 th Street	AM PM	222 150	145		
4- S.W. 70 th Avenue and US-41 / SR 90 / S.W. 8 th Street	AM PM			71 362	115
5- S.W. 69 th Avenue and US-41 / SR 90 / S.W. 8 th Street	AM PM	105 101	145		
6- S.W. 70 th Avenue and S.W. 12 th Street	AM PM	65 77	140		
7- S.W. 69 th Avenue and S.W. 12 th Street	AM PM			0 53	125
8- S.W. 70 th Avenue and S.W. 16 th Street	AM PM			73 220	120
9- Plaza Driveway, SR 972 / S.W. 24 th Street	AM PM			478 432	390
10- S.W. 69 th Avenue and SR 972 / S.W. 24 th Street	AM PM	375 486	115		
11- S.W. 70 th Avenue and SR 976 / S.W. 40 th Street	AM PM			149 23	120
12- S.W. 69 th Avenue and SR 976 / S.W. 40 th Street	AM PM	640 75	170		
13- S.W. 69 th Avenue and S.W. 56 th Street	AM PM	0 27	120		
14- S.W. 69 th Court and S.W. 56 th Street	AM PM			52 41	120
15- S.W. 69 th Avenue and SR 986 / S.W. 72 nd Street	AM PM	35 59	320		
16- S.W. 70 th Avenue and S.W. 80 th Street	AM PM	288 209	10		
17- S.W. 69 th Avenue and S.W. 16 th Street	AM PM	0 27	125		
18- SR 986 / S.W. 72 nd Street and S.W. 70 th Avenue	AM PM			0 0	140
19- S.W. 69 th Avenue and S.W. 60 th Street	AM PM	149 44	150		

Using the recommendations of MDC and TEM (**Table 18** and **Table 19**) and considering the queue length analysis (**Table 20**), the final 15 recommended Ludlam Trail crossing treatments are summarized in **Table 21**:

Table 21. Crossing Treatment Recommendations

Crossing	Recommendation (Based on road type and previous analysis in Table 18 and Table 19)	Less than 300 feet to nearest alternative crossing location	Less than 660 feet between two intersections	Will queue from next intersection extend to crosswalk	Final Proposed Treatment
1-SR 968 / W. Flagler Street; west of N.W. 69 th Avenue	Traffic Signal	Y	N	Y	GRADE SEPARATED
2-S.W. 4 th Street; west of S.W. 69 th Avenue	RRFB	N	N	Y	RRFB
3- US-41 /SR 90 / S.W. 8 th Street; between S.W. 69 th Avenue and S.W. 70 th Avenue	Traffic Signal	Y	Y	Y	GRADE SEPARATED
4- S.W. 12 th Street; between S.W. 69 th Avenue and S.W. 70 th Avenue	Crosswalk	N	N	N	CROSSWALK
5- S.W. 16 th Street; between S.W. 69 th Avenue and S.W. 70 th Avenue	PHB	Y	N	Y	PHB OR DIVERT TO SW 70 TH AVENUE
6- S.W. 21 st Street; east of S.W. 70 th Avenue	Crosswalk	Y	N	N	CROSSWALK OR DIVERT TO SW 70 TH AVENUE
7- S.W. 22 nd Street; west of S.W. 69 th Avenue	Crosswalk	N	N	N	CROSSWALK
8- SR 972 / S.W. 24 th Street; west of S.W. 69 th Avenue	Traffic Signal	N	N	Y	GRADE SEPARATED

Table 21. Crossing Treatment Recommendations - Continued

Crossing	Recommendation (Based on road type and previous analysis in Table 10 and Table 11)	Less than 300 feet to nearest alternative crossing location	Less than 660 feet between two intersections	Will queue from next intersection extend to crosswalk	Final Proposed Treatment
9- N. Waterway Drive; west of S.W. 69 th Avenue	Traffic Signal	N	N	N	PHB
10- SR 976 / S.W. 40 th Street; between S.W. 69 th Avenue and S.W. 70 th Avenue	Traffic Signal	N	N	Y	GRADE SEPARATED
11- S.W. 56 th Street; between S.W. 69 th Avenue and S.W. 69 th Court	Traffic Signal	N	N	N	PHB
12- S.W. 60 th Street; between S.W. 69 th Avenue and S.W. 69 th Court	Crosswalk	N	N	N	CROSSWALK
13- S.W. 64 th Street; west of S.W. 69 th Avenue	PHB	N	N	N	PHB
14- SR 986 / S.W. 72 nd Street; between S.W. 70 th Avenue and S.W. 69 th Court	Traffic Signal	N	N	N	PHB
15- S.W. 80 th Street; west of S.W. 70 th Avenue	PHB	Y	N	Y	PHB OR DIVERT TO SW 70 TH AVENUE

As noted in **Table 21**, there are four locations where a grade separated crossing is recommended. This is consistent with the recommendations presented in the *Ludlam Trail Corridor Impact Fee Study* (Cathy Sweetapple & Associates, 2018).

5. Safety Analysis

Crash data were obtained from the FDOT CARS and Signal 4 Analytics databases for the most recent five years available (January 2012 to December 2016). A safety analysis was performed for the study intersections/crossings and segments at which the proposed trail will intersect roadways.

Based on the crash data, a total of 3,810 crashes were documented in the half-mile vicinity of the study corridor within the five-year period. Of those reported; 489 (12.8%) were injury type crashes, 3,316 (87.0%) were property damage only crashes and five (5) were fatal crashes. A total of 817 (21.4%) occurred in dark/dusk/dawn conditions and a total of 465 (6.2%) occurred under wet/slippery pavement conditions. A total of 27 (0.7%) pedestrian crashes and 24 (0.6%) bicycle crash were reported in the vicinity of the Ludlam Trail Corridor. One of the reported pedestrian crashes resulted in a fatality. The predominant crash types reported in the vicinity of the corridor were rear-end (40.1%) followed by angle (14.7%).

The top five intersections with the highest concentration of crashes are as follows:

1. NW 74 Street and NW 72 Avenue (157 crashes)
2. Coral Way/SW 24 Street and SW 72 Avenue (136 crashes)
3. SR 968/Flagler Street and SW 67 Avenue (102 crashes)
4. SR 90/SW 8 Street and SW 67 Avenue (101 crashes)
5. SW 56 Street and SW 72 Avenue (61 crashes)

Pedestrian and bicycle crashes were spread throughout the length of the study corridor. However, several pedestrian and bicycle crashes were concentrated along the following roads:

1. SR 90/SW 8 Street from SW 72 Avenue to SW 67 Avenue (Section 87120000 from MP 10.573 to MP 11.069): 11 pedestrian/bicycle crashes
2. SR 976/ SW 40 Street/Bird Road from SW 72 Avenue to east of SW 69 Avenue (Section 87044000 from MP 4.696 to MP 4.994): 9 pedestrian/bicycle crashes
3. SR 968/Flagler Street from Tamiami Canal Road to SW 67 Avenue (Section : 87053000 from MP 1.555 to MP 2.003): 9 pedestrian/bicycle crashes.

The complete safety analysis along with crash and data collection summaries is provided in **Appendix M**. Table 22 shows the summary of five reported fatal crashes followed by a brief explanation of these crashes.

Table 22. Fatal Crashes Summary (2012 to 2016)

CRASH NUMBER	SR	MILE POST	DATE	DAY	TIME	CRASH TYPE	FATAL	DAY/NIGHT	WET/DRY	CONTRIBUTING CAUSE (VEHICLE ONLY)
835540590	SR 986	5.549	11/28/12	Wed	1604	Angle	1	Day	Dry	Ran Red Light
834176190	SR 90	11.069	06/24/12	Sun	1030	Pedestrian	1	Day	Wet	Driver Distraction
823296880	SR 968	2.003	07/07/13	Sun	1014	Left-turn	1	Day	Dry	Failed to Yield Right-of-Way
860676100	SR 968	2.003	05/27/15	Wed	1243	Pedestrian	1	Day	Dry	Disregarded Other Traffic Sign
865219040	NW 7 St.	E. of LTC	06/08/16	Thu	1045	Tree (Standing)	1	Day	Wet	Not Coded

Fatal Crash # 835540590: This fatal crash occurred in 2012 at the intersection of SW 72 Street and SW 72 Avenue. This crash was classified as angle collision and was caused by a vehicle traveling southbound on SW 72 Avenue that ran the red light.

Fatal Crash # 834176190: This fatal crash occurred in 2012 at the intersection of SW 8 Street and SW 67 Avenue. This crash involved two pedestrians that were standing on the northwest corner of the intersection and were hit by a vehicle driving in the westbound direction. This crash was caused by a distracted driver.

Fatal Crash # 823296880: This fatal crash occurred in 2013 at the intersection of Flagler Street and SW 67 Avenue. This crash was classified as a left-turn collision involving a motorcycle. The crash was caused by a westbound left-turning vehicle that failed to yield the right of way.

Fatal Crash # 860676100: This fatal crash occurred in 2015 at the intersection of Flagler Street and NW 67 Avenue. This crash involved a pedestrian that was walking eastbound on the north side of Flagler Street to cross NW 67 Avenue when was hit by a vehicle that did not yield the right of way while making a right-turn in the southbound direction.

Fatal Crash # 865219040: This fatal crash occurred in 2016 and occurred at the intersection of NW 7 Street and NW 67 Avenue. The driver lost control of the vehicle, ran off the road and collided with a tree. Driving under the influence of drugs or alcohol is not the contributing cause of the crash.

6. Conclusion

This study explored the traffic impacts of converting the existing abandoned rail corridor to a shared use path known as Ludlam Trail. The proposed alignment is located between N.W. 7th Street and S.W. 80th Street, parallel to previous Florida East Coast Railway (FECR) corridor (approximately S.W./N.W. 67th Avenue).

- The review of existing data using microsimulation software (Synchro) indicated that most of the intersections in the study zone are performing with acceptable LOS D or better, with one exception (S.W. 70th Avenue with SR 976 / S.W. 40th Street). In the future no build scenario (after applying traffic growth factors), the following five intersections will either perform at capacity (LOS E) or will fail operationally (LOS F):
 - ✓ S.W. 69th Avenue and S.W. 4th Street
 - ✓ S.W. 70th Avenue and SR 976 / S.W. 40th Street
 - ✓ S.W. 69th Avenue and SR 976 / S.W. 40th Street
 - ✓ S.W. 69th Avenue and S.W. 56th Street
 - ✓ S.W. 70th Avenue and S.W. 80th Street
- Using regional travel demand model (SERPM) and Strava pedestrian and bicycle activity data, and surrogate trails data collection (M-Path and Fred Marquis), it was calculated that 127 pedestrian and 64 bicyclists will use the trail during the peak hour in design year 2040.
- The FHWA method to estimate Shared Use Path Level of Service was applied into the forecasted pedestrian and bicycle volumes. It was estimated Ludlam Trail will perform at LOS B from opening year of 2020 through LOS C at design year of 2040.
- The FDOT Traffic Engineering Manual and MDC spreadsheets for midblock crossings were used to identify proposed treatments at road/trail crossings. It is recommended that Ludlam Trail be provided with grade separated (bridge / tunnel) crossings at the following four intersections:
 - ✓ SR 968 / W. Flagler Street
 - ✓ US-41 / SR 90 / S.W. 8th Street
 - ✓ SR 972 / S.W. 24th Street
 - ✓ SR 976 / S.W. 40th Street
- Any type of assembly recommended in this report, either RRFB or PHB or Signal should be coordinated and approved by Miami-Dade County Signal Division.

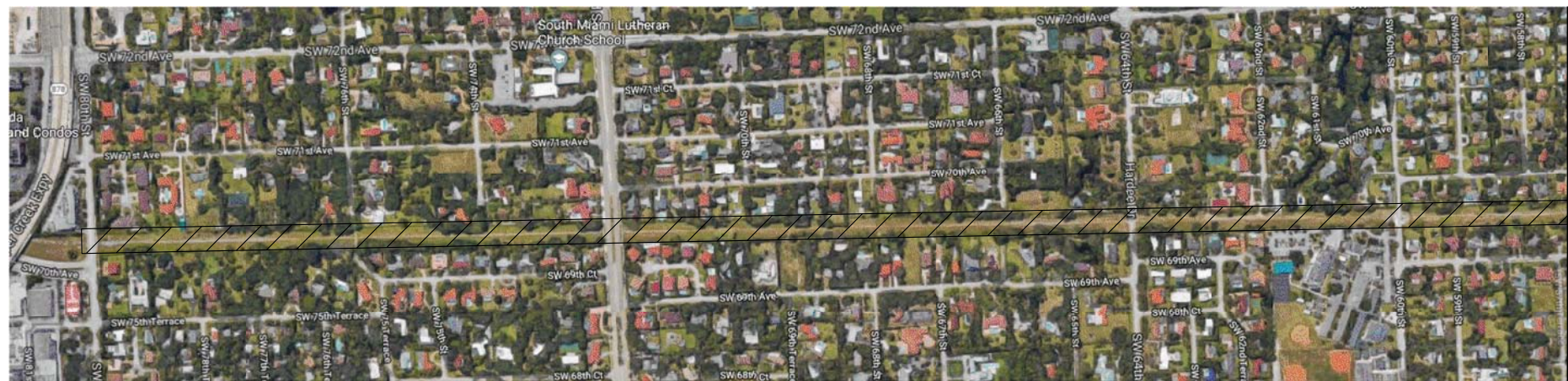
Appendix A -Data and Survey



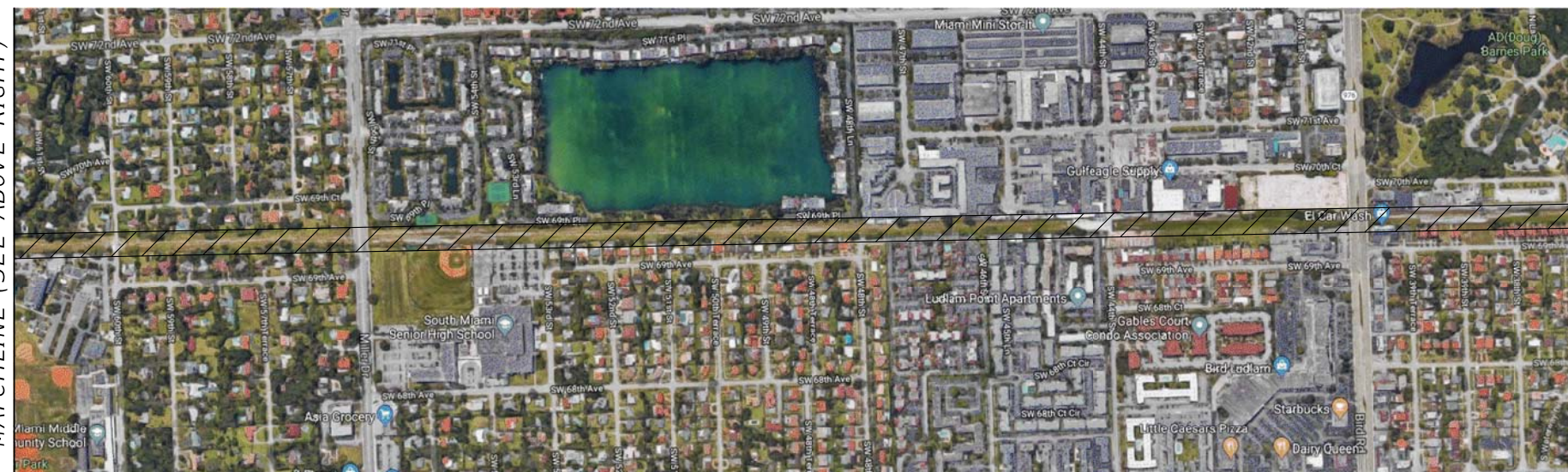
Survey



TOPOGRAPHIC SURVEY



MATCHLINE (SEE BELOW LEFT)



MATCHLINE (SEE ABOVE RIGHT)

MATCHLINE (SEE SHEET C-2)

LOCATION SKETCH
N.T.S.

INDEX:

- C-1 COVER SHEET
C-2 COVER SHEET
1-26 TOPOGRAPHIC SURVEY

LEGEND

- | | | | | | |
|----|------------------------|---|-------------------------|-----|---|
| HA | DELINEATOR POST | o | GUY WIRE | — | SECTION LINE |
| HA | WATER VALVE | o | TELEPHONE BOX | --- | PROPOSED RIGHT OF WAY LINE |
| HA | COLUMNS | o | HOLE | -x- | CHAIN LINK FENCE |
| HA | TRANSFORMER | * | TREE | — | RIGHT OF WAY LINE |
| HA | MONUMENT | * | POLE TELEPHONE | | |
| HA | SANITARY MISCELLANEOUS | o | DRAIN MISCELLANEOUS | | SET MAIL & DISC 7360
(SET N & D 7360) |
| HA | PULL BOX | o | LUMINARY | | |
| HA | RAILROAD SWITCH | o | WATER VALVE COVER | | SET 1/2" IRON PIPE 7360
(SET 1/2" I.P. 7360) |
| HA | RAILROAD UTILITIES | o | SIGN | | |
| HA | FIRE HYDRANT | o | SANITARY MANHOLE | ● | FOUND 1/2" IRON PIPE
(FD 1/2" I.R.) |
| HA | MONITORING WELL | o | MANHOLE COVER (UNKNOWN) | | |
| HA | SANITARY STORM | o | DRAIN INLET | | FOUND 1/2" IRON REBAR
(FD 1/2" I.R.) |
| HA | MANHOLE ELECTRIC | o | ELEVATION | | |

ABBREVIATIONS

- | | | | |
|--------|-----------------------|-------|-----------------------|
| C.B.S. | CONCRETE BLOCK STUCCO | (C) | CALCULATED |
| (M) | RIGHT OF WAY | (M) | MEASURED |
| C | CENTERLINE | (P) | PLAT |
| P | PROPERTY LINE | P.O.C | POINT OF COMMENCEMENT |
| P.G. | PAGE | P.O.B | POINT OF BEGINNING |
| P.B. | PLAT BOOK | | |
| SEC. | SECTION | | |
| TWP. | TOWNSHIP | | |
| RGE. | RANGE | | |
| R | RADIUS | | |
| A | CURVE LENGTH | | |
| Δ | DELTA | | |
| CB | CHORD BEARING | | |
| CD | CHORD DISTANCE | | |

SURVEYOR NOTES:

1. NO INSTRUMENTS OF RECORD REFLECTING EASEMENTS, RIGHT OF WAY, AND OR OWNERSHIP WERE FURNISHED TO THIS SURVEYOR EXCEPT AS SHOWN.
2. THE SURVEY MAP OR THE COPIES THEREOF ARE NOT VALID WITHOUT THE SIGNATURE AND THE ORIGINAL RAISED SEAL OF A FLORIDA LICENSED SURVEYOR AND MAPPER.
3. THE SYMBOLS (IF ANY) REFLECTED IN THE LEGEND AND ON THE SURVEY HAVE BEEN ENLARGED FOR CLARITY. THE SYMBOLS HAVE BEEN PLOTTED AT THE CENTER OF THE FIELD LOCATION AND MAY NOT REPRESENT THE ACTUAL SIZE OR SHAPE OF THE FEATURE.
4. THE SURVEYOR DID NOT INSPECT THE PROPERTY FOR ENVIRONMENTAL HAZARDS OR JURISDICTIONAL WETLANDS.
5. THE INFORMATION DEPICTED ON THIS MAP REPRESENTS THE RESULTS OF THE SURVEY ON THE DATE INDICATED AND CAN ONLY BE CONSIDERED AS INDICATING THE GENERAL CONDITIONS EXISTING AT THAT TIME. LAST FIELD SURVEY DATE: 10-08-2018.
6. DUE TO THE FREQUENT CHANGES AND INTERPRETATIONS OF ZONING ORDINANCES IT IS THE OWNER'S RESPONSIBILITY TO VERIFY ZONING RESTRICTIONS BEFORE CONSTRUCTION.
7. ADDITIONS OR DELETIONS TO SURVEY MAPS OR REPORTS BY OTHER THAN THE SIGNING PARTY OR PARTIES IS PROHIBITED WITHOUT WRITTEN CONSENT OF THE SIGNING PARTY OR PARTIES.
8. FENCE OWNERSHIP, IF ANY, WAS ESTABLISHED BY VISUAL MEANS ONLY, BUT LEGAL OWNERSHIP HAS NOT BEEN DETERMINED.
9. UNLESS OTHERWISE NOTED RECORD AND MEASURED DATA ARE IN SUBSTANTIAL AGREEMENT. ALL DISTANCES AND ELEVATIONS (IF ANY) SHOWN ARE IN ACCORD WITH THE UNITED STATES STANDARD USING FEET.
10. LIMITS OF ASPHALT PAVING ARE APPROXIMATE AND, UNLESS OTHERWISE SHOWN, ARE REASONABLY CONSISTENT WITH PROPERTY LINES AND/OR FENCE LINES.
11. THIS DOCUMENT CONSISTS OF TWENTY SEVEN (27) SHEETS AND EACH SHEET WILL NOT BE CONSIDERED FULL, VALID AND COMPLETE UNLESS ATTACHED TO THE OTHERS.
12. NO UNDERGROUND INSTALLATIONS OR IMPROVEMENTS HAVE BEEN LOCATED.
13. LANDS DEPICTED HEREON WERE SURVEYED PER PROVIDED BY CLIENT AND NO CLAIMS AS TO OWNERSHIP ARE MADE OR IMPLIED.
14. THIS IS NOT A BOUNDARY SURVEY.

BEARINGS, COORDINATES, GEOMETRY AND BASELINE STATIONING INFORMATION
OBTAINED FROM A BOUNDARY SURVEY PREPARED FOR A RIGHT OF WAY CORRIDOR
MAP FOR FECR LUDLAM TRAIL PREPARED BY LUDOVICI AND ORANGE CONSULTING
ENGINEERS INC.

BASELINE OF SURVEY WAS NOT STAKED IN THE FIELD.

BEARINGS AND COORDINATES ARE RELATIVE TO THE STATE PLANE COORDINATES,
FLORIDA EAST ZONE, NORTH AMERICAN DATUM (NAD) OF 1983 ADJUSTMENT OF 1990
A BEARING OF N 3°35'59" W HAS BEEN ESTABLISHED BETWEEN MONUMENTS
PN01 STAMPED "LUDLAMPN01" TO PN02 STAMPED "LUDLAMPN02"

VERTICAL DATUM N.A.V.D. 88
PROJECT UNITS U.S. SURVEY FEET
FIELD BOOK REFERENCES CHP-425, CHP-418, CHP-405 & CHP-426
ELECTRONIC DATABASE LUDLAM.ZIP

SURVEYOR CERTIFICATION:

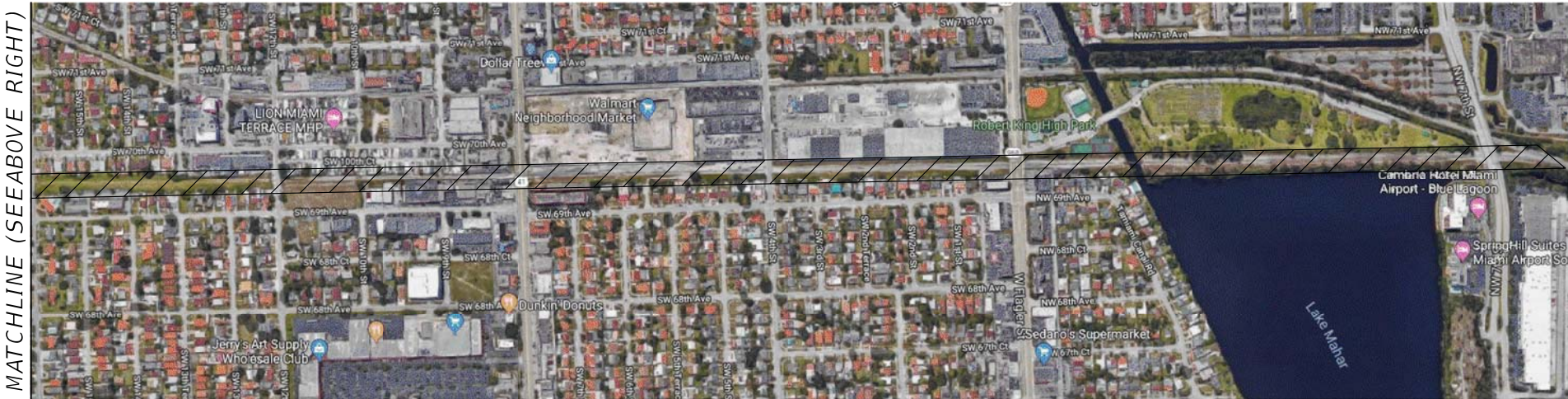
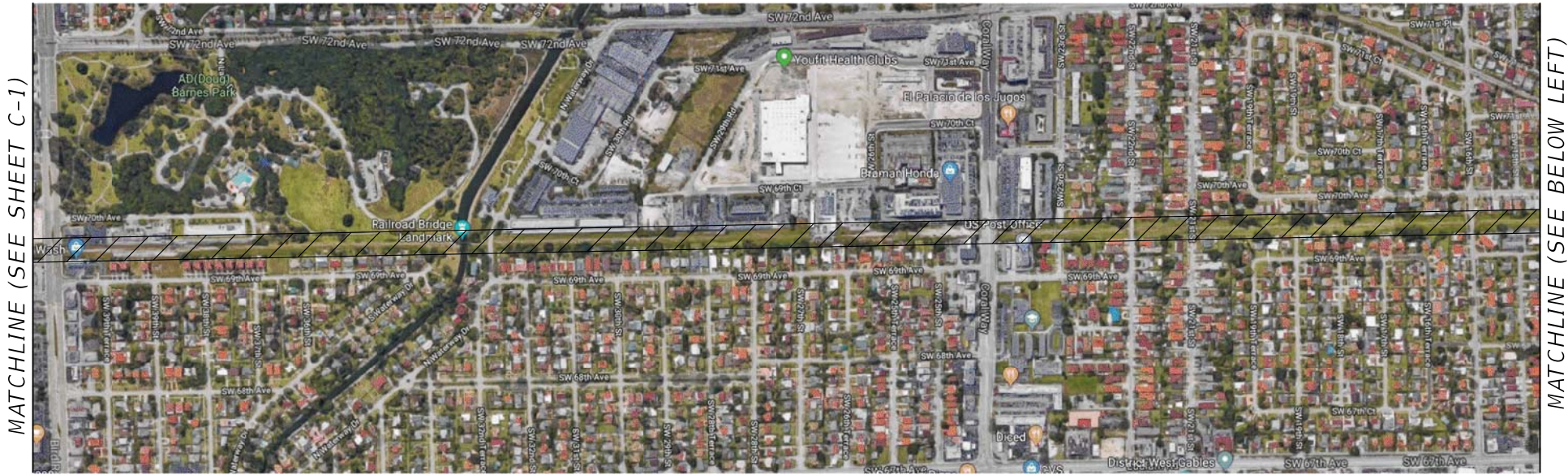
THIS IS TO CERTIFY THAT THIS TOPOGRAPHIC SURVEY MEETS THE STANDARD OF PRACTICE SET FORTH BY THE FLORIDA BOARD OF PROFESSIONAL SURVEYORS AND MAPPERS IN CHAPTER 5J-17, FLORIDA ADMINISTRATIVE CODE, PURSUANT TO SECTION 472.027, FLORIDA STATUTES. AND, THAT THE SKETCH HEREON IS TRUE AND CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF. SUBJECT TO NOTES AND NOTATIONS SHOWN HEREON.

FRANCISCO L. NUNEZ, Jr.
PROFESSIONAL LAND SURVEYOR NO. 6382
STATE OF FLORIDA

NOT VALID WITHOUT THE ORIGINAL RAISED SEAL OF A FLORIDA SURVEYOR AND MAPPER.

REVISIONS				MAPS PREPARED BY: CH PEREZ & ASSOCIATES CONSULTING ENGINEERS, INC CERTIFICATE OF AUTHORIZATION NO. EB-25976 / LB-7360 9594 NW 41 STREET, SUITE 201 MIAMI, FLORIDA 33178 (305)592-1070 / FAX: (305)592-1078 FRANK L. NUNEZ, JR., PSM P.S.M. LICENSE NO. 6382	LUDLAM TRAIL CORRIDOR PD&E STUDY			COVER SHEET	SHEET NO.	
DATE	DESCRIPTION	DATE	DESCRIPTION							
					Miami-Dade County Parks, Recreation, and Open Spaces (MDPROS)	Hickman Building 275 NW 2nd Street Miami, FL 33128 305-755-7800	P&R CONTRACT NO. RFQ 786B P&R PROJECT NO. 43502-15-001-14470619			C-1

TOPOGRAPHIC SURVEY



LOCATION SKETCH
N.T.S.

LEGEND

H

DELINATOR POST

W

WATER VALVE

C

COLUMNS

T

TRANSFORMER

M

MONUMENT

S

SANITARY MISCELLANEOUS

P

PULL BOX

R

RAILROAD SWITCH

U

RAILROAD UTILITIES

F

FIRE HYDRANT

W

MONITORING WELL

S

SANITARY STORM

E

MANHOLE ELECTRIC

G

GUY WIRE

T

TELEPHONE BOX

H

HOLE

P

POLE TELEPHONE

D

DRAIN MISCELLANEOUS

L

LUMINARY

V

WATER VALVE COVER

S

SIGN

M

SANITARY MANHOLE

U

MANHOLE COVER (UNKNOWN)

I

DRAIN INLET

E

ELEVATION

S

SECTION LINE

P

PROPOSED RIGHT OF WAY LINE

X

CHAIN LINK FENCE

-

RIGHT OF WAY LINE

S

SET NAIL & DISC 7360
(SET N & D 7360)

S

SET 1/2" IRON PIPE 7360
(SET 1/2" I.P. 7360)

F

FOUND 1/2" IRON PIPE
(FD 1/2" I.P.)

R

FOUND 1/2" IRON REBAR
(FD 1/2" I.R.)

N

FOUND NAIL
(FD NAIL)

C

CONCRETE BLOCK STUCCO

R

RIGHT OF WAY

C

CENTERLINE

P

PROPERTY LINE

P

PAGE

S

SECTION

T

TOWNSHIP

R

RANGE

R

RADIUS

A

CURVE LENGTH

A

DELTA

CB

CHORD BEARING

CD

CHORD DISTANCE

C

CALCULATED

M

MEASURED

P

PLAT

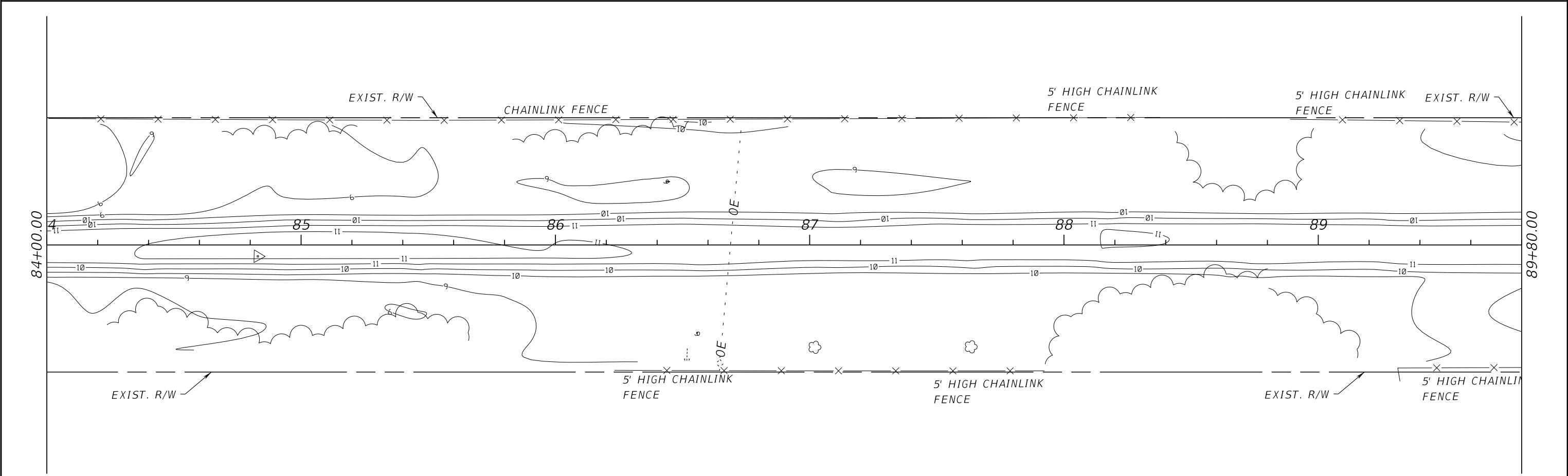
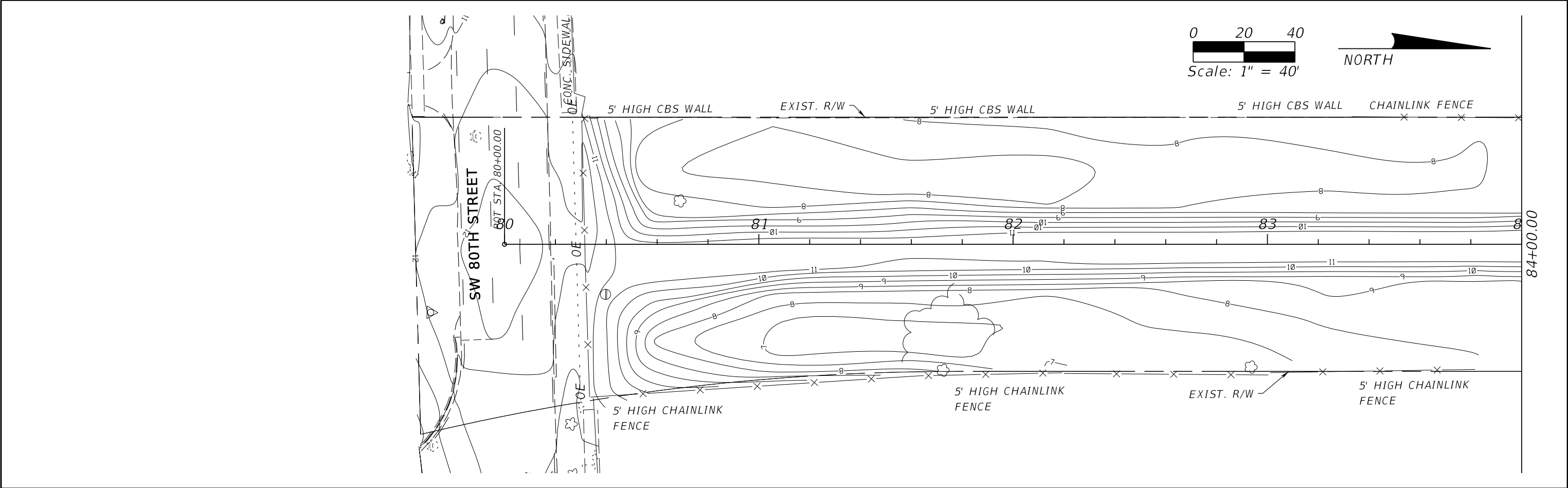
P.O.C

POINT OF COMMENCEMENT

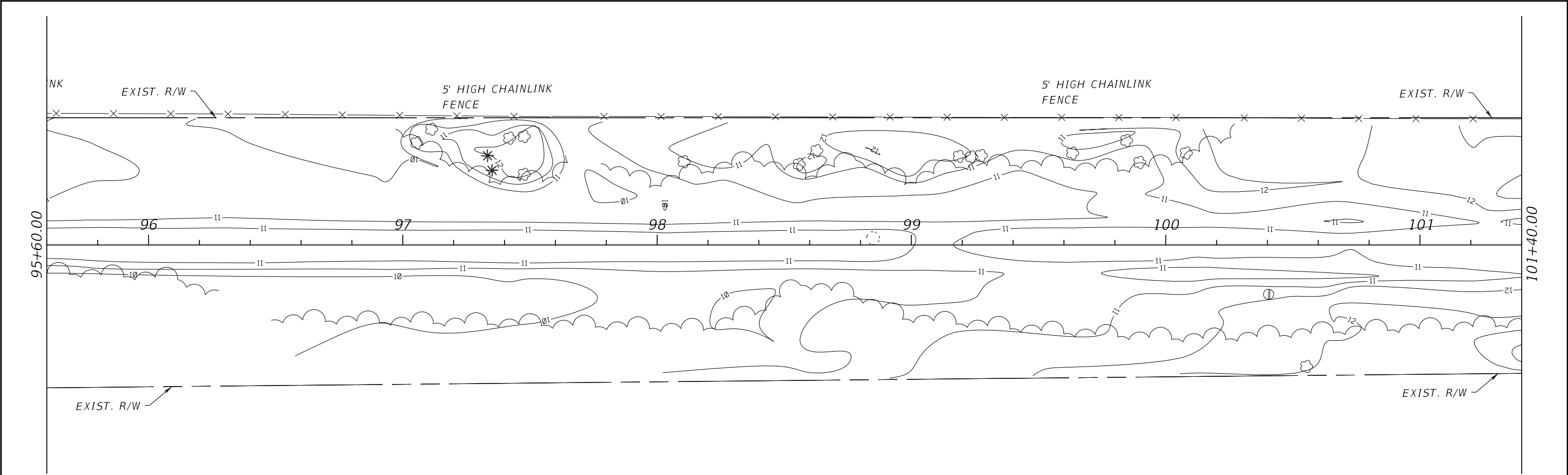
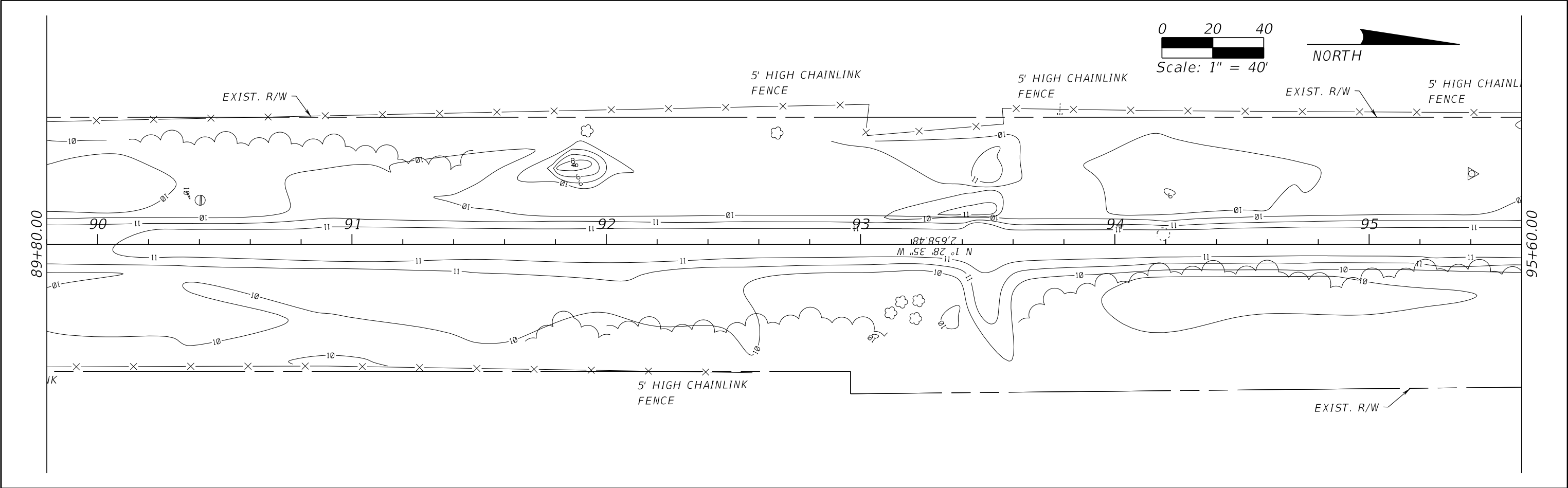
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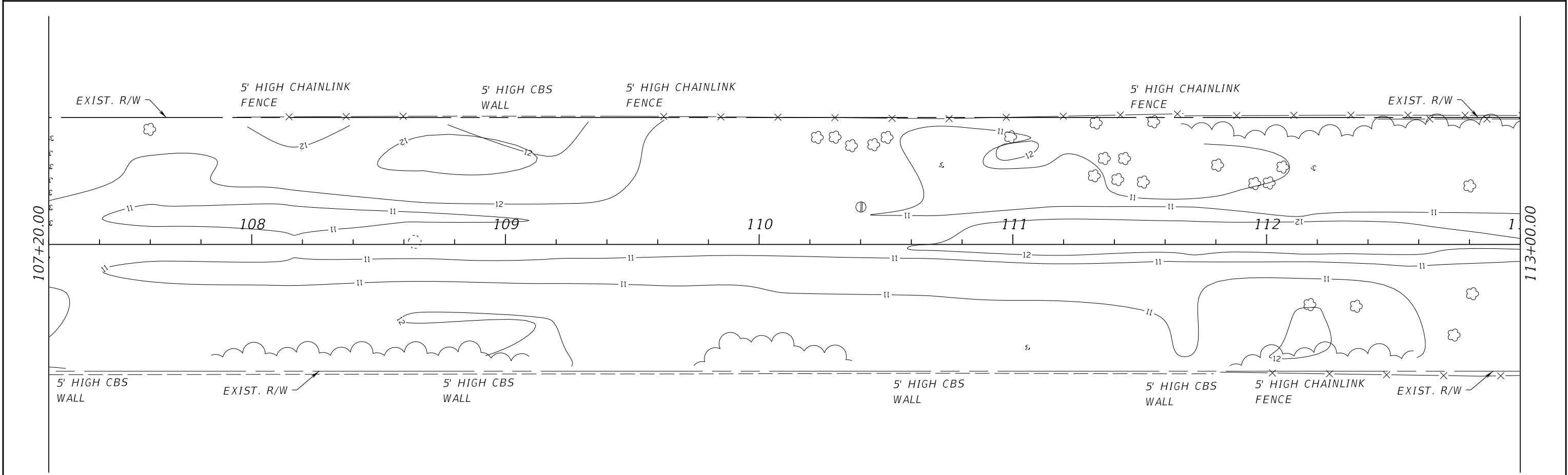
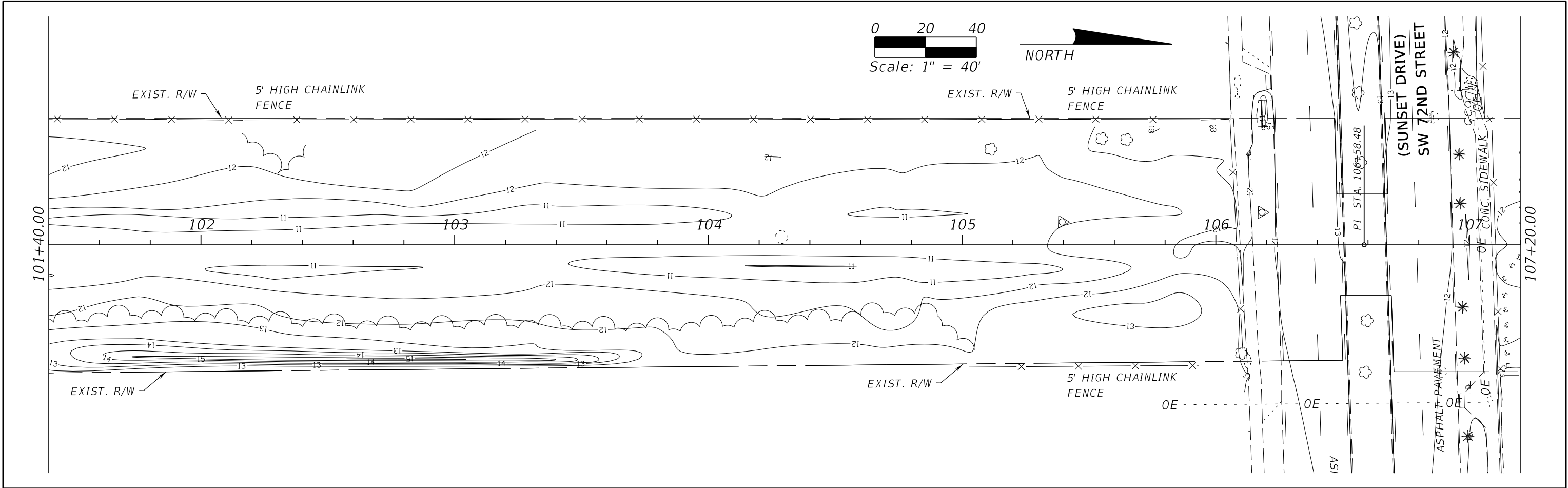
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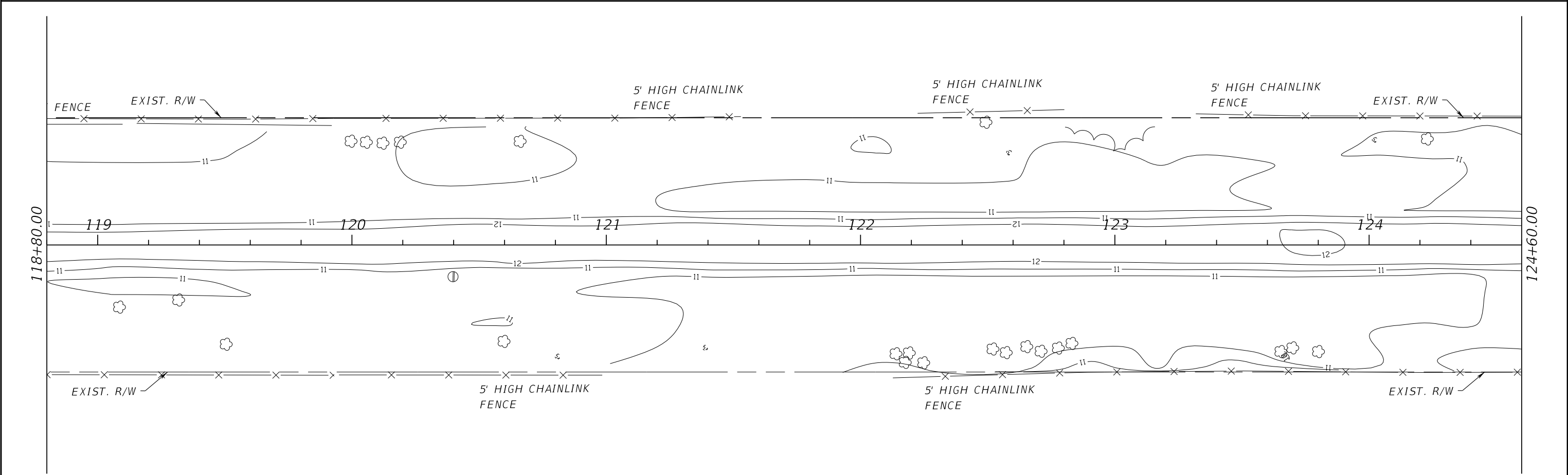
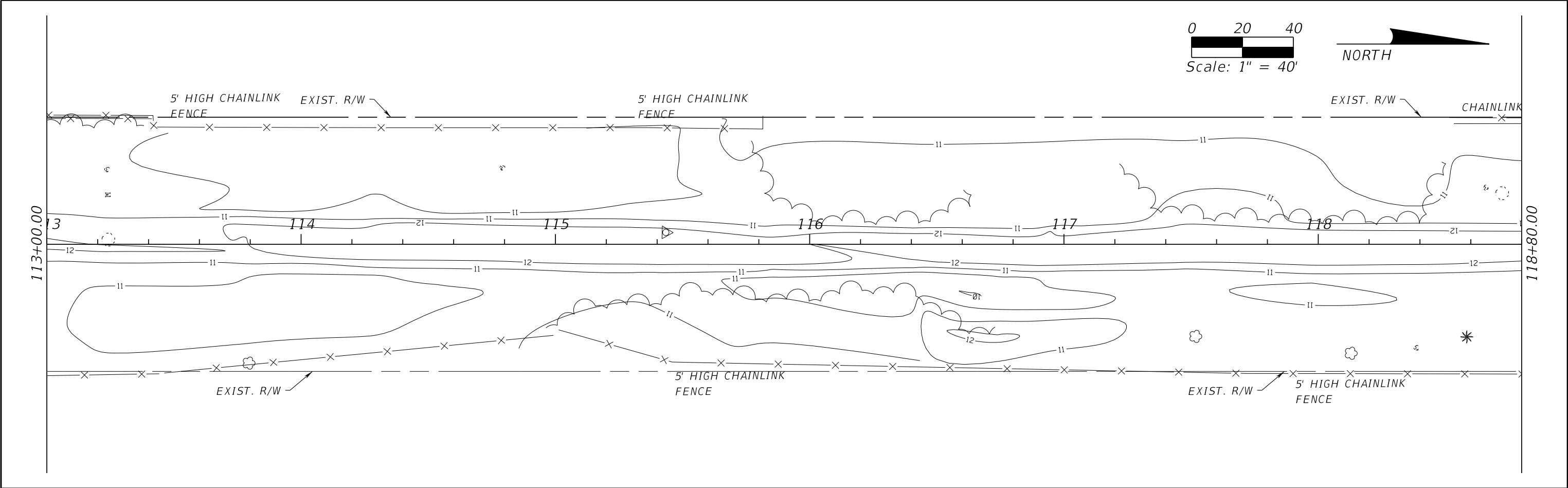
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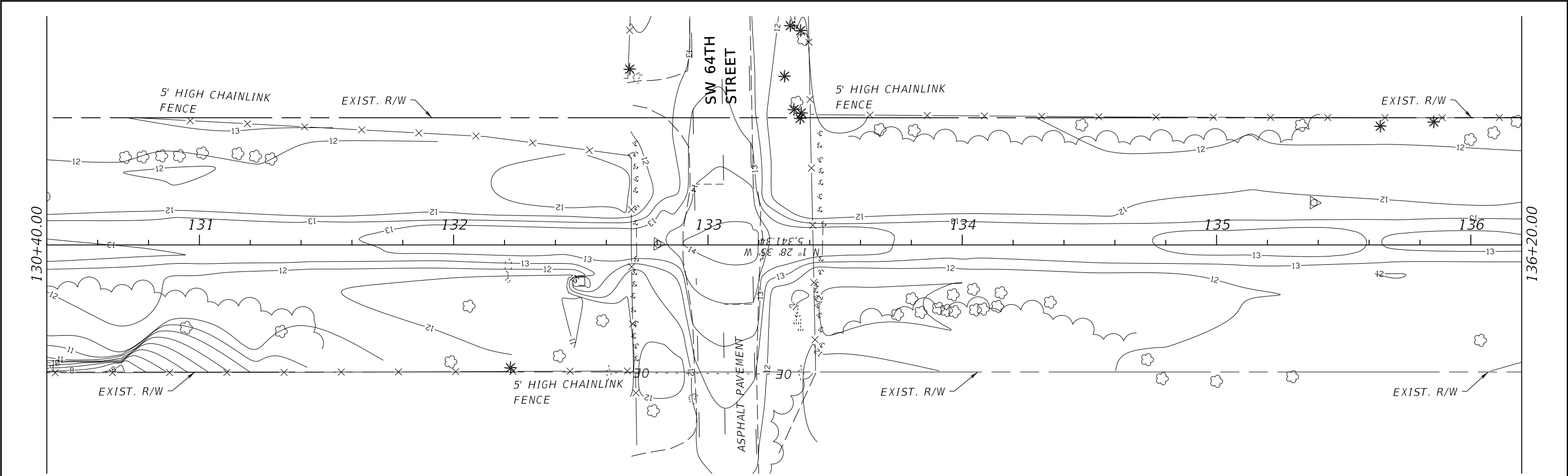
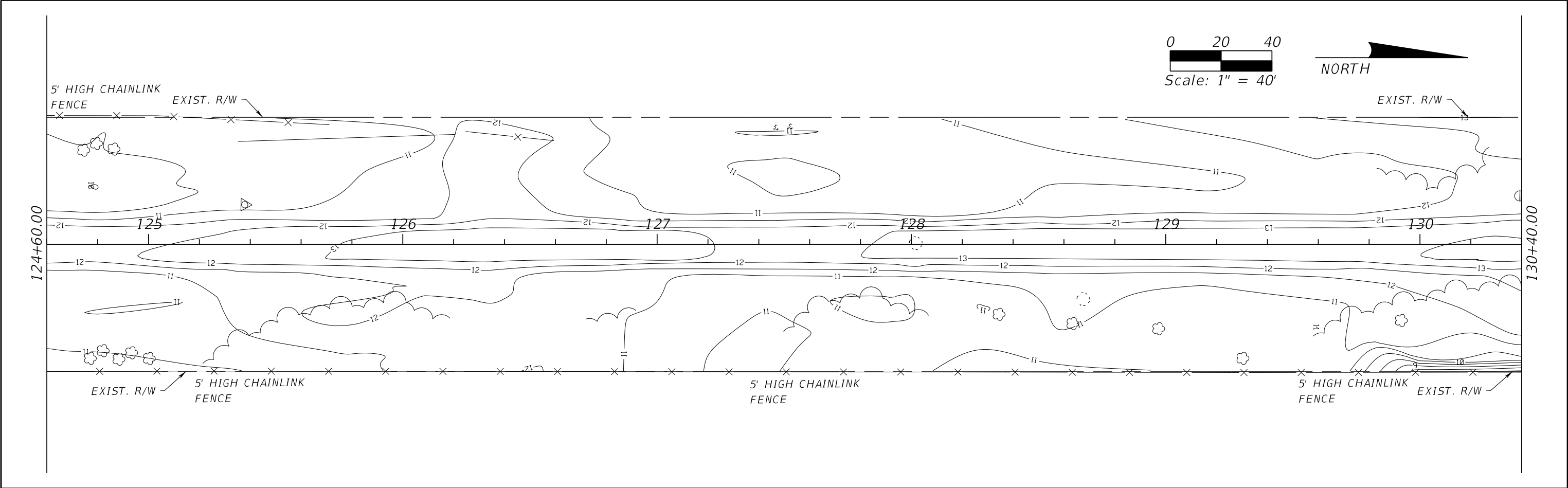
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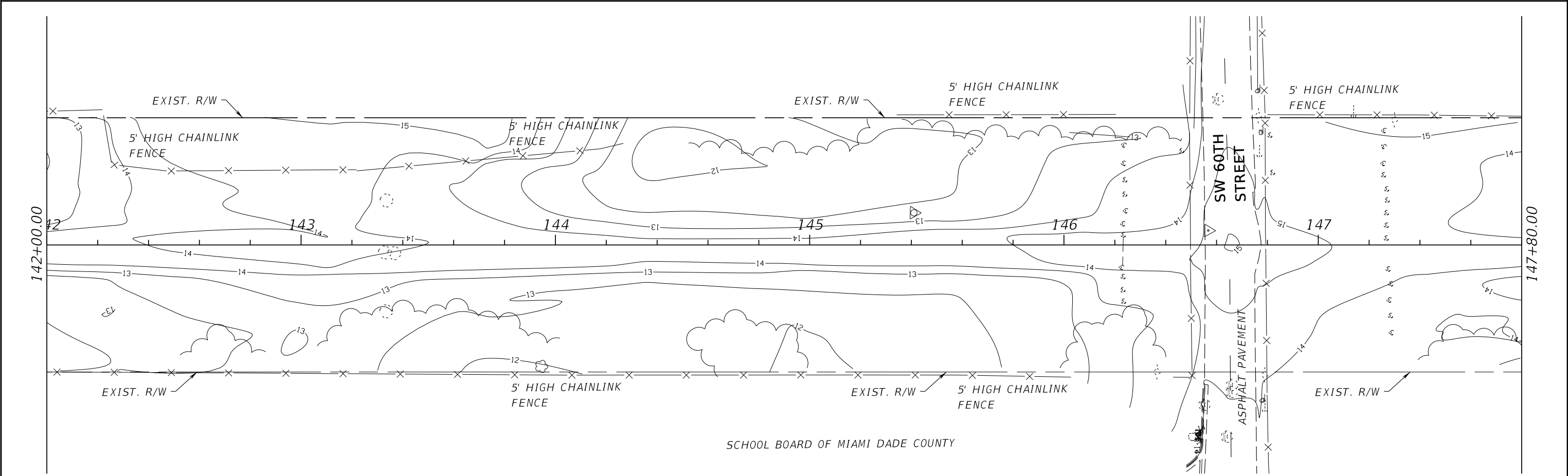
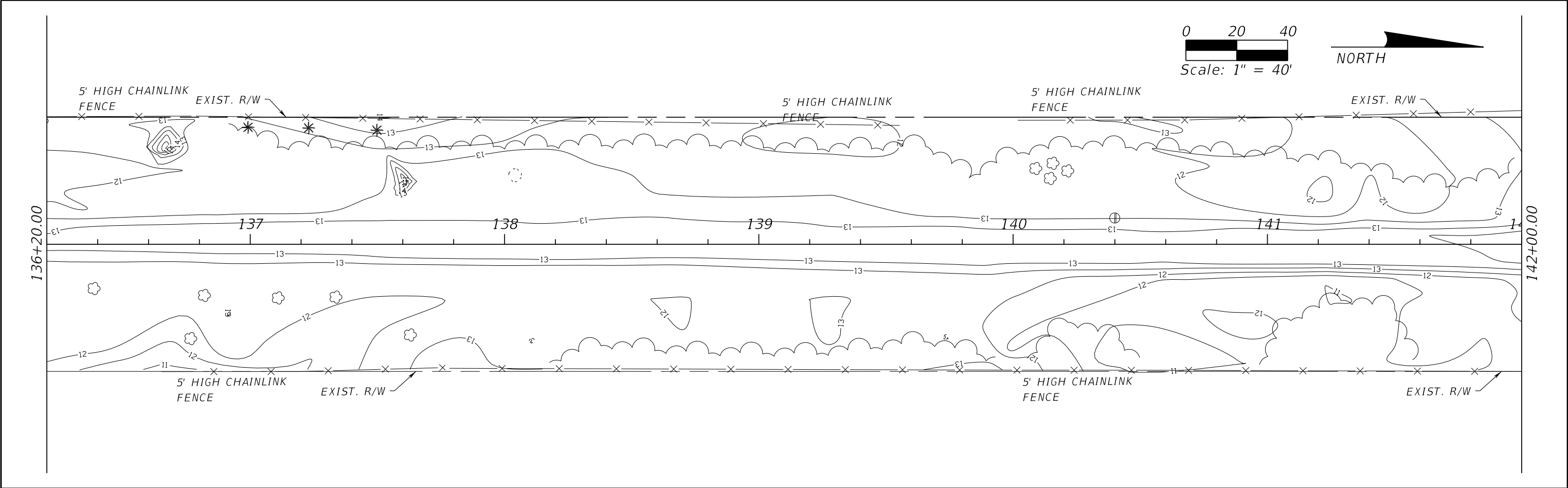
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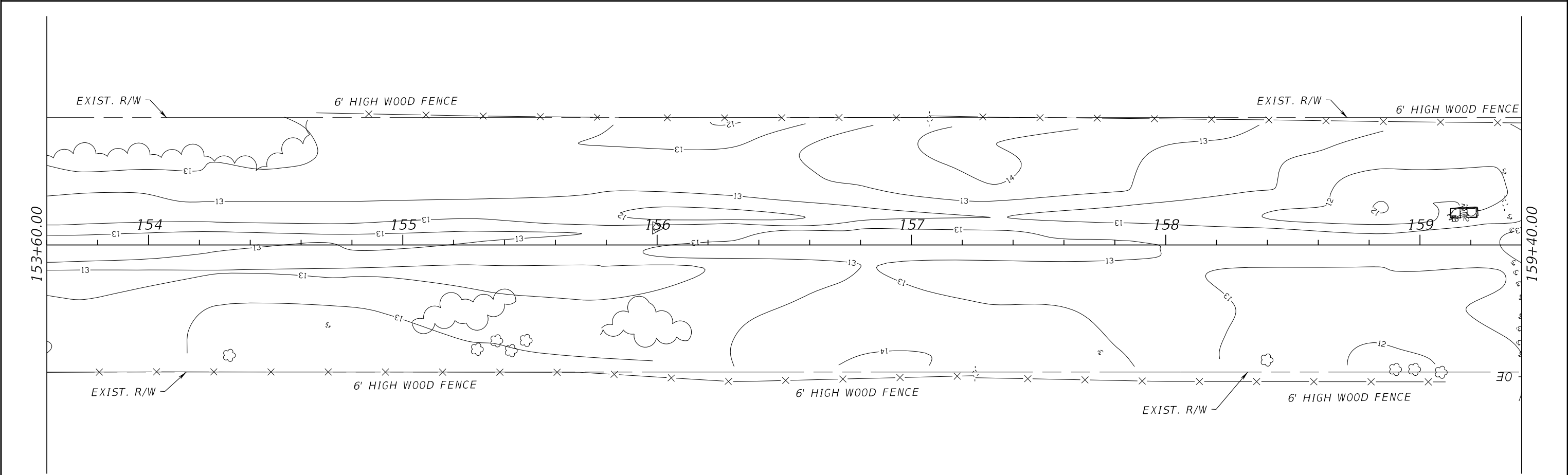
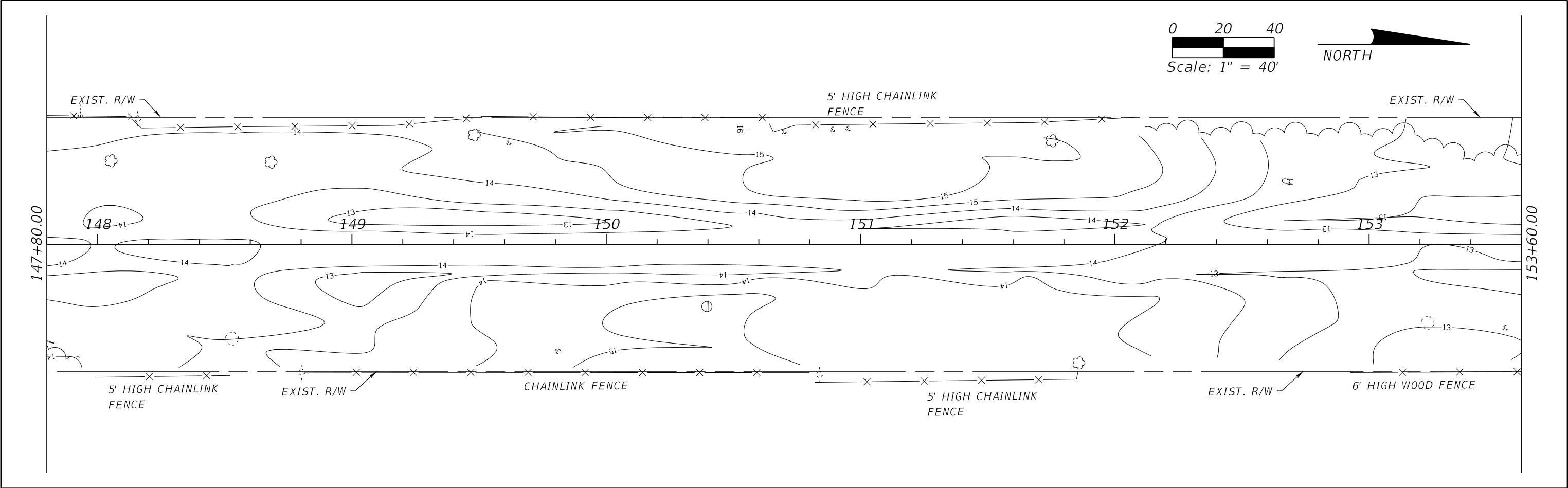
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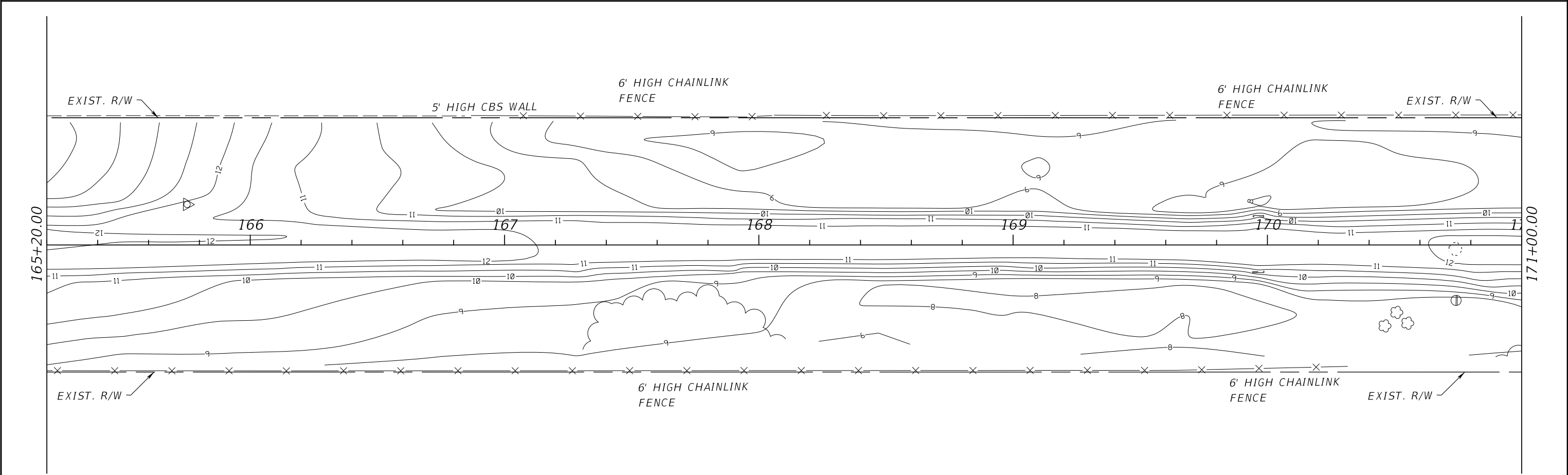
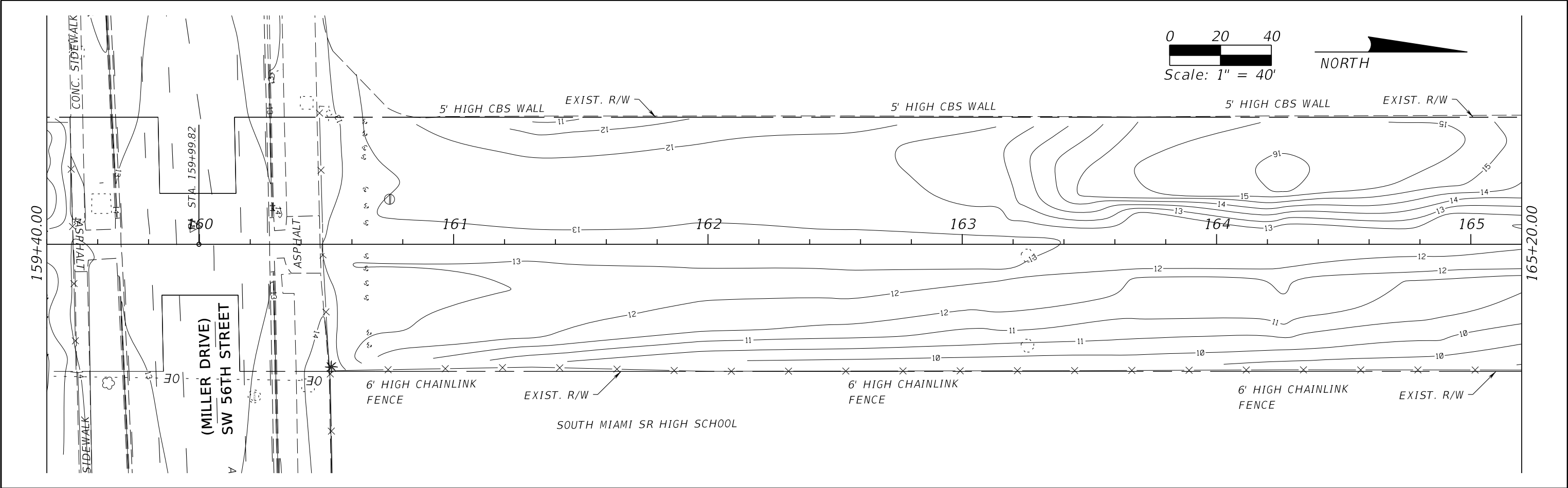
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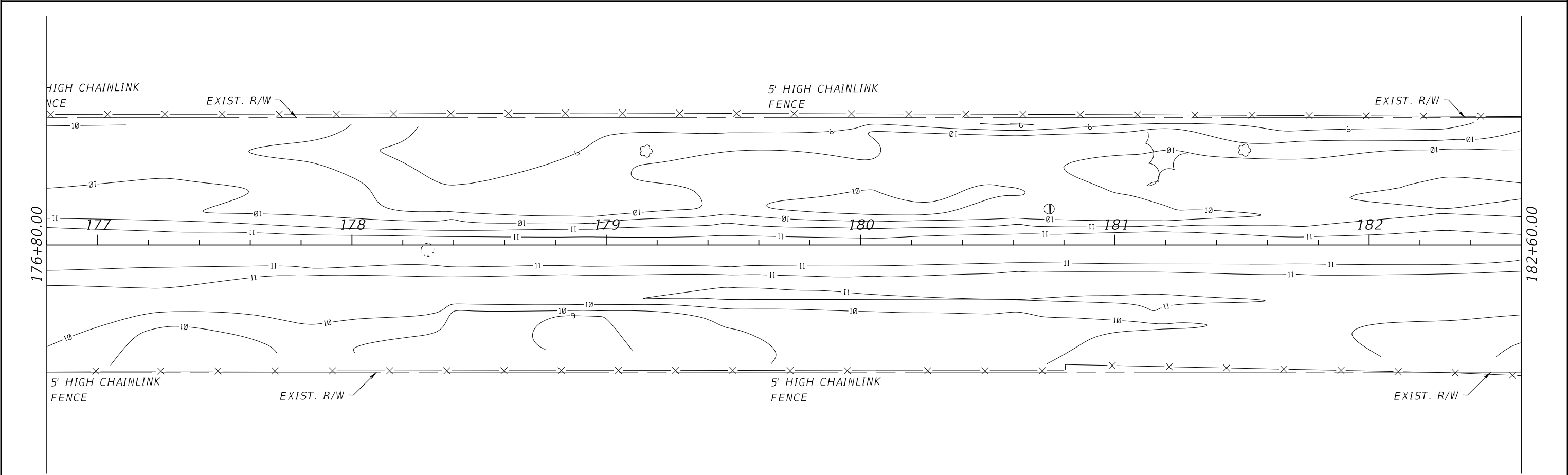
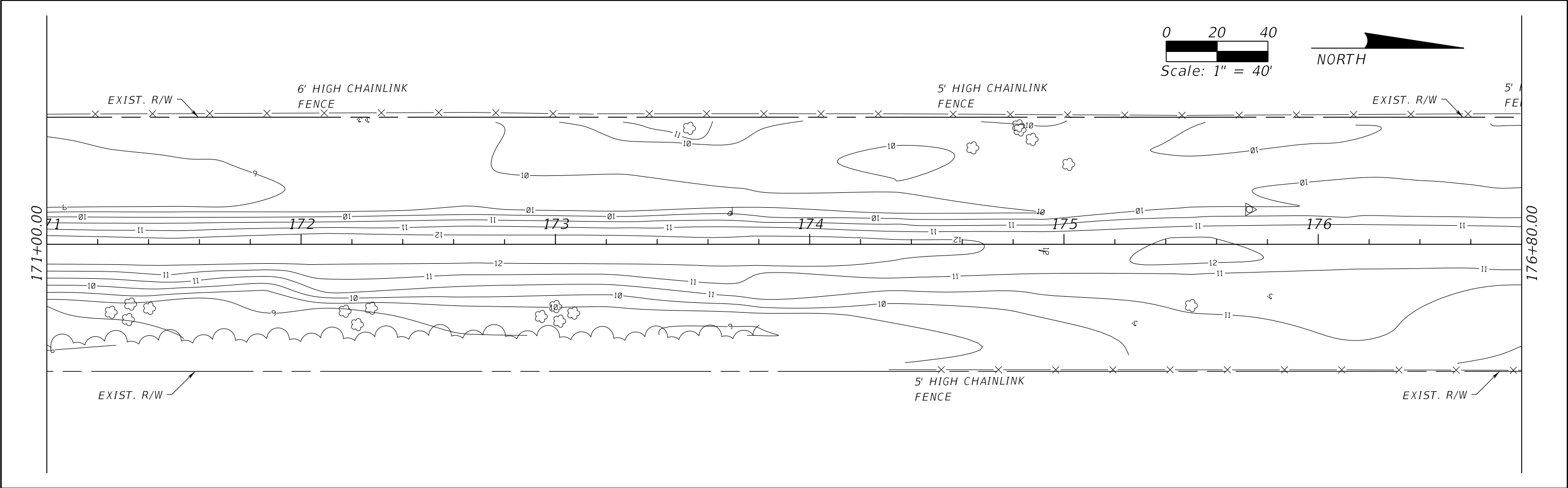
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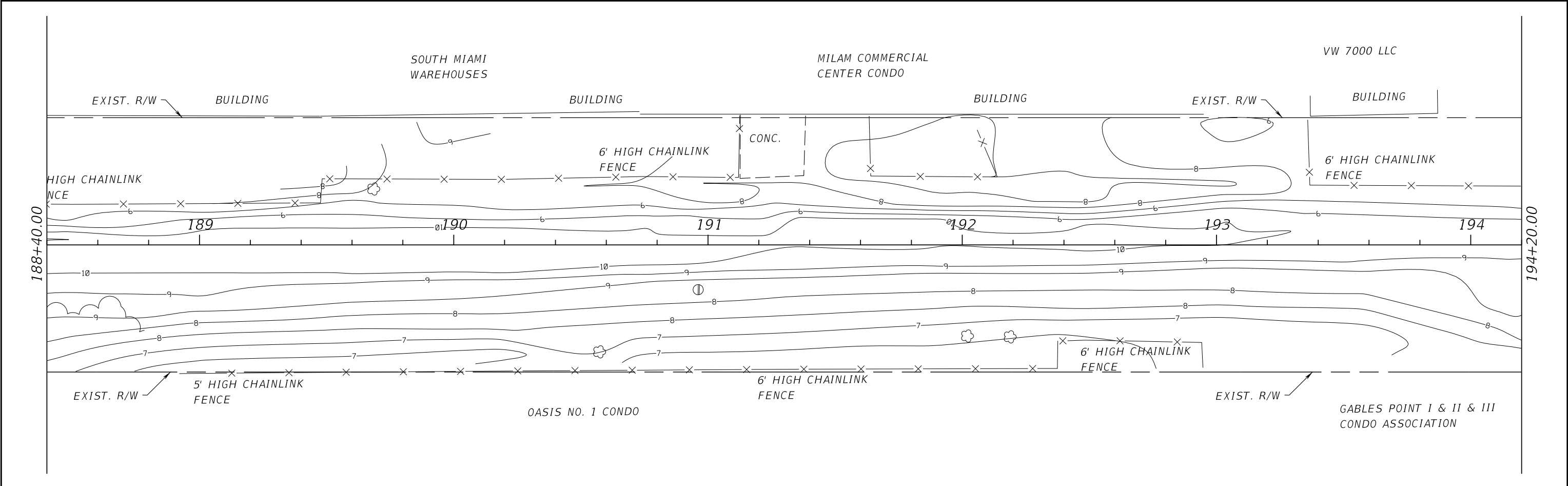
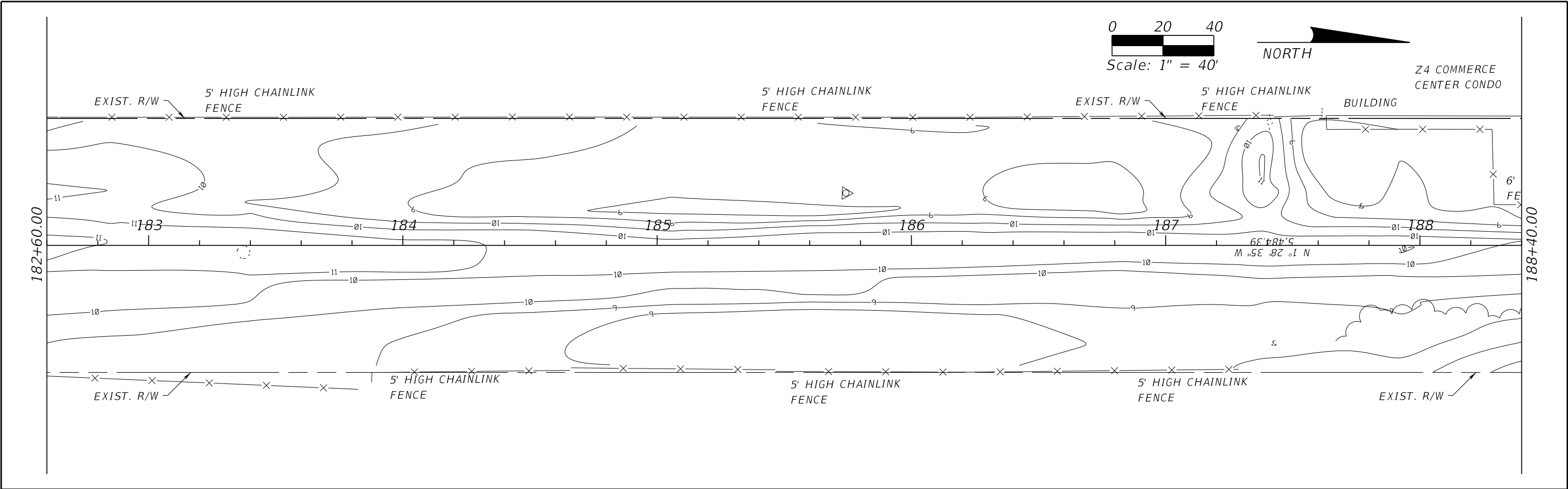
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REVISIONS				MAPS PREPARED BY: CH PEREZ & ASSOCIATES CONSULTING ENGINEERS, INC CERTIFICATE OF AUTHORIZATION NO. EB-25976 / LB-7360 9594 NW 41 STREET, SUITE 201 MIAMI, FLORIDA 33178 (305)592-1070 / FAX: (305)592-1078 FRANK L. NUNEZ, JR., PSM P.S.M. LICENSE NO. 6382	LUDLAM TRAIL CORRIDOR PD&E STUDY			TOPOGRAPHIC SURVEY	SHEET NO.
DATE	DESCRIPTION	DATE	DESCRIPTION		Miami-Dade County Parks, Recreation, and Open Spaces (MDPROS)	Hickman Building 275 NW 2nd Street Miami, FL 33128 305-755-7800	P&R CONTRACT NO. RFQ 786B		08
							P&R PROJECT NO. 43502-15-001-14470619		

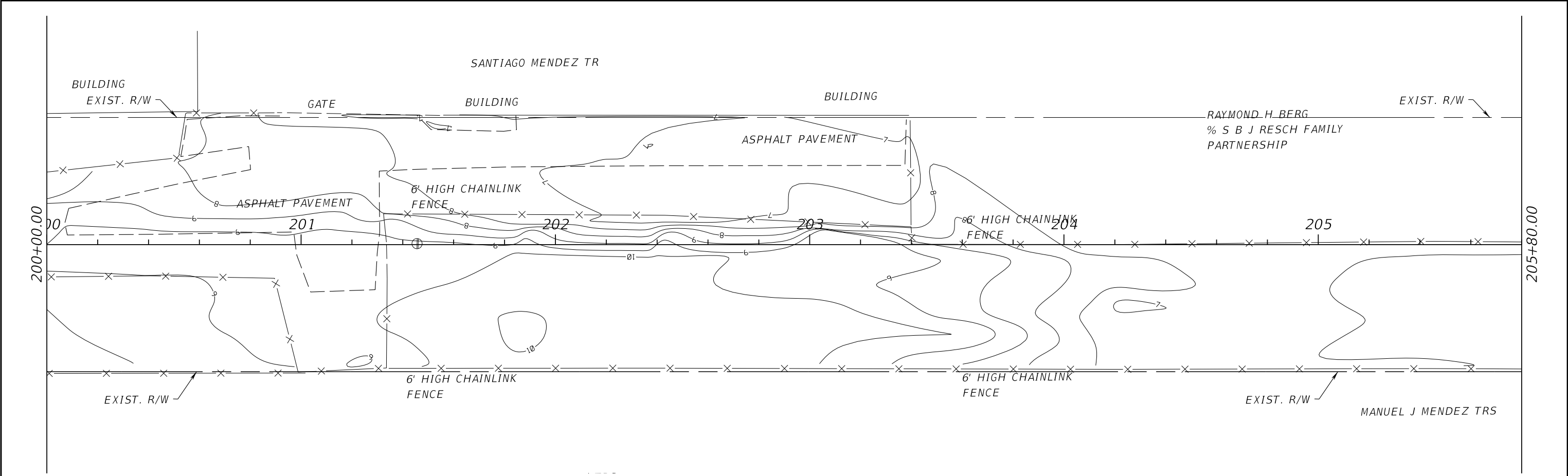
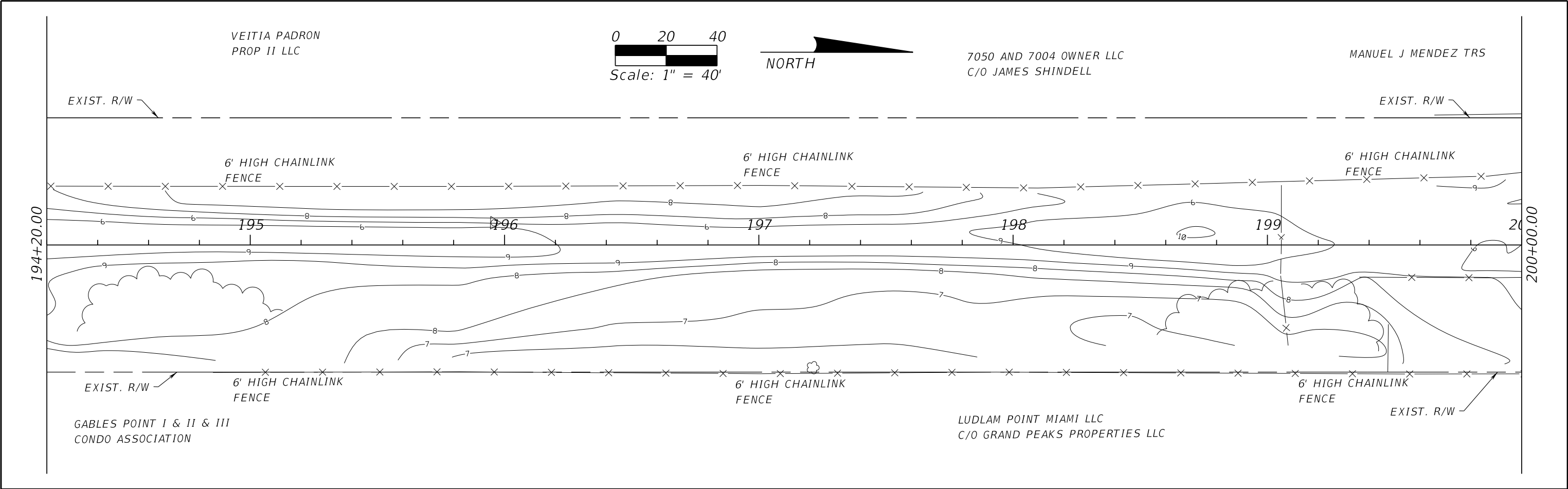


REVISIONS				MAPS PREPARED BY: CH PEREZ & ASSOCIATES CONSULTING ENGINEERS, INC CERTIFICATE OF AUTHORIZATION NO. EB-25976 / LB-7360 9594 NW 41 STREET, SUITE 201 MIAMI, FLORIDA 33178 (305)592-1070 / FAX: (305)592-1078 FRANK L. NUNEZ, JR., PSM P.S.M. LICENSE NO. 6382			LUDLAM TRAIL CORRIDOR PD&E STUDY			TOPOGRAPHIC SURVEY		SHEET NO. 09
DATE	DESCRIPTION	DATE	DESCRIPTION									
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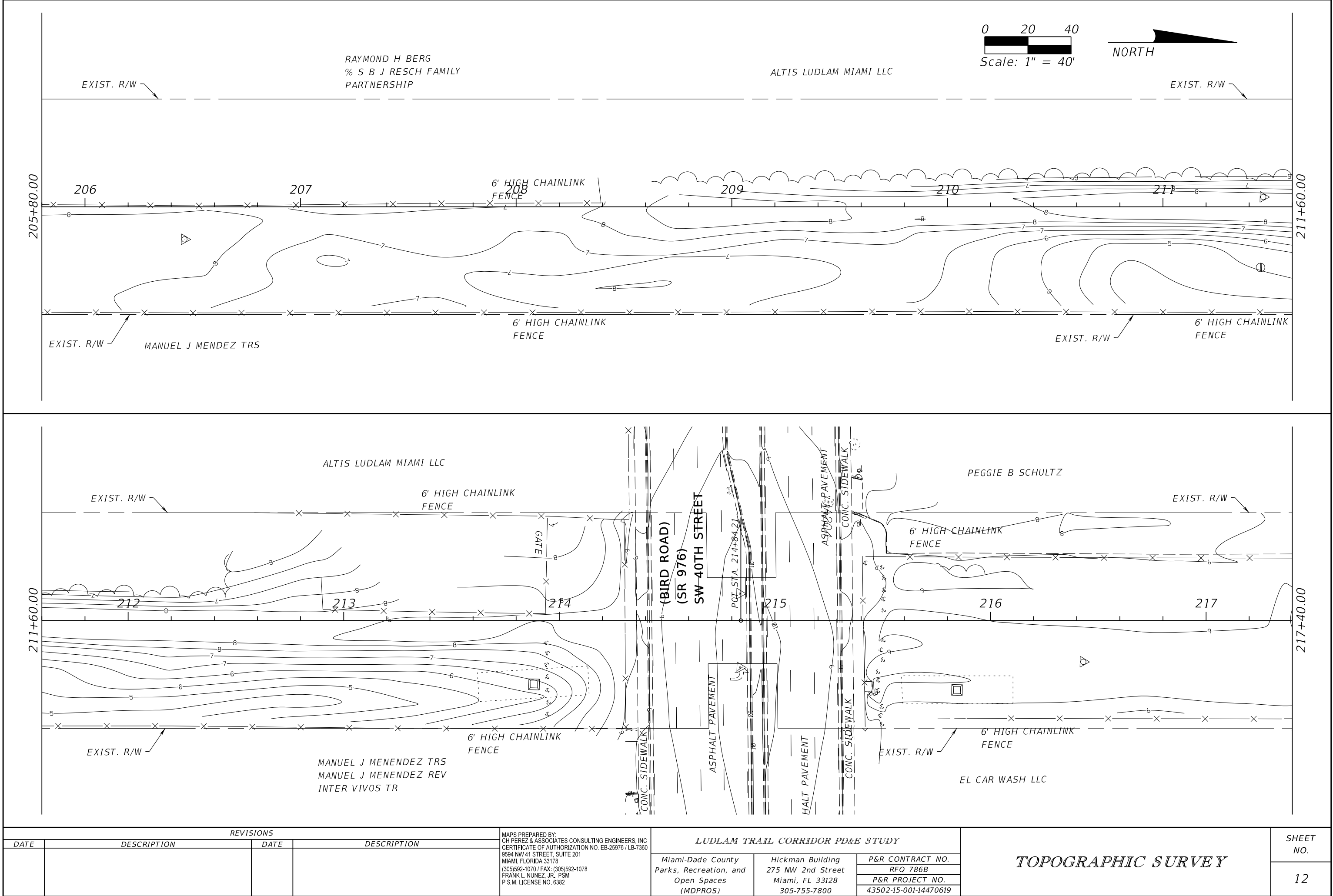


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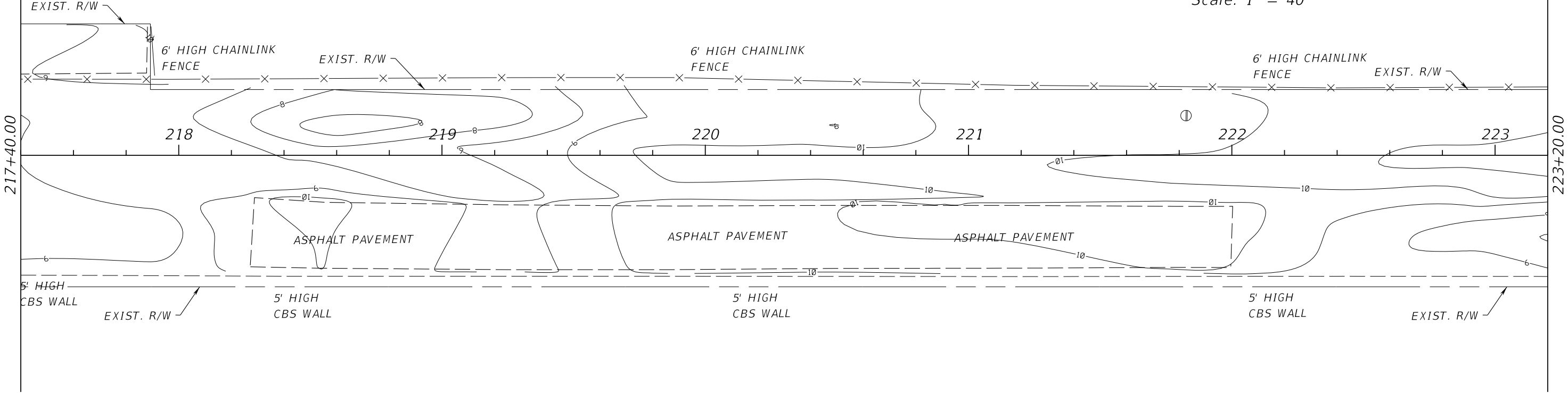
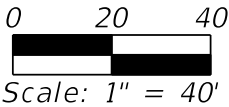
MAPS PREPARED BY:
CH PEREZ & ASSOCIATES CONSULTING ENGINEERS, INC.
CERTIFICATE OF AUTHORIZATION NO. EB-25976 / LB-7360
9594 NW 41 STREET, SUITE 201
MIAMI, FLORIDA 33178
(305)592-1070 / FAX: (305)592-1078
FRANK L. NUNEZ, JR., PSM
P.S.M. LICENSE NO. 6382



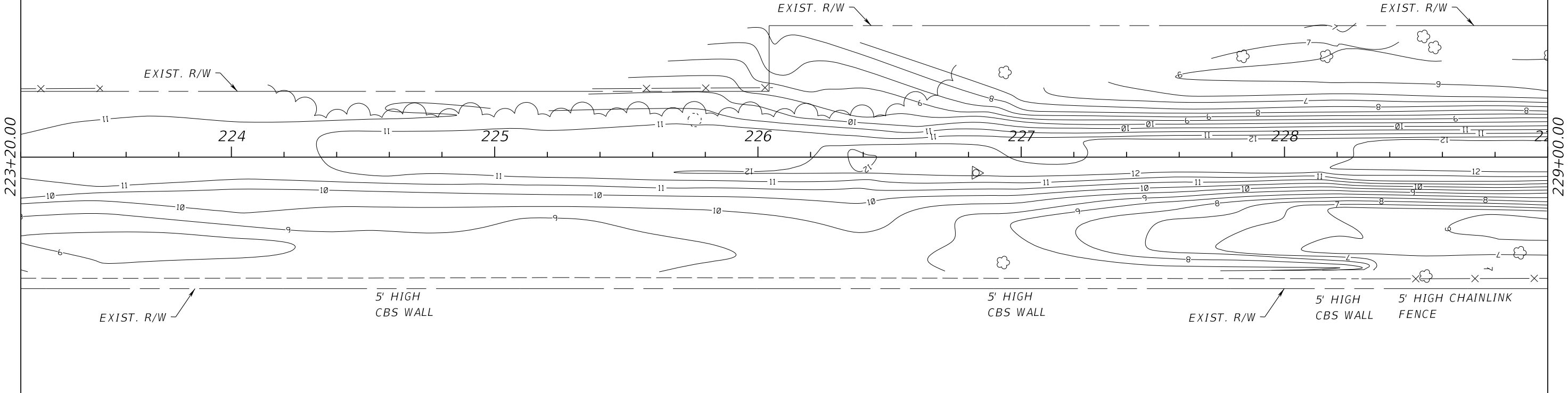
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							P&R PROJECT NO. 43502-15-001-14470619		11



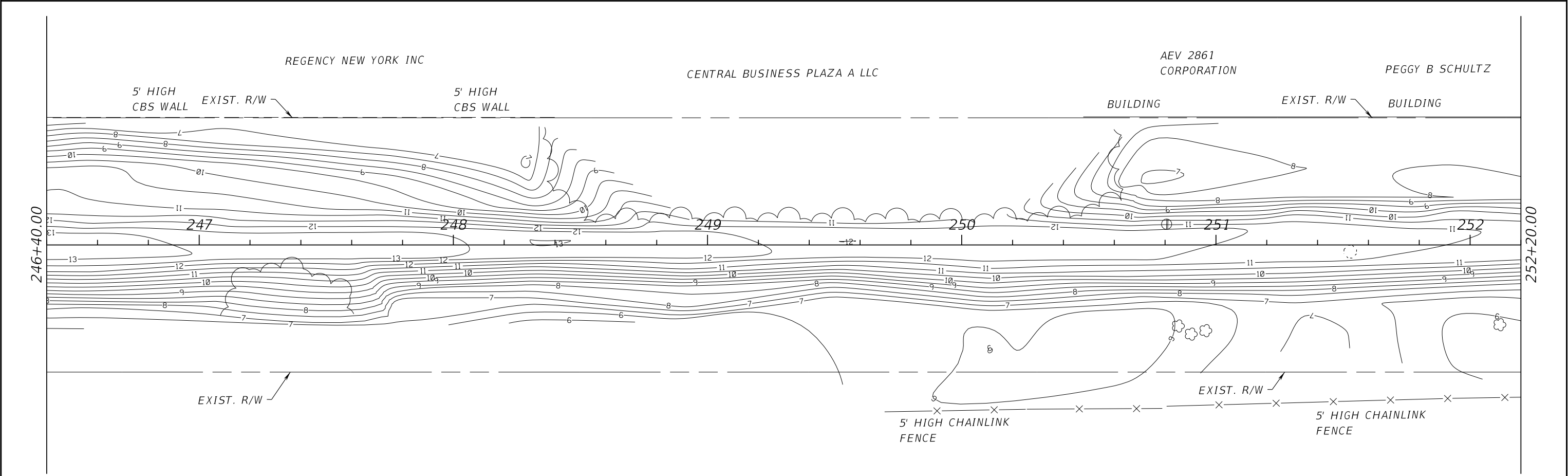
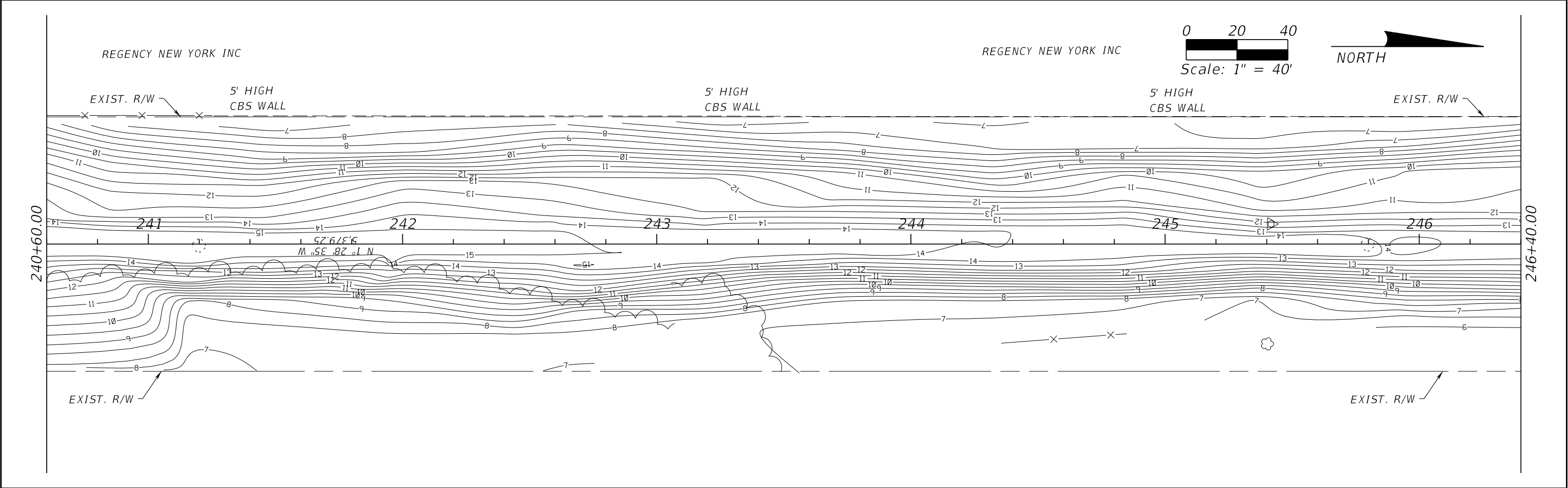
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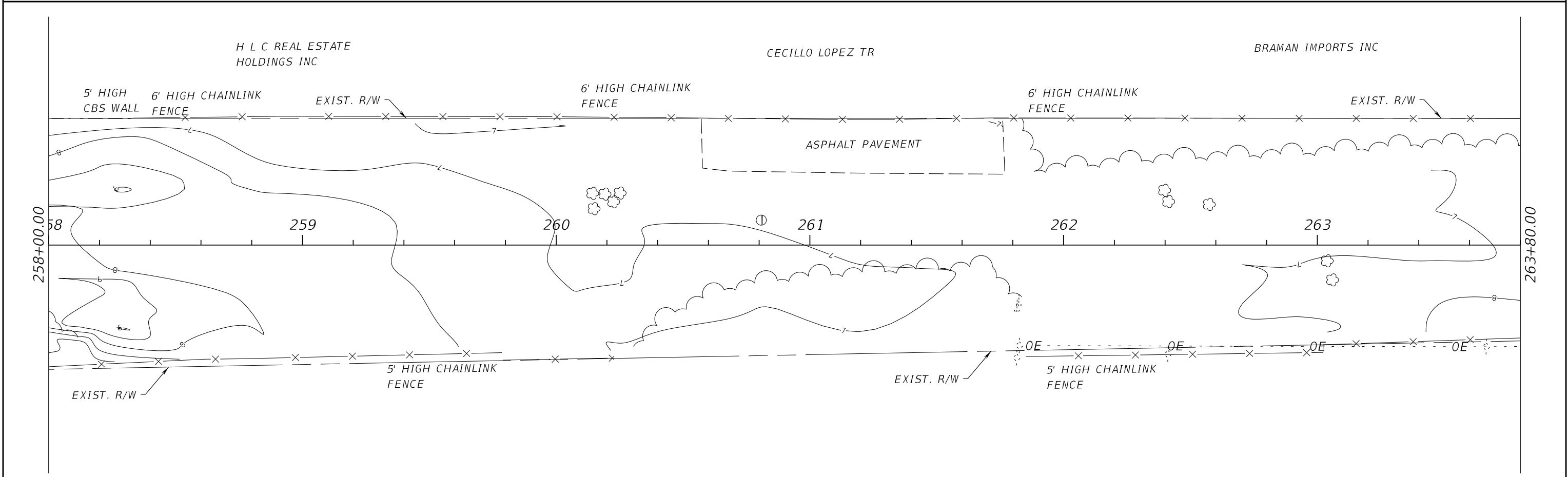
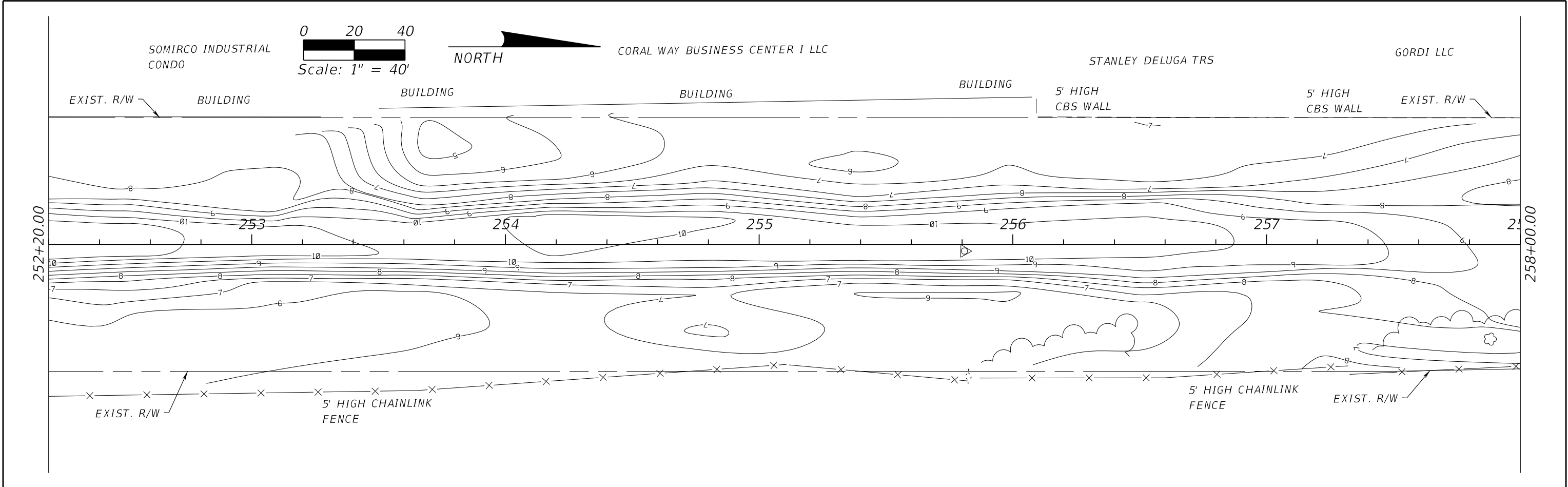
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ATTN PROPERTY TAX DEPT



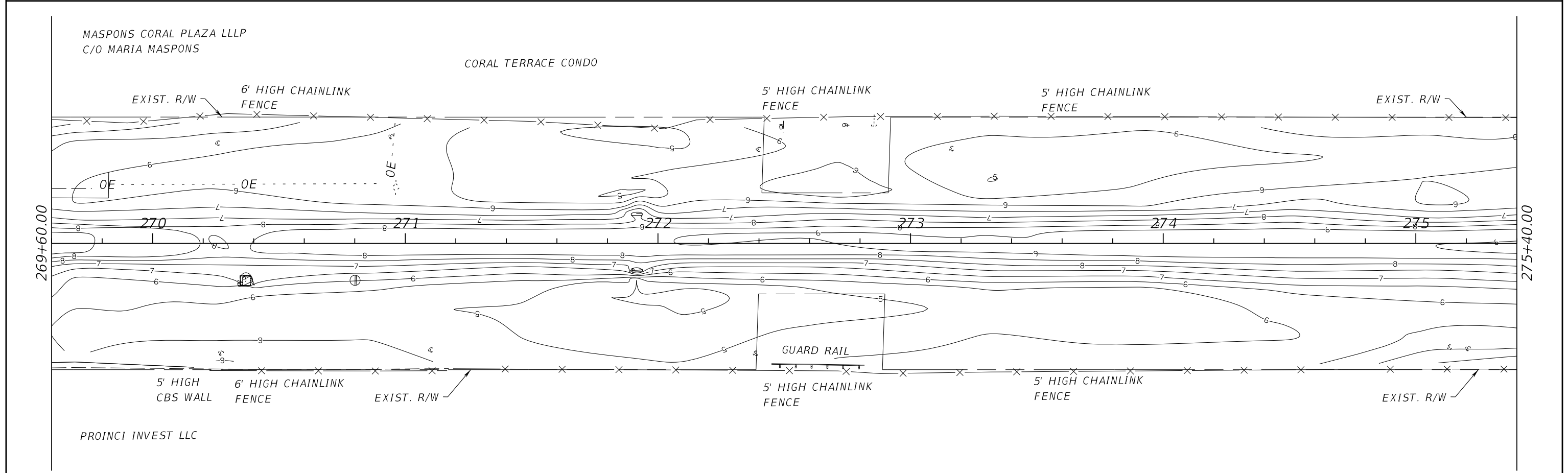
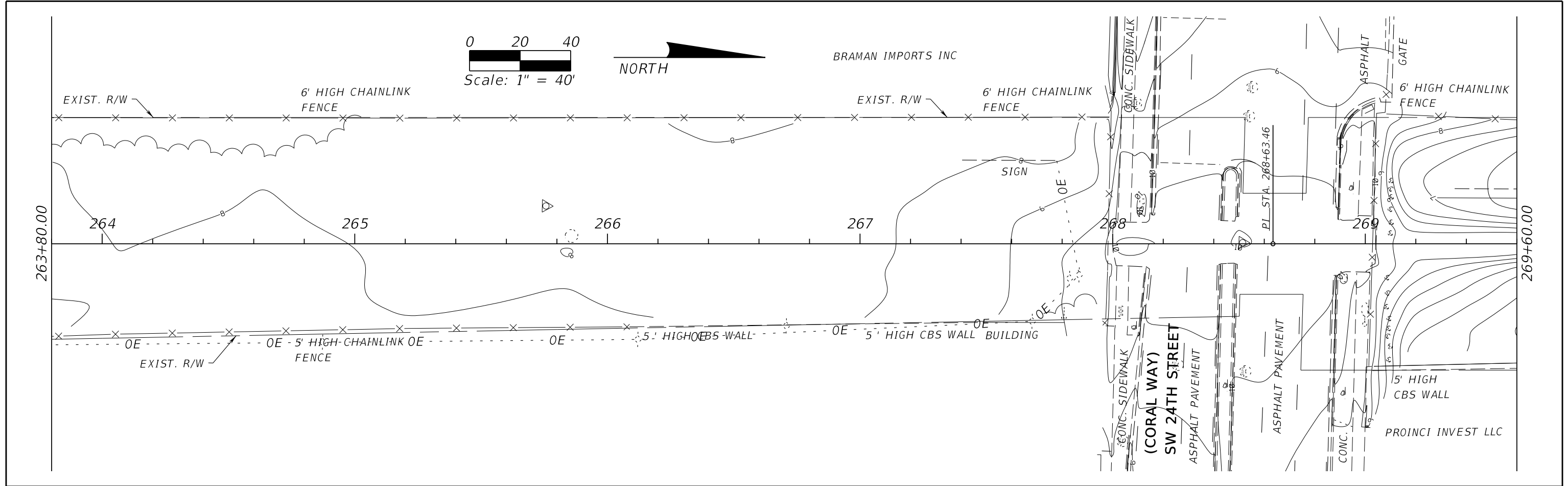
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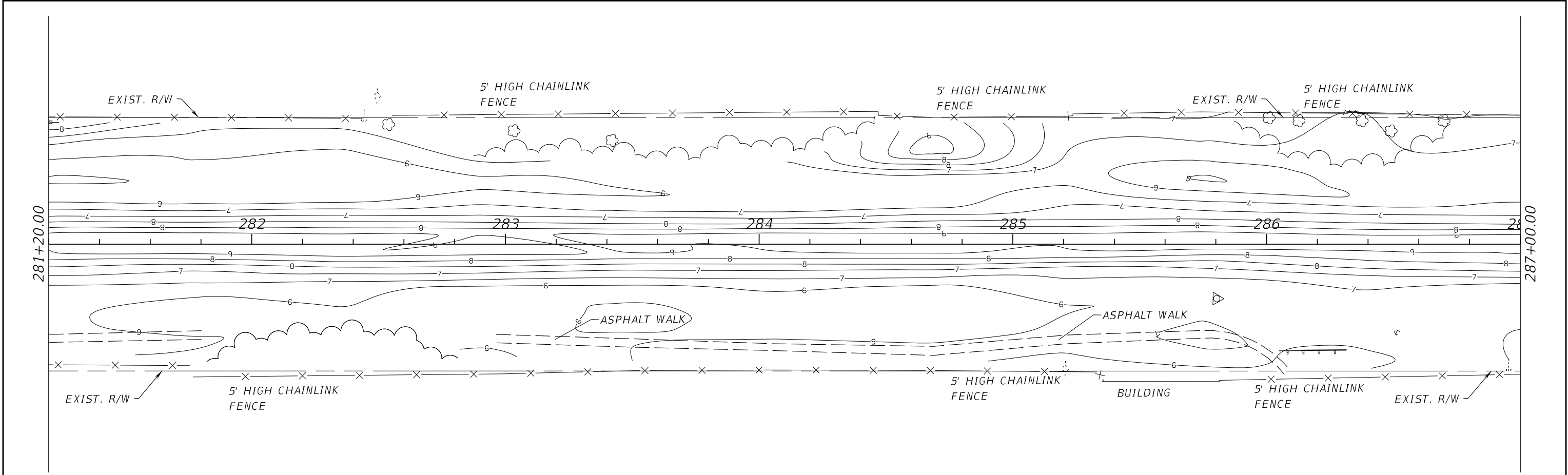
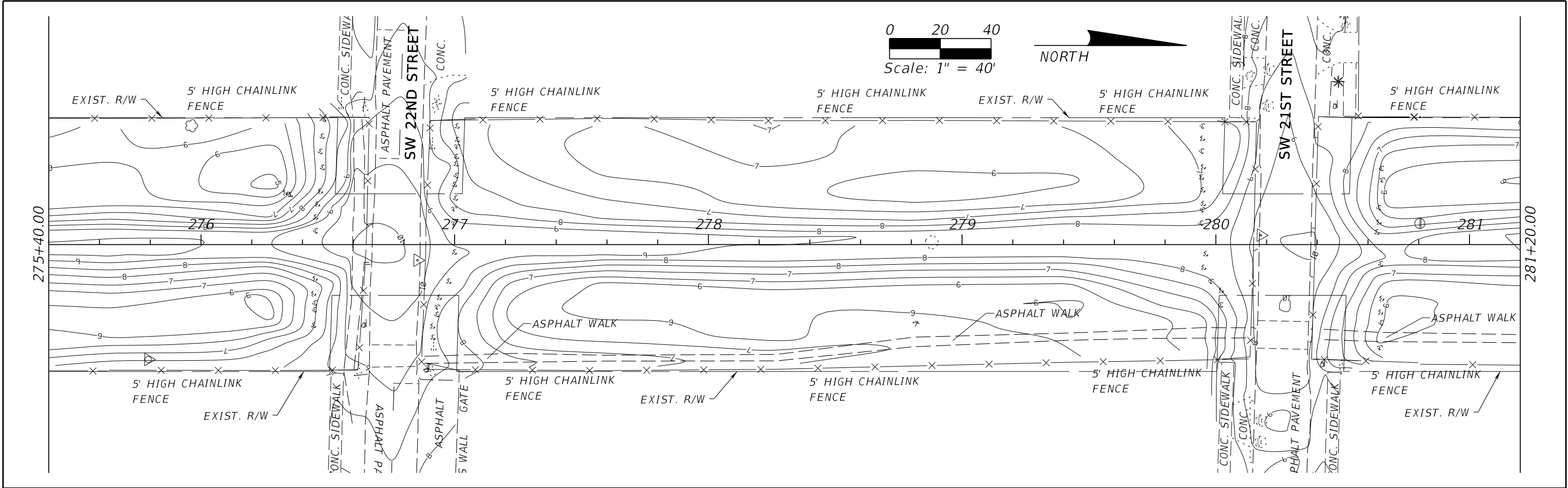
REVISIONS				MAPS PREPARED BY: CH PEREZ & ASSOCIATES CONSULTING ENGINEERS, INC CERTIFICATE OF AUTHORIZATION NO. EB-25976 / LB-7360 9594 NW 41 STREET, SUITE 201 MIAMI, FLORIDA 33178 (305)592-1070 / FAX: (305)592-1078 FRANK L. NUNEZ, JR., PSM P.S.M. LICENSE NO. 6382	LUDLAM TRAIL CORRIDOR PD&E STUDY			TOPOGRAPHIC SURVEY	SHEET NO.
DATE	DESCRIPTION	DATE	DESCRIPTION						15
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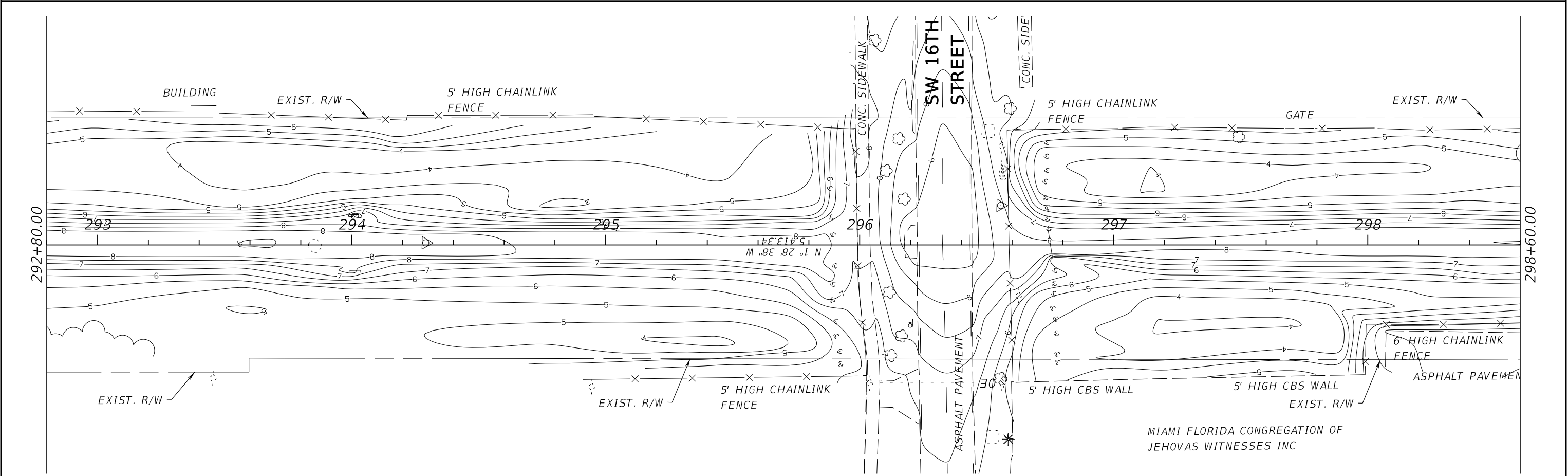
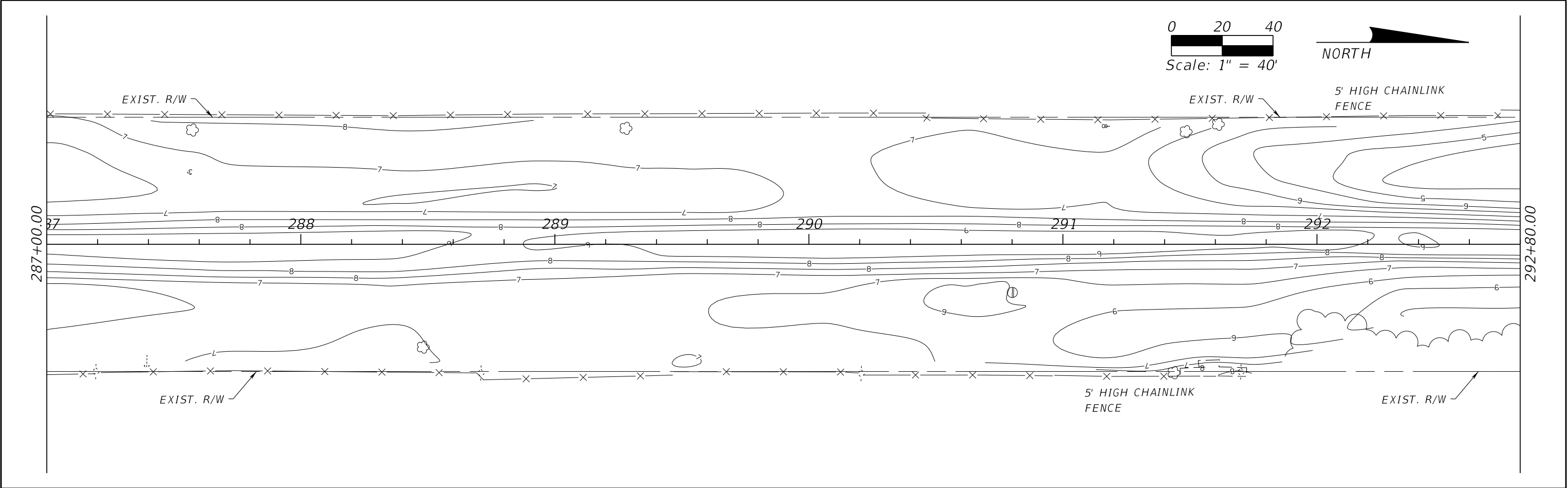
REVISIONS				MAPS PREPARED BY: CH PEREZ & ASSOCIATES CONSULTING ENGINEERS, INC CERTIFICATE OF AUTHORIZATION NO. EB-25976 / LB-7360 9594 NW 41 STREET, SUITE 201 MIAMI, FLORIDA 33178 (305)592-1070 / FAX: (305)592-1078 FRANK L. NUNEZ, JR., PSM P.S.M. LICENSE NO. 6382	LUDLAM TRAIL CORRIDOR PD&E STUDY			TOPOGRAPHIC SURVEY	SHEET NO.
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					Miami-Dade County Parks, Recreation, and Open Spaces (MDPROS)	Hickman Building 275 NW 2nd Street Miami, FL 33128 305-755-7800	P&R CONTRACT NO. RFQ 786B		
							P&R PROJECT NO. 43502-15-001-14470619		
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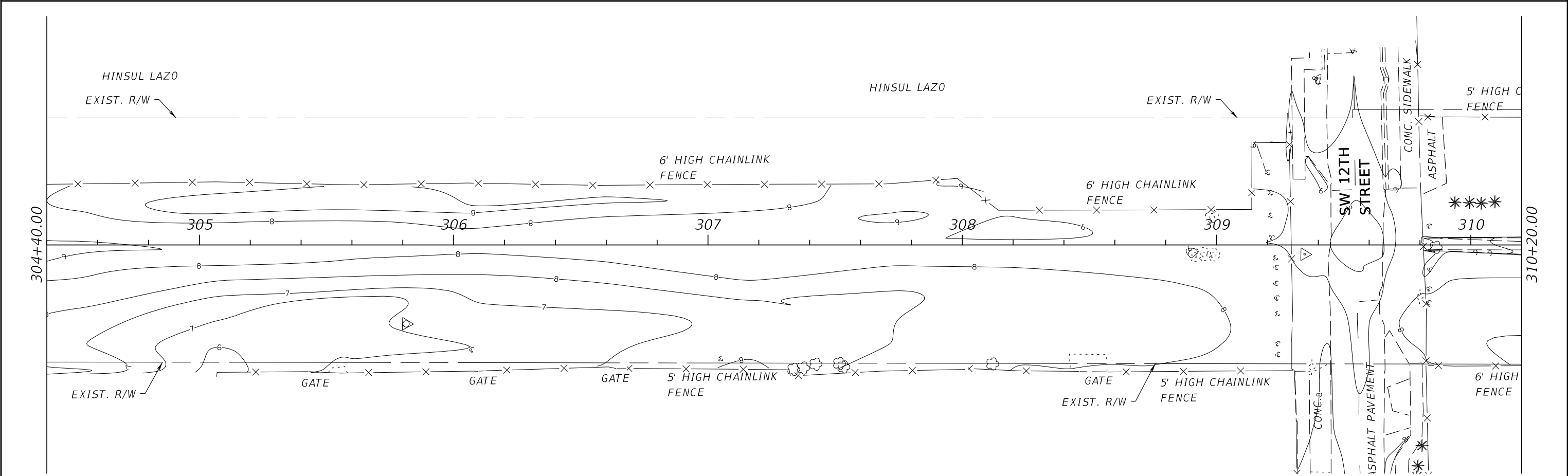
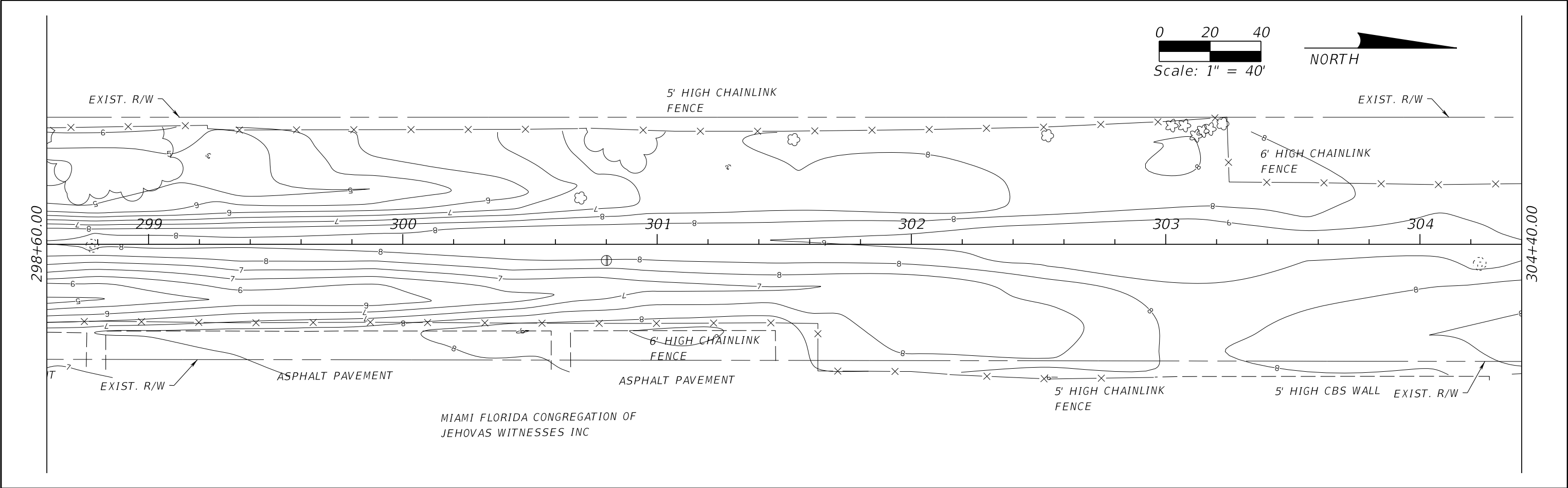
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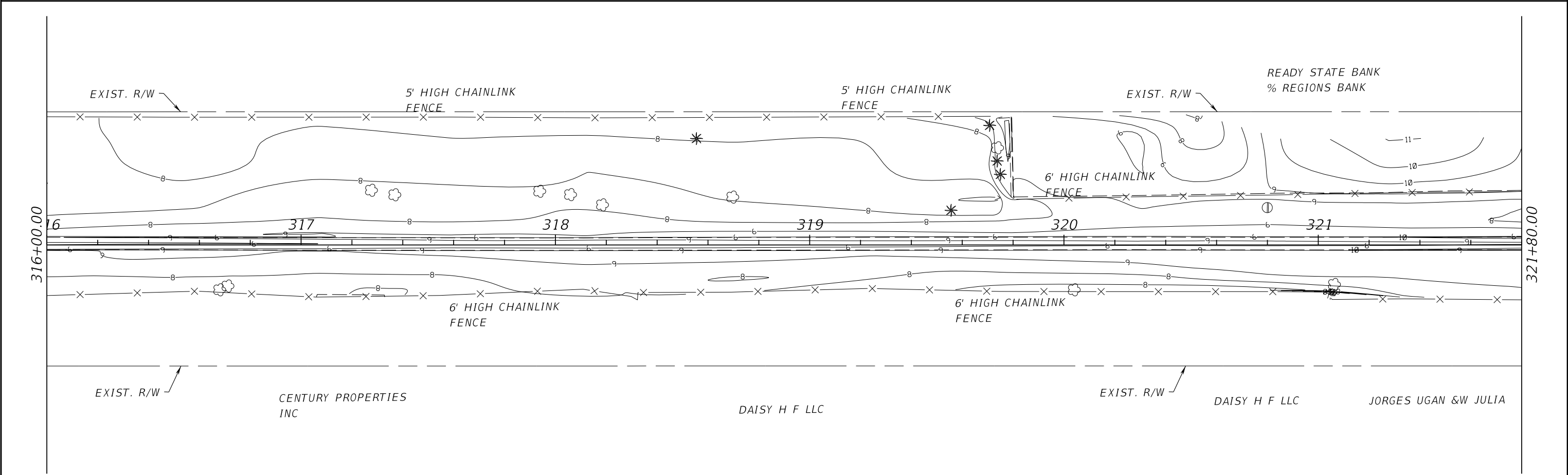
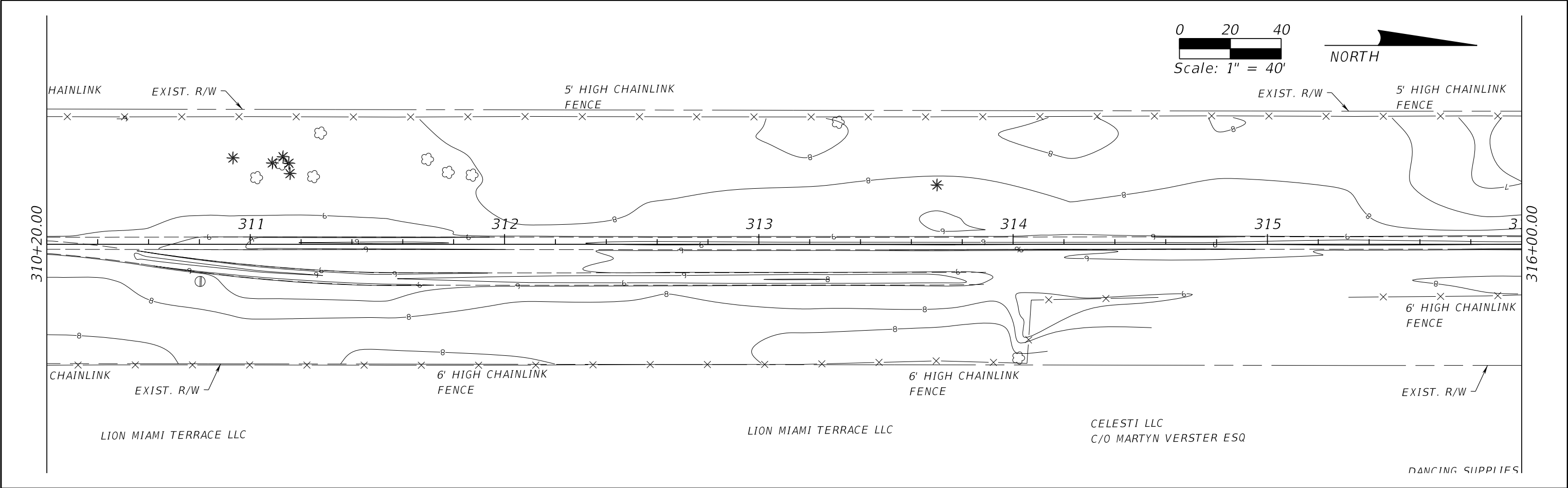
REVISIONS				MAPS PREPARED BY: CH PEREZ & ASSOCIATES CONSULTING ENGINEERS, INC CERTIFICATE OF AUTHORIZATION NO. EB-25976 / LB-7360 9594 NW 41 STREET, SUITE 201 MIAMI, FLORIDA 33178 (305)592-1070 / FAX: (305)592-1078 FRANK L. NUNEZ, JR., PSM P.S.M. LICENSE NO. 6382	LUDLAM TRAIL CORRIDOR PD&E STUDY			TOPOGRAPHIC SURVEY	SHEET NO.
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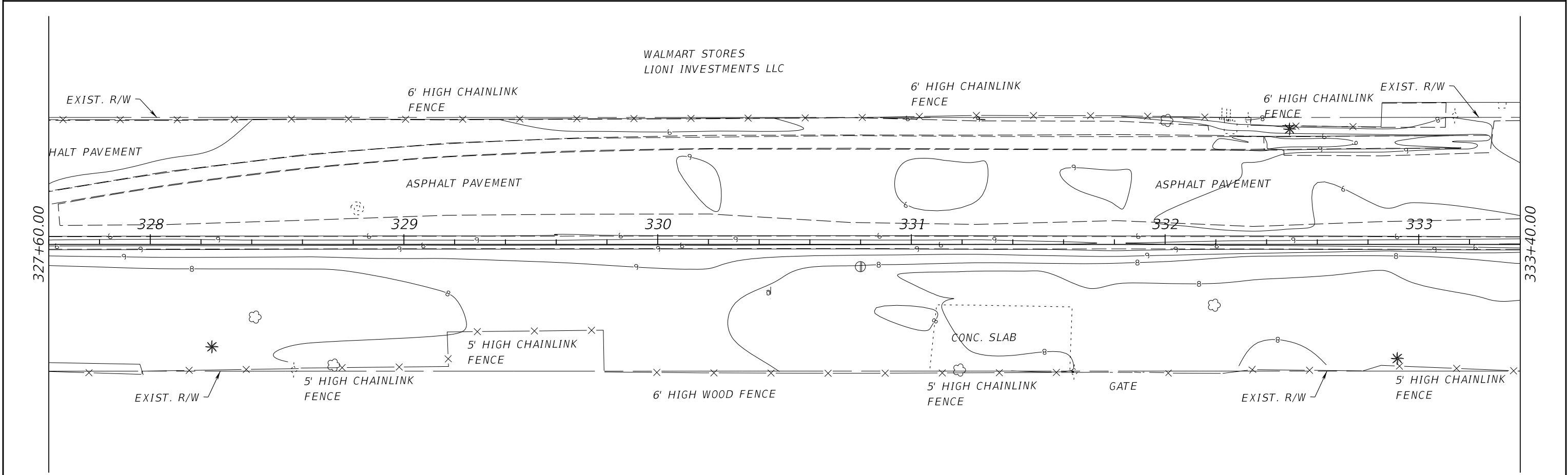
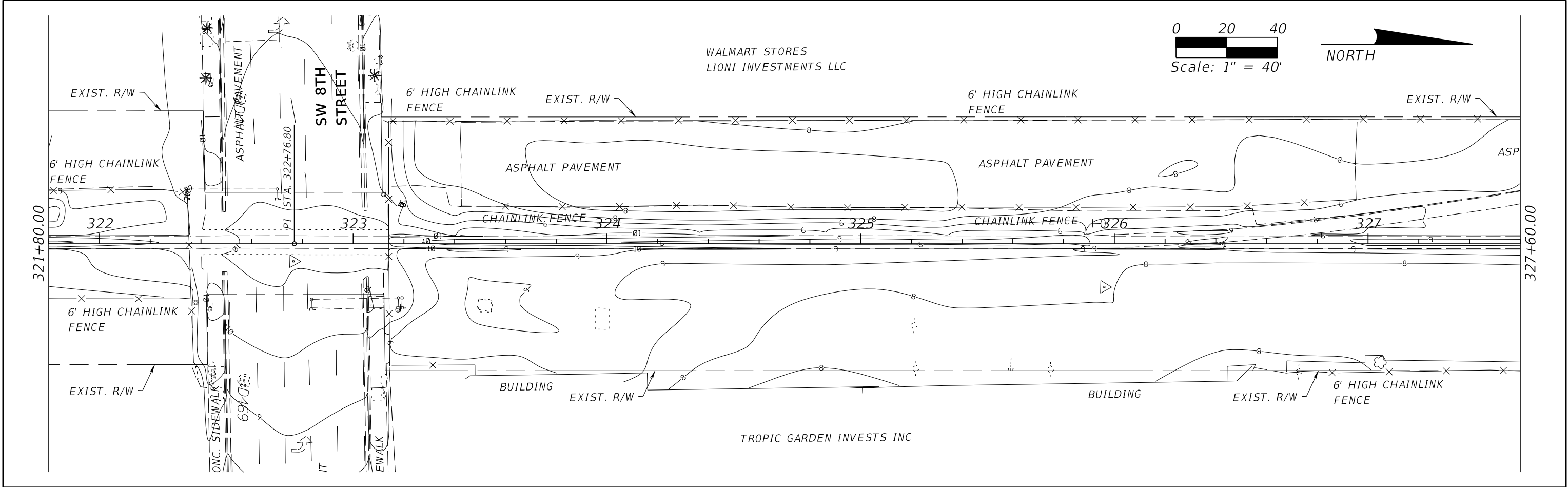
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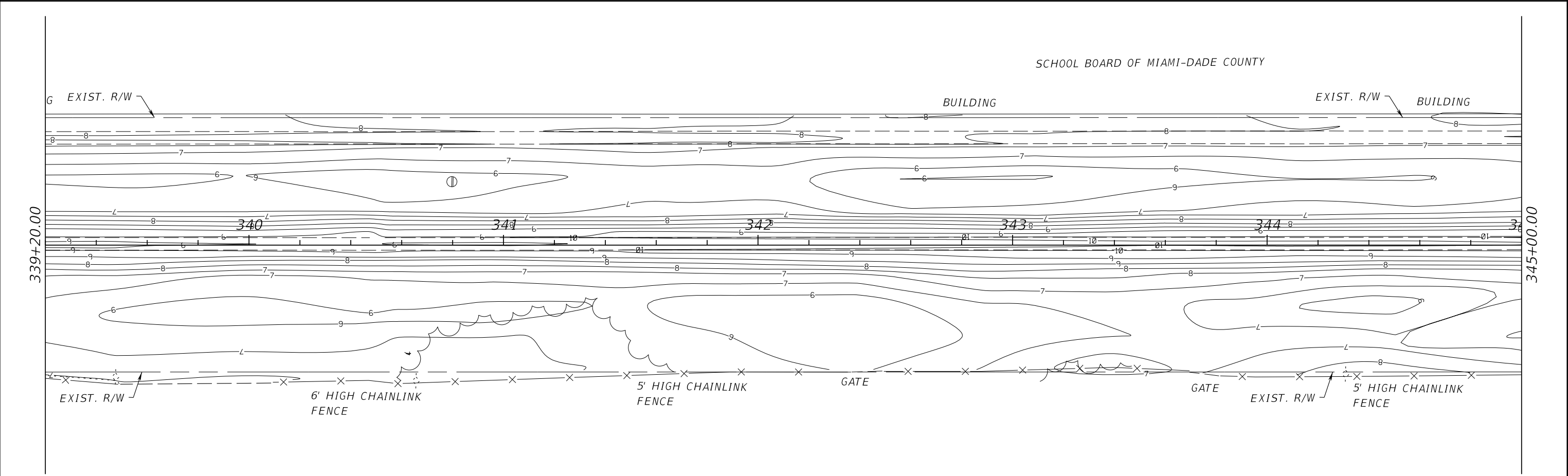
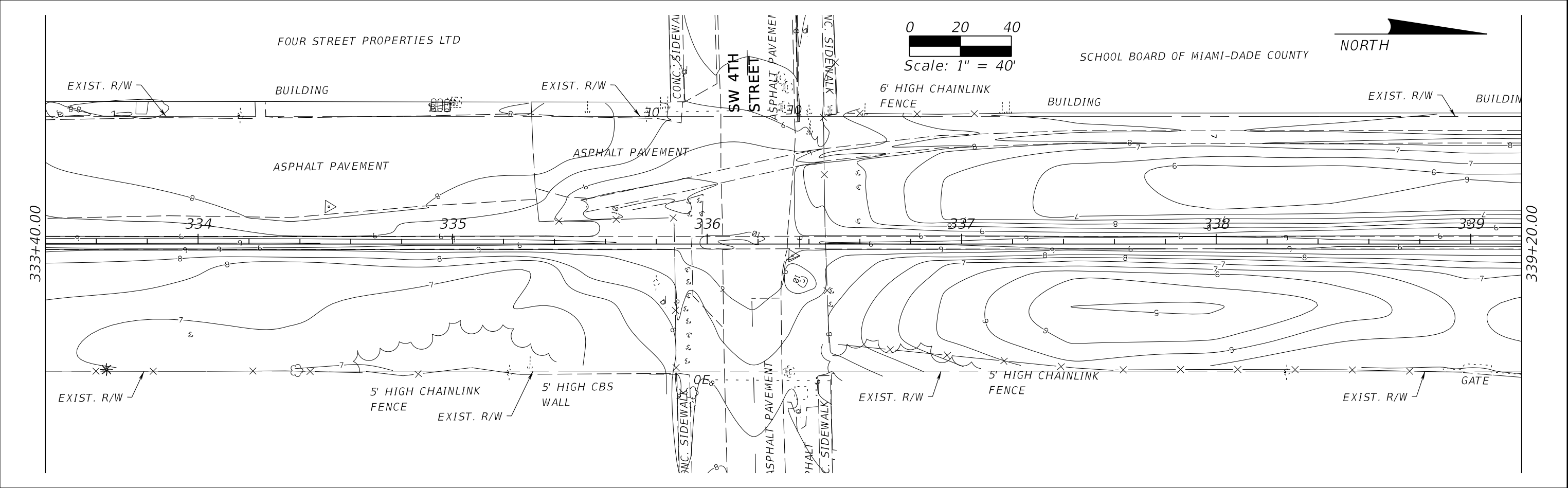
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DATE	DESCRIPTION	DATE	DESCRIPTION		Miami-Dade County Parks, Recreation, and Open Spaces (MDPROS)	Hickman Building 275 NW 2nd Street Miami, FL 33128 305-755-7800	P&R CONTRACT NO. RFQ 786B P&R PROJECT NO. 43502-15-001-14470619		20



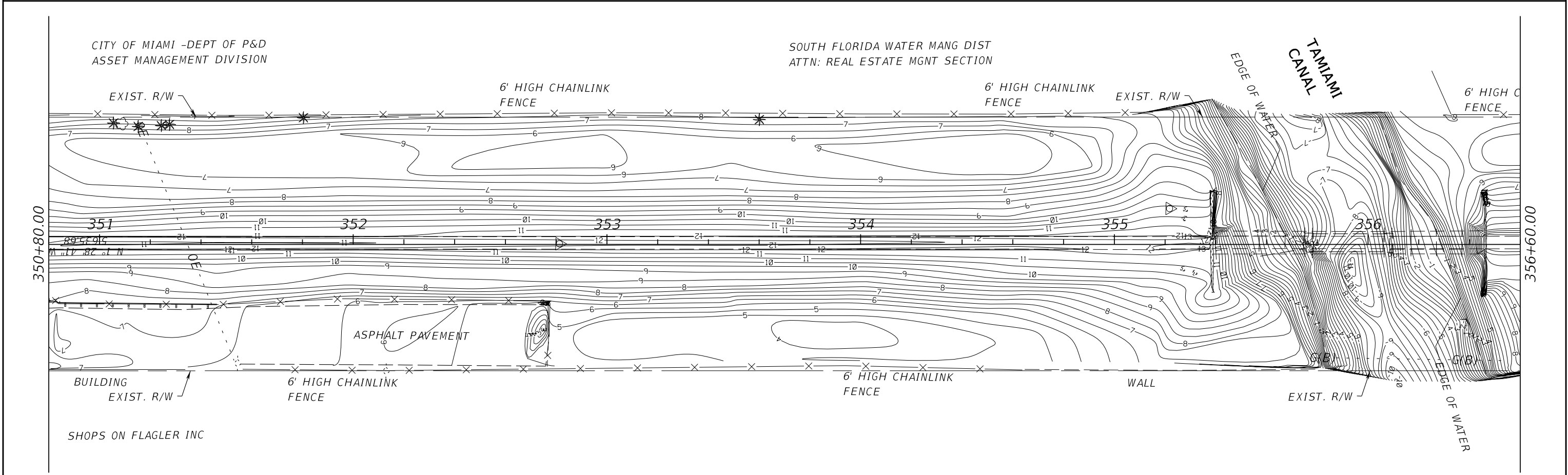
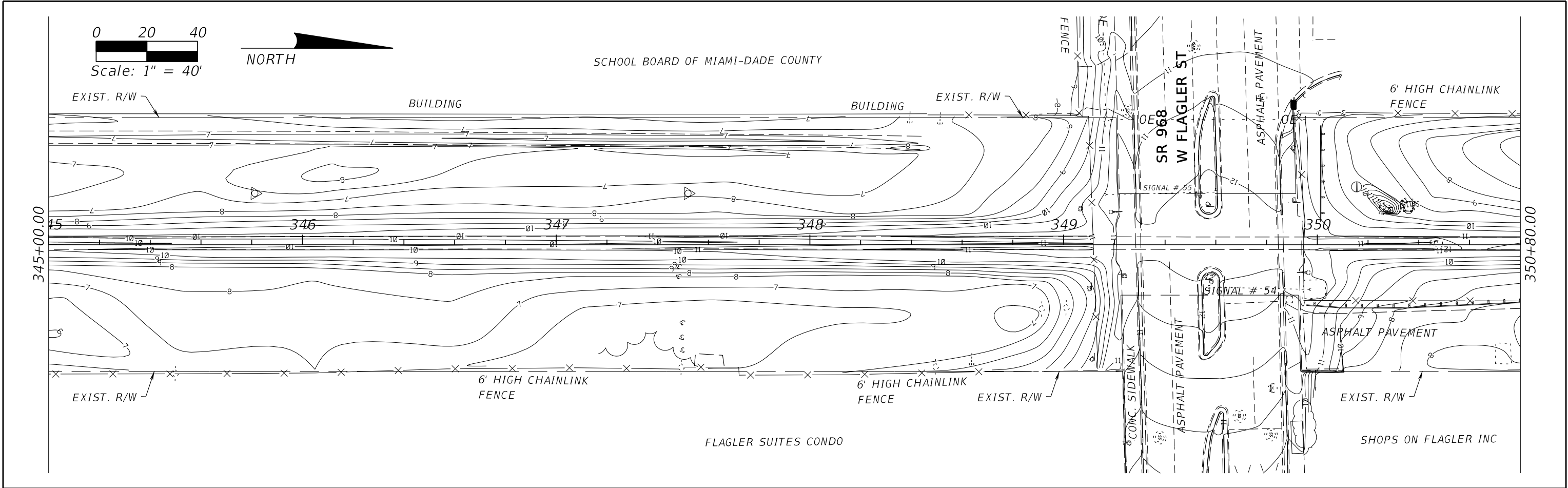
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DATE	DESCRIPTION	DATE	DESCRIPTION		Miami-Dade County Parks, Recreation, and Open Spaces (MDPROS)	Hickman Building 275 NW 2nd Street Miami, FL 33128 305-755-7800	P&R CONTRACT NO. RFQ 786B		21
							P&R PROJECT NO. 43502-15-001-14470619		



REVISIONS				MAPS PREPARED BY: CH PEREZ & ASSOCIATES CONSULTING ENGINEERS, INC CERTIFICATE OF AUTHORIZATION NO. EB-25976 / LB-7360 9594 NW 41 STREET, SUITE 201 MIAMI, FLORIDA 33178 (305)592-1070 / FAX: (305)592-1078 FRANK L. NUNEZ, JR., PSM P.S.M. LICENSE NO. 6382	LUDLAM TRAIL CORRIDOR PD&E STUDY			SHEET NO.
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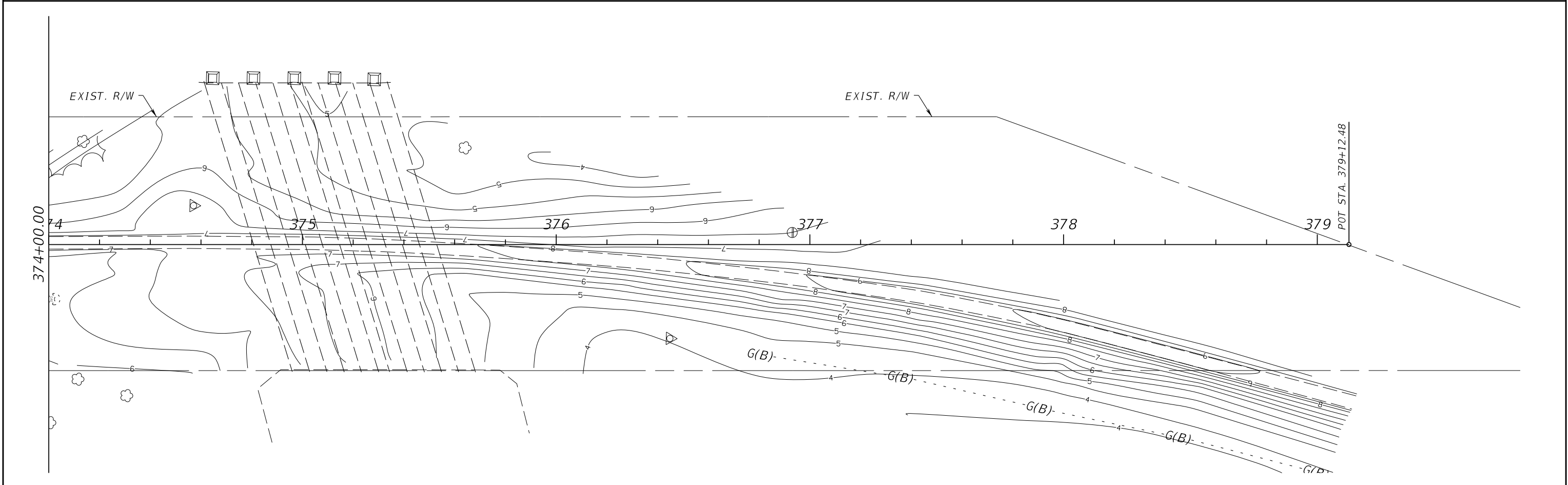
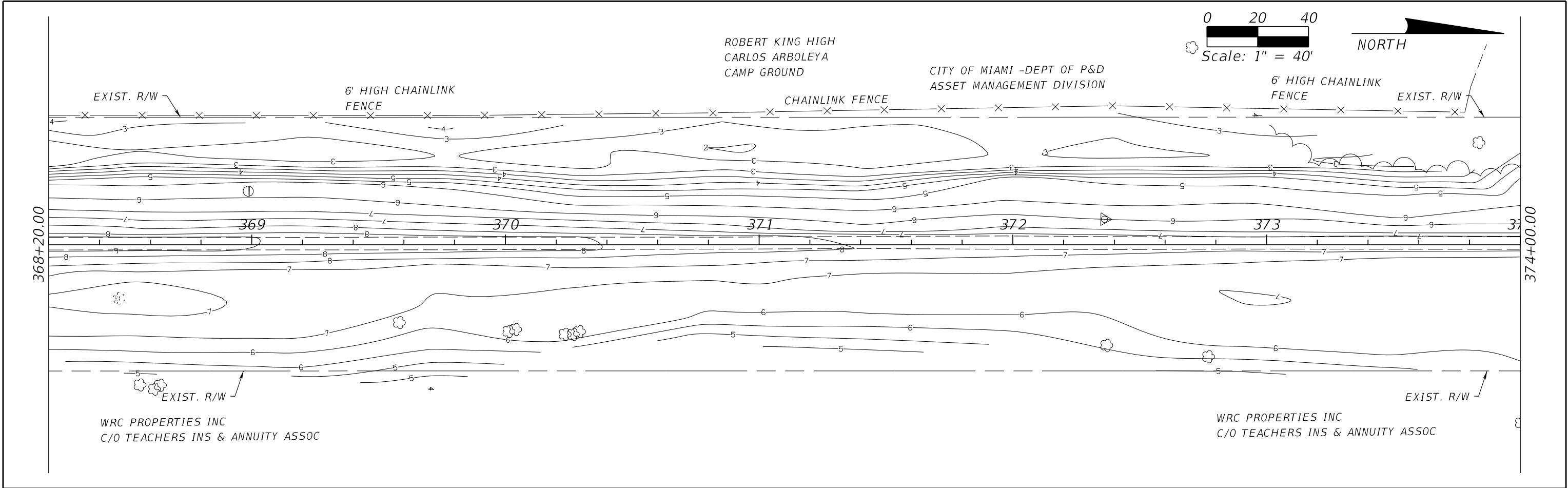


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DATE	DESCRIPTION	DATE	DESCRIPTION									
				Miami-Dade County Parks, Recreation, and Open Spaces (MDPROS)			Hickman Building 275 NW 2nd Street Miami, FL 33128 305-755-7800			P&R CONTRACT NO. RFQ 786B P&R PROJECT NO. 43502-15-001-14470619		23



REVISIONS				MAPS PREPARED BY: CH PEREZ & ASSOCIATES CONSULTING ENGINEERS, INC CERTIFICATE OF AUTHORIZATION NO. EB-25976 / LB-7360 9594 NW 41 STREET, SUITE 201 MIAMI, FLORIDA 33178 (305)592-1070 / FAX: (305)592-1078 FRANK L. NUNEZ, JR., PSM P.S.M. LICENSE NO. 6382	LUDLAM TRAIL CORRIDOR PD&E STUDY			SHEET NO.
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							RFQ 786B	
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						43502-15-001-14470619		

TOPOGRAPHIC SURVEY



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