

Assessment of Distress At Mt. San Antonio Stadium

On Call Engineering Services



June 18, 2010

 **IDS GROUP**

1 Peters Canyon Road, Suite 140, Irvine, CA 92606 949-387-8500 fax: 949-387-0800

June 18, 2010

Mr. Gary Nellesen
Director
Facility Planning & Management
Mt. San Antonio College
1100 North Grand Avenue
Walnut, CA 91789-1399

Subject: *Assessment of the Distress at Mt. San Antonio Stadium*
 IDS Project Number: 29.157.03

Dear Mr. Nellesen:

At your request, IDS Group, Inc. (IDS) completed the assessment of the distress observed at the main stadium at Mt. San Antonio College (MTSAC) located at 1100 North Grand Avenue, Walnut, California. Our scope of work for this review consisted of:

1. A site visit to observe the existing structure.
2. Review of project drawings.
3. Providing a priority list of repair items.
4. Providing recommendations for methods of repair.
5. Providing an opinion of the repair cost.
6. Providing recommendations if there are any DSA implications for life safety.

In addition, a civil engineering study of storm water has been performed and results are presented as part of our investigations.

This letter and its attachments represent our opinions and recommendations and will serve as the project report. Note that this report does not include the press box structure, which will be provided under a separate report.

Project Description

The Mt. San Antonio Stadium (Also Known as Hilmer Lodge Stadium) is located at the southeast corner of the campus, south of W. Temple Avenue (see the site plan below). The original stadium construction is consisted of concrete stands formed and cast on grade. It appears that the original construction is dated in the later 1940's. No plans of the original construction were available for our review. In a 1957 modification, additional stands were added using elevated concrete framing supported by concrete columns, beams and footings at both the east and west sides (see the structural key plan).

Site Observations

After receiving a notice to proceed with this study, IDS visited the site on April 27, 2010 and May 5, 2010 and met with Mr. Roger Sneeds, the facility manager. The site visit performed by our team of a structural engineer, ADA architects, and civil engineers. We evaluated the stadium structure, ADA conformance, and storm water control. Please refer to the attached key plans and photos taken during our site visits.

Our observations indicate that:

- The concrete slabs on grade are cracked in many areas. The crack widths vary from hairline to larger than 1/8". Full depth rupture of the concrete slab was observed in several locations.
- Differential settlement at slab on grade joints is noticeable in several locations and exceeds 2" in some areas.
- Separation of concrete between vertical and horizontal portions of the stepped concrete slab has created gaps as large as 2" in numerous locations.
- The wood seats in both the East and West stands are severely damaged. It appears that over two-thirds of the seats are cracked, broken, rotten or loose.
- Storm water investigations indicate that siltation and clogging in several V ditches and basins has significantly lowered the capacity of the drainage system and contributed to settlement of the stands.
- Handicapped areas do not meet current ADA requirements.

Detailed results of the site observation are identified on key plans and are reflected in the attached evaluation matrices.

Conclusions

Based on our site visits and review of existing drawings for the stadium we indicate the following primary factors in relation to the distressed conditions at stadium:

- The cracking in the concrete slabs has occurred due to long term shrinkage of the concrete and settlement of the supporting soils. Once cracking in the slabs occurs, slab settlement is exacerbated by the repeated intrusion of water into the soils beneath the slab, which can cause soil weakening and erosion.
- The more significant areas of slab settlement in the east stands appears primarily due to inadequate drainage conditions which have resulted in soil erosion below the slabs and large gaps in the supporting soils.
- Significant settlement of up to 2" appear where the added elevated concrete stands of 1957 meet the original slab on grade stands. It is noted that the added slab has different structural support conditions: Please note the following: 1) the existing slabs have already settled at the time of construction for the new stands, but the new stands still undergo some settlement as they age, and 2) the nature of structural support in the original and 1957 stands addition, and therefore the extent of long term settlement, is substantially different, i.e. slab on grade vs. elevated slabs supported on columns and footings.

Recommendations

Recommendations for repair and maintenance are reflected in the attached evaluation matrices for structural, civil and ADA items. Our recommendations are preliminary in nature and are not considered repair design document; they are intended to identify the scope of work needed to make the stadium safer and more functional and minimize future damage. Additional engineering and design work is required in order to translate the general repair recommendations into actual construction documents to perform the repair work. Key recommendations are listed below.

1. Eliminate tripping hazards which can present safety concerns:
 - a. Remove the concrete at the expansion joints and pour new concrete to provide a smooth transition between the adjacent surfaces.
 - b. Remove and replace areas of broken and heavily cracked concrete slab.
2. Eliminate the risks of injury by replacing damaged and splintered wood seating.
3. Remove the siltation and clogging from V ditches and catch basins to control rain and storm water and thereby mitigate continued wash-out of soils and associated settlement.
4. Seal all concrete slab cracks with measurable width, and repair large cracks (1/8" width or larger) to limit water intrusion which can result in deterioration of reinforcement and concrete damage.
5. Fill in the gaps at corners in the slab on grade to prevent water penetration and soil wash-out under the stands.
6. Conduct annual (or more frequent) follow-up surveys to confirm repairs are holding and continued cracking and soil erosion damage has been mitigated.

Repair Costs

Our opinion of probable cost of the repair construction is presented in the attached tables. This preliminary cost estimate is based on the current condition of the stadium as of our last site visit of May 5, 2010. It is expected that a more thorough investigation during the preparation of the construction document could revise the construction cost shown in the tables.

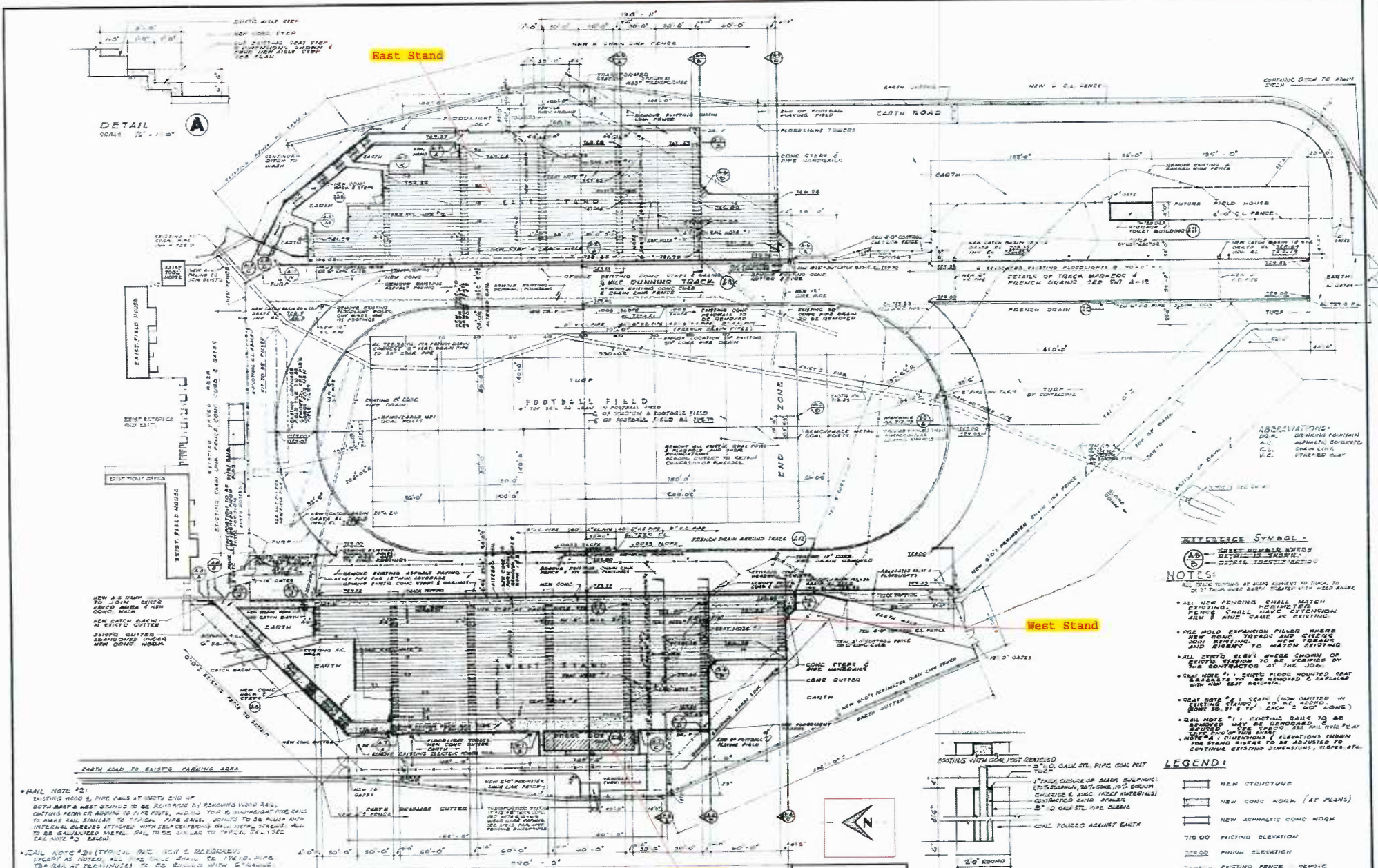
Thank you for the opportunity to be of service on this project. If you have any questions or would like us to provide investigation services for other facilities, please do not hesitate to contact us.

Sincerely,
IDS Group, Inc.

Matt Kani, SE
Project Manager

Said Hilmy, Ph.D., SE, LEED AP
Principal





DETAIL
SCALE 1/4" = 1'-0"

East Stand

West Stand

REFERENCE SYMBOLS
AB - SHEET NUMBER WHERE
DETAIL IS LOCATED
B - DETAIL IDENTIFY SYMBOL

- NOTES:
- ALL SCALE DIMENSIONS AT THIS POINT TO TRACK TO BE 3/4" THICK UNLESS OTHERWISE NOTED WITH DIMENSION LINE.
 - ALL NEW FINISHING SHALL MATCH EXISTING. EXISTING FINISHING TO BE MAINTAINED UNLESS OTHERWISE NOTED. ALL NEW FINISHING SHALL BE 1/2" ABOVE FINISH GRADE UNLESS OTHERWISE NOTED.
 - PIPE HOLD EXPANSION FILLED WHERE NEW CONC. TRENCHES NEW EXISTING CONC. TRENCHES TO MATCH EXISTING AND REPAIRS TO MATCH EXISTING.
 - ALL EXISTING BLEND WHERE CHANGES OF EXISTING SYSTEMS TO BE PROVIDED BY THE CONTRACTOR AT THE JOB.
 - CRAT NOTE #1: EXIST' FLOOR MOUNTED CRAT REPAIRS TO BE REMOVED & REPLACED WITH NEW CRAT AS SHOWN.
 - CRAT NOTE #2: CRAT (NOW OMITTED IN EXISTING STANDS) TO BE RE-ACCORD DOWN 3/4" & TO BE 1/2" ABOVE FINISH GRADE.
 - CRAT NOTE #3: EXISTING CRAT TO BE REMOVED & RE-ACCORD DOWN 3/4" & TO BE 1/2" ABOVE FINISH GRADE.
 - NOTE #4: DIMENSIONS & ELEVATIONS SHOWN FOR STAND REPAIRS AS INDICATED TO CONTINUE EXISTING DIMENSIONS, SLOPES, ETC.

- LEGEND:
- NEW STRUCTURE
 - NEW CONC. WORK (AT PLANS)
 - NEW ASPHALT CONC. WORK
 - 710.00 EXISTING ELEVATION
 - 720.00 FINISH ELEVATION
 - EXISTING FENCE REMOVE
 - EXISTING BARBED WIRE FENCE REMOVE
 - NEW FENCE

- RAIL NOTE #1:
EXISTING WOOD & PIPE PILES AT WEST END OF BOTH EAST & WEST STANDS TO BE REMOVED BY REMOVING WOOD AND CUTTERS FROM OR ADDING TO PIPE PILES, AS SHOWN FOR 1/2" IN HEIGHT PIPE PILES TO MAKE PILES EQUAL TO 720.00. PIPE PILES TO BE REPLACED WITH 6" DIA. PIPE TO MAKE UNIFORM 7" DIA. PIPE PILES. ALL HEIGHTS TO BE 720.00. ALL TO BE BALANCED INTERNAL DIAL TO BE SIMILAR TO TYPICAL DIALS (SEE NOTE #2).
- RAIL NOTE #2 (TYPICAL ONE NEW & REMOVED):
AS NOTED, ALL PIPE SHALL BE 720.00. PIPE TO BE REPLACED WITH 6" DIA. PIPE TO MAKE UNIFORM 7" DIA. PIPE PILES. ALL HEIGHTS TO BE 720.00. ALL TO BE BALANCED INTERNAL DIAL TO BE SIMILAR TO TYPICAL DIALS (SEE NOTE #1).

Remarks

Revisions Engineers Approvals

Hall

Press Box

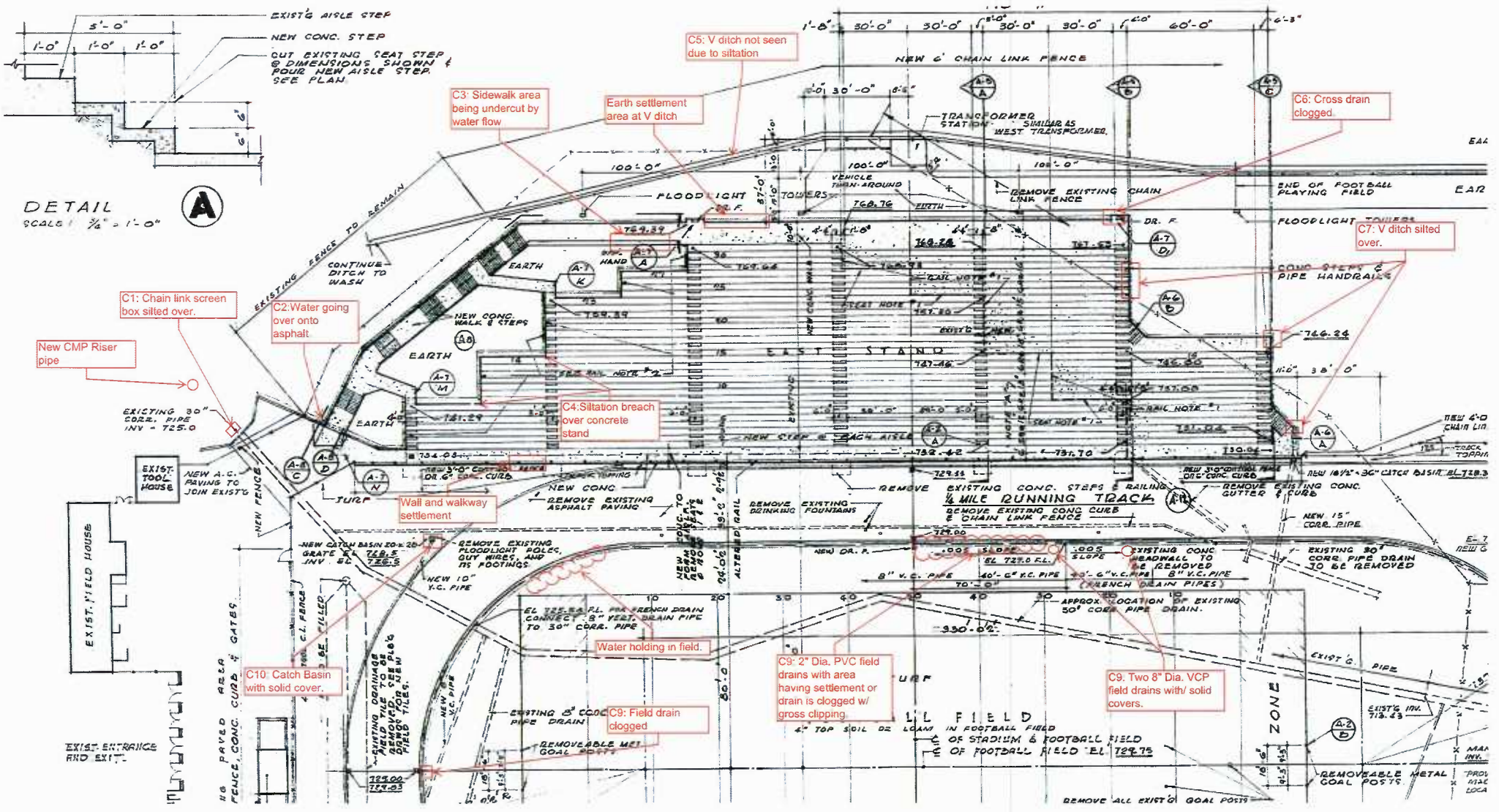
16401 APPROVED OCT 28 1957
By *E. J. Perry*

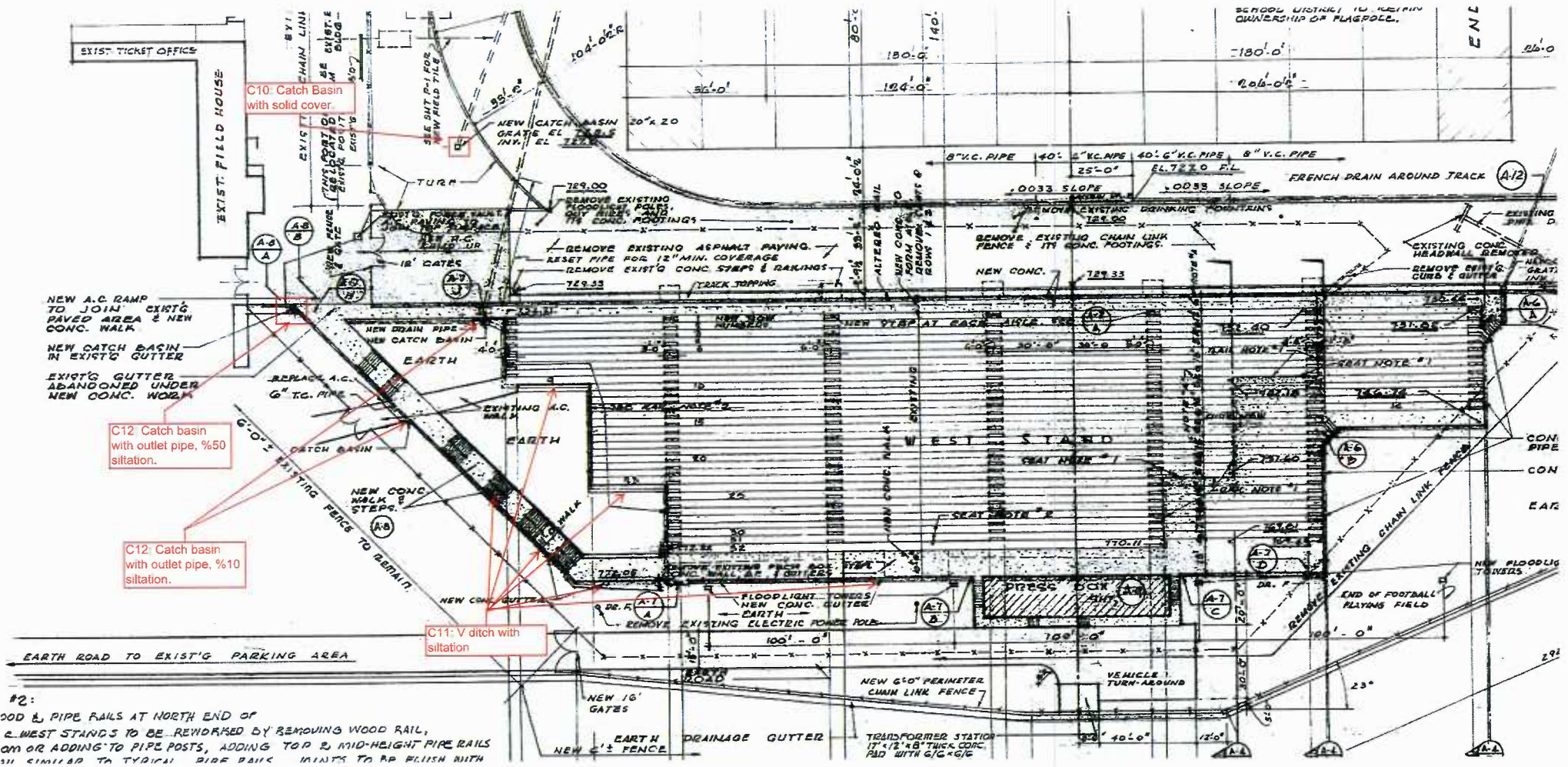
GOAL POST BASE
SCALE 3/4" = 1'-0"

AUSTIN FIELD & IRY
2811 WEST THIRD STREET
LOS ANGELES 57, CALIFORNIA

FLOOR PLAN
MT SAN ANTONIO COLLEGE STADIUM
CALIFORNIA

DATE: 10-21-57





Project Assessment Tables

The following tables provide a concise summary of the distress conditions observed during our investigation. Description of each item is identified. Also included are photo references, approximate size of distressed area and recommendation of each repair. An estimate of repair cost of each item is also provided.

▲ IDS INTEGRATED DESIGN SERVICES, INC.

Structural Engineers
1 Peters Canyon Rd., Suite 140
Irvine, CA 92606

Sheet: A6

Job No.: 29.157.03

Calc. By.: MK


Chck'd By.: SH

Date: 6/15/2010

Date: 6/16/2010

MTSAC Stadium Distress - Structural Evaluation

Item #	Description	Ref. Photo	Measurements	Recommended Action	Rough Constr. Cost
S1	Large cracking at slab on grade initiating from face of steps extending to the center of slab. Resulted in full-depth rupture of the slab with visible vertical offset.	S1a to S1d	75 ft	Damaged portion of the slab shall be demolished to pour new concrete and tied to existing slab using epoxy dowels.	\$13,400
S2	Top of concrete retaining wall is tilted. This is possibly caused by rotation of the foundation due to the soil and water pressure and has created slab rupture indicated in item 1.	S2a & S2b	4ft tall & 36 ft long	Retaining wall to be periodically monitored for further rotation and future reconstruction.	A/R
S3	Cracking at slab with width $\pm 1/8$ "	S3	10 ft	Infill with epoxy injection.	\$1,000
S4	Separation of concrete at the bottom of the step	S4	16 ft	To be sealed with epoxy injection or other means.	\$1,200
S5	Exposed bar at joint	S5		Cover bar with epoxy coating.	\$150
S6	Concrete break down at railing support	S6a & S6b	4 plcs	Remove broken and cracked concrete around railing. Place new concrete repair mortar and connect to existing by epoxy dowels.	\$1,700
S7	Approximately 2/3 of the wood seats are rotten and damaged. Connection screws are loose and separated in many locations.	S7a to S7i	Approx. 5,000 linear ft	Replace all the seats.	\$205,000
S8	Slab reinforcing is exposed	S8a & S8b	8 plcs	Infill with epoxy to restore original shape and provide cover for exposed bar.	\$1,350
S9	Separation of concrete at the bottom of the step	S9	60ft	To be sealed with epoxy injection or other means.	\$4,500
S10	Concrete break down with tripping hazard. Possible nest for snakes	S10a & S10b	6ft	Remove broken and cracked concrete . Pour new concrete and connect to existing by epoxy dowels.	\$1,200
S11	Vertical offset of ± 2 " between walkway and seat section. This is due to differential settlement between south and north portion of the stand. The south portion was added in 1957 and is supported by concrete columns, beams and footings while the north portion is older construction (probably) with slab on grade and shows more settlement.	S11a to S11d	6 plcs	Some portion of the concrete slab shall be demolished and new concrete to be poured for smooth leveling between two sides.	\$10,500
S12	Separation of concrete at the bottom of the step ± 2 "	S12	6 ft	To be sealed with epoxy injection or other means.	\$225
S13	Vertical offset of ± 1 " at separation joint with tripping hazard	S13	20 ft	Some portions of the concrete shall be demolished and new concrete to be poured for smooth leveling between two sides.	\$4,500

 IDS INTEGRATED DESIGN SERVICES, INC. Structural Engineers 1 Peters Canyon Rd., Suite 140 Irvine, CA 92606	Sheet: A7	
	Job No.: 29.157.03	
	Calc. By.: MK	Date: 6/15/2010
	Chck'd By.: SH	Date: 6/16/2010

MTSAC Stadium Distress - Structural Evaluation(continued)

S14	Large separation of concrete at the bottom of the step ±2"	S14	40ft	To be sealed with epoxy injection or other means.	\$1,500
S15	Vertical offset of ±1/2" at separation joint with tripping hazard	S15	10 plcs	Some portion of the concrete slab shall be demolished and new concrete to be poured for smooth leveling between two sides.	\$6,300
S16	Vertical offset of ±1/2" at separation joint with tripping hazard	S16	4 plcs	Some portion of the concrete slab shall be demolished and new concrete to be poured for smooth transition between two sides.	\$3,900
S17	Separation of concrete at the bottom of the step ±2"	S17	50ft	To be sealed with epoxy injection or other means.	\$3,000
S18	Separation of concrete at the bottom of the step ±1"	S18	40ft	To be sealed with epoxy injection or other means.	\$2,400
S19	Separation of concrete at the bottom of the step ±1"	S19	30 ft	To be sealed with epoxy injection or other means.	\$2,000
S20	Vegetation inside construction joints	S20		Clean all the vegetation and trash.	\$2,600
S21	Approximately 2/3 of the Wood seats are rotten and damaged, Connection screws are loose and separated in many locations. Some of the seats are totally broken.	S21	Approx. 6,500 linear ft	Replace all the seats.	\$265,000
S22	Separation of concrete at the bottom of the step ±1"	S22	60 ft	To be sealed with epoxy injection or other means.	\$3,600
S23	Vertical offset of ±1/2" at separation joint with tripping hazard	S23	6 plcs	Some portion of the concrete slab shall be demolished and new concrete to be poured for smooth leveling between two sides.	\$4,000
S24	Cracking at slab with width ±1/8"	S24a & S24b	60 ft	Infill with epoxy injection. Concrete around seat support shall be demolished and new concrete to be poured with epoxy dowel connection.	\$6,800
S25	Damaged concrete with exposed bar and slab cracking	S25	6 ft	Remove damaged portions of concrete and infill with epoxy injection.	\$400
S25	Exposed bar at joint	S26a & S26b	8plcs	Cover bar with epoxy coating.	\$2,000
S26	Cracking at slab with width less tahn 1/8"		1,000 linear ft (assumed)	Cover bar Sealant.	\$12,000

Total Estimated Costs= \$585,725

IDS INTEGRATED DESIGN SERVICES, INC.
 Structural Engineers
 1 Peters Canyon Rd., Suite 140
 Irvine, CA 92606

Sheet:	A8		
Job No.:	29.157.03		
Calc. By.:	KL	Date:	6/15/2010
Chck'd By.:	SH	Date:	6/16/2010

MTSAC Stadium Distress - Storm water investigation

Item #	Description	Ref. Photo	Measurements	Recommended Action	Estimated Constr. Costs
C1	At the proposed, 9-3-1957 Headwall location, a hole was cut at the top of the 30" CMP and a protective chain link screen box constructed over top of the hole. This new drainage point for the surface water coming from the East Stand area was observed to be silted over reducing the effect of the drain.	C1		Remove siltation, remove solid plate cover. Repair chain link fence guard. Install perforated cover over existing hole and secure to CMP	\$1,800
C2	The north East Stand entry point at the lower left corner of the entry steps; water is draining over the constructed concrete "V" ditch and flowing onto the asphalt drive area. This is due to excessive siltation build at the "V" ditch turning point.	C2		Remove siltation	\$250
C3	At the upper most elevation, the water from the high side of the sidewalk was being redirected to a lower point of the sidewalk, causing water flow over the concrete sidewalk to the earthen area. this new water direction created an undercutting of the sidewalk and exposing the underside of the walk by 1'-0" to 2'-0". This redirection is due to ground settlement, of 1 to 2 inches of the upper "V" ditch section.			At settlement area re-grade the area for positive drainage into the "V" ditch. Slurry mix the area of side walk that has been under cut and re-grade the landscape area for positive water flow.	\$7,700
C4	This excessive water flow breached and silted over the upper concrete "V" ditch for the lower Stands, causing water to flow over the stands into existing cracks and butt joints. Several weep holes have visible siltation coming from them.	C4a to C4e		Remove siltation. At all points at both East and West Stands where the concrete "V" ditches make a 90 degree down turn, a concrete based material should be constructed at the upper most corner to direct the water away from going into the stand.	\$1,700
C5	At the top of the East Stand behind the light towers, the first "V" ditch, on the east side of the chain link fence, was non-existent. No exploratory measures were taken at this time			Remove siltation	\$7,500
C6	At the South side of the East Stand area; several under sidewalk drains were clogged with siltation making the drains inoperable.			Remove siltation	\$400
C7	The south side of the East Stand "V" ditches were also silted to the point they were inoperable.	C7		Remove siltation	\$700
C8	Several 8" VAC drains were protected with solid covers that contained one 3/4" hole. Reducing the effectiveness of the drain.			Remove solid cover and install perforated cover and secure.	\$750


IDS INTEGRATED DESIGN SERVICES, INC.
 Structural Engineers
 1 Peters Canyon Rd., Suite 140
 Irvine, CA 92606

Sheet:	A9		
Job No.:	29.157.03		
Calc. By.:	MK	Date:	6/15/2010
Chck'd By.:	SH	Date:	6/16/2010

MTSAC Stadium Distress - Storm water investigation(continued)

C9	Several 2" PVC drains were covered with grass clippings and/or the area around the drains were settled 1" below the grade. Reducing the effectiveness of the drain.			Remove grass clippings and re-grade area for positive water flow.	\$2,400
C10	Two turf catch basin drains located at the northeast and west corner of the track had solid plates bolted down over the catch basin grates. Reducing the effectiveness of the drain.			Remove the solid covers and install perforated covers and secure	\$2,700
C11	Several concrete "V" ditches have been silted over causing a redirection of storm water flow over the stand area and walk way.			Remove siltation	\$3,200
C12	Several catch basins at the north base of the stands are silted closed from 10% - 50% of the pipe diameter.			Remove siltation	\$1,600
C13	Upper earth drainage gutter has siltation.			Remove siltation	\$7,200
C14	Upper most "V" ditch area behind chain link fence.			Future recommendation if top "V" ditch does not control water runoff a French Drain could be installed at the upper elevation adjacent to the "V" ditch draining to the designed catch basins.	Future

Total Estimated Costs= \$37,900

 IDS INTEGRATED DESIGN SERVICES, INC. Structural Engineers 1 Peters Canyon Rd., Suite 140 Irvine, CA 92606	Sheet: A10	
	Job No.: 29.157.03	
	Calc. By.: CC	Date: 6/15/2010
	Chck'd By.: SH	Date: 6/16/2010

MTSAC Stadium Distress - ADA Evaluation

Item #	Description	Ref. Photo	Measurements	Recommended Action	Estimated Constr. Costs
A1	ADA seating area is not accessible from parking lot		Approx. 2400 s.f.	Demo concrete sidewalk, regrade, compact soils and pour new sidewalk so that POT does not exceed 5% and cross-slope does not exceed 2%	\$27,000
A2	ADA seating area is not code-compliant. Wheelchair can slip off edge.		Approx. 30 linear feet	Provide 6" concrete curb on sides where drop exceeds 18".	\$1,600
A3	Replace handrails on POT.		Approx. 400 linear feet.	Provide ADA compliant handrails with wheelchair guard to keep wheelchair from slipping off sidewalk.	\$60,000

Total Estimated Costs= \$118,600

PHOTOS



Site Plan



Photo S1a:



Photo S1b:

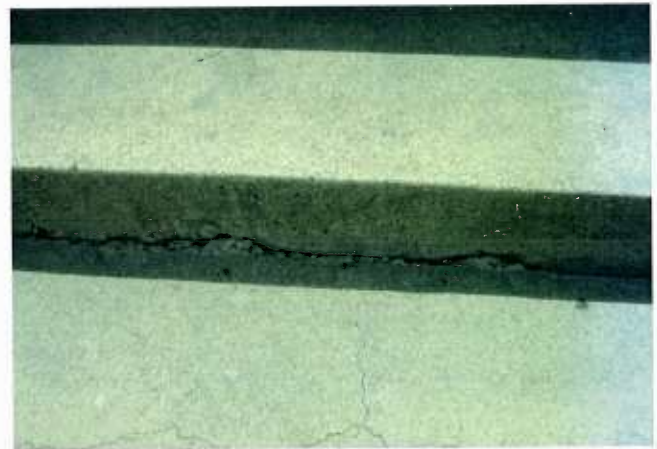


Photo S1c:



Photo S1d:



Photo S2a:



Photo S2b:



Photo S3:



Photo S4:



Photo S5:



Photo S6a:



Photo S6b:



Photo S7a:



Photo S7b:



Photo S7c:



Photo S7d:



Photo S7e:

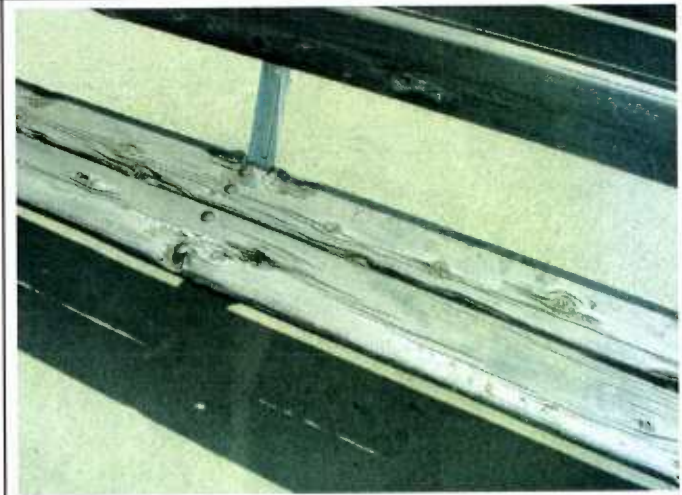


Photo S7f:



Photo S7g:



Photo S7i:



Photo S8a:



Photo S8b:

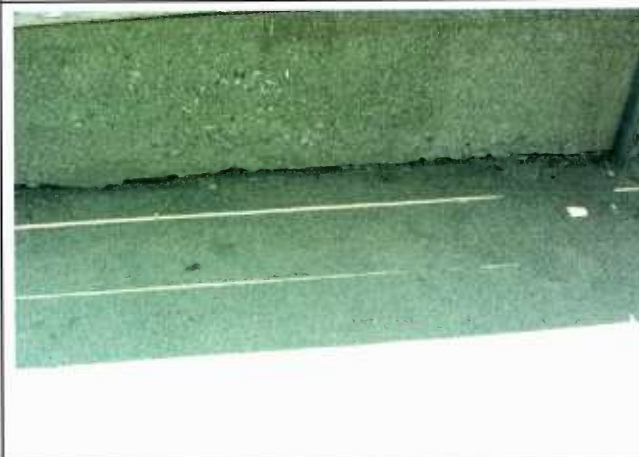


Photo S9:

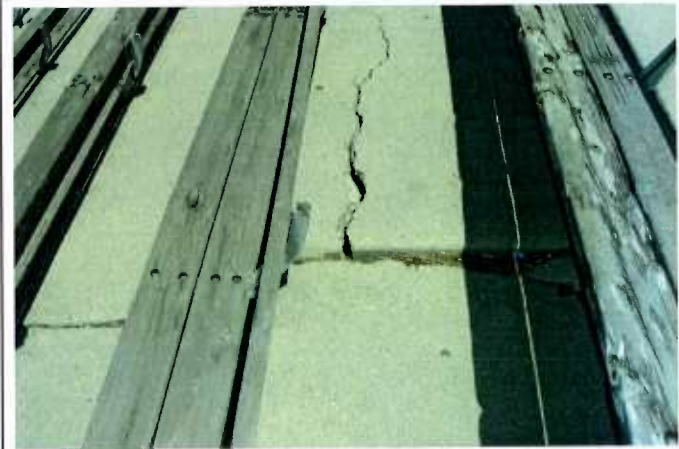


Photo S10a:



Photo S10b:



Photo S11a:



Photo S11b:



Photo S11c:



Photo S11d:



Photo S12:



Photo S13:



Photo S14:



Photo S15:



Photo S16:



Photo S17:



Photo S18:



Photo S19:



Photo S20:



Photo S21a:



Photo S21b:



Photo S21c:



Photo S22:



Photo S23:



Photo S24a:



Photo S24b:



Photo S25:



Photo S26a:



Photo S26b:



Photo C1:



Photo C4a:



Photo C4b:



Photo C4c:



Photo C4d:



Photo C7:

Facility : 0050 50F- STADIUM PRESS BOX

General Info:

Type: Building	Estimate Cost: \$195,243.37
Gross Area: 1845 S. F.	Additional Cost: \$111,953.63
Year Built: 1948	Repair Cost: \$307,197.00
Last Renovation: 1959	Replacement Value: \$448,242.75
	FCI%: 68.53%



Facility Description:

0049; Building, No.50 D, is located at the Mt. San Antonio College in Walnut, California. The 1 - story, 1845 square foot building contains press box. Originally constructed in 1948 with a minor remodel in 1959 with no major renovations to date, 2013.

STRUCTURAL/EXTERIOR CLOSURE:

The building rests on slab-on-grade that are original to construction. The main structure is cast in place, CMU that is metal framed with metal skinned exterior walls. Roof framing is metal. The roof is rolled asphalt of unknown vintage. Exterior entrance doors are typically hollow metal in hollow metal frames using lever handles. The windows in this building are a combination of metal and or aluminum fixed and operational window walls.

INTERIORS:

Partition wall types include painted CMUs. The interiors of exterior walls are typically painted brick. Most ceilings 12"x12" are acoustical tiles. Flooring in high traffic areas is carpet. Interior doors are generally solid wood in wood frames. There are no restrooms in this building.

MECHANICAL/PLUMBING

Heating/cooling is provided by a roof top heat pump with roof top exposed duct for ceiling supply and returns. The plumbing is of original type. The plumbing is a porcelain sink and a electric in line water heater with a wall mounted water fountain.

ELECTRICAL:

The electrical system is fed from the sub station behind press box to the local panel to the press box 60 amp sub panel. The lighting is by T-12 fixtures using typical switches and outlets.

FIRE PROTECTION/LIFE SAFETY SYSTEMS:

The fire protection is by fire extinguishers.

Hazmat.

None noted.

