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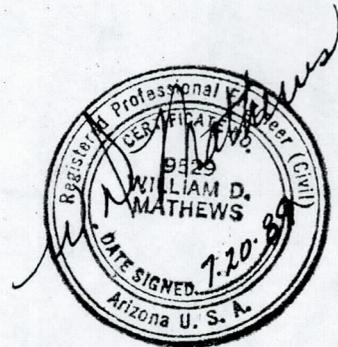
ARIZONA CANAL DIVERSION CHANNEL (REACH 4)

VICINITY OF THE BILTMORE HOTEL

CONSTRUCTION SCHEDULE ANALYSIS

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JULY 20, 1989



Prepared By:

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ARIZONA CANAL DIVERSION CHANNEL

(REACH 4)

The purpose of this analysis is to perform a detailed study of the construction schedule for work to be performed in constructing the Arizona Canal Diversion Channel (ACDC) between Stations 921+00 and 936+00. This section of the ACDC is in the immediate proximity of the Biltmore Hotel. This report is prepared to review in detail construction activities and time sequences of the activities which are necessary for completing the construction of the covered channel section in the most expeditious time frame.

Two scenarios are considered for each of three ACDC alignment assumptions. Each of the alignments require different activities related to the relocation of the Arizona Canal existing roadways, buildings, powerlines, and other structural improvements.

I. ALIGNMENTS:

- A. *The desired result of this study is the determination of changes that need to be made in the current preliminary design for the study segment of ACDC to allow the construction to be completed in 90 days or less. The preliminary design shown on DM 12 is estimated to require a five month construction period under normal circumstances. This study considers construction schedules related to three different alignments which are:*
1. *Per Corps of Engineers DM-12 plan*
 2. *Move the Arizona Canal southerly, sufficiently to construct ACDC within the current right-of-way in the area of the Biltmore Hotel Complex*
 3. *Leave the Arizona Canal essentially as is and construct the ACDC 30 feet northerly from the Arizona Canal.*
- B. *These alignments are shown on the attached exhibits and labeled Nos. 1, 2 and 3 respectively. It should be noted that Alignments No. 1 and 3 extend northerly outside of the current right-of-way into the paved parking lot of the Biltmore Hotel. Alignments No. 1 and 2 will require extensive reconstruction of various improvements immediately adjacent to the south side of the canal. This also requires additional right-of-way to the south for these improvements. The following criteria were incorporated into Alternates Nos. 1 and 2.*

1. *The Arizona Canal was relocated 30 feet south where necessary to allow the construction of the ACDC in the Alternate alignment.*
2. *Thirty (30) feet was also used as the minimum control distance from edge of canal waterline to the near edge of the ACDC structure.*
3. *Twenty-five (25) feet was a control minimum dimension used for the distance from the edge of ACDC structure to the proposed new right-of-way line or T.C.E. to the north.*

II. ACDC CONSTRUCTION

A. Haul Route:

1. *A disposal site for excavated materials and the corresponding haul route has not been specified. There is no known vacant land in the immediate area large enough to serve as a staging site or storage area for selected materials for the ACDC structure. It was assumed that all materials excavated from the 1,500 Ft. reach will have to be hauled from the site.*

In making estimated cost comparisons, it was assumed that the dump site would entail approximately a thirty (30) mile round trip and that each belly-dump hauling unit, 16 C.Y. capacity, could make four (4) round trips per eight (8) hour shift.

B. Method of Excavation:

Soils investigations studies made available by Corps of Engineers and CRSS, Inc., indicate bedrock approximately 10 to 15 feet below an alluvium soil mantel at the base of the hill of the Wrigley Mansion. The bedrock compound of caliche, etc., gets denser and harder with increasing depth. The twenty-five (25) feet depth needed for the project may prove difficult to excavate. Large D-9 cats (or equivalent) with a ripper tooth are proposed as a logical method of breaking the existing cemented layers and rock.

Loading belly-dump hauling units is assumed to be done with a shovel having a three (3) yard bucket which is capable of loading 1,200 C.Y. per day.

C. Method of Forming and Removal:

It is assumed the contractor will rent steel forms for constructing the invert and walls. Also the steel framing (stringers and joists) for the deck pour. The steel will stand up best under the repeated installation and removal that is expected to take place.

The use of high-early concrete will allow the Contractor to strip forms in 24 hours on the invert and wall pours.

The deck pour, because of the span etc., will require reshoring or leaving the forms in place until the deck has reached the required strength. This may be at least five (5) days, as determined by concrete cylinder breaks. It may be advisable for the Contractor to purchase additional 3/4 inch exterior grade plywood for forms and rent additional deck frames. The plywood can be purchased for less than \$30,000 and may prove cheaper than rental on reshoring frames, labor, etc. for this 1,500 L.F. covered section.

Installing and removing forms will be aided with the use of a crane in conjunction with a flat-bed truck and fork lifts. This equipment will also be needed for the installation of steel reinforcement.

D. Maintaining Access to the Hotel Complex:

Access to the hotel complex will be maintained by the Contractor throughout the construction period. Under Alternate No. 2 the realignment of the Arizona Canal to keep the ACDC within current right-of-way limits would require both temporary and permanent bridges to be constructed over the canal and the ACDC construction excavation.

Alignments No. 1 and 3 do not preclude continued use of the existing bridges over the Arizona Canal for access to the Biltmore Hotel. Temporary access across the ACDC may be required for pedestrians.

Either of the existing vehicular bridges, or both, could be used during construction to handle two-way traffic for hotel patrons. Delivery trucks, maintenance forces, etc., could use Biltmore Circle which connects both 24th Street and Lincoln Drive to the hotel. There would not be a need to route hotel patrons over temporary structures to gain access to the hotel or golf course.

E. Backfill:

It is assumed that adequate and suitable backfill material will be generated from excavation of the project. However, there is no suitable vacant property

available near the site to provide a staging or storage area. All materials must be excavated, removed by truck and backfill returned to the site when needed.

Compaction can be accomplished by self-propelled sheepsfoot rollers and water will be added at the site as needed to achieve required density.

F. Constraints Related to Right-of-way:

The existing right-of-way is adequate to accommodate both the Arizona Canal and ACDC as evidenced by Alignment No. 2 (Exhibit No. 2). However, other improvements have been constructed within this right-of-way. These improvements then become one of several significant factors to consider and are the reason why there is more than one alignment being considered.

If the project construction is absolutely to be held within the current right-of-way, then Alignment No. 2 is the only viable alternative. Note that this alignment disrupts more of the existing Arizona Canal and other improvements adjacent and immediately to the south of it than the other alternatives.

G. Shoring Requirements:

Shoring can sometimes be used to protect existing improvements and narrow the setback requirements between construction activities and structures. It is assumed that shoring will be required adjacent to the existing building at Station 935 + 00 to protect it during construction of the ACDC. Also SRP forces may use shoring to protect the ends of canal realignment excavation for Alignments No. 1 and No. 2. The shoring is a must for the Canal realignment in Alignment No. 3 since the required excavation and backfill may all be accomplished while the canal contains water.

H. Details Relating to Construction:

The major items of construction activities from excavation to parking lot restoration, are shown in sequence on the enclosed bar graph, Exhibit "A". Also shown is the anticipated construction time to complete each activity.

Nearly all activities, (Items 1 through 6), will require double-shifting on weekdays and some work on Saturdays in order to complete the 1,500 L.F. within the three month period. Onsite hours of work would be limited to 6:00 AM to 10:00 PM.

Contractors haul routes will be on existing arterial (major) streets. No hauling is allowed on Sundays. No hauling is allowed during the weekdays between 6:00 AM to 8:30 AM and between 4:00 PM and 7:00 PM. Evening hours for hauling are from 7:00 PM to 6:00 AM.

The start time for any other individual construction activity after commencing site excavation is judgmental, depending on sufficient room and other work conditions in which to begin forming, etc. for the concrete invert. Stripping of forms and loading concrete walls and invert with the weight of the top deck is dictated by the strength of the concrete as determined by concrete cylinder tests. Tests shall also be used to determine the safe time for loading induced by the concrete deck and loading of the concrete deck by equipment to place the backfill and/or gravel and paving for the parking lot.

I. Arizona Canal

Construction realignments and/or improvements to the Arizona Canal will be accomplished by SRP forces. For Alignments No. 1 and 2, it is anticipated SRP would do a major portion of the alignment excavation and lining before the dry-up. During the dry-up period, SRP would do the remaining excavation and lining at each connecting end.

The proposed alternate alignments and items of work, including major quantities, are shown on Bar-Graph Exhibit "A" under SRP. No estimate was made for the relocation of the Canal.

Alignment No. 3 includes the construction of vertical banks in place of the existing sloped banks. This could be completed during dry-up with woven-wire mesh and a gunite coating of the required thickness over the steel shoring.

III. CONCLUSIONS:

- A. Each of the three alignments have favorable points as well as drawbacks.*
- B. Excavation by ripping the bedrock material may prove to be very difficult and time consuming. There may be the necessity to go to a third (3rd) shift if progress does not stay on schedule.*
- C. Concrete work will have to be double-shifted in order to have each phase done in a timely manner and be able to start the next phase. Concrete cylinder testing is required to insure proper structural strength before beginning the next phase.*
- D. Depending on the alignment, demolition, shoring, bridges and landscaping are a minor consideration and can be scheduled around the major items of construction.*
- E. Work on the Arizona Canal can be accomplished by scheduling the bulk of the realignment work ahead and only connecting ends during the dry-up in order to have a viable and functioning canal after the thirty (30) day dry-up period.*

IV. RECOMMENDATION:

The existing Biltmore Hotel complex is a mature development which includes landscaping adjacent to the Arizona Canal and a golf course to the southeast. A preferred alignment would have the least impact on the existing structural and aesthetic improvements and yet be constructable in a three (3) month period of the summer.

With the aforementioned in mind, it is recommended:

- 1. Alignment No. 3 be given first consideration.*
- 2. The ACDC contractor install steel-sheet shoring, do the required excavation and backfill to make the minor adjustment to the existing canal alignment as shown on Exhibit No. 3. SRP forces could at the next dry-up period surface treat the steel sheeting by placing a woven-wire mesh and shotcrete incorporating the shoring into the canal bank.*
- 3. Existing bridges over the Arizona Canal should alternately be used for a temporary two-way access for hotel patrons. Service and delivery trucks should use the entrance to the hotel off Biltmore Circle with access from 24th Street or Lincoln Drive.*