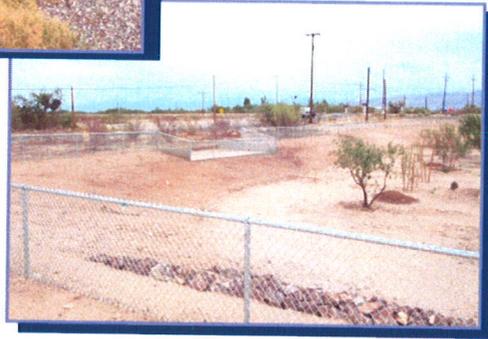
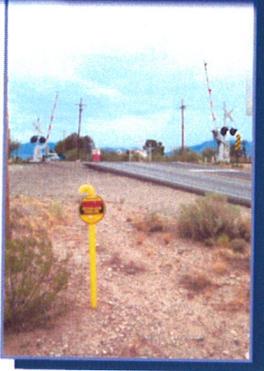
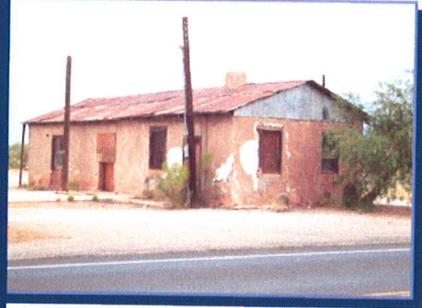
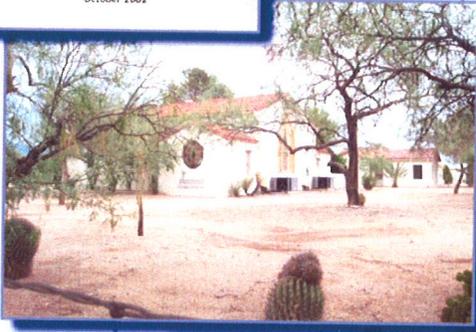
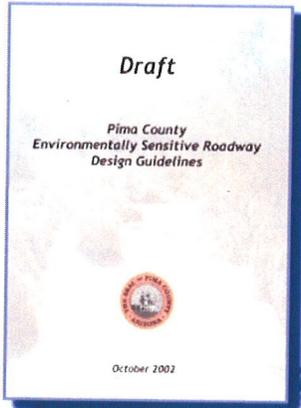


Colossal Cave Road Improvement Project: Acacia Elementary School to Old Vail Road

Final Addendum to Design Concept Report



Submitted to:
Pima County
Department of Transportation

Submitted by:
**PB PARSONS
BRINCKERHOFF**
100 YEARS

September 2008

**COLOSSAL CAVE ROAD IMPROVEMENT PROJECT:
ACACIA ELEMENTARY SCHOOL TO OLD VAIL ROAD
W.O. #4VRISP**

**FINAL ADDENDUM TO
DESIGN CONCEPT REPORT**

Prepared for:

PIMA COUNTY DEPARTMENT OF TRANSPORTATION

Prepared by:

**Parsons Brinckerhoff
177 North Church Avenue, Suite 500
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September, 2008

EXECUTIVE SUMMARY

The main purpose of the Colossal Cave Road Improvement Project (CCRIP), and thus this addendum, is to improve traffic operations along the roadway through the traditional center of the community of Vail. At the time the Design Concept Report (DCR) for this project was written the intention was to construct a two-lane roadway between the two widely separated Union Pacific Railroad (UPRR) tracks. Subsequent to the completion of the DCR, conditions have changed and Pima County has requested that a three-lane roadway be built between the tracks to match the remainder of the roadway and to improve traffic operations in that section. This addendum will facilitate the construction of the three-lane roadway by documenting two necessary changes to the previous DCR.

The first change documented in this addendum addresses the issue of a three lane roadway between the tracks. It will document what the DCR stated regarding roadway width between the tracks; document the conditions that have changed subsequent to the completion of the DCR; identify the impacts of a proposed three-lane roadway between the railroad tracks; and specify the additional tasks Pima County will perform in connection with constructing a three-lane roadway in this section.

The second change documented in this addendum addresses drainage changes that may be needed. A field reconnaissance in connection with the above design change revealed a new Kinder-Morgan gas pipe line along the most southerly railroad right-of-way adjacent to the Success Drive right-of-way. The new pipe line may necessitate a revision to the previously designed drainage of Success Drive just east of Colossal Cave Road.

THREE LANE ROADWAY BETWEEN TRACKS

Since the DCR was produced, conditions that justified a two-lane roadway between the tracks have significantly changed.

- The traffic along Colossal Cave Road has doubled, rather than being reduced as was projected would happen with the opening of Mary Ann Cleveland Way.
- The owner of the property along the west side of the roadway between the tracks has requested approval of an improvement plan that will significantly intensify land use.
- The owners of property on both sides of Old Vail Road approximately one mile west of Colossal Cave Road have proposed a 21 acre, 24-lot industrial park. The bulk of the traffic destined for the industrial park will come from I-10 and turn left onto Old Vail Road. Considerable backup of traffic may occur along northbound Colossal Cave Road if a left turn lane is not provided at Old Vail Road.
- The Shrine of Santa Rita Catholic Church plans on building a larger church and parking lot. Parishioners arriving from the rapidly multiplying residential subdivisions to the north will have to turn left off Colossal Cave Road in order to access the proposed new parking lot. This turn would be safer if a left turn lane is provided.

In view of these changes, Pima County staff has concluded that a three-lane roadway is necessary and will contribute to the Vail community by creating a better operational environment for vehicles through the introduction of a center turn lane. Therefore, Pima County intends to construct a three-lane roadway between the two railroad tracks on Colossal Cave Road to match the remainder of the roadway instead of the two-lane roadway envisioned when the DCR was developed.

Initially, consideration was given to shifting the new roadway centerline to the east so that the entire widening would occur on the east side of the roadway. The logic was to leave the impact on the adobe building (the old Vail Post Office) the same as had been previously planned. It was hoped that the additional impact on the Shrine of Santa Rita property on the east side of the road by moving the roadway closer, would be negligible. That did not turn out to be the case.

Therefore, it is recommended that the previously designed centerline location be retained and that the additional pavement width be added equally to each side of the roadway. Widening the roadway to the west will have additional impacts to the adobe building beyond the impacts previously envisioned in the DCR and Environmental Assessment and Mitigation Report (EAMR). Those impacts will be mitigated in the same manner previously specified – by limiting the use of vibratory construction equipment in the vicinity of the building.

The Shrine of Santa Rita on the east side of the roadway will be impacted more than previously envisioned, but not to the extent it might have been with an alignment shift to the east that was considered. Pima County will mitigate the impact to the Shrine of Santa Rita by trimming the existing trees so that trucks will not hit their branches. All the existing trees and the fence along the front of the shrine property will be retained in their present location.

The widening to three lanes will also necessitate relocating the Southwest Gas regulator station near the northwest corner of the Shrine of Santa Rita property.

SUCCESS DRIVE DRAINAGE MODIFICATIONS

A field reconnaissance in March 2008 revealed a new Kinder-Morgan gas pipe line along the most southerly railroad right-of-way adjacent to the Success Drive right-of-way. The new pipe line necessitates a revision to the previously designed drainage for Success Drive just east of Colossal Cave Road.

Previously the plans specified a 24-inch RCP under Success Drive about 60 feet east of the centerline of Colossal Cave Road. The RCP was designed to convey storm water in a southerly direction from the Shrine of Santa Rita property and from the Success Road right-of-way onto Union Pacific Railroad right-of-way where it would join with flow along the north side of the railroad track and would be channeled to the west under Colossal Cave Road in culverts.

A 24-inch RCP under Success Drive may no longer be an option given the new Kinder-Morgan pipeline. Thus two options have been developed and are being evaluated at the time of this writing. Either the drainage will be carried under the roadway in multiple smaller pipes, or the

water will have to be conveyed across Success Drive in a dip section. The preferred option is to carry the drainage under the roadway in multiple smaller pipes. The preferred option will be built unless it is determined not to be feasible, in which case the water will have to be conveyed across Success Drive in a dip section.

ADDENDUM

INTRODUCTION

The main purpose of the Colossal Cave Road Improvement Project (CCRIP), and thus this addendum, is to improve traffic operations along the roadway through the traditional center of the community of Vail. At the time the Design Concept Report (DCR) for this project was written the intention was to construct a two-lane roadway between the two widely separated Union Pacific Railroad (UPRR) tracks. Subsequent to the completion of the DCR, conditions have changed and Pima County has requested that a three-lane roadway be built between the tracks to match the remainder of the roadway and to improve traffic operations in that section. This addendum will facilitate the construction of the three-lane roadway by documenting two necessary changes to the previous DCR.

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The second change documented in this addendum addresses drainage changes that may be needed. A field reconnaissance in connection with the above design change revealed a new Kinder-Morgan gas pipe line along the most southerly railroad right-of-way adjacent to the Success Drive right-of-way. The new pipe line may necessitate a revision to the previously designed drainage of Success Drive just east of Colossal Cave Road.

THREE LANE ROADWAY BETWEEN TRACKS

PREVIOUS STATEMENTS IN DCR AND EAMR

The DCR, in a section entitled *Number of Lanes between the Railroad Tracks*, gave the following introduction to the issue of two vs. three lanes between the railroad tracks:

The originally proposed project included a center turn lane throughout the project segment with the objective of improving operational capacity by reducing stop delays from left turning vehicles. In addition to this alternative, the Draft DCR provided an alternative that included three lanes north from the southern project limit to the first railroad crossing, then two lanes between the railroad tracks, and finally three lanes from the northern most railroad track crossing to the northern project limit. This latter alternative was introduced...as a way to reduce right-of-way requirements and impacts on the (two) historical sites between the tracks. (DCR, p. 46)

The reasons for the introduction of a two-lane alternative between the tracks were described as follows:

Both the adobe building (old Vail Post Office on the west side of the roadway) and the Shrine (Shrine of Santa Rita on the east side of the roadway) contribute substantially to the historic character of the Vail community's center between the UPRR tracks. Participants in the public participation process and the design charrette emphasized the importance of exploring ways that character could not only be preserved but enhanced through the roadway design. This goal coupled with the objectives of the ESR Design Guidelines to minimize impacts to historic resources, was a key factor in the development of the recommended (two-lane) project alternative. (DCR, p. 37)

The DCR provided two full pages (p. 54-55) of discussion on pros and cons of the two alternatives (2 lanes vs. 3 lanes). That discussion is summarized by the following bullet points:

- One of the primary project goals is to minimize adverse impacts to the old adobe building and the Shrine of Santa Rita.
- Thus two Options were developed for this roadway segment:
- Option 1 – 3 lanes the entire length of the project.
 - Advantages: Separate left turning vehicle from through traffic which minimized delays and provides for increased safety for turning vehicles.
 - Disadvantages: increased encroachment on adjacent property, closer proximity of roadway to adobe building and potential relocation of Southwest Gas regulator station
- Option 2 – 2 lanes between RR tracks.
 - Advantages: minimal impacts to the two sensitive sites and retains the existing location of SW Gas regulator station
 - Disadvantages: existing traffic operations will remain – however traffic survey results show relatively few turning movements between the two tracks.
- Discussion:
 - Although one reason for undertaking this project is to address problems of turning movements on a two-lane roadway, accident analysis shows only 2 of 16 accidents within project limits occurred between the tracks and neither of those was a turning accident.
 - The option of 3 lanes south and north of the tracks applies the operational improvements where they are needed based on available data while respecting the goals and objectives of the ESR by being sensitive to the historic and picturesque environment between the tracks.
 - Currently the uses between the tracks have less traffic volume, and particularly less peak hour volume, than those uses north and south of the tracks.
 - The maintenance of two lanes between the tracks does not preclude adding a center left-turn lane in the future if accident data should indicate a need.
 - The design considerations for Option 2 are the locations of the transitions from 3 to 2 lanes and the operational viability of retaining the two-lane section. Given concerns of negotiating a merging maneuver and the railroad crossing simultaneously, the taper from 3 to 2 lanes should occur between the tracks. The length of the roadway between the tracks is sufficiently long to fit the required tapers and allow over 400 feet of two-lane roadway between the tracks.

The recommendation reached in DCR was to maintain the two-lane section between the track to minimize the need for additional ROW and potential effects on the views and character of the historic center and most directly on the historic adobe building and Shrine of the Santa Rita properties.

In view of the concern over the stability of the old adobe building, a Building Condition Assessment Report (a BCA) was completed on the structure in 2005. That report recommended a complete rehabilitation of the building. The recommendation developed for the adjacent road work was that vibratory equipment could not be used in the vicinity of the building.

In 2007 emergency repairs were completed to the adobe building, with some additional emergency work carried out in early 2008. Currently the building has extensive interior shoring and some exterior shoring. Complete rehabilitation of the building is dependent on funding which is projected to come from Pima County bonds, authorization for which has been proposed for the November 2008 election.

CHANGES SUBSEQUENT TO THE DCR

Pima County staff has recently reexamined the conclusions reached at the time the DCR was produced. Staff believes circumstances have sufficiently changed in the intervening time period to warrant reconsideration of the conclusion to build a two-lane roadway between the tracks. Therefore they requested that this addendum to the DCR be prepared by Parsons Brinckerhoff (PB).

The following are the intervening changes that have been identified:

- 1) The projected reduction in traffic volumes along this section of roadway, with the opening of Mary Ann Cleveland Way in the Spring of 2005, have not occurred. In fact, the opposite has occurred, traffic along Vail-Colossal Cave Road more than doubled between 2003 (4,300 ADT) and 2006 (9,000 ADT) (PAG 2003 and 2007 traffic volume maps). In addition, Mary Ann Cleveland Way carried 5,000 ADT in 2006. It could be argued that had it not been built almost all those trips would have used Vail-Colossal Cave Road and traffic would have almost tripled instead of just doubled. These dramatic increases in traffic in a short period of three years are symptomatic of the rapid population growth in the Vail/Rincon Valley area.
- 2) Pending change of use for the property on the west side of the roadway will alter previous conclusions about future trips and turning movements generated along this section of roadway. The DCR indicated that fewer trips were being generated by uses in this section of the project, even at peak hours, than uses adjacent to the sections north and south of the railroad tracks. However, that will no longer be the case if development plans recently submitted by the owner of the property on the west side of the roadway between the tracks are approved and proposed development occurs.
- 3) The owners of property on both sides of Old Vail Road approximately one mile west of Colossal Cave Road have proposed a 21 acre, 24-lot industrial park. Offsite improvements would be made to Old Vail Road to provide access to the industrial park

from Colossal Cave Road. While a Traffic Impact Study has not yet been conducted to identify the impacts of this development, intuitively, with an interchange on Interstate 10 at Colossal Cave Road, the bulk of the traffic destined for the industrial park will exit I-10 and proceed north on Colossal Cave Road then turn left onto Old Vail Road. Considerable backup of traffic may occur along northbound Colossal Cave Road if a left turn lane is not provided at Old Vail Road.

- 4) The Shrine of Santa Rita Catholic Church plans on building a larger church and parking lot. Parishioners arriving from the rapidly multiplying residential subdivisions to the north will have to turn left off Colossal Cave Road in order to access the proposed new parking lot. This turn would be safer if a left turn lane is provided.

Pima County Department of Transportation staff has therefore concluded that a three-lane roadway is necessary and will contribute to the Vail community by creating a better operational environment for vehicles through the introduction of a center turn lane.

IMPACTS OF THREE LANE ROADWAY BETWEEN TRACKS

Since a three-lane roadway was one of the two alternatives considered in the DCR, its impacts are well documented, were summarized above, and are repeated here:

- Option 1 – 3 lanes the entire length of the project.
 - Advantages: Separate left turning vehicle from through traffic which minimized delays and provides for increased safety for turning vehicles.
 - Disadvantages: increased encroachment on adjacent property, closer proximity of roadway to adobe building and potential relocation of Southwest Gas regulator station

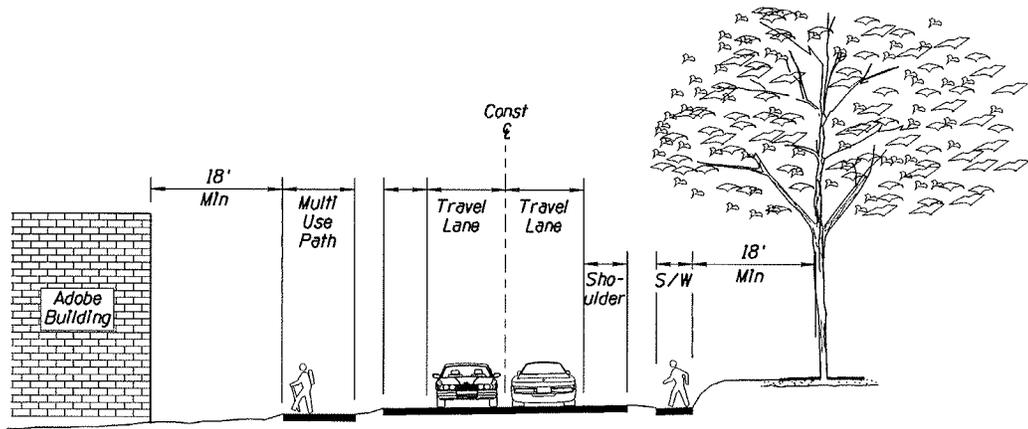
In addition, adding a third lane will obviously increase the cost of the new roadway. The DCR found that the three lane section would increase the overall construction cost by 5%. (DCR, p. 61).

Since conditions have changed and Pima County has now requested that a three-lane roadway be constructed, PB staff has studied the best way to minimize impacts to the two historic properties. Initially, rather than just widen the roadway equally on each side to achieve the additional width needed for a center left-turn lane, PB considered shifting the centerline to the east so that the entire widening would occur on the east side of the roadway. The logic was to leave the impact on the adobe building (the old Vail Post Office), given its fragile condition, the same as had been previously planned.

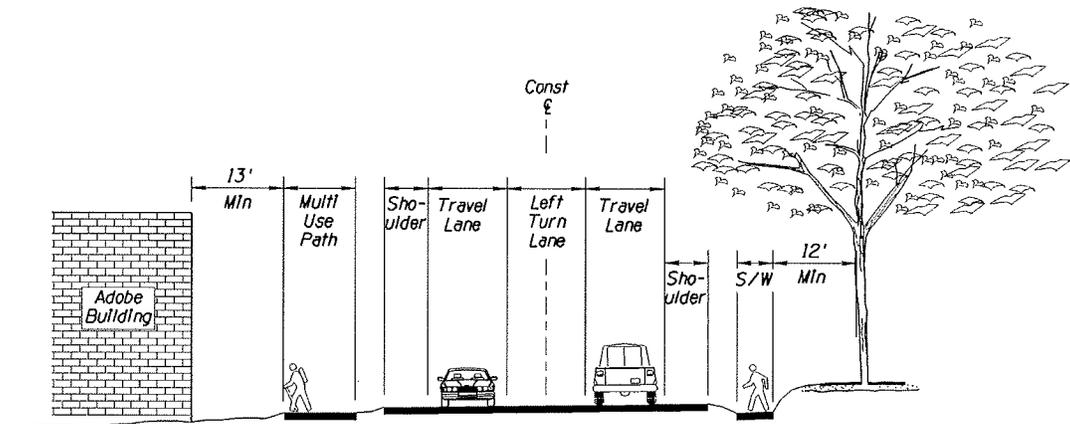
It was hoped that the additional impact on the Shrine of Santa Rita property by moving the roadway closer on the east side, would be negligible. That did not turn out to be the case. The alignment shift to the east resulted in the potential removal of the mature trees lining the front of the shrine property.

Therefore, Pima County staff made the decision to leave the centerline in its originally planned location and widen the roadway an equal distance on each side to obtain the additional width

required for the three-lane cross section. Figure 1 shows the changes made in the cross section to accommodate a three-lane roadway and compares them to the previously proposed cross section for a two lane roadway. Note that on the west side, the nearest edge of the pedestrian facility is 13 feet from the face of the adobe building with the three-lane section compared to 18 feet with the two-lane roadway. On the east side, with the three-lane roadway the nearest edge of the pedestrian facility is 12 feet from the line of trees whereas with the two-lane roadway it was 18 feet away.



2 LANE CONFIGURATION



3 LANE CONFIGURATION

FIGURE 1

With the centered three-lane alignment, the specific impacts to the two historic properties are as follows:

- Shrine of Santa Rita: The roadway and adjacent pedestrian facility will be 5.5 feet closer to the front of the property. Since the historic shrine building sits back a considerable distance from the roadway, the building itself has never been impacted by any of the alignments considered or the options regarding number of lanes. The potential impact is on the trees and fence along the front of the property. With the centered three-lane alignment now being proposed, the fence and line of trees would not have to be relocated or moved. However, some of the trees may have to be trimmed to prevent trucks from hitting their branches.
- Adobe building (the old Vail Post Office): The roadway and adjacent pedestrian facility will be 5.5 feet closer to the adobe building. Therefore, the previous determination to limit vibratory construction equipment in the vicinity of the adobe building was reviewed. Pima County concluded that this limitation should be adequate to protect the building despite the roadway being moved closer.

In either case (centered or shifted alignment), widening the roadway to three-lanes directly impacts the Southwest Gas regulator station located near the northwest corner of the Shrine of Santa Rita property. Thus the station will have to be relocated.

CONCLUSION – ADDITIONAL TASKS REQUIRED

Since the DCR was produced, four significant changes have occurred:

- The traffic along Colossal Cave Road has doubled
- The owner of the property along the west side of the roadway between the tracks has requested approval of an improvement plan that will significantly intensify land use
- Vehicles accessing an industrial park being proposed along Old Vail Road may create significant delays to northbound Colossal Cave Road traffic while attempting to turn left onto Old Vail Road
- The Shrine of Santa Rita plans a new church and parking lot which will increase left turns between the tracks.

Therefore, Pima County intends to construct a three-lane roadway between the two railroad tracks on Colossal Cave Road instead of the two-lane roadway envisioned when the DCR was developed. It is recommended that the previously designed centerline location be retained and that the additional pavement width be added equally to each side of the roadway. Widening the roadway to the west will have additional impacts to the adobe building (the old Vail Post Office) on the west side of the roadway beyond the impacts previously envisioned in the DCR and EAMR. Those impacts will be mitigated in the same manner as previously specified – by limiting the used of vibratory construction equipment in the vicinity of the building.

The Shrine of Santa Rita on the east side of the roadway will be impacted more than previously envisioned, but not to the extent it might have been with an alignment shift to the east that was considered. Pima County will mitigate the impact to the Shrine of Santa Rita by trimming the existing trees so that trucks will not hit their branches. All the existing trees and the fence along the front of the shrine property will be retained in their present location.

In addition, the Southwest Gas regulator station located near the northwest corner of the Shrine of Santa Rita property will be relocated.

SUCCESS DRIVE DRAINAGE MODIFICATIONS

A field reconnaissance in March 2008 in connection with the design change discussed in the first section of this addendum, revealed a new Kinder-Morgan pipe line along the most southerly railroad right-of-way adjacent to the Success Drive right-of-way. The new pipe line necessitates a revision to the previously designed drainage for Success Drive just east of Colossal Cave Road.

Previously the plans specified a 24-inch RCP under Success Drive about 60 feet east of the centerline of Colossal Cave Road. The RCP was designed to convey storm water in a southerly direction from the Shrine of Santa Rita property and from the Success Road right-of-way onto Union Pacific Railroad right-of-way where it would join with flow along the north side of the railroad track and would be channeled to the west under Colossal Cave Road in culverts.

A 24-inch RCP under Success Drive may no longer be an option given the new Kinder-Morgan pipeline. Thus two options have been developed and are being evaluated at the time of this writing.

- Option 1: Dip section. Stormwater could be conveyed across Success Drive at grade in a dip section. The dip section would be designed so that water would not be more than one foot high during the 100-year storm event. While less desirable than conveying water under the roadway, this could be the only viable option given the results of the investigation being conducted regarding Option 2.
- Option 2: Three smaller pipes. Convey water under Success Drive via three 18" equivalent elliptical pipes (14" x 23" HERCP's), rather than the 24" RCP previously specified. This is the preferred option, but may not be viable depending on the depth of the new Kinder-Morgan pipeline. The pipeline will be potholed to determine its depth. It will then be determined if there is sufficient clearance (Kinder-Morgan requires two feet) between the pipeline and the bottom of the 14" x 23" HERCP's. If sufficient clearance does not exist, then Option 1 will become the only viable option.

In summary, a different drainage solution is required under Success Drive due to a new Kinder-Morgan pipeline. The preferred option is to carry the drainage under the roadway in multiple smaller pipes. The preferred option will be built unless it is determined not to be feasible, in which case the water will have to be conveyed across Success Drive in a dip section.