COUNTY OF IMPERIAL

DEPARTMENT OF PUBLIC WORKS

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COUNTY OF IMPERIAL PUBLIC WORKS

Request for Proposals: Niland Storm Drainage Feasibility Study Report, County Project Number 7096NSDFS

ADDENDUM NO. 1 **December 15, 2023**

This *ADDENDUM* is hereby made part of the Contract Documents and specifications to the same extent as if originally included therein, and shall be signed by the Bidder and included with the proposal.

1. **Can the County please provide a copy of the 2007 Niland Drainage Master Plan as referenced in the RFP?**
   a. See attached

2. **In appears that the sample consultant agreement provided in Exhibit C is not complete and cuts off after section 19.6. Can the County please provide a complete copy of the sample consultant agreement for review?**
   a. See attached

3. **In Section IV. Proposal Content and Information, the Statement of Qualifications requirements includes "experience related to multi-modal transportation planning." Because this is not a transportation planning project, can the County please confirm this requirement?**
   a. Consultants should describe the company's qualifications and experience related to storm drainage feasibility and hydrology studies and drainage infrastructure capital improvement projects.

4. **The County's entry for this project on the "Projects Out to Bid" page lists the proposal due date as December 14th; however, the RFP lists the due date as December 29th. Can the County please confirm that proposals are due December 29th?**
   a. Proposals for this RFP are due on Friday, December 29, 2023 at 4:00 p.m.

5. **Given that the RFP did not provide the full sample consultant agreement, would the County please extend the question deadline to account for any questions that should arise regarding the contract? Conversely, would the County allow consultants to submit contract exceptions as part of the proposal?**
   a. No, the County will not extend the question deadline for questions regarding the contract. No changes to the consultant agreement shall be made.

FOR

John A. Gay, P.E.
Director of Public Works

Acknowledgement of Addendum No. 1

The general contractor is responsible for advising any and all subcontractors of this change. Each bidder must acknowledge receipt of this addendum in the noted space below and where indicated on the Bidder's Proposal Section of the Special Provisions. This Addendum must be attached to the proposal.

License No: _____

Print or Type Company Name: _____

Print or Type Authorized Name: _____

Authorized Signature of Contractor: _____

Date Signed: _____

TOWN OF NILAND
DRAINAGE MASTER PLAN

Prepared By:

Nolte Associates, Inc.
1605 West Main Street
El Centro, CA 92243
&
15070 Avenue of Science, Suite 100
San Diego, CA 92128

January 2007

TOWN OF NILAND
DRAINAGE MASTER PLAN

Prepared For:

Imperial County Planning and Development Services Department
801 Main Street
El Centro, CA 92243

Prepared By:

Nolte Associates, Inc.
1605 West Main Street
El Centro, CA 92243
&
15070 Avenue of Science, Suite 100
San Diego, CA 92128

January 2007

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1. EXECUTIVE SUMMARY

The Townsite of Niland is expanding to accommodate the growing population in the Imperial Valley. The existing infrastructure is deficient and was not designed to account for this growth. To resolve the existing deficiencies and plan for this growth, a Drainage Master Plan has been prepared. The limits of the study are the Southern Pacific Railroad to the north and Highway 111 to the west. The eastern boundary is approximately 240 feet east of Commercial Avenue until it reaches Seventh Street. The boundary travels west along Seventh Street until it reaches International Avenue. It then travels south to Alcott Road, which signifies the most southern end of our study limits. Within these limits, there are no storm water collection systems. Currently, storm water runoff ponds in ditches located alongside the streets and often spills into the roadway causing potential traffic and pedestrian accidents. One of the largest concerns is near the school located at the west end of town where children often walk in the streets to avoid ponded water at the sides of the streets.

To resolve the existing deficiencies and accommodate future development of the town, several proposed storm drain systems are recommended. These systems include curb and gutter to convey runoff to storm drain inlets. Runoff will collect in the inlets and be conveyed via underground storm drain pipes to detention facilities. The detention facilities will detain the storm water runoff until it can be discharged to an Imperial Irrigation District drain. The detention facilities can be used as recreational parks during dry conditions which would benefit the entire community. Once all of the recommended improvements have been implemented, the overall quality of life in Niland will dramatically increase.

2. INTRODUCTION AND PURPOSE

A Drainage Master Plan is needed for the unincorporated Townsite of Niland. Within this area is a residential “colonia” which was originally developed with minimal drainage provisions. The roads did not include curb and gutter, rather the intent was that road drainage would be conveyed within shoulder area borrow pits to nearby drains. The existing overall drainage scheme flows from south to north.

The Drainage Master Plan will be a planning tool for the County to plan for future drainage related improvements. The principal objective of this project is to provide the community with a road map for future drainage improvements that will enhance the safety and health of area residents by planning drainage related improvements. Under existing conditions, rainfall collects and ponds in the shoulder areas, which remain wet for weeks. This creates a risk for the safety of pedestrians, especially schoolchildren, as they walk on the paved road to avoid the wet, clayey shoulder, placing them in direct conflict with vehicular traffic. The wet clay also causes mud tracking onto paved roads which increases road hazards to motorists and contributes to PM 10 dust hazards to adjacent residents.

The Master Plan includes recommendations for future installations of curb, gutter, sidewalk, and underground storm drain systems. These systems in their entirety will provide a cohesive synchronicity in minimizing pedestrian and vehicular conflicts to enhance safety to pedestrians by keeping them off the roadways, improve motorist safety by reducing mud tracking onto paved roads, and reduce PM 10 dust hazards to nearby residents. These proposed improvements will

cause a reduction in Townsite public street maintenance requirements along with reduction of vector generating environments.

A hydrologic model was developed using industry-standard engineering practices. First, watershed boundaries, points of flow concentrations and land uses were established. The data was then entered into hydrologic modeling software and the 100-year peak storm flows were calculated. Finally, a hydrology exhibit was prepared to illustrate the modeling procedure and hydrologic characteristics of the existing conditions. Along with the hydrologic model, hydraulic calculations were conducted to determine the recommended pipe sizes, lengths, material, and detention basin sizes.

3. PLANNING AREA CHARACTERISTICS

3.1 Area Characteristics

The community of Niland is located in northern Imperial County along State Highway 111, east of the Salton Sea, approximately 30 miles due north of the City of El Centro. Its northern border is the Union Pacific Railroad tracks before the railroad makes a turn due south and then the railroad tracks form the easterly boundary of Niland. Highway 111 forms its western boundary and Alcott Road forms the southern boundary. These limits were established by the Imperial County Planning and Development Services prior to the start of this project.

The central service area can be characterized as residential and small business, with agriculture surrounding the Town of Niland. Agriculture and agrarian-oriented products are the mainstays of the local economy. The current population is 1,224 persons and 433 households. The topography of the area is essentially flat, with the ground surface generally sloped downward toward the southwest. The Imperial Irrigation District has several canals, drains, and laterals in the south and southwest portions of the Town. Agricultural drainage is under the responsibility of the Imperial Irrigation District, while urban drainage is under the responsibility of the County of Imperial.

3.2 Soil Type

The soil classification used in this analysis was Type “D”. The majority of the underlying soil appears to be clay, which has very slow infiltration rates. Type “D” describes soils having very slow infiltration rates when saturated. They have also been classified as severely erodible, requiring protective and corrective measures prior to and during soil disturbances. The Type “D” soil classification is taken from the San Diego County Hydrology Manual. The soil in Niland was compared to the classifications in San Diego County because the hydrologic modeling software incorporates those soil classifications.

3.3 Land Uses

Land uses for the purpose of this study are residential homes, a school, commercial, and light industrial areas with the surrounding areas consisting of agricultural and undeveloped land. The future development of Niland will consist of additional residential, commercial, and light industrial developments to go along with the existing infrastructure (see zoning on Niland Urban Area Map – Figure 1 in Appendix A).

4. METHODOLOGY

4.1 Modified Rational Method

Per the County of Imperial Engineering Design Guidelines Manual (dated September 9, 2004) for watersheds greater than 0.5 square mile with stream junctions, we used the modified rational formula, as excerpted below. A draft document prepared by Boyle Engineering was also used for the hydrologic analysis. The draft document has a description of the El Centro rainfall gage data used along with a Rainfall-Depth-Duration chart and Intensity-Duration-Frequency chart. The Imperial County Public Works Department provided this draft document to Nolte Associates, Inc. to use in this Drainage Master Plan. The draft document can be found in Appendix B of this report. Computer calculations were prepared using the Advanced Engineering Software (AES) RATSCx 2004 program, version 2.0. The calculations are included in Appendix D.

From the Engineering Design Guidelines Manual, this method is as follows:

Q = CIA, where:

Q is the discharge in cubic feet per second (cfs)

C is a runoff coefficient, proportion of the rainfall that runs off the surface (no units).

I is the average rainfall intensity in inches per hour for a storm duration equal to the time of concentration (Tc) of the contributing drainage area.

A is the drainage area in acres tributary to design point.

Runoff Coefficient, C

For the planned build-out conditions outlined on the Niland Urban Area Map in the Imperial County General Plan, recommended values based on engineering judgment were used for this project. These values were reviewed by the Imperial County Public Works Department and found to be acceptable. A table of these C-values can be found in Appendix C and the Niland Urban Area Map has been inserted in Appendix A.

Rainfall Intensity, I

Using the computed time of concentration and nomograph developed using the Intensity-Duration-Frequency chart found in the draft document prepared by Boyle Engineering and provided by the Imperial County Public Works Department, the rainfall intensity is computed by the hydrologic modeling program. The computer modeling program first calculates the time of concentration for each basin, then interpolates the corresponding intensity using the nomograph. That intensity is used in the hydrologic calculations.

Time of Concentration, Tc

The time of concentration is the time required for runoff to flow from the most remote part of the watershed to the outlet point under consideration. The hydrologic modeling program calculates the time of concentration for each basin. The modeler needs to input the flow path length, elevations at start and end of flow path, and the type of terrain.

The rational method calculations were performed using Advanced Engineering Software (AES) RATSCx 2004 program, version 2.0. The model output is provided in Appendix D of this report. The model was developed from the drainage boundaries and points of storm flow concentration shown on the Hydrology Maps (Appendix E). These were determined using available topographic maps, field investigations, and other survey data completed by Nolte Associates in 2005.

4.2 Storm Frequency

Per the direction of the Imperial County Public Works Department, this study used the 100-year, 1-hour frequency storm. A nomograph was developed using the Intensity-Duration-Frequency chart found in the draft document prepared by Boyle Engineering is located in Appendix B.

4.3 Design Assumptions

The following assumptions were made for the hydrologic and hydraulic analyses of the current drainage infrastructure and future drainage improvements:

1. The outlet pipes for all detention facilities are twelve inches in diameter to allow for proper discharge to the Imperial Irrigation District drains. Evaporation while runoff is detained was not considered in this Master Plan because typically it is accounted for during drainage facility design.

2. The minimum pipe slope shall be 0.001 (0.1%) for all recommended improvements.

3. The minimum pipe cover shall be 24 inches for all recommended improvements.

4. The flows used to plan and size underground storm drain pipes were obtained by using the contributing area multiplied by 1.5 cfs/acre and checked with the hydrologic results for consistency. The hydrologic results show an average A/Q of 1.5 cfs/acre. For future designs, a more detailed hydrologic analysis is recommended.

5. Reinforced Concrete Pipe (RCP) shall be used for all underground storm drains.

5. SUMMARY

5.1 Hydrology Results

The results of the hydrologic analysis are summarized in Table 5.1.1 on the next page. The complete AES hydrologic models are located in Appendix D of this report. The node numbers, watershed boundaries, and drainage systems discussed in this section are shown on the maps located in Appendix E.

Table 5.1.1 – Hydrologic Results

Location	Node Number	Drainage Area (ac)	Q_{100} (cfs)
Intersection of Highway 111 & Seventh St.	106	151.2	316.5
Intersection of International Ave. & Seventh St.	210	92.1	189.2
Intersection of Highway 111 & Alcott Rd.	307	93.4	143.4

5.2 Recommended Facilities/Improvements

The recommended pipe size table, included in Appendix F of this report, lists recommended pipe sizes for proposed conditions. The Proposed Storm Drain and Detention Basin System Map shown in Appendix G are to be considered as the trunk pipelines. When further development of the town occurs, the individual developments will need to design a storm drain system to capture and convey runoff. Those systems will then be able to connect into the trunk pipelines. The pipes were sized to consider ultimate build-out of the contributing areas based on the Niland Urban Area Map from the Imperial County General Plan done in March 1997. A copy of this map is included in Appendix A.

An inlet analysis was not performed for this report; rather, approximated flows were entered at various nodes along the storm drain line to determine appropriate slope and pipe sizing. For future design reports, a full scale inlet analysis including location, sizing, and hydrologic analysis is recommended. The types of recommended inlets are not known at this time, but the Imperial County Engineering Design Guidelines Manual states that grate inlets should be avoided when possible. Curb inlets would be sufficient to capture runoff from the proposed curb and gutter systems.

The storm drain analysis for proposed conditions was analyzed per guidelines laid out in the Imperial County Engineering Design Guidelines Manual. The assumptions and guidelines used in this analysis are listed in Section 4.3.

Due to the mild slopes of the recommended storm drain pipes, sediment and debris could accumulate in the pipes. It is recommended that regular maintenance and repairs be performed on all storm drain systems within the town. Inlets and culverts should be cleaned and inspected after each major storm event.

The detention basin sizing calculations, included in Appendix F of this report, lists a recommended detention basin size for proposed conditions. The approximate detention basin location is shown on the Proposed Storm Drain and Detention Basin System Map found in Appendix G of this report. The recommended detention basin locations were determined by analyzing the existing drainage patterns, proposed storm drain lines, and availability of land. The detention basin volume was calculated using a simplified hydrograph, 100-year flows, and approximate time of concentrations. For future design, a full scale detention basin analysis is recommended. During future detention basin design, the issues of hydraulic residence times and vector concerns must be accounted for to remain in compliance with the National Pollutant

Discharge Elimination System (NPDES). All detention basins will empty into Imperial Irrigation District drains via a 12-inch Polyvinyl Chloride (PVC) pipe. The depths of these drains are unknown and may require a pump station to be installed to pump detained runoff to the drains. The Imperial Irrigation District has a policy that does not allow pumping into their drains. It is recommended that pumping be avoided whenever possible. However, in some cases the only option is to install a pump station, so this Master Plan has included the possibility for planning purposes. The pump stations would be duplex submersible with concrete wet wells, screens to capture large debris, and float switch controls with high water alarms. Additional pump station details would be determined during design. The recommended basin is listed below:

- The basin southeast of the intersection of Niland Avenue and Highway 111 requires a capacity of 61.3 acre-feet. Due to the size of the pipes discharging to this basin, the depth of the basin should be 8 feet. The surface area of the basin would then be approximately 348,100 square feet (8.0 acres). This detention basin will discharge via a 12-inch PVC pipe to the "R" Drain near the intersection of Alcott Road and Highway 111. Using the contour data for the "R" Drain and the estimated bottom of detention basin, it appears that a pump station is not needed to carry runoff to the "R" Drain. The discharge can flow via a gravity pipeline to the "R" Drain.

For storm drain pipe crossings, the design must be in accordance with the Imperial Irrigation District's Standard Drawing L-3086. For proposed storm discharge pipes from a detention facility, the design must be in accordance with the Imperial Irrigation District's Standard Drawing 12F-6855. When beginning the detention facility design, the Imperial Irrigation District's Developer Guide 2006 should be reviewed for possible impacts to the existing drainage system. If further impacts to Imperial Irrigation District's water facilities result, then the Imperial Irrigation District's Water Department must be contacted regarding encroachments, drainage, and water service.

The proposed detention basin can be designed as a mixed-use facility. The basin can be lined with grass and used as recreational fields during dry conditions. This would serve to benefit the community in multiple ways, thus improving the overall quality of life in Niland. Exact placement of the proposed detention facility can be moved to accommodate future development. For example, the proposed basin along Niland Avenue can be set back from the road to allow for highway fronting space to be developed.

6. PRIORITY RATING SYSTEM

The priorities of drainage improvements were taken from discussions with the Imperial County Public Works Department and the Imperial County Planning and Development Services. Both agencies agree that the school at the west end of town is at the top of the priority list. Currently, children attending school during rainy conditions must walk in the street to avoid ponded water on the sides of the roads. The children are then put at tremendous risk by walking in the streets. The potential is high for accidents involving automobiles and children. Based on this possible scenario, the priorities for improvements are listed below:

1. Southwest corner of town, west of International Avenue and south of 4th Street including Niland Avenue, Lotus Avenue (Highway 111), Isis Avenue, 4th Street, 5th Street, 6th Street, and 7th Street.

2. Southeast corner of town, east of International Avenue and south of 4th Street including Luxor Avenue, Memphis Avenue, 4th Street, 5th Street, 6th Street, and 7th Street.

3. North side of town, north of 4th Street including 1st Street, Main Street, and 3rd Street. This priority also covers the cross streets north of 4th Street including Lotus Avenue (Highway 111), Isis Avenue, International Avenue, Luxor Avenue, Memphis Avenue, and Niland Avenue.

Priority 1 above is categorized as a short-term need, meaning that the goal is to have the drainage improvements completed within 5 years. Priority 2 above is a medium-term need and the goal is to have those improvements completed within 10 years. Priority 3 above is a long-term need and the goal is to have those improvements completed within 15-20 years. Each of the three priorities has been categorized as phases in the Capital Improvements Program in Section 8 below. Phase 1 corresponds to Priority 1, Phase 2 corresponds to Priority 2, and Phase 3 corresponds to Priority 3.

7. COST OPINION FOR MASTER PLAN FACILITIES

The cost opinions for this study are based on previous master planning and construction bid estimates. These are planning level cost estimates only and should be revised accordingly once the design work is completed. The cost estimates include approximate material costs, material quantities, installation, engineering design costs, geotechnical, surveying, construction management, Imperial Irrigation District review fees, and Imperial County Encroachment permit costs. The cost estimates do not include Caltrans permitting costs or any environmental documentation that could be required. Due to rising construction costs over the past few years, each cost opinion projects the construction cost for each year from 2006 through 2010. The annual increase is set at 15% which appears to be consistent with the annual increase in construction costs during the past few years. Construction costs are also projected for the years 2015 and 2020 with an annual increase of 5% after 2010. The itemized cost opinions and a summary of cost increases are included in Appendix H.

8. CAPITAL IMPROVEMENTS PROGRAM WITH PHASING

We recommend ultimately installing curb and gutter with sidewalk on all city streets, a storm drain system, and detention basin within the town of Niland. Realistically these improvements cannot be completed all at the same time, therefore we have provided phases in which to undertake the process. Priority is first placed on installing a box culvert system that will be used as the backbone of the storm drain system as a whole. In reading the phase recommendations below, it would be helpful to look at the Proposed Storm Drain and Detention Basin System Map found in Appendix G and the CIP Phase Breakdown found in Appendix H of this report.

8.1 Phasing

- Phase 1 (Short Term – 5 years): We recommend installing a curb and gutter with sidewalk system along Niland Avenue. We recommend that a dual pipe system, which shall serve as the main line within the Townsite of Niland, be installed along Niland Avenue. For Phase 1, the beginning of this dual pipe system will be at the intersection of International Avenue and Sixth Street (Junction J-3, see Appendix G). Two reinforced concrete pipes are recommended and will range in size from 48 inches up to 60 inches. The 48-inch RCPs along Niland Avenue will start at Sixth Street and run to Seventh Street. Both pipes will then transition to 60-inch RCPs which will run to the intersection of Niland Avenue and Highway 111. The 60-inch RCPs will then change direction to the southeast and outlet into a detention basin. The detention basin will be installed just southeast of the intersection of Niland Avenue and Highway 111. Curb inlets are recommended along Niland Avenue to collect runoff. Exact locations will be determined during design phases.

  In line with this dual pipe system, we recommend installing a 36-inch RCP along International Avenue from Fourth Street to Fifth Street, then transition to a 42-inch RCP from Fifth Street to Sixth Street which ties directly into the junction structure (Junction J-3, see Appendix G) at the intersection of Niland Avenue and Sixth Street. Curb inlets are recommended along International Avenue to collect runoff. Exact locations will be determined during design phases. Curb, gutter and sidewalk are also recommended for International Avenue from Fourth Street to Seventh Street.

  To capture runoff in and around the school area, we recommend installing a curb, gutter and sidewalk system with curb inlets west of International Avenue along Fourth Street, Fifth Street, Sixth Street, and Seventh Street; and south of Fourth Street along Isis Avenue and International Avenue. Exact locations of curb inlets will be determined during design phases. The captured runoff would be conveyed by several underground pipes. Along Fourth Street from Highway 111 to Isis Avenue, we recommend installing a 24-inch RCP. Then, along Isis Avenue from Fourth Street to Sixth Street, we recommend installing a 54-inch RCP. The reason for the large size pipe along this street is to accommodate future expansion of the underground collection system which would occur during Phase 3 (below). Along Sixth Street from Highway 111 to Isis Avenue, we recommend installing a 24-inch RCP. This 24-inch RCP would junction with the 54-inch RCP along Isis Avenue. From that junction at the intersection of Sixth Street and Isis Avenue, a 60-inch RCP is recommended that runs along Isis Avenue to Seventh Street. Then, a 72-inch RCP is recommended for Seventh Street to run from Isis Avenue to Niland Avenue. At Niland Avenue, a junction structure is recommended to tie into one of the recommended 60-inch RCPs that make up the dual pipe system.

- Phase 2 (Medium Term – 10 years): We recommend installing curb and gutter with sidewalk along Niland Avenue from Sixth Street to Fourth Street. From the junction structure (Junction J-3, see Appendix G) at the intersection of Sixth Street and Niland Avenue, extending the dual pipe system is recommended. From the junction structure,

two 36-inch RCPs are recommended and will run to the intersection of Fourth Street and Luxor Avenue. Curb inlets will be installed along this stretch, but the exact locations will be determined during the design phase.

To capture runoff in the eastern portion of town, we recommend installing a curb, gutter and sidewalk system with curb inlets east of International Avenue along Fourth Street, Fifth Street, Sixth Street, and Seventh Street; and south of Fourth Street along Luxor Avenue and Memphis Avenue. Exact locations of curb inlets will be determined during design phases. The captured runoff would be conveyed by several underground pipes. Along Memphis Avenue from Fourth Street to Fifth Street, we recommend installing an 18-inch RCP. Continuing on Memphis Avenue, we recommend installing a 24-inch RCP from Fifth Street to Sixth Street. Then, from Sixth Street to Seventh Street, we recommend installing a 36-inch RCP. From the intersection of Seventh Street and Memphis Avenue, we recommend installing a 36-inch RCP along Seventh Street to Luxor Avenue. At Luxor Avenue and Seventh Street, a junction structure is recommended to junction a recommended 24-inch RCP that will run from the intersection of Luxor Avenue and Sixth Street to the structure (I-16, see Appendix G) at Seventh Street. Then, from the junction structure, we recommend installing a 36-inch RCP to the intersection of International Avenue and Seventh Street. Lastly, we recommend installing a 42-inch RCP from International Avenue that will tie into the large junction structure (J-4, see Appendix G) at the intersection of Niland Avenue and Seventh Street discussed in Phase 1.

- Phase 3 (Long Term – 15-20 years): We recommend installing curb and gutter with sidewalk along First Street, Main Street, and Third Street. We also recommend installing curb, gutter and sidewalk north of Fourth Street on Isis Avenue, International Avenue, Niland Avenue, Luxor Avenue, and Memphis Avenue. Curb inlets are recommended along all of the streets mentioned in Phase 3 to collect runoff. Exact locations will be determined during design phases. The remainder of the dual pipe system along Niland Avenue would be completed during Phase 3 improvements. The dual pipe system extension in Phase 2 ended at the intersection of Niland Avenue and Fourth Street. We recommended installing two 36-inch RCPs along Niland Avenue from Fourth Street to Third Street. A junction structure (J-1, see Appendix G) is recommended at Niland Avenue and Third Street to accommodate additional pipes upstream. From the upstream side of the junction structure, we recommend a 24-inch RCP that would run to the intersection of Niland Avenue and Main Street. We also recommend installing a 48-inch RCP from the east side of the junction structure (J-1, see Appendix G) that would run along Third Street to the intersection of Third Street and Commercial Avenue. Then, we recommend installing a 48-inch RCP from the intersection of Third Street and Commercial Avenue to the northeast and intersecting with the existing culvert located under the Southern Pacific Railroad. The intent is that runoff from the northeast will be conveyed in the proposed underground storm drain system rather than sheet flowing through Niland.

  The northwest portion of Niland also requires an extension to the proposed storm drain system recommended in Phase 1. One of the pipe systems in Phase 1 ended at the intersection of International Avenue and Fourth Street. We recommend installing a 30-

inch RCP from the intersection of International Avenue and Fourth Street to the intersection of International Avenue and First Street.

The other storm drain system extension would begin at the intersection of Isis Avenue and Fourth Street. From that intersection, we recommend installing a 42-inch RCP to run along Isis Avenue to Third Street. A junction structure is recommended at the intersection of Isis Avenue and Third Street. The junction structure would accommodate a recommended 24-inch RCP that runs along Third Street from Highway 111 to Isis Avenue. A 42-inch RCP is recommended from the junction structure to the intersection of Isis Avenue and Main Street. Another junction structure is recommended at the intersection of Isis Avenue and Main Street to accommodate a recommended 24-inch RCP that would run along Main Street from Highway 111 to Isis Avenue. A 36-inch RCP is recommended from the junction structure to the intersection of Isis Avenue and First Street. Lastly, we recommend installing a 24-inch RCP along First Street from Highway 111 to Isis Avenue.

8.2 Possible Funding Sources

The estimated costs for all of the recommended improvements would be a significant burden on the local agencies and taxpayers of Imperial County. To assist Imperial County in supplying funds, there are several possible sources listed below:

- Federal Highway Administration (FHWA) – Grant Anticipation Revenue Vehicles (GARVEE) Bonds to fund drainage improvements as long as it meets the requirements outlined in Title 23, section 115 of United States Code.
- USDA Rural Development – The Water and Environment Programs (WEP) provides loans, grants, and loan guarantees for storm drainage facilities in rural areas, cities, and towns less than 10,000 inhabitants.
- Housing and Urban Development – The Rural Housing and Economic Development (RHED) can provide funding to improve infrastructure in rural areas (<20,000 inhabitants).

9. REFERENCES

AES Advanced Engineering Software, Rational Method Hydrology System Model, January 2004.

County of Imperial, Department of Public Works, Engineering Design Guidelines Manual, September 9, 2004.

Boyle Engineering, Imperial Valley Design Storm, date unknown.

Haestad Methods, Inc., StormCAD v5.6, June 2005.

County of Imperial, Planning and Building Department, Imperial County General Plan, March 1997.

APPENDIX A: NILAND URBAN AREA MAP FROM IMPERIAL COUNTY GENERAL PLAN

APPENDIX B: EL CENTRO RAINFALL GAGE DATA AND CHARTS

APPENDIX C: C-VALUES

APPENDIX D: HYDROLOGY CALCULATIONS

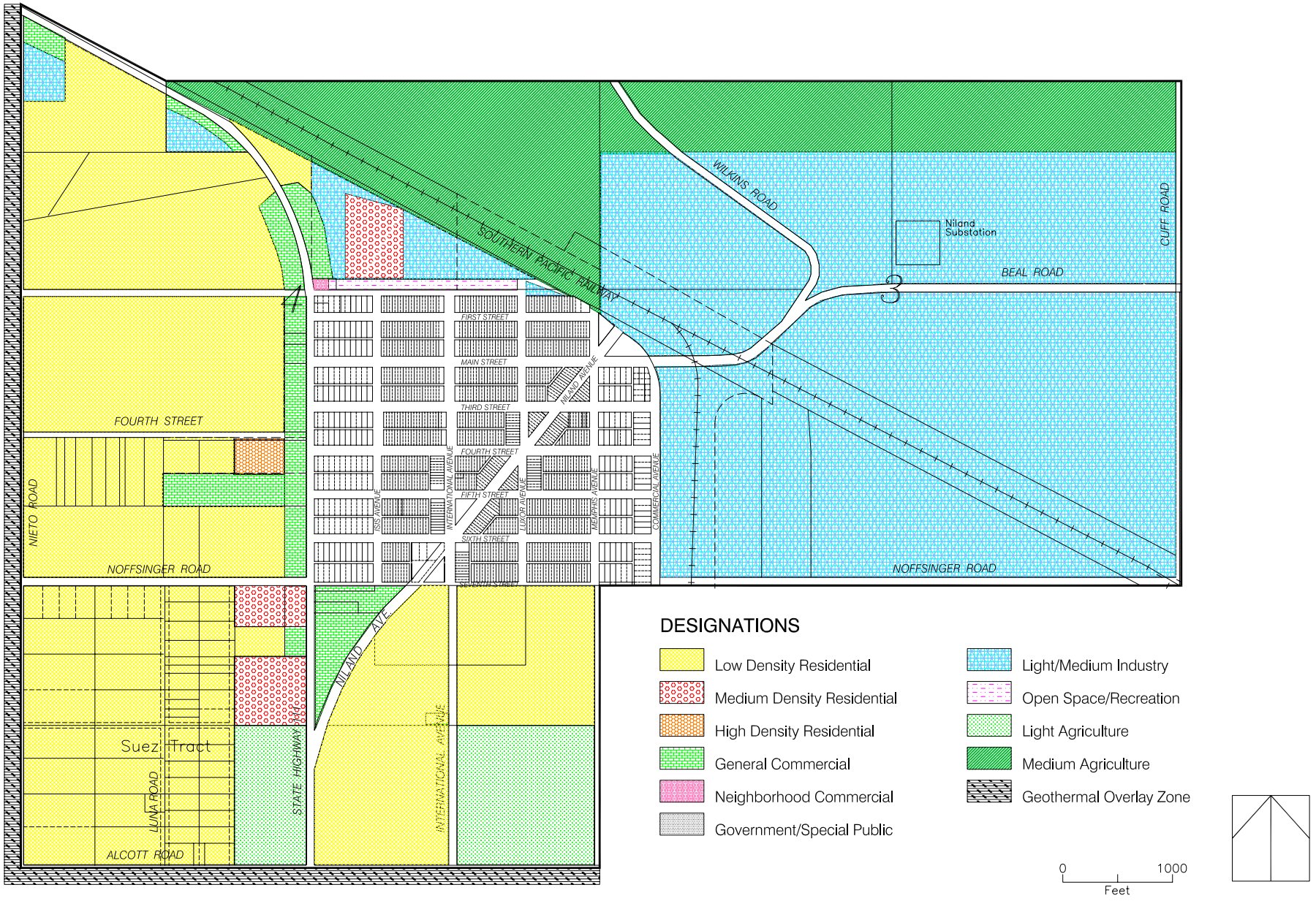
APPENDIX E: HYDROLOGY MAPS

APPENDIX F: HYDRAULIC CALCULATIONS/RESULTS

APPENDIX G: PROPOSED STORM DRAIN AND DETENTION BASIN SYSTEM MAP

APPENDIX H: DETAILED COST OPINIONS

APPENDIX A



Imperial County General Plan

Niland Urban Area Map

Approved April 12, 1994 by Minute Order # 11 B

Land Use Element

Figure 1

Imperial County General Plan

Townsite of Niland
Niland Urban Area Map

Approved April 19, 1994 by Minute Order # 11 B

Updated: August 27, 2004

Land Use Element

Figure 2

APPENDIX B

IMPERIAL VALLEY DESIGN STORM

The design storm for the Imperial Valley hydrology manual is developed from the rainfall data from the El Centro rain gauge. This gauge has 48 years of record of short duration rainfall (51 years of daily values). It is the only gauge found in the Imperial Valley that has short duration rainfall data. There are four other gauges with daily data in the valley (Calexico, Imperial, Brawley, and Niland). The mean annual precipitation for these five stations is 2.77 inches. Sixteen stations in Mexico directly to the south of the Imperial Valley area have monthly rainfall data of varying lengths of record, but no short term data. The average annual precipitation for all twenty-one stations is 2.91 inches, which is the same as the El Centro M.A.P. of 2.90 inches.

Jim Goodridge supplied data for thirty-two stations in California plus data from Yuma, Arizona. The average Mean Annual Precipitation for the thirty-three stations is 3.40 inches. What is also of interest is that the maximum daily rainfall in many cases is greater than the average annual rainfall. The average maximum daily rainfall for these stations is 3.17 inches. For those stations with hourly data the average maximum hour is 1.44 inches.

The storms which produce the greatest amount of rainfall in this region are thunderstorms with durations of less than one day, so that the average annual rainfall in this region is not a significant parameter for defining short duration rainfall. For the valley areas the development and life cycle of the convective storms is essentially the same over the entire region. There may be some difference in storm characteristics for the storms which produce rain in the neighboring mountain ranges, however there is no short duration rainfall data for these areas.

We are fortunate in having a station with short duration data in the center of the study area at El Centro. It was assumed that the storm characteristics reflected in these data are representative of the entire Imperial Valley area, from fifteen to twenty-five or thirty miles in any direction from the gauge. Therefore, the Imperial Valley Hydrology Manual design storm was developed from the El Centro gauge data.

DRAFT

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RAINFALL-DEPTH-DURATION FOR IMPERIAL VALLEY

RETURN PERIOD (yr)	RAINFALL DEPTH (in.)									
	5-min	10-min	15-min	30-min	1-hr	2-hr	3-hr	6-hr	12-hr	24-hr
2	0.10	0.16	0.21	0.30	0.40	0.49	0.55	0.65	0.73	0.80
5	0.17	0.27	0.36	0.51	0.68	0.82	0.93	1.11	1.24	1.36
10	0.22	0.35	0.46	0.66	0.87	1.06	1.20	1.43	1.60	1.75
25	0.28	0.45	0.59	0.85	1.12	1.36	1.54	1.84	2.05	2.25
50	0.32	0.52	0.69	0.99	1.31	1.59	1.79	2.14	2.39	2.62
100	0.37	0.59	0.78	1.13	1.49	1.81	2.04	2.43	2.72	2.99
200	0.41	0.67	0.88	1.27	1.67	2.03	2.29	2.73	3.05	3.35
500	0.47	0.76	1.00	1.44	1.90	2.31	2.61	3.11	3.47	3.82

RETURN PERIOD (yr)	INTENSITY-DURATION-FREQUENCY (in./hr)									
	5-min	10-min	15-min	30-min	1-hr	2-hr	3-hr	6-hr	12-hr	24-hr
2	1.20	0.96	0.84	0.60	0.40	0.25	0.18	0.11	0.06	0.03
5	2.04	1.64	1.44	1.02	0.68	0.41	0.31	0.19	0.10	0.06
10	2.64	2.10	1.84	1.32	0.87	0.53	0.40	0.24	0.13	0.07
25	3.36	2.69	2.36	1.70	1.12	0.68	0.51	0.31	0.17	0.09
50	3.84	3.15	2.76	1.98	1.31	0.80	0.60	0.36	0.20	0.11
100	4.44	3.56	3.12	2.26	1.49	0.91	0.68	0.41	0.23	0.12
200	4.92	4.01	3.52	2.54	1.67	1.02	0.76	0.46	0.25	0.14
500	5.64	4.56	4.00	2.88	1.90	1.16	0.87	0.52	0.29	0.16

APPENDIX C

C-Values

Land Use	Runoff Coefficient "C"
Low Density Residential	0.55
Low Density Residential with more streets and other impervious areas	0.65
High Density Residential	0.82
General Commercial	0.85
Light Industrial	0.85

APPENDIX D

```
**************************************************************************

            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
            Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT
                         2003,1985,1981 HYDROLOGY MANUAL
          (c) Copyright 1982-2004 Advanced Engineering Software (aes)
              Ver. 2.0 Release Date: 01/01/2004  License ID 1504

                              Analysis prepared by:

                              Nolte Associates, Inc.
                             15070 Avenue of Science
                                    Suite 100
                               San Diego, CA 92128

 ************************* DESCRIPTION OF STUDY *************************
* Niland Drainage Master Plan                                           *
* Hydrology Model                                                       *
* ECB009100                                                             *
 *************************************************************************

  FILE NAME: NILAND.DAT
  TIME/DATE OF STUDY: 15:53 04/25/2005
--------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
--------------------------------------------------------------------------
  USER SPECIFIED STORM EVENT(YEAR) = 100.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  12.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  RAINFALL-INTENSITY ADJUSTMENT FACTOR = 1.250
  *USER SPECIFIED:
  NUMBER OF [TIME,INTENSITY] DATA PAIRS =  6
   1)   5.000;  4.440
   2)  10.000;  3.560
   3)  15.000;  3.120
   4)  30.000;  2.260
   5)  60.000;  1.490
   6) 120.000;  0.910
  SAN DIEGO HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: CONSIDER ALL CONFLUENCE STREAM COMBINATIONS
        FOR ALL DOWNSTREAM ANALYSES
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  ================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
```

```
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

****************************************************************************
  FLOW PROCESS FROM NODE    100.00 TO NODE    101.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  INDUSTRIAL DEVELOPMENT RUNOFF COEFFICIENT = .8500
  S.C.S. CURVE NUMBER (AMC II) =   0
  NATURAL WATERSHED NOMOGRAPH TIME OF CONCENTRATION (APPENDIX X-A)
  WITH 10-MIN. ADDED =  11.22(MIN.)
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =    880.00
  DOWNSTREAM ELEVATION(FEET) =    878.00
  ELEVATION DIFFERENCE(FEET) =      2.00
  NATURAL WATERSHED TIME OF CONCENTRATION =  11.22
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.316
  SUBAREA RUNOFF(CFS) =      5.10
  TOTAL AREA(ACRES) =      1.39   TOTAL RUNOFF(CFS) =      5.10

****************************************************************************
  FLOW PROCESS FROM NODE    101.00 TO NODE    102.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    878.00  DOWNSTREAM(FEET) =    873.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   338.00   CHANNEL SLOPE =  0.0148
  CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =  10.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   5.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.126
  *USER SPECIFIED(SUBAREA):
  INDUSTRIAL DEVELOPMENT RUNOFF COEFFICIENT = .8500
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     27.51
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.27
  AVERAGE FLOW DEPTH(FEET) =   0.54   TRAVEL TIME(MIN.) =   1.72
  Tc(MIN.) =  12.94
  SUBAREA AREA(ACRES) =    12.77       SUBAREA RUNOFF(CFS) =   44.79
  TOTAL AREA(ACRES) =     14.16         PEAK FLOW RATE(CFS) =      49.89

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.74   FLOW VELOCITY(FEET/SEC.) =   3.90
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    102.00 =   438.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    102.00 TO NODE    103.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    873.00  DOWNSTREAM(FEET) =    867.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   765.00   CHANNEL SLOPE =  0.0078
  CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =  10.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   5.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.793
  *USER SPECIFIED(SUBAREA):
  SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .5500
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     87.47
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.59
  AVERAGE FLOW DEPTH(FEET) =   1.14   TRAVEL TIME(MIN.) =   3.55
  Tc(MIN.) =  16.50
  SUBAREA AREA(ACRES) =    35.87       SUBAREA RUNOFF(CFS) =   74.82
  TOTAL AREA(ACRES) =     50.03         PEAK FLOW RATE(CFS) =     124.71

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  1.35   FLOW VELOCITY(FEET/SEC.) =   3.94
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    103.00 =  1203.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    103.00 TO NODE    104.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    867.00  DOWNSTREAM(FEET) =    860.50
  CHANNEL LENGTH THRU SUBAREA(FEET) =   686.00   CHANNEL SLOPE =  0.0095
  CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =  10.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   5.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.615
  *USER SPECIFIED(SUBAREA):
  SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .5500
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =    174.43
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   4.62
  AVERAGE FLOW DEPTH(FEET) =   1.51   TRAVEL TIME(MIN.) =   2.47
  Tc(MIN.) =  18.97
  SUBAREA AREA(ACRES) =    49.96       SUBAREA RUNOFF(CFS) =   99.34
  TOTAL AREA(ACRES) =     99.99         PEAK FLOW RATE(CFS) =     224.05

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  1.69   FLOW VELOCITY(FEET/SEC.) =   4.93
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    104.00 =  1889.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    104.00 TO NODE    105.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    860.50  DOWNSTREAM(FEET) =    852.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1134.00   CHANNEL SLOPE =  0.0075
  CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =  10.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   5.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.326
  *USER SPECIFIED(SUBAREA):
  SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .5500
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =    258.33
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   4.68
  AVERAGE FLOW DEPTH(FEET) =   1.90   TRAVEL TIME(MIN.) =   4.04
  Tc(MIN.) =  23.01
  SUBAREA AREA(ACRES) =    37.45       SUBAREA RUNOFF(CFS) =   68.50
  TOTAL AREA(ACRES) =    137.44         PEAK FLOW RATE(CFS) =     292.56

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  2.01   FLOW VELOCITY(FEET/SEC.) =   4.84
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    105.00 =  3023.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    105.00 TO NODE    106.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    852.00  DOWNSTREAM(FEET) =    848.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   627.00   CHANNEL SLOPE =  0.0064
  CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =  10.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   5.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.163
  *USER SPECIFIED(SUBAREA):
  SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .5500
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =    304.55
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   4.61
  AVERAGE FLOW DEPTH(FEET) =   2.12   TRAVEL TIME(MIN.) =   2.27
  Tc(MIN.) =  25.28
  SUBAREA AREA(ACRES) =    13.78       SUBAREA RUNOFF(CFS) =   23.98
  TOTAL AREA(ACRES) =    151.22         PEAK FLOW RATE(CFS) =     316.53

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  2.16   FLOW VELOCITY(FEET/SEC.) =   4.65
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    106.00 =  3650.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    200.00 TO NODE    201.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  INDUSTRIAL DEVELOPMENT RUNOFF COEFFICIENT = .8500
  S.C.S. CURVE NUMBER (AMC II) =   0
  NATURAL WATERSHED NOMOGRAPH TIME OF CONCENTRATION (APPENDIX X-A)
  WITH 10-MIN. ADDED =  10.65(MIN.)
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =    892.20
  DOWNSTREAM ELEVATION(FEET) =    882.00
  ELEVATION DIFFERENCE(FEET) =     10.20
  NATURAL WATERSHED TIME OF CONCENTRATION =  10.65
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.378
  SUBAREA RUNOFF(CFS) =      4.91
  TOTAL AREA(ACRES) =      1.32   TOTAL RUNOFF(CFS) =      4.91

****************************************************************************
  FLOW PROCESS FROM NODE    201.00 TO NODE    202.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    882.00  DOWNSTREAM(FEET) =    880.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   245.00   CHANNEL SLOPE =  0.0082
  CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =  10.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   5.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.198
  *USER SPECIFIED(SUBAREA):
  INDUSTRIAL DEVELOPMENT RUNOFF COEFFICIENT = .8500
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     22.55
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.49
  AVERAGE FLOW DEPTH(FEET) =   0.58   TRAVEL TIME(MIN.) =   1.64
  Tc(MIN.) =  12.29
  SUBAREA AREA(ACRES) =     9.88       SUBAREA RUNOFF(CFS) =   35.25
  TOTAL AREA(ACRES) =     11.20         PEAK FLOW RATE(CFS) =      40.17

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.77   FLOW VELOCITY(FEET/SEC.) =   2.96
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    202.00 =   345.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    202.00 TO NODE    203.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
```

```
  ELEVATION DATA: UPSTREAM(FEET) =   880.00  DOWNSTREAM(FEET) =   879.70
  FLOW LENGTH(FEET) =    40.00   MANNING'S N =  0.024
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.09
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   2
  PIPE-FLOW(CFS) =     40.17
  PIPE TRAVEL TIME(MIN.) =   0.16    Tc(MIN.) =  12.46
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    203.00 =   385.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    203.00 TO NODE    204.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    879.70  DOWNSTREAM(FEET) =    879.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   254.00   CHANNEL SLOPE =  0.0028
  CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =  10.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   5.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.956
  *USER SPECIFIED(SUBAREA):
  INDUSTRIAL DEVELOPMENT RUNOFF COEFFICIENT = .8500
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     47.16
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.08
  AVERAGE FLOW DEPTH(FEET) =   1.09   TRAVEL TIME(MIN.) =   2.04
  Tc(MIN.) =  14.49
  SUBAREA AREA(ACRES) =     4.16       SUBAREA RUNOFF(CFS) =   13.99
  TOTAL AREA(ACRES) =     15.36         PEAK FLOW RATE(CFS) =      54.15

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  1.16   FLOW VELOCITY(FEET/SEC.) =   2.15
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    204.00 =   639.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    204.00 TO NODE    205.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   879.00  DOWNSTREAM(FEET) =   878.50
  FLOW LENGTH(FEET) =    41.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  36.0 INCH PIPE IS  15.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.44
  GIVEN PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   2
  PIPE-FLOW(CFS) =     54.15
  PIPE TRAVEL TIME(MIN.) =   0.07    Tc(MIN.) =  14.57
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    205.00 =   680.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    205.00 TO NODE    206.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    878.50  DOWNSTREAM(FEET) =    878.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   197.00   CHANNEL SLOPE =  0.0025
  CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =  10.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   5.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.820
  *USER SPECIFIED(SUBAREA):
  INDUSTRIAL DEVELOPMENT RUNOFF COEFFICIENT = .8500
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     56.57
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.11
  AVERAGE FLOW DEPTH(FEET) =   1.21   TRAVEL TIME(MIN.) =   1.55
  Tc(MIN.) =  16.12
  SUBAREA AREA(ACRES) =     1.49       SUBAREA RUNOFF(CFS) =    4.84
  TOTAL AREA(ACRES) =     16.85         PEAK FLOW RATE(CFS) =      58.99

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  1.23   FLOW VELOCITY(FEET/SEC.) =   2.14
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    206.00 =   877.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    206.00 TO NODE    207.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   878.00  DOWNSTREAM(FEET) =   877.00
  FLOW LENGTH(FEET) =    34.00   MANNING'S N =  0.024
  DEPTH OF FLOW IN  36.0 INCH PIPE IS  28.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.74
  GIVEN PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     58.99
  PIPE TRAVEL TIME(MIN.) =   0.06    Tc(MIN.) =  16.18
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    207.00 =   911.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    207.00 TO NODE    208.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    877.00  DOWNSTREAM(FEET) =    873.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   439.00   CHANNEL SLOPE =  0.0091
  CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =  10.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   5.00
```

```
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.668
 *USER SPECIFIED(SUBAREA):
 SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .5500
 S.C.S. CURVE NUMBER (AMC II) =   0
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     68.44
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.56
 AVERAGE FLOW DEPTH(FEET) =   0.97   TRAVEL TIME(MIN.) =   2.05
 Tc(MIN.) =  18.23
 SUBAREA AREA(ACRES) =     9.36       SUBAREA RUNOFF(CFS) =   18.88
 TOTAL AREA(ACRES) =     26.21         PEAK FLOW RATE(CFS) =      77.88

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  1.04   FLOW VELOCITY(FEET/SEC.) =   3.67
 LONGEST FLOWPATH FROM NODE    200.00 TO NODE    208.00 =  1350.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    208.00 TO NODE    209.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    873.00  DOWNSTREAM(FEET) =    865.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =  1001.00   CHANNEL SLOPE =  0.0080
 CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =  10.000
 MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   5.00
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.349
 *USER SPECIFIED(SUBAREA):
 SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .5500
 S.C.S. CURVE NUMBER (AMC II) =   0
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     99.17
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.74
 AVERAGE FLOW DEPTH(FEET) =   1.20   TRAVEL TIME(MIN.) =   4.46
 Tc(MIN.) =  22.69
 SUBAREA AREA(ACRES) =    23.06       SUBAREA RUNOFF(CFS) =   42.48
 TOTAL AREA(ACRES) =     49.27         PEAK FLOW RATE(CFS) =     120.35

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  1.32   FLOW VELOCITY(FEET/SEC.) =   3.94
 LONGEST FLOWPATH FROM NODE    200.00 TO NODE    209.00 =  2351.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    209.00 TO NODE    210.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    865.00  DOWNSTREAM(FEET) =    854.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =  1464.00   CHANNEL SLOPE =  0.0075
 CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =  10.000
 MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   5.00
```

```
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.923
 *USER SPECIFIED(SUBAREA):
 SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .5500
 S.C.S. CURVE NUMBER (AMC II) =   0
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =    154.92
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   4.11
 AVERAGE FLOW DEPTH(FEET) =   1.51   TRAVEL TIME(MIN.) =   5.94
 Tc(MIN.) =  28.63
 SUBAREA AREA(ACRES) =    42.83       SUBAREA RUNOFF(CFS) =   68.86
 TOTAL AREA(ACRES) =     92.10         PEAK FLOW RATE(CFS) =     189.21

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  1.65   FLOW VELOCITY(FEET/SEC.) =   4.32
 LONGEST FLOWPATH FROM NODE    200.00 TO NODE    210.00 =  3815.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    300.00 TO NODE    301.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 *USER SPECIFIED(SUBAREA):
 INDUSTRIAL DEVELOPMENT RUNOFF COEFFICIENT = .8500
 S.C.S. CURVE NUMBER (AMC II) =   0
 NATURAL WATERSHED NOMOGRAPH TIME OF CONCENTRATION (APPENDIX X-A)
 WITH 10-MIN. ADDED =  10.94(MIN.)
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
 UPSTREAM ELEVATION(FEET) =    880.00
 DOWNSTREAM ELEVATION(FEET) =    876.00
 ELEVATION DIFFERENCE(FEET) =      4.00
 NATURAL WATERSHED TIME OF CONCENTRATION =  10.94
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.347
 SUBAREA RUNOFF(CFS) =      1.59
 TOTAL AREA(ACRES) =      0.43   TOTAL RUNOFF(CFS) =      1.59

****************************************************************************
 FLOW PROCESS FROM NODE    301.00 TO NODE    302.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    876.00  DOWNSTREAM(FEET) =    873.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =   535.00   CHANNEL SLOPE =  0.0056
 CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =  10.000
 MANNING'S FACTOR = 0.018   MAXIMUM DEPTH(FEET) =   5.00
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.811
 *USER SPECIFIED(SUBAREA):
 SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .5500
 S.C.S. CURVE NUMBER (AMC II) =   0
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      3.19
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.68
```

```
  AVERAGE FLOW DEPTH(FEET) =   0.16   TRAVEL TIME(MIN.) =   5.31
  Tc(MIN.) =  16.24
  SUBAREA AREA(ACRES) =     1.51       SUBAREA RUNOFF(CFS) =    3.17
  TOTAL AREA(ACRES) =      1.94         PEAK FLOW RATE(CFS) =       4.75

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.20   FLOW VELOCITY(FEET/SEC.) =   1.95
  LONGEST FLOWPATH FROM NODE    300.00 TO NODE    302.00 =   635.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    302.00 TO NODE    303.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    873.00  DOWNSTREAM(FEET) =    864.50
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1005.00   CHANNEL SLOPE =  0.0085
  CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =  10.000
  MANNING'S FACTOR = 0.018   MAXIMUM DEPTH(FEET) =   5.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.368
  *USER SPECIFIED(SUBAREA):
  SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .5500
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      8.96
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.71
  AVERAGE FLOW DEPTH(FEET) =   0.26   TRAVEL TIME(MIN.) =   6.19
  Tc(MIN.) =  22.43
  SUBAREA AREA(ACRES) =     4.51       SUBAREA RUNOFF(CFS) =    8.35
  TOTAL AREA(ACRES) =      6.45         PEAK FLOW RATE(CFS) =      13.11

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.32   FLOW VELOCITY(FEET/SEC.) =   3.06
  LONGEST FLOWPATH FROM NODE    300.00 TO NODE    303.00 =  1640.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    303.00 TO NODE    304.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    864.50  DOWNSTREAM(FEET) =    852.50
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1576.00   CHANNEL SLOPE =  0.0076
  CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =  10.000
  MANNING'S FACTOR = 0.018   MAXIMUM DEPTH(FEET) =   5.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.815
  *USER SPECIFIED(SUBAREA):
  SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .5500
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     19.57
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.33
```

```
  AVERAGE FLOW DEPTH(FEET) =   0.41   TRAVEL TIME(MIN.) =   7.88
  Tc(MIN.) =  30.31
  SUBAREA AREA(ACRES) =     8.31       SUBAREA RUNOFF(CFS) =   12.87
  TOTAL AREA(ACRES) =     14.76         PEAK FLOW RATE(CFS) =      25.97

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.48   FLOW VELOCITY(FEET/SEC.) =   3.68
  LONGEST FLOWPATH FROM NODE    300.00 TO NODE    304.00 =  3216.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    304.00 TO NODE    305.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    852.50  DOWNSTREAM(FEET) =    848.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   560.00   CHANNEL SLOPE =  0.0080
  CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =  10.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   5.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.709
  *USER SPECIFIED(SUBAREA):
  SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .6600
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     34.26
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.81
  AVERAGE FLOW DEPTH(FEET) =   0.71   TRAVEL TIME(MIN.) =   3.32
  Tc(MIN.) =  33.63
  SUBAREA AREA(ACRES) =     9.27       SUBAREA RUNOFF(CFS) =   16.57
  TOTAL AREA(ACRES) =     24.03         PEAK FLOW RATE(CFS) =      42.55

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.80   FLOW VELOCITY(FEET/SEC.) =   2.97
  LONGEST FLOWPATH FROM NODE    300.00 TO NODE    305.00 =  3776.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    305.00 TO NODE    306.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    848.00  DOWNSTREAM(FEET) =    841.50
  CHANNEL LENGTH THRU SUBAREA(FEET) =   808.00   CHANNEL SLOPE =  0.0080
  CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =  10.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   5.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.580
  *USER SPECIFIED(SUBAREA):
  SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .6400
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     67.60
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.37
```

```
  AVERAGE FLOW DEPTH(FEET) =   1.00   TRAVEL TIME(MIN.) =   4.00
  Tc(MIN.) =  37.63
  SUBAREA AREA(ACRES) =    30.32       SUBAREA RUNOFF(CFS) =   50.07
  TOTAL AREA(ACRES) =     54.35         PEAK FLOW RATE(CFS) =      92.62

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  1.16   FLOW VELOCITY(FEET/SEC.) =   3.68
  LONGEST FLOWPATH FROM NODE    300.00 TO NODE    306.00 =  4584.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    306.00 TO NODE    307.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    841.50  DOWNSTREAM(FEET) =    835.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1512.00   CHANNEL SLOPE =  0.0043
  CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =  10.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   5.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.321
  *USER SPECIFIED(SUBAREA):
  SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .5600
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =    118.03
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.12
  AVERAGE FLOW DEPTH(FEET) =   1.51   TRAVEL TIME(MIN.) =   8.07
  Tc(MIN.) =  45.70
  SUBAREA AREA(ACRES) =    39.03       SUBAREA RUNOFF(CFS) =   50.74
  TOTAL AREA(ACRES) =     93.38         PEAK FLOW RATE(CFS) =     143.35

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  1.65   FLOW VELOCITY(FEET/SEC.) =   3.28
  LONGEST FLOWPATH FROM NODE    300.00 TO NODE    307.00 =  6096.00 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =     93.38  TC(MIN.) =     45.70
  PEAK FLOW RATE(CFS)   =    143.35
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

APPENDIX E

XREFS: EXT0, X24X36P

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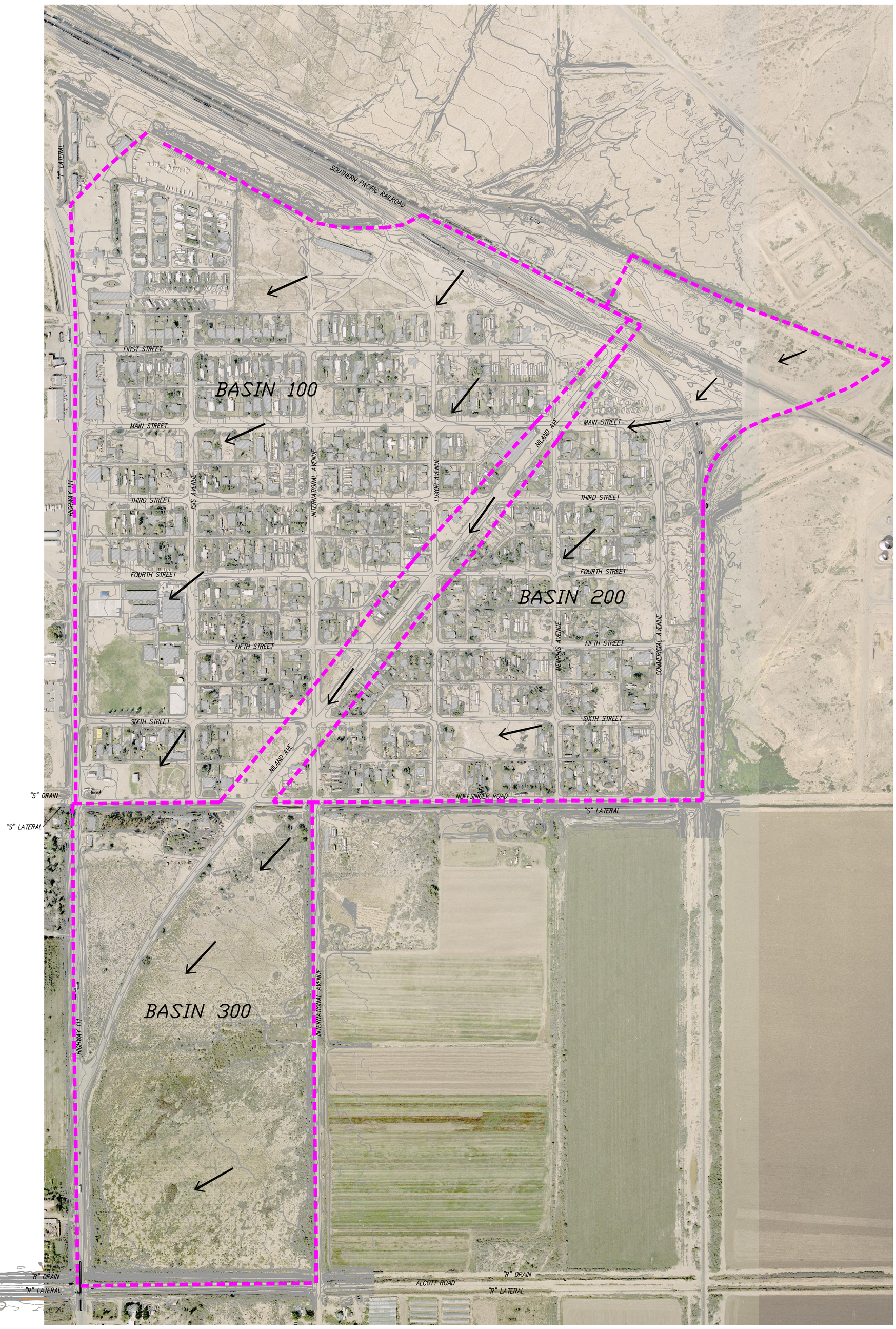
PATH: N:\ECB009100\Cadd\ DESIGNER: TA PROJ. MGR: SB

BASIN INDEX MAP



Coordinates are based on IVPN191 as shown on Record of Survey No. 460, the Imperial Valley Precise Network 2004, recorded on May 19, 2005 in Book 15, Page 52 of Records of Survey, in the office of the County Recorder, County of Imperial, State of California; CCS83 Zone 6 at EPch 1991.35.

Bearings are referenced to Grid North, CCS83 Zone 6 at EPch 1991.3, as defined locally by the calculated line from IVPN 19 to OC N 13 (also on ROS No. 460); S72°40'31"W.

Elevations are referenced to NAVD88 as defined by the elevation of IVPN19 of -2.736 feet with a constant of +1000 feet added to prevent negative elevations; the resulting local datum elevation of IVPN19 is 997.26 feet.

Contour Interval
Horizonal and Vertical Control Provided By:
Compiled Photogrammetrically from photography dated 08-18-05 & 2-25-05
By INLAND AERIAL SURVEYS INC.
7117 Arlington Ave. Suite A, Riverside, CA 92503 (951) 687-4252 fax (951) 687-4120

LEGEND

- NODE
- BASIN BOUNDARY
- DRAINAGE DIRECTION

GRAPHIC SCALE
0' 150' 300' 600'
SCALE 1"= 300'

ABBREVIATIONS

A. , Asph.	Asphalt
C. , Conc.	Concrete
OBS.	Obscured Area
U/C	Under Construction
W/L	Water Level

NO.	BY	DATE	REVISIONS:

CAUTION: The engineer preparing these plans will not be responsible for, or liable for, unauthorized changes to or uses of these plans. All changes to the plans must be in writing and must be approved by the preparer of these plans.

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1605 WEST MAIN STREET EL CENTRO, CA. 92243
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NILAND DRAINAGE MASTER PLAN

BASIN INDEX MAP - EXISTING HYDROLOGY WITH ULTIMATE BUILD-OUT CONDITIONS

PREPARED FOR: IMPERIAL COUNTY DATE SUBMITTED: JAN 2007

SHEET NUMBER 1 OF 1 SHEETS
SCALE
VERTICAL: 1"= XX
HORIZONTAL: 1"= 300'
JOB NUMBER ECB009100

XREFS: EXT0, X24X36P

DATE: 04/26/05 TIME: 3:28 p.m. DRAWING NAME: EXHY.DWG
SERVER: NONE SERVICE: NONE PLOTTING VIEW: NONE
PATH: N:\ECB009100\Cadd\ DESIGNER: TA PROJ. MGR: SB

INDEX SHEET

SHEET 2 SHEET 3 SHEET 4

SHEET 5 SHEET 6

Contour Interval
Horizonal and Vertical Control Provided By:
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Elevations are referenced to NAVD88 as defined by the elevation of IVPN19 of -2.736 feet with a constant of +1000 feet added to prevent negative elevations; the resulting local datum elevation of IVPN19 is 997.26 feet.

ABBREVIATIONS

A. , Asph.	Asphalt
C. , Conc.	Concrete
OBS.	Obscured Area
U/C	Under Construction
W/L	Water Level

LEGEND

- NODE
- BASIN BOUNDARY
- FLOW PATH
- DRAINAGE DIRECTION
- BORROW PIT DRAINAGE DIRECTION

GRAPHIC SCALE
0' 150' 300' 600'
SCALE 1"= 300'

NO.	BY	DATE	REVISIONS:

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NILAND DRAINAGE MASTER PLAN

INDEX SHEET MAP - EXISTING HYDROLOGY WITH ULTIMATE BUILD-OUT CONDITIONS

PREPARED FOR: IMPERIAL COUNTY DATE SUBMITTED: JAN 2007

SHEET NUMBER 1 OF 6 SHEETS
SCALE VERTICAL: 1"= XX HORIZONTAL: 1"= 300'
JOB NUMBER ECB009100

DATE: 08/07/06 TIME: 11:45 a.m. DRAWING NAME: EXHY.DWG
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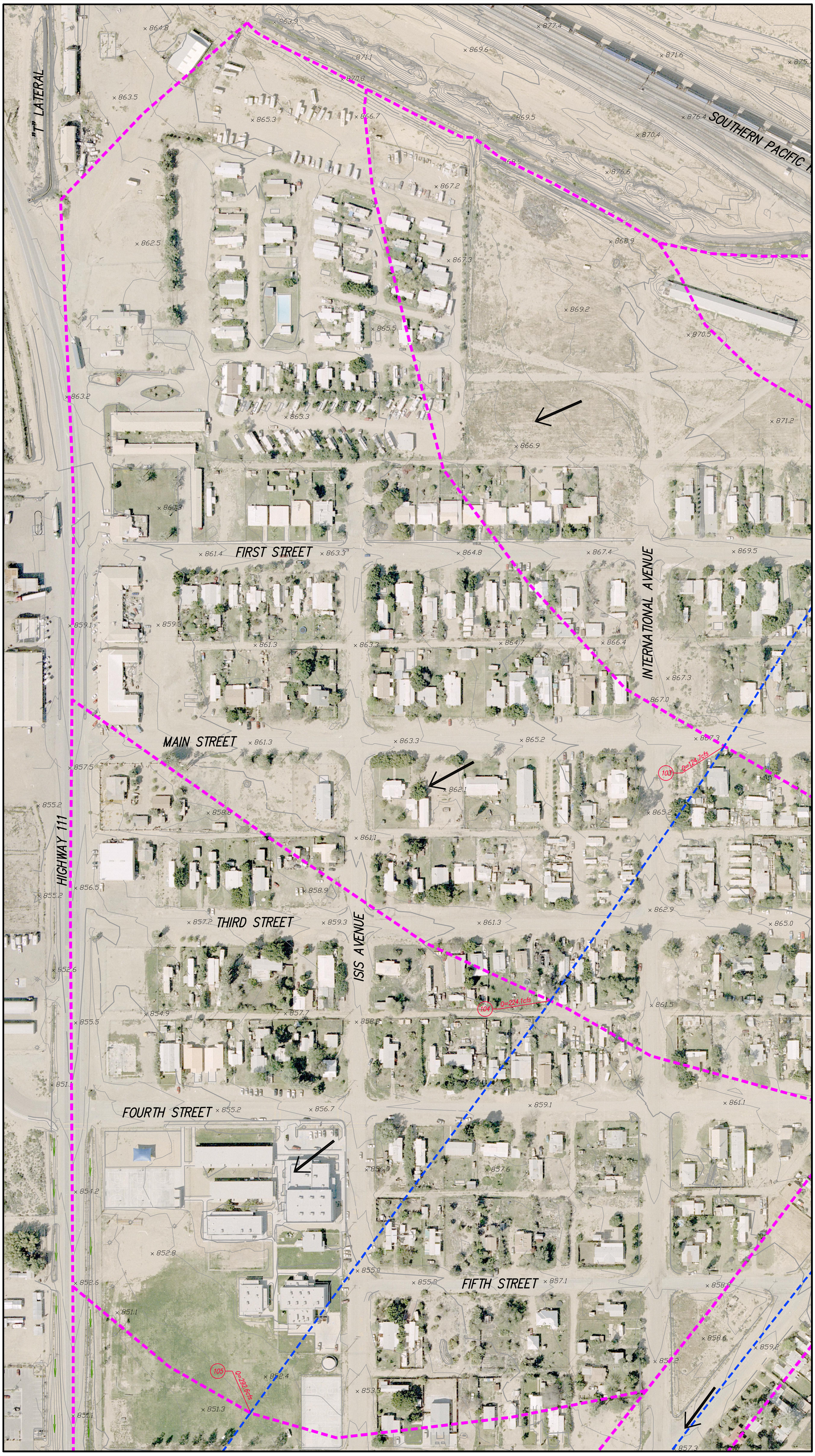
XREFS: EXT0, X24X36P



LEGEND

- NODE
- BASIN BOUNDARY
- FLOW PATH
- DRAINAGE DIRECTION
- BORROW PIT DRAINAGE DIRECTION

NOLTE BEYOND ENGINEERING

GRAPHIC SCALE
0' 50' 100' 200'
SCALE 1"= 100'

NO.	BY	DATE	REVISIONS:

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NILAND DRAINAGE MASTER PLAN

EXISTING HYDROLOGY WITH ULTIMATE BUILD-OUT CONDITIONS

PREPARED FOR: IMPERIAL COUNTY DATE SUBMITTED: JAN 2007

SHEET NUMBER 2 OF 6 SHEETS
SCALE VERTICAL: 1"= XX HORIZONTAL: 1"= 100'
JOB NUMBER ECB009100

XREFS: *EXT0, X24X36P*

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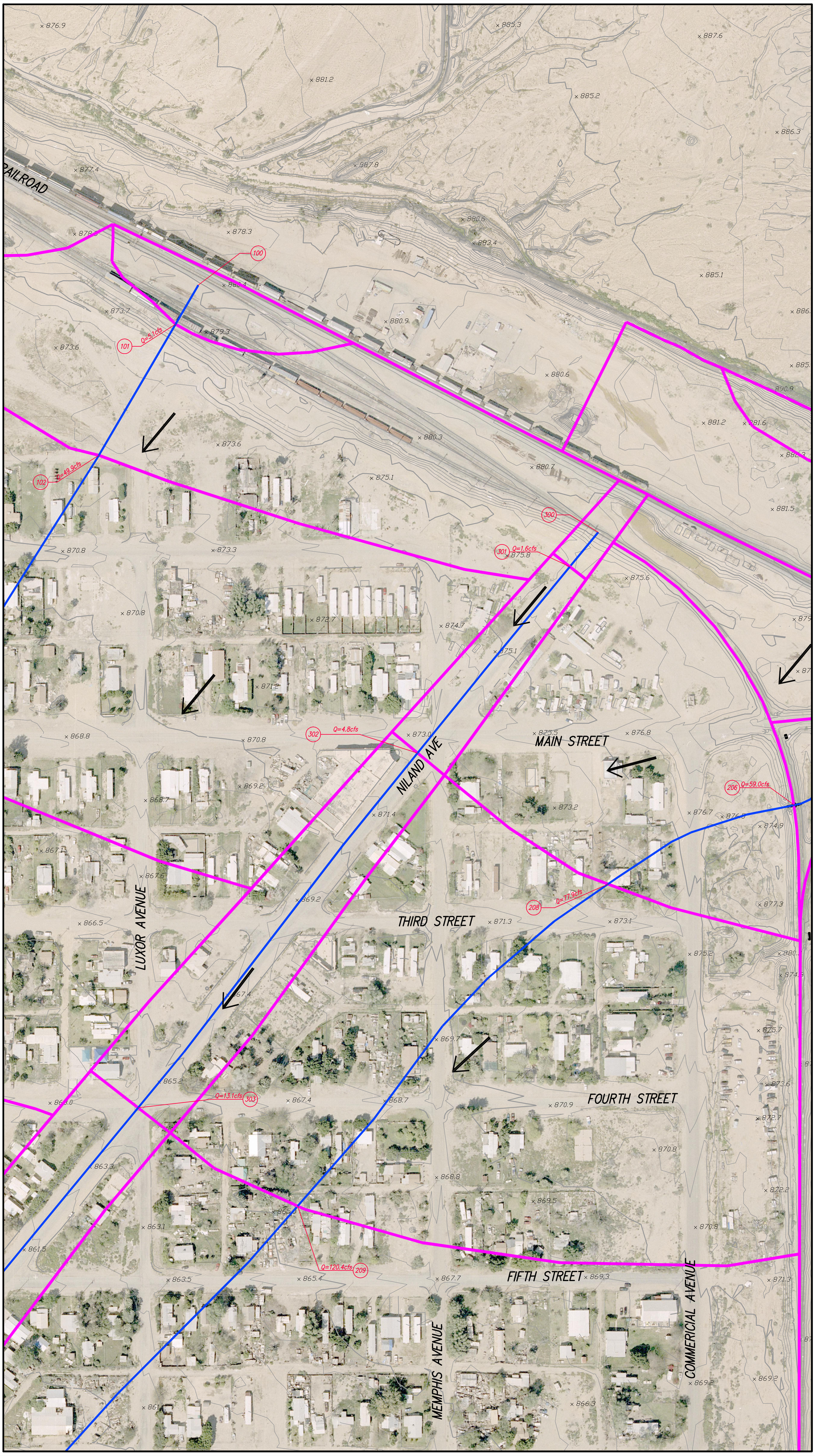

LEGEND

- NODE
- BASIN BOUNDARY
- FLOW PATH
- DRAINAGE DIRECTION

NOLTE BEYOND ENGINEERING

GRAPHIC SCALE
0' 50' 100' 200'
SCALE 1"= 100'

NO.	BY	DATE	REVISIONS:

CAUTION: *The engineer preparing these plans will not be responsible for, or liable for, unauthorized changes to or uses of these plans. All changes to the plans must be in writing and must be approved by the preparer of these plans.*

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NILAND DRAINAGE MASTER PLAN

EXISTING HYDROLOGY WITH ULTIMATE BUILD-OUT CONDITIONS

PREPARED FOR: IMPERIAL COUNTY DATE SUBMITTED: JAN 2007

SHEET NUMBER 3 OF 6 SHEETS

SCALE
VERTICAL: 1"= XX
HORIZONTAL: 1"= 100'

JOB NUMBER ECB009100

XREFS: EXT0, X24X36P

DATE: 04/26/05 TIME: 3:28 p.m. DRAWING NAME: EXHY.DWG
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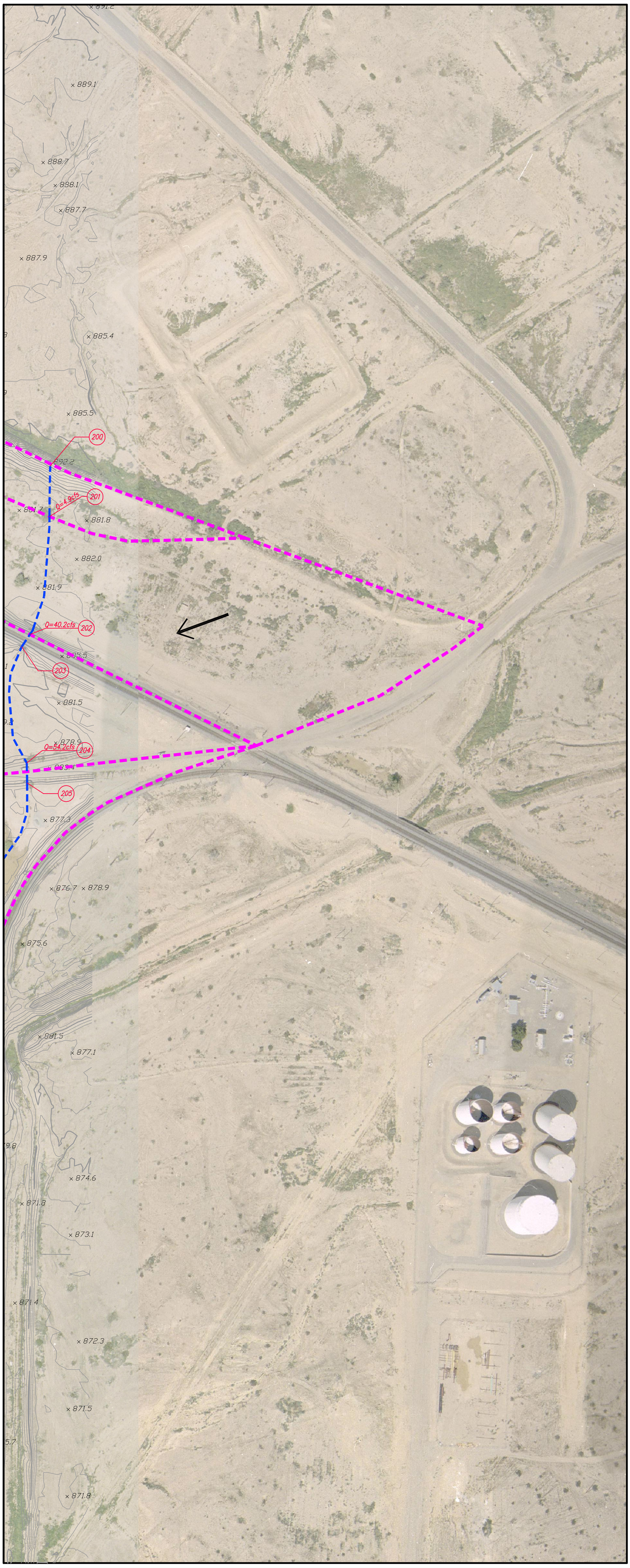

LEGEND

NODE

BASIN BOUNDARY

FLOW PATH

DRAINAGE DIRECTION

NOLTE BEYOND ENGINEERING

GRAPHIC SCALE
0' 50' 100' 200'
SCALE 1"= 100'

NO.	BY	DATE	REVISIONS:

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NILAND DRAINAGE MASTER PLAN

EXISTING HYDROLOGY WITH ULTIMATE BUILD-OUT CONDITIONS

PREPARED FOR: IMPERIAL COUNTY DATE SUBMITTED: JAN 2007

SHEET NUMBER 4 OF 6 SHEETS

SCALE
VERTICAL: 1"= XX
HORIZONTAL: 1"= 100'

JOB NUMBER ECB009100

DATE: 04/26/05 TIME: 3:28 p.m. DRAWING NAME: EXHY.DWG
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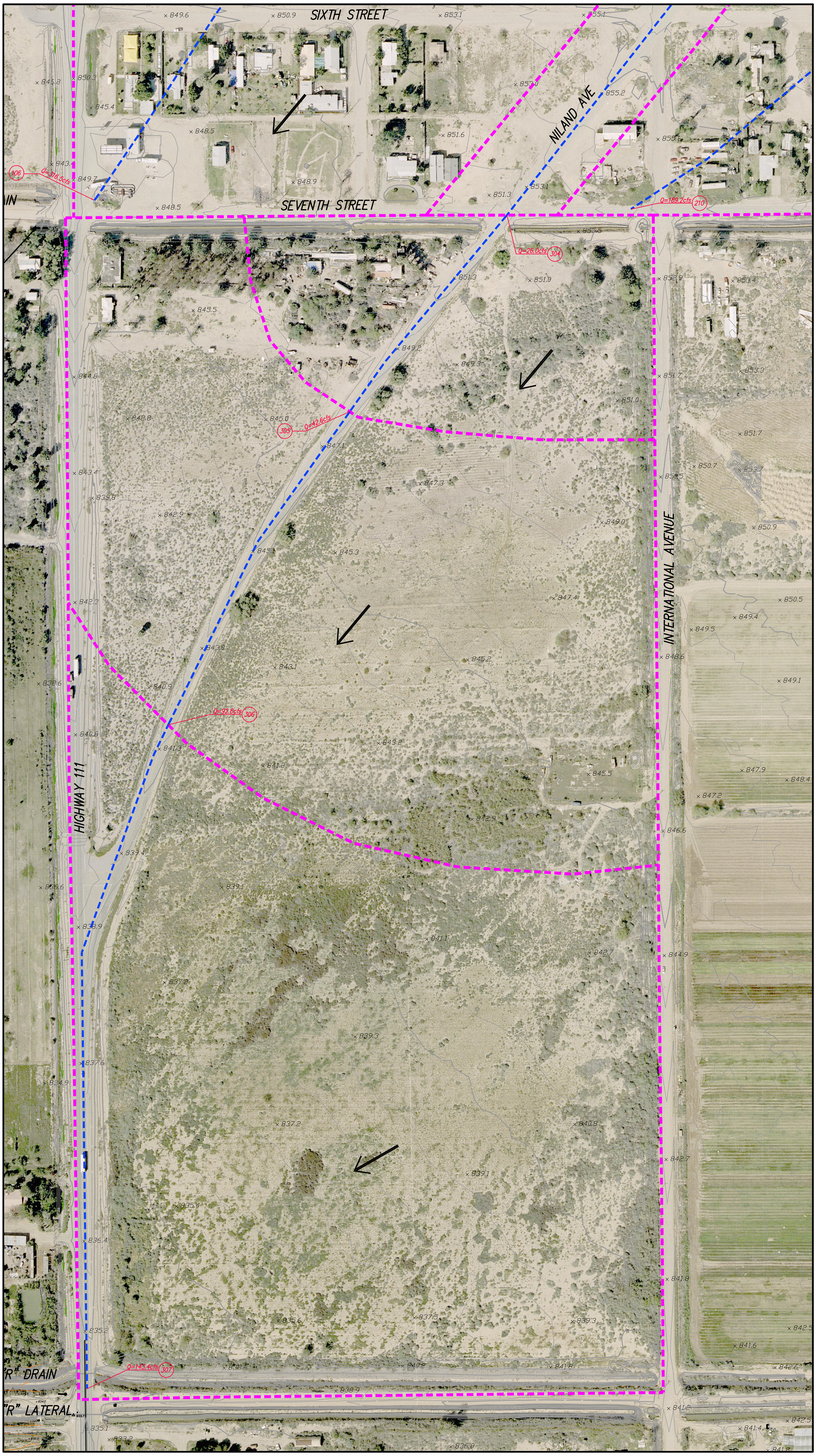

LEGEND

- NODE
- BASIN BOUNDARY
- FLOW PATH
- DRAINAGE DIRECTION
- BORROW PIT DRAINAGE DIRECTION

NOLTE BEYOND ENGINEERING

GRAPHIC SCALE
0' 50' 100' 200'
SCALE 1"= 100'

NO.	BY	DATE	REVISIONS:

CAUTION: The engineer preparing these plans will not be responsible for, or liable for, unauthorized changes to or uses of these plans. All changes to the plans must be in writing and must be approved by the preparer of these plans.

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NILAND DRAINAGE MASTER PLAN

EXISTING HYDROLOGY WITH ULTIMATE BUILD-OUT CONDITIONS

PREPARED FOR: IMPERIAL COUNTY DATE SUBMITTED: JAN 2007

SHEET NUMBER 5 OF 6 SHEETS
SCALE VERTICAL: 1"= XX HORIZONTAL: 1"= 100'
JOB NUMBER ECB009100

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XREFS: EXTO, X24X36P

LEGEND

NODE

BASIN BOUNDARY

FLOW PATH

DRAINAGE DIRECTION

NOLTE BEYOND ENGINEERING

GRAPHIC SCALE
0' 50' 100' 200'
SCALE 1"= 100'

NO.	BY	DATE	REVISIONS:

CAUTION: The engineer preparing these plans will not be responsible for, or liable for, unauthorized changes to or uses of these plans. All changes to the plans must be in writing and must be approved by the preparer of these plans.

NOLTE
BEYOND ENGINEERING
1605 WEST MAIN STREET EL CENTRO, CA. 92243
760.339.4100 TEL 760.482.0300 FAX WWW.NOLTE.COM

NILAND DRAINAGE MASTER PLAN

EXISTING HYDROLOGY WITH ULTIMATE BUILD-OUT CONDITIONS

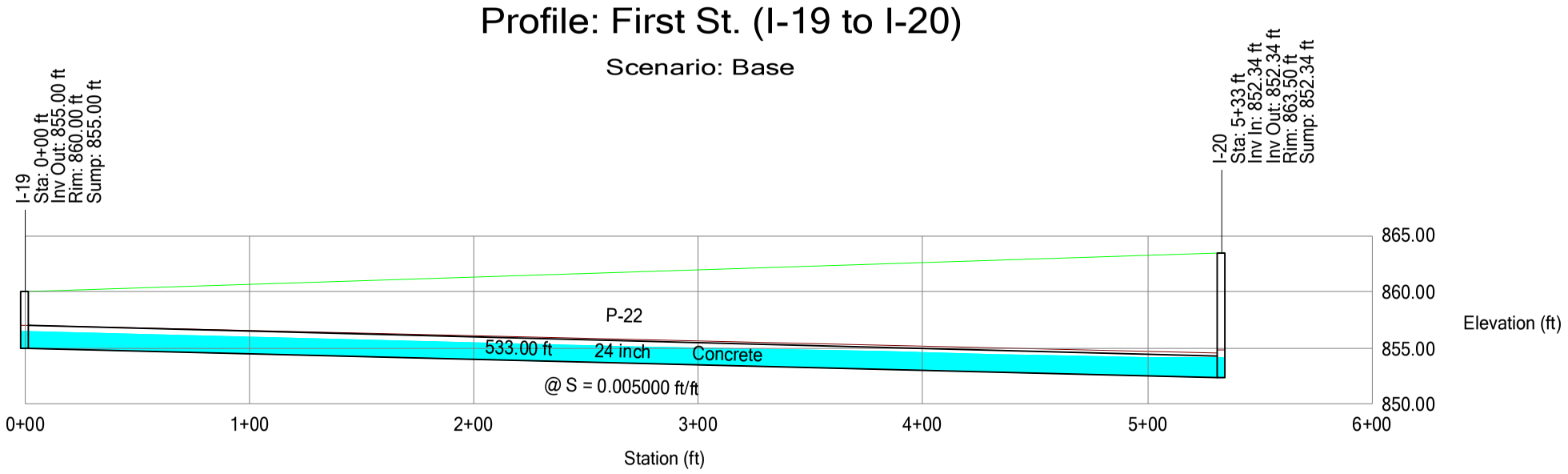
PREPARED FOR: IMPERIAL COUNTY DATE SUBMITTED: JAN 2007

SHEET NUMBER 6 OF 6 SHEETS

SCALE
VERTICAL: 1"= XX
HORIZONTAL: 1"= 100'

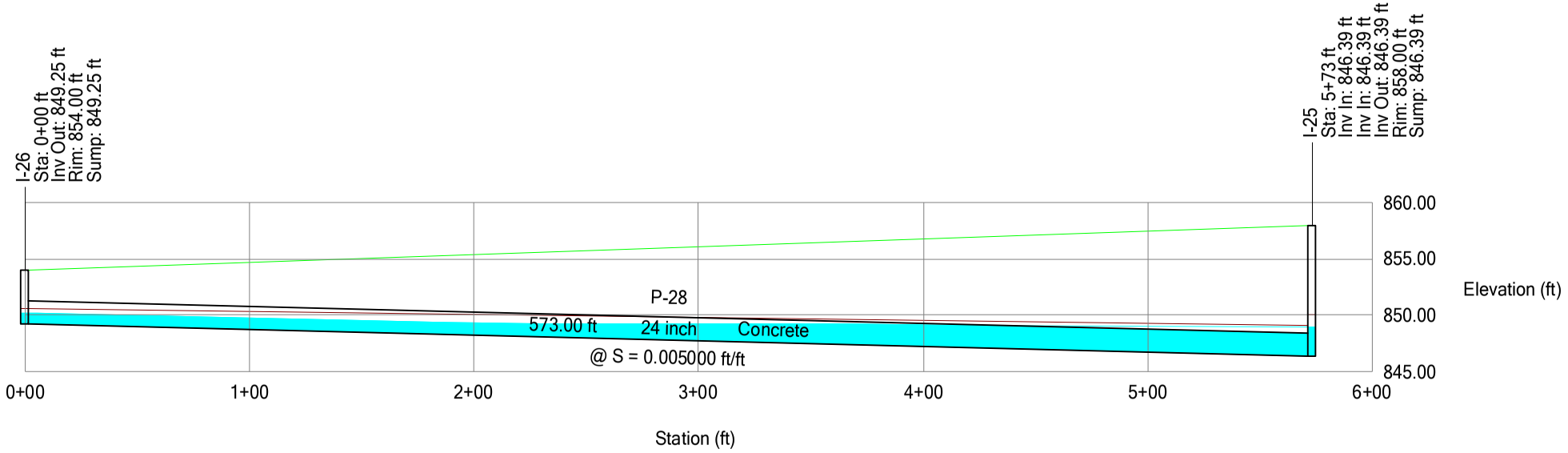
JOB NUMBER ECB009100

APPENDIX F



Profile: Fourth St. (I-26 to I-25)

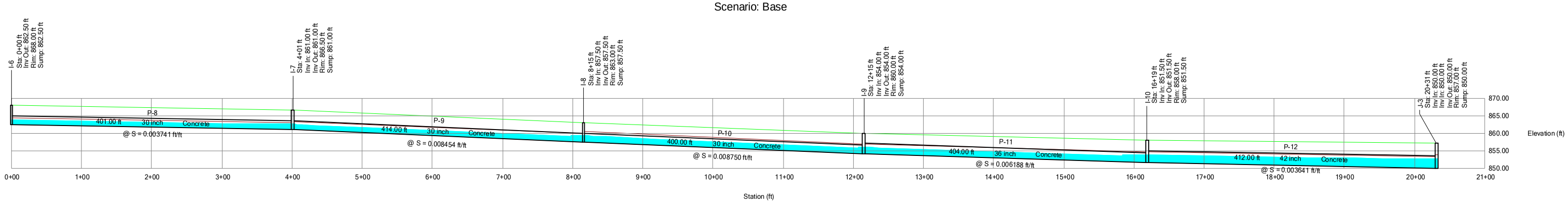
Scenario: Base



Profile
Scenario: Base

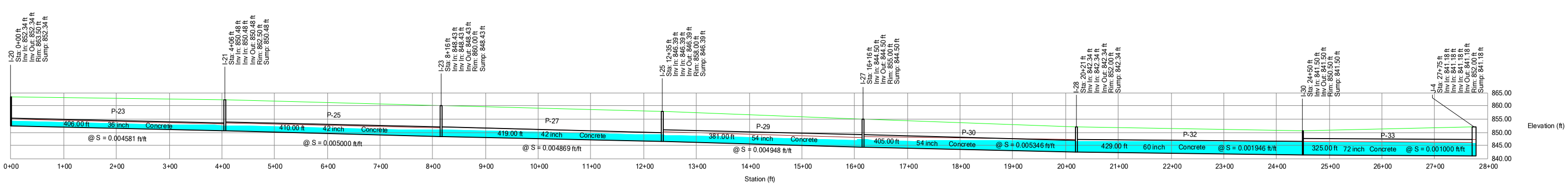
Profile: International Ave.

Scenario: Base



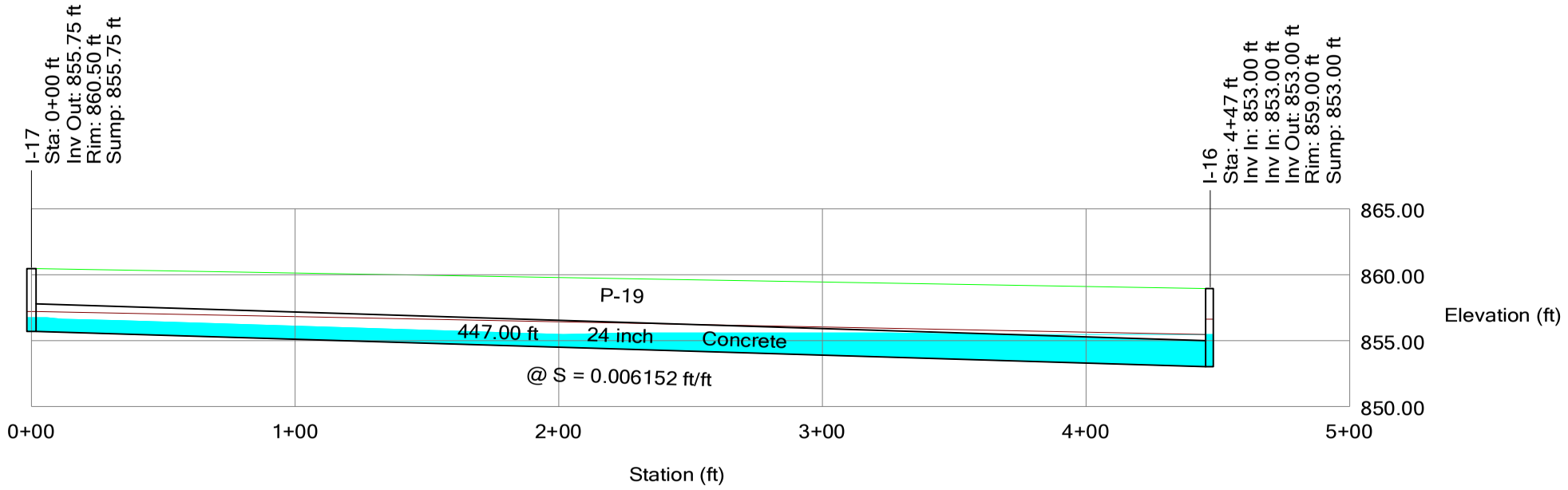
Profile
Scenario: Base

Profile: Isis Ave.
Scenario: Base



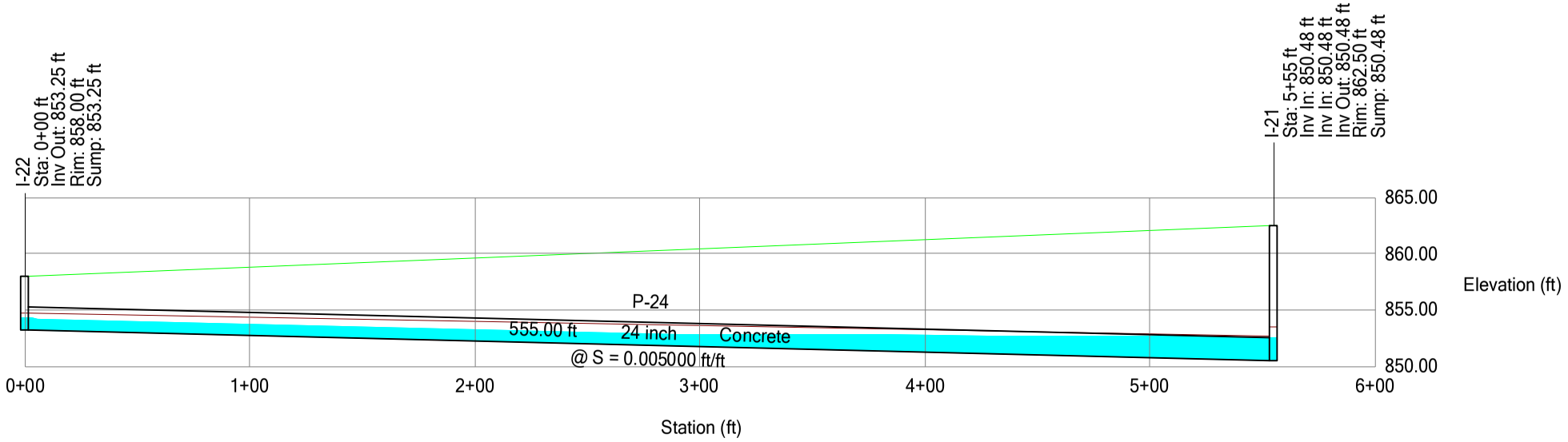
Profile: Luxor Ave. (I-17 to I-16)

Scenario: Base



Profile: Main St. (I-22 to I-21)

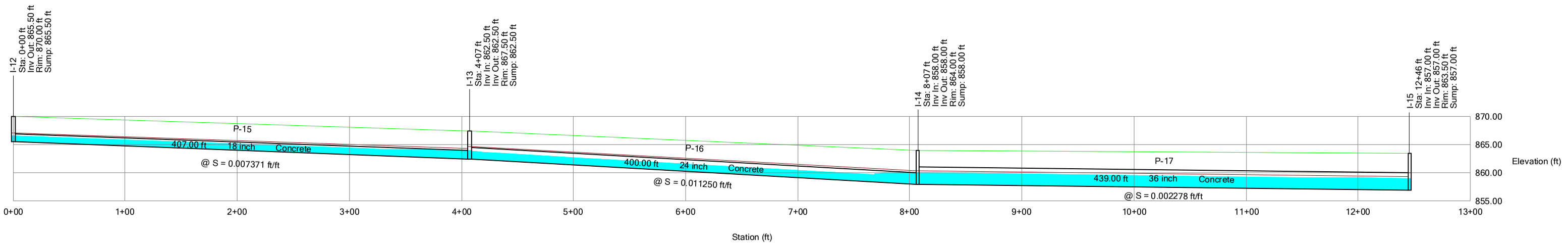
Scenario: Base



Profile
Scenario: Base

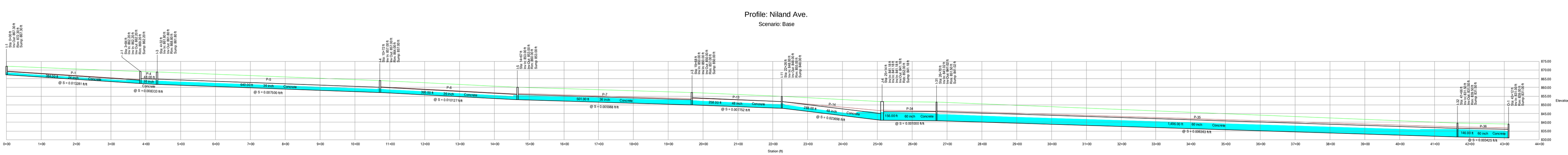
Profile: Memphis Ave.

Scenario: Base



Profile: Niland Ave.

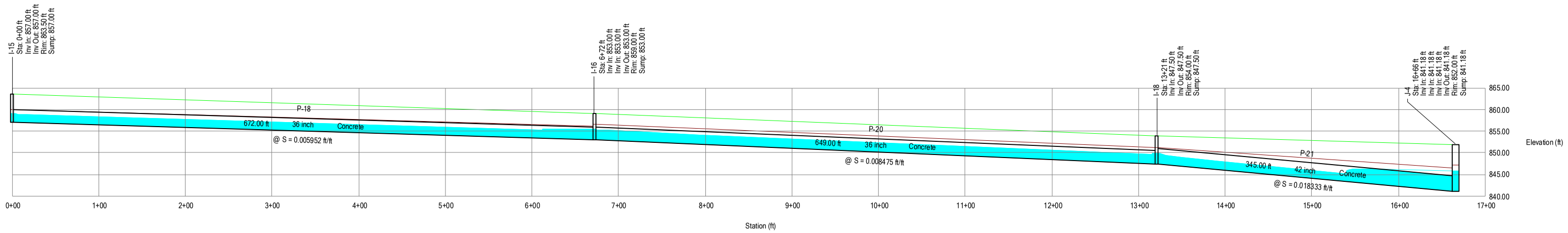
Scenario: Base



Profile
Scenario: Base

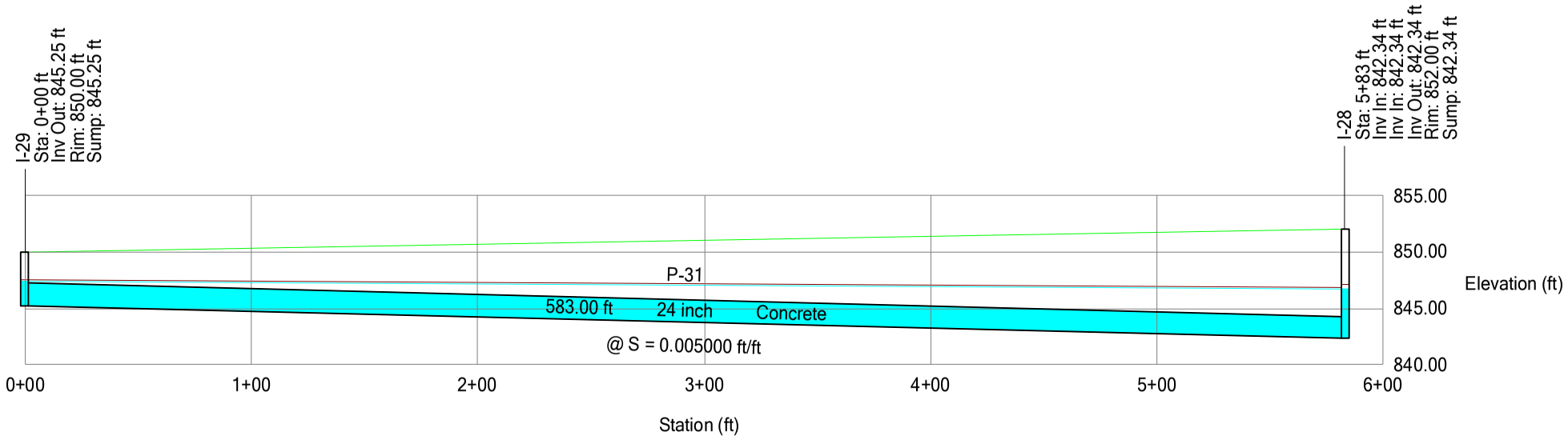
Profile: Seventh St.

Scenario: Base



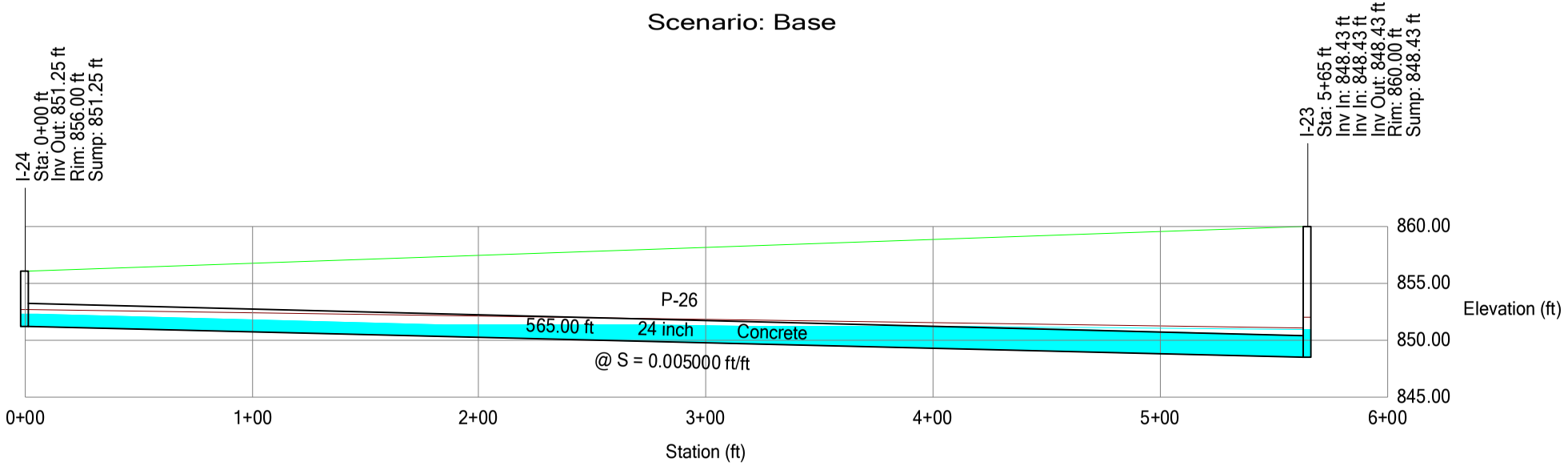
Profile: Sixth St. (I-29 to I-28)

Scenario: Base



Profile: Third St. (I-24 to I-23)

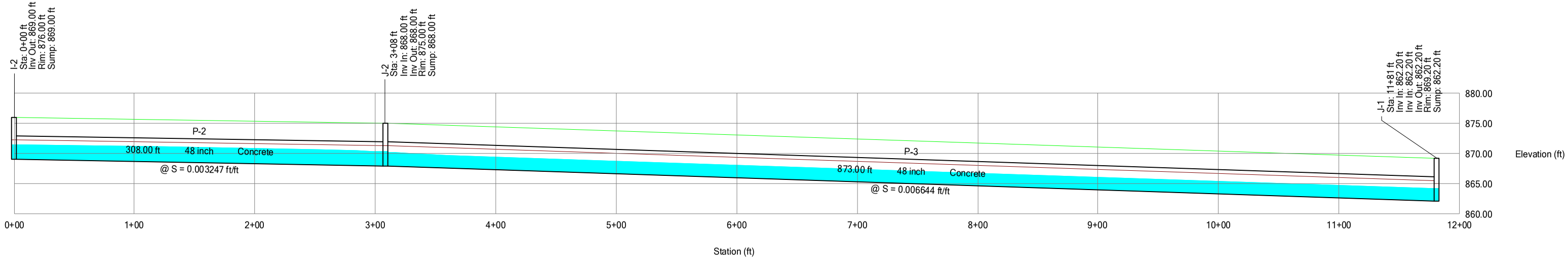
Scenario: Base



Profile
Scenario: Base

Profile: Third St.

Scenario: Base



Scenario: Base

Combined Pipe\Node Report

Label	Upstream Node	Downstream Node	Length (ft)	Number of Sections	Section Size	Material	System Known Flow (cfs)	Total System Flow (cfs)	Average Velocity (ft/s)	Upstream Invert Elevation (ft)	Downstream Invert Elevation (ft)	Hydraulic Grade Line In (ft)	Hydraulic Grade Line Out (ft)	Constructed Slope (ft/ft)
P-36	I-32	O-1	146.00	2	60 inch	Concrete	152.00	364.00	9.27	831.50	831.00	835.98	834.86	0.003425
P-23	I-20	I-21	406.00	1	36 inch	Concrete	15.00	30.00	6.83	852.34	850.48	854.12	852.59	0.004581
P-25	I-21	I-23	410.00	1	42 inch	Concrete	23.00	46.00	7.86	850.48	848.43	852.59	850.98	0.005000
P-27	I-23	I-25	419.00	1	42 inch	Concrete	31.00	62.00	8.24	848.43	846.39	850.98	848.97	0.004869
P-29	I-25	I-27	381.00	1	54 inch	Concrete	39.00	78.00	8.96	846.39	844.50	848.97	847.22	0.004948
P-30	I-27	I-28	405.00	1	54 inch	Concrete	39.00	86.00	9.44	844.50	842.34	847.22	846.70	0.005346
P-32	I-28	I-30	429.00	1	60 inch	Concrete	47.00	102.00	6.61	842.34	841.50	846.70	846.16	0.001946
P-33	I-30	J-4	325.00	1	72 inch	Concrete	47.00	110.00	5.29	841.50	841.18	846.16	845.94	0.001000
P-6	I-4	I-5	395.00	2	36 inch	Concrete	74.00	94.00	10.27	857.00	853.00	859.23	855.48	0.010127
P-5	I-3	I-4	640.00	2	36 inch	Concrete	74.00	84.00	8.91	861.80	857.00	863.91	859.23	0.007500
P-1	I-1	J-1	384.00	1	24 inch	Concrete	15.00	15.00	7.69	867.30	862.20	868.70	864.18	0.013281
P-4	J-1	I-3	48.00	2	36 inch	Concrete	74.00	74.00	9.03	862.20	861.80	864.18	863.91	0.008333
P-3	J-2	J-1	873.00	1	48 inch	Concrete	59.00	59.00	9.33	868.00	862.20	870.31	864.21	0.006644
P-2	I-2	J-2	308.00	1	48 inch	Concrete	59.00	59.00	7.09	869.00	868.00	871.52	870.31	0.003247
P-7	I-5	J-3	501.00	2	36 inch	Concrete	74.00	104.00	8.32	853.00	850.00	855.48	852.63	0.005988
P-8	I-6	I-7	401.00	1	30 inch	Concrete	15.00	15.00	5.34	862.50	861.00	863.89	862.63	0.003741
P-9	I-7	I-8	414.00	1	30 inch	Concrete	15.00	23.00	8.06	861.00	857.50	862.63	859.40	0.008454
P-10	I-8	I-9	400.00	1	30 inch	Concrete	15.00	31.00	8.70	857.50	854.00	859.40	856.03	0.008750
P-11	I-9	I-10	404.00	1	36 inch	Concrete	15.00	39.00	8.13	854.00	851.50	856.03	853.81	0.006188
P-12	I-10	J-3	412.00	1	42 inch	Concrete	15.00	47.00	6.97	851.50	850.00	853.81	852.63	0.003641
P-13	J-3	I-11	258.00	2	48 inch	Concrete	89.00	151.00	10.51	850.00	848.00	852.63	850.72	0.007752
P-14	I-11	J-4	288.00	2	48 inch	Concrete	89.00	161.00	16.21	848.00	841.18	850.72	845.94	0.023698
P-19	I-17	I-16	447.00	1	24 inch	Concrete	8.00	8.00	5.50	855.75	853.00	856.76	855.41	0.006152
P-15	I-12	I-13	407.00	1	18 inch	Concrete	8.00	8.00	5.76	865.50	862.50	866.60	863.94	0.007371
P-16	I-13	I-14	400.00	1	24 inch	Concrete	8.00	16.00	8.18	862.50	858.00	863.94	859.95	0.011250
P-17	I-14	I-15	439.00	1	36 inch	Concrete	8.00	24.00	4.95	858.00	857.00	859.95	859.03	0.002278
P-18	I-15	I-16	672.00	1	36 inch	Concrete	8.00	39.00	8.01	857.00	853.00	859.03	855.41	0.005952
P-20	I-16	I-18	649.00	1	36 inch	Concrete	16.00	55.00	9.82	853.00	847.50	855.41	849.99	0.008475
P-21	I-18	J-4	345.00	1	42 inch	Concrete	16.00	63.00	13.88	847.50	841.18	849.99	845.94	0.018333
P-34	J-4	I-31	156.00	2	60 inch	Concrete	152.00	334.00	8.51	841.18	841.02	845.94	844.78	0.001000
P-35	I-31	I-32	1,496.00	2	60 inch	Concrete	152.00	344.00	11.83	841.02	831.50	844.78	835.98	0.006363
P-28	I-26	I-25	573.00	1	24 inch	Concrete	8.00	8.00	5.09	849.25	846.39	850.26	848.97	0.005000
P-22	I-19	I-20	533.00	1	24 inch	Concrete	15.00	15.00	5.79	855.00	852.34	856.54	854.12	0.005000
P-24	I-22	I-21	555.00	1	24 inch	Concrete	8.00	8.00	5.09	853.25	850.48	854.26	852.59	0.005000
P-26	I-24	I-23	565.00	1	24 inch	Concrete	8.00	8.00	5.09	851.25	848.43	852.26	850.98	0.005000
P-31	I-29	I-28	583.00	1	24 inch	Concrete	8.00	8.00	2.55	845.25	842.34	847.43	846.70	0.005000

DETENTION BASIN SIZING
SUBJECT

ECB009100 — JOB NO.

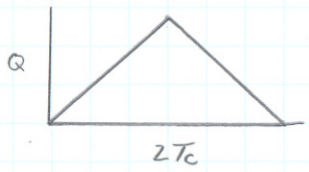
TA — DESIGNED BY

SB — CHECKED BY

DATE

NOLTE

NODE	FLOW (cfs)	T_c (min)	
106	316.5	25.28	} $Q_T = 649$ cfs, $T_c = 45.7$ min.
210	189.2	28.63	
307	143.4	45.70	



Volume = $Q \cdot \frac{1}{2}(2T_c)$

$= 649 \text{ cfs} \cdot \frac{1}{2}(2 \times 45.7 \text{ min.} \times 60 \text{ sec.})$

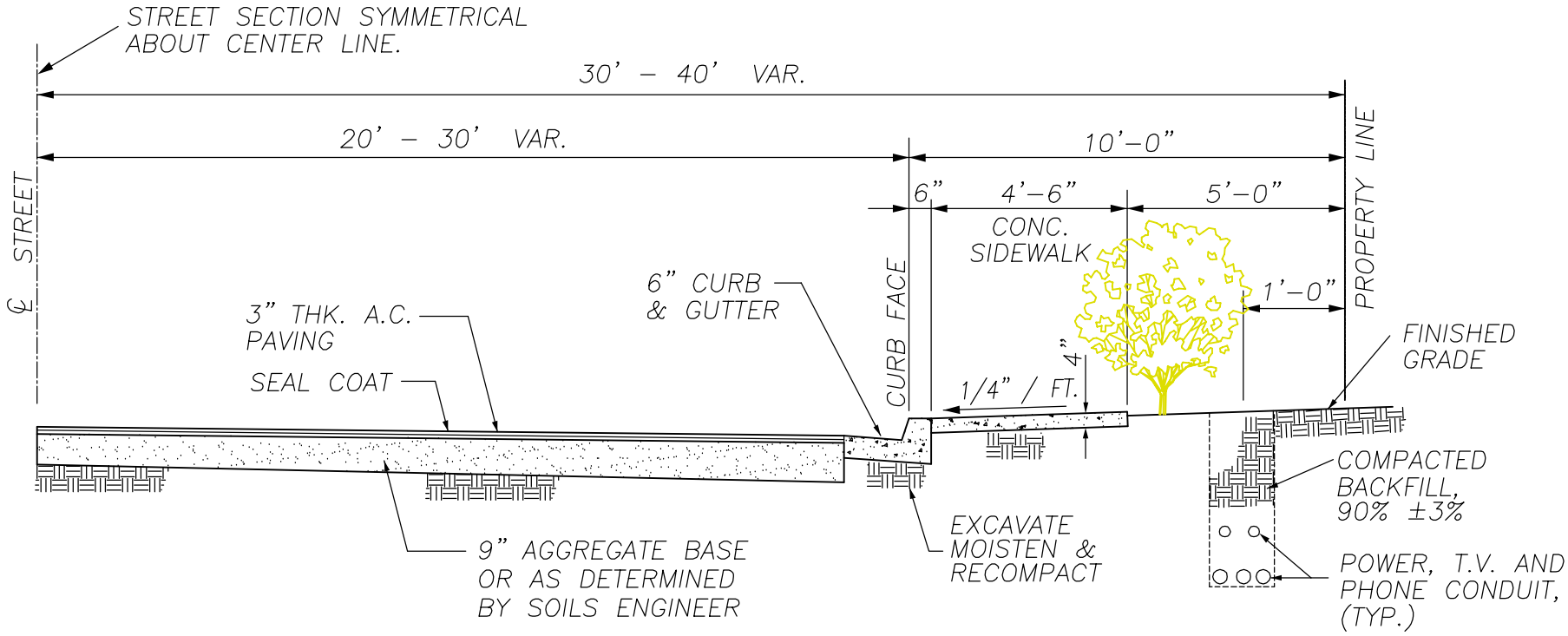
$= 1,779,558 \text{ ft}^3$

$= 40.9$ AC-FT

$\times 1.5$ F.S. = **61.3 AC-FT**

NOTES: ALL Q AND T_c ARE APPROXIMATE FROM RATIONAL METHOD ANALYSIS RELATED TO THIS PROJECT

APPENDIX G



TYPICAL HALF STREET SECTION

NOT TO SCALE

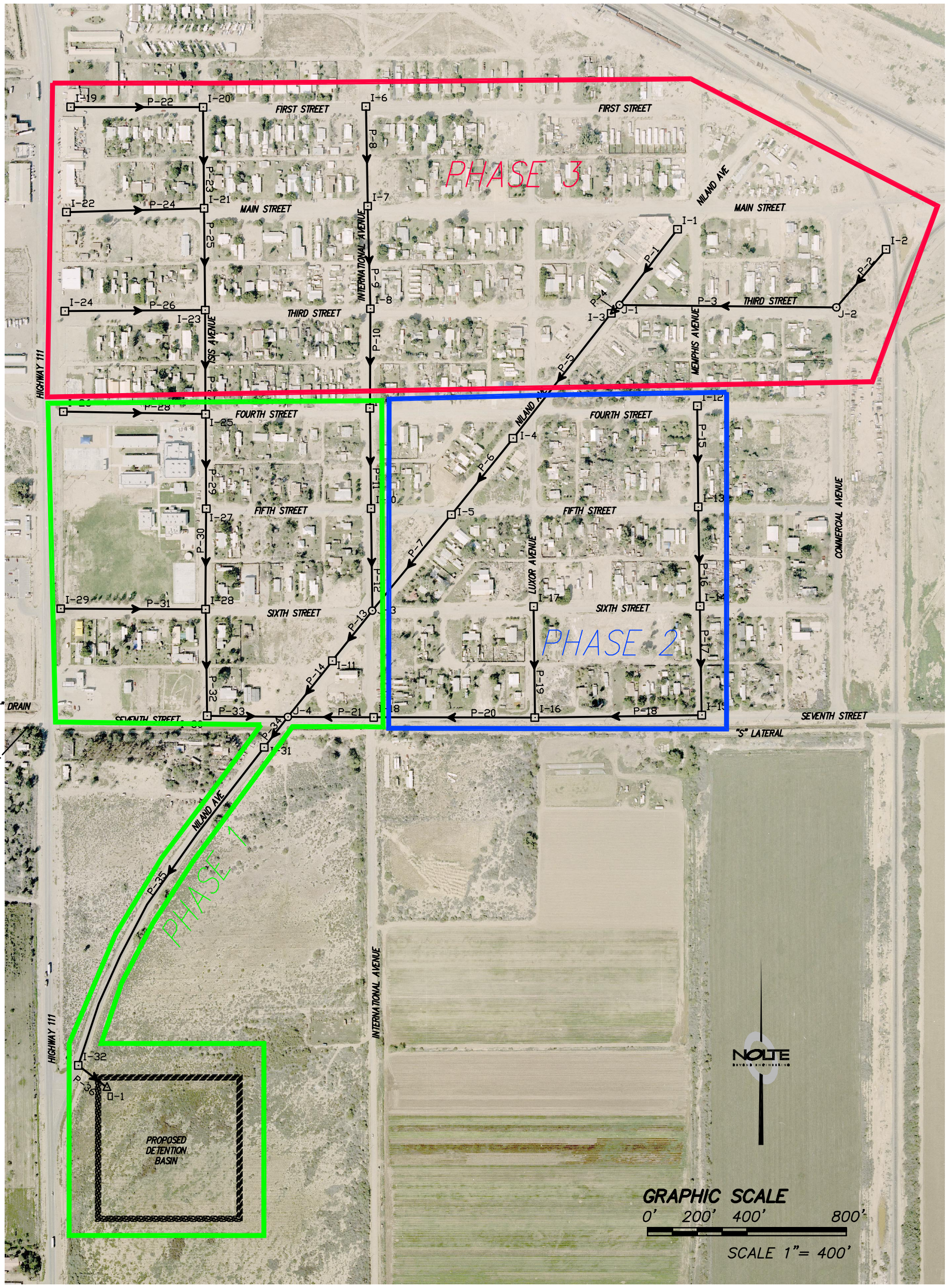
APPENDIX H

AREAS:

PHASE 1 = Short Term (1–5 Years)

PHASE 2 = Medium Term (5–10 Years)

PHASE 3 = Long Term (15–20 Years)



NOLTE BEYOND ENGINEERING

1005 WEST MAIN STREET EL CENTRO, CA. 92243
760.336.4100 TEL. 760.482.0300 FAX WWW.NOLTE.COM

DATE: NONE TIME: NONE
NETWORK: NONE
PATH: NONE
DWG NAME: NONE
PLOT VIEW: NONE
DESIGNER: NONE MGR: SB

NILAND DRAINAGE MASTER PLAN
PROPOSED STORM DRAIN & DETENTION BASIN SYS.
CIP PHASE BREAKDOWN

PREPARED FOR: IMPERIAL COUNTY DATE SUBMITTED: JAN 2007

SHEET NUMBER 1 OF 1 SHEETS

JOB NUMBER ECB009100

Cost Increase Summary

Phase	1	2	3
Subtotal (2006 Dollars)	$3,688,533	$1,782,020	$2,777,688
Contingency (25%)	$922,134	$445,505	$694,422
Grand Total (2006 Dollars)	$4,611,000	$2,228,000	$3,473,000
Subtotal (2007 Dollars)	$4,241,812	$2,049,323	$3,194,341
Contingency (25%)	$1,060,454	$512,331	$798,586
Grand Total (2007 Dollars)	$5,303,000	$2,562,000	$3,993,000
Subtotal (2008 Dollars)	$4,878,084	$2,356,721	$3,673,492
Contingency (25%)	$1,219,522	$589,181	$918,373
Grand Total (2008 Dollars)	$6,098,000	$2,946,000	$4,592,000
Subtotal (2009 Dollars)	$5,609,797	$2,710,230	$4,224,515
Contingency (25%)	$1,402,450	$677,558	$1,056,129
Grand Total (2009 Dollars)	$7,013,000	$3,388,000	$5,281,000
Subtotal (2010 Dollars)	$6,451,266	$3,116,764	$4,858,193
Contingency (25%)	$1,612,817	$779,192	$1,214,549
Grand Total (2010 Dollars)	$8,065,000	$3,896,000	$6,073,000
Subtotal (2015 Dollars)	$8,233,632	$3,977,869	$6,200,422
Contingency (25%)	$2,058,409	$994,468	$1,550,106
Grand Total (2015 Dollars)	$10,293,000	$4,973,000	$7,751,000
Subtotal (2020 Dollars)	$10,508,433	$5,076,880	$7,913,484
Contingency (25%)	$2,627,109	$1,269,221	$1,978,372
Grand Total (2020 Dollars)	$13,136,000	$6,347,000	$9,892,000

Note: Construction cost increase is anticipated to be 15% per year from 2006 through 2010. After 2010, a 5% increase is used.

LOCATION:	ESTIMATE BY:			ENGINEERING FIRM:			SHEET:	
Phase 1	T. Atwood			Nolte Associates, Inc.			1 of 1	
TITLE:				CHECKED BY:			DATE:	
Townsite of Niland				S. Berkebile, P.E.				
Capital Improvement Plan								
DESCRIPTION:	QUANTITY			INSTALLED COST			ENGINEERING EST	
Engineering Cost Opinion	NO.	UNIT		UNIT	TOTAL			TOTAL
Mobilization	1	LS		$10,000	$10,000			$10,000
Clearing and Grubbing	1	LS		$1,000	$1,000			$1,000
Traffic Control	1	LS		$5,000	$5,000			$5,000
Temporary fiber rolls	12405	LF		$2.50	$31,013			$31,013
Material delivery and storage	1	LS		$2,000	$2,000			$2,000
Solid waste and stockpile management	1	LS		$5,000	$5,000			$5,000
AC Pavement Removal	50165	SF		$2	$100,330			$100,330
4" PCC Sidewalk	90850	SF		$5.00	$454,250			$454,250
4" AC Paving	50165	SF		$3.00	$150,495			$150,495
Concrete Minor Structures (Cleanouts)	2	EA		$2,250	$4,500			$4,500
Concrete Minor Structures (Curb & Gutter)	18170	LF		$20.00	$363,400			$363,400
Concrete Minor Structures (Curb Inlet)	24	EA		$3,500	$84,000			$84,000
Land Acquisition for Detention Facility	6	ACRE		$1,845	$11,070			$11,070
Export	81360	CY		$7	$569,520			$569,520
Trench Safety and Shoring	1	LS		$30,000	$30,000			$30,000
12" PVC (Detention Basin to Drain)	700	LF		$45	$31,500			$31,500
12" PVC (Laterals)	720	LF		$45	$32,400			$32,400
24" RCP	1156	LF		$85	$98,260			$98,260
36" RCP	404	LF		$125	$50,500			$50,500
42" RCP	757	LF		$140	$105,980			$105,980
48" RCP	1092	LF		$175	$191,100			$191,100
54" RCP	789	LF		$185	$145,965			$145,965
60" RCP	4025	LF		$210	$845,250			$845,250
72" RCP	325	LF		$240	$78,000			$78,000
Engineering Design	1	LS		$100,000	$100,000			$100,000
Geotechnical	1	LS		$30,000	$30,000			$30,000
Survey	1	LS		$56,000	$56,000			$56,000
Construction Management	1	LS		$90,000	$90,000			$90,000
Imperial Irrigation District Review Fees	1	LS		$10,000	$10,000			$10,000
Imperial County Encroachment Permit	1	LS		$2,000	$2,000			$2,000
SUBTOTAL								$3,688,533
CONTINGENCY (25%)								$922,134
GRAND TOTAL (2006 Dollars)								**$4,611,000**

LOCATION:	ESTIMATE BY:			ENGINEERING FIRM:			SHEET:	
Phase 2	T. Atwood			Nolte Associates, Inc.			1 of 1	
TITLE:				CHECKED BY:			DATE:	
Townsite of Niland				S. Berkebile, P.E.				
Capital Improvement Plan								
DESCRIPTION:	QUANTITY			INSTALLED COST			ENGINEERING EST	
Engineering Cost Opinion	NO.	UNIT		UNIT	TOTAL			TOTAL
Mobilization	1	LS		$10,000	$10,000			$10,000
Clearing and Grubbing	1	LS		$1,000	$1,000			$1,000
Traffic Control	1	LS		$5,000	$5,000			$5,000
Temporary fiber rolls	7820	LF		$2.50	$19,550			$19,550
Material delivery and storage	1	LS		$1,000	$1,000			$1,000
Solid waste and stockpile management	1	LS		$3,000	$3,000			$3,000
AC Pavement Removal	17770	SF		$2	$35,540			$35,540
4" PCC Sidewalk	85500	SF		$5.00	$427,500			$427,500
4" AC Paving	17770	SF		$3.00	$53,310			$53,310
Concrete Minor Structures (Cleanouts)	0	EA		$2,250	$0			$0
Concrete Minor Structures (Curb & Gutter)	17100	LF		$20.00	$342,000			$342,000
Concrete Minor Structures (Curb Inlet)	16	EA		$3,500	$56,000			$56,000
Trench Safety and Shoring	1	LS		$30,000	$30,000			$30,000
12" PVC (Laterals)	480	LF		$45.00	$21,600			$21,600
18" RCP	407	LF		$75	$30,525			$30,525
24" RCP	847	LF		$85	$71,995			$71,995
36" RCP	3552	LF		$125	$444,000			$444,000
Engineering Design	1	LS		$100,000	$100,000			$100,000
Geotechnical	1	LS		$20,000	$20,000			$20,000
Survey	1	LS		$48,000	$48,000			$48,000
Construction Management	1	LS		$50,000	$50,000			$50,000
Imperial Irrigation District Review Fees	1	LS		$10,000	$10,000			$10,000
Imperial County Encroachment Permit	1	LS		$2,000	$2,000			$2,000
SUBTOTAL								$1,782,020
CONTINGENCY (25%)								$445,505
GRAND TOTAL (2006 Dollars)								**$2,228,000**

LOCATION:	ESTIMATE BY:			ENGINEERING FIRM:			SHEET:	
Phase 3	T. Atwood			Nolte Associates, Inc.			1 of 1	
TITLE:				**CHECKED BY:**			**DATE:**	
Townsite of Niland				S. Berkebile, P.E.				
Capital Improvement Plan								
DESCRIPTION:	**QUANTITY**			**INSTALLED COST**			**ENGINEERING EST**	
Engineering Cost Opinion	**NO.**	**UNIT**		**UNIT**	**TOTAL**			**TOTAL**
Mobilization	1	LS		$10,000	$10,000			$10,000
Clearing and Grubbing	1	LS		$1,000	$1,000			$1,000
Traffic Control	1	LS		$5,000	$5,000			$5,000
Temporary fiber rolls	12715	LF		$2.50	$31,788			$31,788
Material delivery and storage	1	LS		$1,500	$1,500			$1,500
Solid waste and stockpile management	1	LS		$3,000	$3,000			$3,000
AC Pavement Removal	27130	SF		$2	$54,260			$54,260
4" PCC Sidewalk	148500	SF		$5.00	$742,500			$742,500
4" AC Paving	27130	SF		$3.00	$81,390			$81,390
Concrete Minor Structures (Cleanouts)	2	EA		$2,250	$4,500			$4,500
Concrete Minor Structures (Curb & Gutter)	29700	LF		$20.00	$594,000			$594,000
Concrete Minor Structures (Curb Inlet)	23	EA		$2,000	$46,000			$46,000
Trench Safety and Shoring	1	LS		$30,000	$30,000			$30,000
12" PVC (Laterals)	690	LF		$45	$31,050			$31,050
24" RCP	2037	LF		$85	$173,145			$173,145
30" RCP	1215	LF		$98	$119,070			$119,070
36" RCP	1782	LF		$125	$222,750			$222,750
42" RCP	829	LF		$140	$116,060			$116,060
48" RCP	1181	LF		$175	$206,675			$206,675
Engineering Design	1	LS		$130,000	$130,000			$130,000
Geotechnical	1	LS		$20,000	$20,000			$20,000
Survey	1	LS		$72,000	$72,000			$72,000
Construction Management	1	LS		$70,000	$70,000			$70,000
Imperial Irrigation District Review Fees	1	LS		$10,000	$10,000			$10,000
Imperial County Encroachment Permit	1	LS		$2,000	$2,000			$2,000
SUBTOTAL								$2,777,688
CONTINGENCY (25%)								$694,422
GRAND TOTAL (2006 Dollars)								**$3,473,000**

AGREEMENT FOR SERVICES

SAMPLE

THIS AGREEMENT FOR SERVICES ("Agreement"), made and entered into effective the _____ day of _____, 2021, by and between the County of Imperial, a political subdivision of the State of California, by and through its Department of Public Works ("COUNTY") and **[CONSULTANT]**, an active California corporation ("CONSULTANT") (individually, "Party;" collectively, "Parties") shall be as follows:

RECITALS

WHEREAS, COUNTY desires to retain a qualified individual, firm or business entity to provide updates to the ("Project"); and

WHEREAS, CONSULTANT represents that it is qualified and experienced to perform the services; and

WHEREAS, COUNTY desires to engage CONSULTANT to provide services by reason of its qualifications and experience for performing such services, and CONSULTANT has offered to provide the required services for the Project on the terms and in the manner set forth herein.

NOW, THEREFORE, in consideration of their mutual covenants, COUNTY and CONSULTANT have and hereby agree to the following:

1. INCORPORATION OF RECITALS.

The Parties certify that, to the best of their knowledge, the above recitals are true and correct. The above recitals are hereby adopted and incorporated within this Agreement.

2. DEFINITIONS.

2.1. "Request for Proposal" or "RFP" shall mean that document that describes the Project and project requirements to prospective bidders entitled, [RFP] dated [RFP Date]. The Request for Proposal is attached hereto as **Exhibit "A"** and incorporated herein by this reference.

2.2. "Proposal" shall mean CONSULTANT's document entitled, [Proposal] and submitted to COUNTY's Department of Public Works. The Proposal is attached hereto as **Exhibit "B"** and incorporated herein this by reference.

3. CONTRACT COORDINATION.

3.1. The Director of Public Works or his/her designee shall be the representative of COUNTY for all purposes under this Agreement. The Director of Public Works or his/her designee is hereby designated as the Contract Manager for COUNTY. He/she shall supervise the progress and execution of this Agreement.

3.2. CONSULTANT shall assign a single Contract Manager to have overall responsibility for the progress and execution of this Agreement. Should circumstances or conditions subsequent to the execution of this Agreement require a substitute Contract Manager for any reason, the Contract Manager designee shall be subject to the prior written acceptance and approval of COUNTY's Contract Manager.

4. <u>DESCRIPTION OF WORK</u>.

CONSULTANT shall provide all materials and labor to perform this Agreement consistent with the RFP and the Proposal, as set forth in **Exhibits "A" and "B."** In the event of a conflict amongst this Agreement, the RFP, and the Proposal, the RFP shall take precedence over the Proposal and this Agreement shall take precedence over both.

5. <u>WORK TO BE PERFORMED BY CONSULTANT</u>.

5.1. CONSULTANT shall comply with all terms, conditions and requirements of the Proposal and this Agreement.

5.2. CONSULTANT shall perform such other tasks as necessary and proper for the full performance of the obligations assumed by CONSULTANT hereunder; including but not limited to any additional work or change orders agreed upon pursuant to written authorization as described in Paragraph 6.3, and as contemplated under Sections 13, 14, and 28. Proposed additional work or change order requests, when applicable, will be attached and incorporated herein under **Exhibit "B"** (as "B-1," "B-2," etc.).

5.3. CONSULTANT shall:

5.3.1. Procure all permits and licenses, pay all charges and fees, and give all notices that may be necessary and incidental to the due and lawful prosecution of the services to be performed by CONSULTANT under this agreement;

5.3.2. Keep itself fully informed of all existing and proposed federal, state and local laws,

ordinances, regulations, orders and decrees which may affect those engaged or employed under this Agreement;

5.3.3. At all times observe and comply with, and cause all of its employees to observe and comply with all of said laws, ordinances, regulations, orders and decrees mentioned above; and

5.3.4. Immediately report to COUNTY's Contract Manager in writing any discrepancy or inconsistency it discovers in said laws, ordinances, regulations, orders and decrees mentioned above in relation to any plans, drawings, specifications or provisions of this Agreement.

6. <u>REPRESENTATIONS BY CONSULTANT</u>.

6.1. CONSULTANT understands and agrees that COUNTY has limited knowledge in the multiple areas specified in the Proposal. CONSULTANT has represented itself to be an expert in these fields and understands that COUNTY is relying upon such representation.

6.2. CONSULTANT represents and warrants that it is a lawful entity possessing all required licenses and authorities to do business in the State of California and perform all aspects of this Agreement.

6.3. CONSULTANT shall not commence any work under this Agreement or provide any other services, or materials, in connection therewith until CONSULTANT has received written authorization from COUNTY's Contract manager to do so.

6.4. CONSULTANT represents and warrants that the people executing this Agreement on behalf of CONSULTANT have the authority of CONSULTANT to sign this Agreement and bind CONSULTANT to the performance of all duties and obligations assumed by CONSULTANT herein.

6.5. CONSULTANT represents and warrants that any employee, contractor and/or agent who will be performing any of the duties and obligations of CONSULTANT herein possess all required licenses and authorities, as well as the experience and training, to perform such tasks.

6.6. CONSULTANT represents and warrants that the allegations contained in the Proposal are

true and correct.

6.7. CONSULTANT understands and agrees not to discuss this Agreement or work performed pursuant to this Agreement with anyone not a party to this Agreement without the prior permission of COUNTY. CONSULTANT further agrees to immediately advise COUNTY of any contacts or inquiries made by anyone not a party to this Agreement with respect to work performed pursuant to this Agreement.

6.8. Prior to accepting any work under this Agreement, CONSULTANT shall perform a due diligence review of its files and advise COUNTY of any conflict or potential conflict CONSULTANT may have with respect to the work requested.

6.9. CONSULTANT understands and agrees that in the course of performance of this Agreement CONSULTANT may be provided with information or data considered by the owner or the COUNTY to be confidential. COUNTY shall clearly identify such information and/or data as confidential. CONSULTANT shall take all necessary steps necessary to maintain such confidentiality including but not limited to restricting the dissemination of all material received to those required to have such data in order for CONSULTANT to perform under this Agreement.

6.10. CONSULTANT represents that the personnel dedicated to this project as identified in CONSULTANT's Proposal, will be the people to perform the tasks identified therein. CONSULTANT will not substitute other personnel or engage any contractors to work on any tasks identified herein without prior written notice to COUNTY.

6.11. CONSULTANT understands that COUNTY considers the representations made herein to be material and would not enter into this Agreement with CONSULTANT if such representations were not made.

7. <u>TERM OF AGREEMENT</u>.

This Agreement shall commence on the date first written above and shall remain in effect until the services provided as outlined in Section 4, ("DESCRIPTION OF WORK"), have been completed, unless otherwise terminated as provided for in this Agreement.

8. <u>COMPENSATION</u>.

8.1. The total compensation payable under this Agreement shall not exceed **[amount]** unless otherwise previously agreed to in writing by COUNTY, and shall be broken down as follows:

8.1.1. [Cost Proposal]

8.2. The fee for any additional services required by COUNTY will be computed either on a negotiated lump sum basis or upon actual hours and expenses incurred by CONSULTANT and based on CONSULTANT's current standard rates as set forth in the Proposal. Additional services or costs will not be paid without a prior written agreement between the Parties.

8.3. Except as provided under Paragraphs 8.1 and 8.2, COUNTY shall not be responsible to pay CONSULTANT any compensation, out of pocket expenses, fees, reimbursement of expenses or other remuneration.

9. PAYMENT.

9.1. CONSULTANT shall bill COUNTY on a time and material basis as set forth in **Exhibit "B."** COUNTY shall pay CONSULTANT for completed and approved services upon presentation of its itemized billing.

9.2. COUNTY shall have the right to retain five percent (5%) of the total of amount of each invoice, not to exceed five percent (5%) of the total compensation amount of the completed project. "Completion of the Project" is when the work to be performed has been completed in accordance with this Agreement, as determined by COUNTY, and all subcontractors, if any, have been paid in full by CONSULTANT. Upon completion of the Project CONSULTANT shall bill COUNTY the retention for payment by COUNTY.

10. METHOD OF PAYMENT.

CONSULTANT shall at any time prior to the fifteenth (15^{th}) day of any month, submit to COUNTY a written claim for compensation for services performed. The claim shall be in a format approved by COUNTY. No payment shall be made by COUNTY prior to the claims being approved in writing by COUNTY's Contract Manager or his/her designee. CONSULTANT may expect to receive payment within a reasonable time thereafter and in any event in the normal course of business within thirty (30) days after

the claim is submitted.

11. TIME FOR COMPLETION OF THE WORK.

The Parties agree that time is of the essence in the performance of this Agreement. Program scheduling shall be as described in Exhibits unless revisions are approved by both COUNTY's Contract Manager and CONSULTANT's Contract Manager. Time extensions may be allowed for delays caused by COUNTY, other governmental agencies or factors not directly brought about by the negligence or lack of due care on the part of CONSULTANT.

12. MAINTENANCE AND ACCESS OF BOOKS AND RECORDS.

12.1. CONSULTANT shall maintain books, records, documents, reports and other materials developed under this Agreement as follows:

12.2. CONSULTANT shall maintain all ledgers, books of accounts, invoices, vouchers, canceled checks, and other records relating to CONSULTANT's charges for services or expenditures and disbursements charged to COUNTY for a minimum period of three (3) years, or for any longer period required by law, from the date of final payment to CONSULTANT pursuant to this Agreement.

12.3. CONSULTANT shall maintain all reports, documents, and records, which demonstrate performance under this Agreement for a minimum period of five (5) years, or for any longer period required by law, from the date of termination or completion of this Agreement.

12.4. Any records or documents required to be maintained by CONSULTANT pursuant to this Agreement shall be made available to COUNTY for inspection or audit at any time during CONSULTANT's regular business hours provided that COUNTY provides CONSULTANT with seven (7) days advanced written or e-mail notice. Copies of such documents shall, at no cost to COUNTY, be provided to COUNTY for inspection at CONSULTANT's address indicated for receipt of notices under this Agreement.

13. SUSPENSION OF AGREEMENT.

COUNTY's Contract Manager shall have the authority to suspend this Agreement, in whole or in part, for such period as deemed necessary due to unfavorable conditions or to the failure on the part

of CONSULTANT to perform any provision of this Agreement. CONSULTANT will be paid the compensation due and payable to the date of suspension.

14. TERMINATION.

COUNTY retains the right to terminate this Agreement for any reason by notifying CONSULTANT in writing twenty (20) days prior to termination and by paying the compensation due and payable to the date of termination; provided, however, if this Agreement is terminated for fault of CONSULTANT, COUNTY shall be obligated to compensate CONSULTANT only for that portion of CONSULTANT's services which are of benefit to COUNTY. Said compensation is to be arrived at by mutual agreement between COUNTY and CONSULTANT; should the parties fail to agree on said compensation, an independent arbitrator shall be appointed and the decision of the arbitrator shall be binding upon the parties.

15. INSPECTION.

CONSULTANT shall furnish COUNTY with every reasonable opportunity for COUNTY to ascertain that the services of CONSULTANT are being performed in accordance with the requirements and intentions of this Agreement. All work done and materials furnished, if any, shall be subject to COUNTY's Contract Manager's inspection and approval. The inspection of such work shall not relieve CONSULTANT of any of its obligations to fulfill its Agreement as prescribed.

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16. OWNERSHIP OF MATERIALS.

All original drawings, videotapes, studies, sketches, computations, reports, information, data and other materials given to or prepared or assembled by or in the possession of CONSULTANT pursuant to this Agreement shall become the permanent property of COUNTY and shall be delivered to COUNTY upon demand, whether or not completed, and shall not be made available to any individual or organization without the prior written approval of COUNTY.

17. INTEREST OF CONSULTANT.

17.1. CONSULTANT covenants that it presently has no interest, and shall not acquire any interest, direct or indirect, financial or otherwise, which would conflict in any manner or degree with the performance of the services hereunder.

17.2. CONSULTANT covenants that, in the performance of this Agreement, no sub-contractor or person having such an interest shall be employed.

17.3. CONSULTANT certifies that no one who has or will have any financial interest under this Agreement is an officer or employee of COUNTY.

18. INDEMNIFICATION.

18.1. CONSULTANT agrees to the fullest extent permitted by law, in accordance with the limits required by California Civil Code § 2782.8, to indemnify, defend, protect and hold COUNTY and its representatives, officers, directors, designees, employees, successors and assigns harmless from any and all claims, expenses, liabilities, losses, causes of actions, demands, losses, penalties, attorneys' fees and costs, in law or equity, of every kind and nature whatsoever that arise out of, pertain to, or relate to CONSULTANT's negligence, recklessness, or willful misconduct under this Agreement ("Claims"), whether or not arising from the passive negligence of COUNTY, but does not include Claims that are the result of the negligence, recklessness, or willful misconduct of COUNTY.

18.2. In accordance with the limits required by California Civil Code § 2782.8, if applicable, CONSULTANT agrees to defend with counsel acceptable to COUNTY, indemnify and hold COUNTY harmless from all Claims, including but not limited to:

18.2.1. Personal injury, including but not limited to bodily injury, emotional injury, sickness or disease or death to persons including but not limited to COUNTY's representatives, officers, directors, designees, employees, agents, successors and assigns, subcontractors and other third parties and/or damage to property of anyone (including loss of use thereof) arising out of, pertaining to, or relating to CONSULTANT's negligent or reckless performance of, or willful misconduct surrounding, any of the terms contained in this Agreement, or anyone directly or indirectly employed by CONSULTANT or anyone for whose acts CONSULTANT may be liable;

18.2.2. Liability arising from injuries to CONSULTANT and/or any of

CONSULTANT's employees or agents arising out of, pertaining to, or relating to CONSULTANT's negligent or reckless performance of, or willful misconduct surrounding, any of the terms contained in this Agreement, or anyone directly or indirectly employed by CONSULTANT or anyone for whose acts CONSULTANT may be liable;

18.2.3. Penalties imposed upon account of the violation of any law, order, citation, rule, regulation, standard, ordinance or statute caused by the negligent or reckless action or inaction, or willful misconduct of CONSULTANT or anyone directly or indirectly employed by CONSULTANT or anyone for whose acts CONSULTANT may be liable, including but not limited to:

(a) Any loss of funding, penalties, fees, or other costs resulting from CONSULTANT's failure to adhere to Disadvantaged Business Enterprise requirements and/or goals, as determined by COUNTY or such other lawful entity in charge of monitoring Disadvantaged Business Enterprise compliance;

(a) Any loss of funding, penalties, fees, or other costs resulting from CONSULTANT's failure to adhere to prevailing wage requirements, as determined by COUNTY, the California Department of Industrial Relations, or such other lawful entity in charge of monitoring prevailing wage compliance;

18.2.4. Infringement of any patent rights which may be brought against COUNTY arising out of CONSULTANT's work;

18.2.5. Any violation or infraction by CONSULTANT of any law, order, citation, rule, regulation, standard, ordinance or statute in any way relating to the occupational health or safety of employees; and

18.2.6. Any breach by CONSULTANT of the terms, requirements or covenants of this Agreement.

18.3. These indemnification provisions shall extend to Claims occurring after this Agreement

is terminated, as well as while it is in force.

19. <u>INDEPENDENT CONTRACTOR</u>.

In all situations and circumstances arising out of the terms and conditions of this Agreement, CONSULTANT is an independent contractor, and as an independent contractor, the following shall apply:

19.1. CONSULTANT is not an employee or agent of COUNTY and is only responsible for the requirements and results specified by this Agreement or any other agreement.

19.2. CONSULTANT shall be responsible to COUNTY only for the requirements and results specified by this Agreement and except as specifically provided in this Agreement, shall not be subject to COUNTY's control with respect to the physical actions or activities of CONSULTANT in fulfillment of the requirements of this Agreement.

19.3. CONSULTANT is not, and shall not be, entitled to receive from, or through, COUNTY, and COUNTY shall not provide, or be obligated to provide, CONSULTANT with Workers' Compensation coverage or any other type of employment or worker insurance or benefit coverage required or provided by any Federal, State or local law or regulation for, or normally afforded to, an employee of COUNTY.

19.4. CONSULTANT shall not be entitled to have COUNTY withhold or pay, and COUNTY shall not withhold or pay, on behalf of CONSULTANT, any tax or money relating to the Social Security Old Age Pension Program, Social Security Disability Program, or any other type of pension, annuity, or disability program required or provided by any federal, State or local law or regulation.

19.5. CONSULTANT shall not be entitled to participate in, nor receive any benefit from, or make any claim against any COUNTY fringe program, including, but not limited to, COUNTY's pension plan, medical and health care plan, dental plan, life insurance plan, or any other type of benefit program, plan, or coverage designated for, provided to, or offered to COUNTY's employees.

19.6. COUNTY shall not withhold or pay, on behalf of CONSULTANT, any Federal, State, or local tax, including, but not limited to, any personal income tax, owed by

CONSULTANT.

19.7. CONSULTANT is, and at all times during the term of this Agreement, shall represent and conduct itself as an independent contractor, not as an employee of COUNTY.

19.8. CONSULTANT shall not have the authority, express or implied, to act on behalf of, bind or obligate COUNTY in any way without the written consent of COUNTY.

20. INSURANCE.

20.1. CONSULTANT hereby agrees at its own cost and expense to procure and maintain, during the entire term of this Agreement and any extended term therefore, insurance in a sum acceptable to COUNTY and adequate to cover potential liabilities arising in connection with the performance of this Agreement and in any event not less than the minimum limit set forth in the "Minimum Insurance Amounts" attachment to RFP (**Exhibit "A"**) which are incorporated as if set forth fully herein.

20.2. Special Insurance Requirements. All insurance required shall:

20.2.1. Be procured from California admitted insurers (licensed to do business in California) with a current rating by Best's Key Rating Guide, acceptable to COUNTY. A rating of at least A-VII shall be acceptable to COUNTY; lesser ratings must be approved in writing by COUNTY.

20.2.2. Be primary coverage as respects COUNTY and any insurance or self-insurance maintained by COUNTY shall be in excess of CONSULTANT's insurance coverage and shall not contribute to it.

20.2.3. Name The Imperial County Department of Public Works and the County of Imperial and their officers, employees, and volunteers as additional insured on all policies, except Workers' Compensation insurance and Errors & Omissions insurance, and provide that COUNTY may recover for any loss suffered by COUNTY due to CONSULTANT's negligence.

20.2.4. State that it is primary insurance and regards COUNTY as an additional insured and contains a cross-liability or severability of interest clause.

20.2.5. Not be canceled, non-renewed or reduced in scope of coverage until after thirty

(30) days written notice has been given to COUNTY. CONSULTANT may not terminate such coverage until it provides COUNTY with proof that equal or better insurance has been secured and is in place. Cancellation or change without prior written consent of COUNTY shall, at the option of COUNTY, be grounds for termination of this Agreement.

20.2.6. If this Agreement remains in effect more than one (1) year from the date of its original execution, COUNTY may, at its sole discretion, require an increase to liability insurance to the level then customary in similar COUNTY Agreements by giving sixty (60) days notice to CONSULTANT.

20.3. Additional Insurance Requirements.

20.3.1. COUNTY is to be notified immediately of all insurance claims. COUNTY is also to be notified if any aggregate insurance limit is exceeded.

20.3.2. The comprehensive or commercial general liability shall contain a provision of endorsements stating that such insurance:

(a) Includes contractual liability;

(b) Does not contain any exclusions as to loss or damage to property caused by explosion or resulting from collapse of buildings or structures or damage to property underground, commonly referred to by insurers as the "XCU Hazards;"

(c) Does not contain a "pro rata" provision which looks to limit the insurer's liability to the total proportion that its policy limits bear to the total coverage available to the insured;

(d) Does not contain an "excess only" clause which require the exhaustion of other insurance prior to providing coverage;

(e) Does not contain an "escape clause" which extinguishes the insurer's liability if the loss is covered by other insurance;

(f) Includes COUNTY as an additional insured.

(g) States that it is primary insurance and regards COUNTY as an additional

insured and contains a cross-liability or severability of interest clause.

20.4. Deposit of Insurance Policy. Promptly on issuance, reissuance, or renewal of any insurance policy required by this Agreement, CONSULTANT shall, if requested by COUNTY, provide COUNTY satisfactory evidence that insurance policy premiums have been paid together with a duplicate copy of the policy or a certificate evidencing the policy and executed by the insurance company issuing the policy or its authorized agent.

20.5. Certificates of Insurance. CONSULTANT agrees to provide COUNTY with the following insurance documents on or before the effective date of this Agreement:

20.5.1. Complete copies of certificates of insurance for all required coverages including additional insured endorsements shall be attached hereto as **Exhibit "C"** and incorporated herein.

20.5.2. The documents enumerated in this Paragraph shall be sent to the following:

County of Imperial
Risk Management Department
Re: County Project No. [Project Number]
940 Main Street, Suite 101
El Centro, CA 92243

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///

County of Imperial
Department of Public Works
Re: County Project No.[Project Number]
155 South 11th Street
El Centro, CA 92243

20.6. Additional Insurance. Nothing in this, or any other provision of this Agreement, shall be construed to preclude CONSULTANT from obtaining and maintaining any additional insurance policies in addition to those required pursuant to this Agreement.

21. PREVAILING WAGE.

21.1. CONSULTANT acknowledges that any work that qualifies as a "public work" within the meaning of California Labor Code section 1720 shall cause CONSULTANT, and its sub-

consultants, to comply with the provisions of California Labor Code sections 1775 et seq.

21.2. When applicable, copies of the prevailing rate of per diem wages shall be on file at COUNTY's Department of Public Works and/or Clerk of the Board of Supervisors, and available to any interested party upon request. CONSULTANT shall post copies of the prevailing wage rate of per diem wages at the Project site.

21.3. CONSULTANT hereby acknowledges and stipulates to the following:

21.3.1. CONSULTANT has reviewed and agrees to comply with the provisions of Labor Code section 1776 regarding retention and inspection of payroll records and noncompliance penalties; and

21.3.2. CONSULTANT has reviewed and agrees to comply with the provisions of Labor Code section 1777.5 regarding employment of registered apprentices; and

21.3.3. CONSULTANT has reviewed and agrees to comply with the provisions of Labor Code section 1810 regarding the legal day's work; and

21.3.4. CONSULTANT has reviewed and agrees to comply with the provisions of Labor Code section 1813 regarding forfeiture for violations of the maximum hours per day and per week provisions contained in the same chapter.

21.3.5. CONSULTANT has reviewed and agrees to comply with any applicable provisions for those Projects subject to Department of Industrial Relations (DIR) Monitoring and Enforcement of prevailing wages. COUNTY hereby notifies CONSULTANT that CONSULTANT is responsible for complying with the requirements of Senate Bill 854 (SB854) regarding certified payroll record reporting. Further information concerning the requirements of SB854 is available on the DIR website located at: http://www.dir.ca.gov/Public-Works/PublicWorksEnforcement.html.

22. <u>WORKERS' COMPENSATION CERTIFICATION</u>.

22.1. Prior to the commencement of work, CONSULTANT shall sign and file with COUNTY the following certification: "I am aware of the provisions of California Labor Code §§3700 et seq. which require every employer to be insured against liability for workers'

compensation or to undertake self-insurance in accordance with the provisions of that code, and I will comply with such provisions before commencing the performance of the work of this contract."

22.2. This certification is included in this Agreement and signature of the Agreement shall constitute signing and filing of the certificate.

22.3. CONSULTANT understands and agrees that any and all employees, regardless of hire date, shall be covered by Workers' Compensation pursuant to statutory requirements prior to beginning work on the Project.

22.4. If CONSULTANT has no employees, initial here: _____.

23. ASSIGNMENT.

Neither this Agreement nor any duties or obligations hereunder shall be assignable by CONSULTANT without the prior written consent of COUNTY. CONSULTANT may employ other specialists to perform services as required with prior approval by COUNTY.

24. NON-DISCRIMINATION.

24.1. During the performance of this Agreement, CONSULTANT and its subcontractors shall not unlawfully discriminate, harass or allow harassment against any employee or applicant for employment because of sex, race, color, ancestry, religious creed, national origin, physical disability (including HIV and AIDS), mental disability, medical condition (cancer), age (over forty (40)), marital status and denial of family care leave. CONSULTANT and its subcontractors shall insure that the evaluation and treatment of their employees and applicants for employment are free from such discrimination and harassment.

24.2. CONSULTANT and its subcontractors shall not discriminate on the basis of race, color, national origin, or sex in the performance of this Agreement. CONSULTANT shall carry out applicable requirements of 49 CFR 26 in the award and administration of DOT-assisted contracts. Failure by CONSULTANT to carry out these requirements is a material breach of this Agreement, which may result in the termination of this Agreement, or such other remedy as COUNTY deems appropriate.

24.3. CONSULTANT and its subcontractors shall comply with the provisions of the Fair Employment and Housing Act (Gov. Code §12990 (a-f) et seq.) and the applicable regulations promulgated thereunder (California Code of Regulations, Title 2, §7285 et seq.).

24.4. The applicable regulations of the Fair Employment and Housing Commission implementing Government Code §12990 (a-f), set forth in Chapter 5 of Division 4 of Title 2 of the California Code of Regulations, are incorporated into this Agreement by reference and made a part hereof as if set forth in full.

24.5. The applicable regulations of §504 of the Rehabilitation Act of 1973 (29 U.S.C. §794 (a)) are incorporated into this Agreement by reference and made a part hereof as if set forth in full.

24.6. CONSULTANT and its subconsultants shall give written notice of their obligations under this clause to labor organizations with which they have a collective bargaining or other agreement.

24.7. CONSULTANT shall include the nondiscrimination and compliance provisions of this clause in all subcontracts to perform work under this Agreement.

25. <u>DISADVANTAGED BUSINESS ENTITY COMPLIANCE</u>.

25.1. When applicable, CONSULTANT represents and warrants that it has fully read the applicable Disadvantaged Business Enterprise ("DBE") requirements pertaining to this Project and has fully and accurately completed any and all required DBE forms.

25.2. CONSULTANT represents and warrants that it will comply with all applicable DBE requirements for this Project.

25.3. CONSULTANT shall comply with any applicable DBE provisions attached hereto as **Exhibit "D"** and incorporated by this reference as though fully set forth herein.

25.4. If any state or federal funds are withheld from COUNTY or not reimbursed to COUNTY due to CONSULTANT's failure to either comply with the DBE requirements set forth in the RFP and this Agreement, or to meet the mandatory DBE goals as determined by COUNTY, Caltrans, the Federal Highway Administration, and/or any other state or

federal agency contributing funds to the Project, then CONSULTANT shall fully reimburse COUNTY the amount of funding lost. COUNTY reserves the right to deduct any such loss in funding from the amount of compensation due to CONSULTANT under this Agreement.

25.5. In addition to the above, CONSULTANT's failure to comply with DBE requirements/goals shall subject it to such sanctions as are permitted by law, which may include, but shall not be limited to the following:

25.5.1. Termination of this Agreement;

25.5.2. Withholding monthly progress payments;

25.5.3. Compensatory, special, incidental, liquidated and other damages; and/or

25.5.4. Designation of CONSULTANT as "nonresponsible," and disqualification from bidding on future public works projects advertised by COUNTY.

26. NOTICES AND REPORTS.

26.1. Any notice and reports under this Agreement shall be in writing and may be given by personal delivery or by mailing by certified mail, addressed as follows:

COUNTY

Director of Public Works
Re: County Project No.[Project Number]
155 South 11th Street
El Centro, CA 92243

County of Imperial
Clerk of the Board of Supervisors
Re: PW County Project No.[Project Number]
940 W. Main Street, Suite 209
El Centro, CA 92243

CONSULTANT

26.2. Notice shall be deemed to have been delivered only upon receipt by the Party, seventy-two (72) hours after deposit in the United States mail or twenty-four (24) hours after deposit with an overnight carrier.

26.3. The addressees and addresses for purposes of this Section may be changed to any other addressee and address by giving written notice of such change. Unless and until written notice of change of addressee and/or address is delivered in the manner provided in this

Section, the addressee and address set forth in this Agreement shall continue in effect for all purposes hereunder.

27. ENTIRE AGREEMENT.

This Agreement contains the entire Agreement between COUNTY and CONSULTANT relating to the transactions contemplated hereby and supersedes all prior or contemporaneous agreements, understandings, provisions, negotiations, representations, or statements, either written or oral.

28. MODIFICATION.

No modification, waiver, amendment, discharge, or change of this Agreement shall be valid unless the same is in writing and signed by both Parties.

29. CAPTIONS.

Captions in this Agreement are inserted for convenience of reference only and do not define, describe or limit the scope or the intent of this Agreement or any of the terms thereof.

30. PARTIAL INVALIDITY.

If any provision in this Agreement is held by a court of competent jurisdiction to be invalid, void, or unenforceable, the remaining provisions will nevertheless continue in full force without being impaired or invalidated in any way.

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31. GENDER AND INTERPRETATION OF TERMS AND PROVISIONS.

31.1. As used in this Agreement and whenever required by the context thereof, each number, both singular and plural, shall include all numbers, and each gender shall include a gender.

31.2. CONSULTANT as used in this Agreement or in any other document referred to in or made a part of this Agreement shall likewise include the singular and the plural, a corporation, a partnership, individual, firm or person acting in any fiduciary capacity as executor, administrator, trustee or in any other representative capacity or any other entity.

31.3. All covenants herein contained on the part of CONSULTANT shall be joint and several if more than one person, firm or entity executes the Agreement.

32. WAIVER.

No waiver of any breach or of any of the covenants or conditions of this Agreement shall be construed to be a waiver of any other breach or to be a consent to any further or succeeding breach of the same or any other covenant or condition.

33. CHOICE OF LAW.

This Agreement shall be governed by the laws of the State of California. This Agreement is made and entered into in Imperial County, California. Any action brought by either Party with respect to this Agreement shall be brought in a court of competent jurisdiction within said County.

34. AUTHORITY.

34.1. Each individual executing this Agreement on behalf of CONSULTANT represents and warrants that:

34.1.1. He/She is duly authorized to execute and deliver this Agreement on behalf of CONSULTANT;

34.1.2. Such execution and delivery is in accordance with the terms of the Articles of Incorporation or Partnership, any by-laws or Resolutions of CONSULTANT and;

34.1.3. This Agreement is binding upon CONSULTANT accordance with its terms.

34.2. CONSULTANT shall deliver to COUNTY evidence acceptable to COUNTY of the foregoing within thirty (30) days of execution of this Agreement.

35. COUNTERPARTS.

This Agreement (as well as any amendments hereto) may be executed in any number of counterparts, each of which when executed shall be an original, and all of which together shall constitute one and the same Agreement. No counterparts shall be effective until all Parties have executed a counterpart hereof.

36. REVIEW OF AGREEMENT TERMS.

36.1. Each Party has had the opportunity to receive independent legal advice from its attorneys with respect to the advisability of making the representations, warranties, covenants and agreements provided for herein, and with respect to the advisability of executing this Agreement.

36.2. Each Party represents and warrants to and covenants with the other Party that:

36.2.1. This Agreement in its reduction to final written form is a result of extensive good faith negotiations between the Parties and/or their respective legal counsel; and

36.2.2. The Parties and/or their legal counsel have carefully reviewed and examined this Agreement for execution by said Parties.

36.3. Any statute or rule of construction that ambiguities are to be resolved against the drafting party shall not be employed in the interpretation of this Agreement.

37. NON-APPROPRIATION.

37.1. All obligations of COUNTY are subject to appropriation of resources by various federal, State, and local agencies, including but not limited to the U.S. Department of Transportation ("DOT") and the California Department of Transportation ("Caltrans").

37.2. This Agreement is valid and enforceable only if sufficient funds are made available to COUNTY for the purposes of this Project. In addition, this Agreement is subject to any additional restrictions, limitations, conditions, or any statute enacted by Congress, State Legislature, or COUNTY, and any regulations prescribed therefrom, that may affect the provisions, terms, or funding of this Agreement.

37.3. If sufficient funds for the Project are not appropriated, this Agreement may be amended or terminated in order to reflect said reduction in funding.

38. APPENDIX E OF THE TITLE VI ASSURANCES.

During the performance of this contract, the CONSULANT, for itself, its assignees, and successors in interest agrees to comply with the following nondiscrimination statutes and authorities; including but not limited to:

38.1. Pertinent Nondiscrimination Authorities:

(a) Title VI of the Civil Rights Act of 1964 (42 U.S.C. § 2000d et seq, 78 stat. 252), (prohibits discrimination on the basis of race, color, national origin); and 49 CFR Part 21.

(b) The Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, (42 U.S.C. § 4601), (prohibits unfair treatment of persons displaced or whose property has been acquired because of Federal or Federal-Aid programs

and projects);

(c) Federal-Aid Highway Act of 1973, (23 U.S.C. § 324 et seq.), prohibits discrimination on the basis of sex);

(d) Section 504 of the Rehabilitation Act of 1973, (29 U.S.C. § 794 et seq.) as amended, (prohibits discrimination on the basis of disability); and 49 CFR Part 27;

(e) The Age Discrimination Act of 1975, as amended, (42 U.S.C. § 6101 et seq.), (prohibits discrimination on the basis of age);

(f) Airport and Airway Improvement Act of 1982, 949 U.S.C. § 4 71, Section 4 7123), as amended, (prohibits discrimination based on race, creed, color, national origin, or sex);

(g) The Civil Rights Restoration Act of 1987, (PL 100-209), (Broadened the scope, coverage and applicability of Title VI of the Civil Rights Act of 1964, The Age Discrimination Act of 1975 and Section 504 of the Rehabilitation Act of 1973, by expanding the definition of the terms "programs or activities" to include all the programs or activities of the Federal-aid recipients, subrecipients and contractors, whether such programs or activities are Federally funded or not);

(h) Titles II and III of the Americans with Disabilities Act, which prohibit discrimination on the basis of disability in the operation of public entities, public and private transportation systems, places of public accommodation, and certain testing entities (42 U.S.C. §§ 12131-12189) as implemented by Department of Transportation regulations at 49 C.F.R. parts 37 and 38;

(i) The Federal Aviation Administration's Nondiscrimination statute (49 U.S.C. § 47123) (prohibits discrimination on the basis of race, color, national origin, and sex);

(j) Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, which ensures discrimination against minority populations by discouraging programs, policies, and activities

with disproportionately high and adverse human health or environmental effects on minority and low-income populations;

(k) Executive Order 13166, Improving Access to Services for persons with Limited English Proficiency, and resulting agency guidance, national origin discrimination includes discrimination because of limited English proficiency (LEP). To ensure compliance with Title VI, you must take reasonable steps to ensure that LEP persons have meaningful access to your programs (70 Fed. Reg. at 74087 to 74100);

(l) Title IX of the Education Amendment of 1972, as amended, which prohibits you from discriminating because of sex in education programs or activities (20 U.S.C. 1681 et seq).

[Signatures to Follow on Next Page]

IN WITNESS WHEREOF, the Parties have executed this Agreement on the day and year first above written.

County of Imperial

By:_____

Michael W. Kelly, Chairman
Imperial County Board of Supervisors

ATTEST:

_____
Blanca Acosta, Clerk of the Board,
County of Imperial, State of California

APPROVED AS TO FORM:

Eric Havens,
County Counsel

By:_____
Faye Winkler,
Deputy County Counsel

[Consultant]

By:_____

[Signatory]