Docket #
102

SOLUTIA
Applied Chemistry, Creative Solutions

Solutia Inc.
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Anniston, Alabama 36201
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May 19, 1998

Mr. Wm. Gerald Hardy, Chief
Hazardous Waste Branch
Land Division
Alabama Department of Environmental Management
1751 Cong. W. L. Dickinson Drive
Montgomery, AL 36130-1463

Re: Revised Supplemental Interim Measures Work Plan
Solutia Inc. Anniston, AL Facility
EPA ID No. ALD 004 019 048

Dear Mr. Hardy:

Attached are three copies of a revised Supplemental Interim Measures Work Plan for containment of soils and sediments on property owned by Solutia downgradient of the West End Landfill at its Anniston, Alabama facility. The revisions contained in this document respond to comments provided by ADEM on the original Supplemental Work Plan which was submitted to the Department in December 1997. Many of these comments reflect the fact that the earlier submission was based on a conceptual design for the Interim Measures. As such, many of the design details which are requested in the comments were not available for inclusion in the original Work Plan. The designs have now been completed and are included in this revised document.

In reviewing the attached document, you will note that the design concept has changed from that presented in the December 1997 submission in several respects. The most significant changes are as follows:

- Runoff from the drainage basin will be collected and discharged into an existing 2 ft. x 5 ft. sewer running along the north side of Tenth Street, instead of into a pipeline running north along Parkwin Avenue as originally envisaged. This change avoids the uncertainties and likely disruptions associated with installing a pipeline across the myriad of domestic service connections along Parkwin Avenue.

- The discharge from a 36 in. diameter culvert under the railroad tracks will flow directly into the new pipeline to be constructed across the covered property. The original concept allowed the discharge to flow in an existing ditch to an inlet structure constructed on Solutia-owned property. The present design keeps the water out of this ditch, with its potentially affected soils and allows for the closure of the ditch.

Each of the comments provided by the Department is listed below, followed by Solutia's response in italicized text.

1. **Section 2, Second Paragraph and Attached Drawings SK-2:** The Workplan text describes specific drainage basins and major stormwater conveyances that are the subject of the Supplemental Work Plan. However, the drainage basin/divides and major conveyances (culverts, DSN 008, open channels and swales) are not depicted on the drawings. This information should be included on the figures, as well as being described in detail in the text. This applies to the drainage basin south of the railroad tracks as well as the drainage basin(s) that comprise the proposed pipeline area and capped contamination area.

   Response:

   Figure 3 has been added to the Work Plan. This Figure shows the requested information. As well, the text has been revised to more fully describe the various drainage basins.

2. **Section 2, Third Paragraph:** The Workplan states that the existing culverts under Highway 202 and the railroad tracks are inadequate to pass runoff from a significant stormwater event. As a result, during significant events, the report indicates that the combined flow leaving the subject drainage basin (from "culvert" and "railroad tracks") will be exit controlled at 100 cfs. Thus, it appears that the design flow entering the proposed storm water sewer is 100 cfs. But it is not clear if some of the flow is being diverted around the capped area by the proposed swale. Please clarify the basis of the 100 cfs value (by providing additional technical and engineering data); the flow distribution and ultimate disposition of the 100 cfs (north of the railroad tracks); the design flows (runoff and in-pipe) from the capped area and impoundment area; and the adjacent runon contributions/flow diversions around the capped area. All of these flow values appear necessary to accurately describe and estimate storm water flows from the proposed Interim Measures facilities.

   Response:

   The hydrological analyses performed to determine the various flow quantities from each of the catchment areas are included in Attachment 1 of this Work Plan. Additionally, the text has been revised to describe each of these components and the dispositions of each. In summary, runoff from the catchment area south of the railroad tracks collects behind the railroad embankment and is conveyed under the tracks at a maximum flow rate of 100cfs by the culvert under the tracks. This runoff will enter a new pipeline to be constructed across Solutia-owned property and will be conveyed to the northeast, under Tenth Street, to discharge into an existing 2 ft. x 5 ft. culvert running along the north side of the street. The culvert discharges into a tributary of Snow Creek.

   Runoff from Solutia-owned property north of the tracks will sheet flow to the north and will be collected in an impoundment basin to be created by construction of a perimeter berm on the northern half of the Solutia-owned property. The impounded water will enter the new pipeline through an inlet structure to be constructed immediately inside the berm and will

discharge to the culvert along the north side of Tenth Street. The peak discharge in this area from a 100-year, 24-hour storm is estimated to be 50 cfs.

Runoff from the area outside of the berm, estimated to be 50 cfs from a 100-year, 24-hour storm, will flow in drainage ditches constructed along the northern and western outer edges of the berm and will discharge into an existing 30 in. x 54 in. arch culvert near the corner of Tenth Street and Duncan Avenue This culvert runs easterly along the southern side of Tenth Street and crosses the street at its intersection with Parkwin Avenue. Water in this culvert discharges into the 2 ft. x 5 ft. culvert on the north side of the street.

In the event that the peak discharge from the 100-year, 24-hour storm surcharges the 2 ft. x 5 ft. culvert along Tenth Street, the secondary inlet structure in the northeastern corner of the impoundment will allow surcharge flow in the pipeline to flow into the impoundment and be stored there until it can enter the discharge culvert. This inlet structure will in fact serve as both an inlet and outlet structure.

3. **Profile Drawing, Sheet SK - 3:** This drawing depicts two existing pipelines or utilities crossing above the secondary inlet structure. However, the identity of these items is not defined. Also, the horizontal reference or scale may be inaccurate in the top profile of sheet SK-3, as the first proposed storm manhole is not shown (but should be based on the scale). Thus, the location of the two utilities may be inaccurate. Solutia may wish to verify these locations on the profile sheet and also indicate these locations on the Plan view, sheet SK-1 for clarity to prevent potential construction interference. Also, a clarifying note to identify the source of these utilities may be warranted.

Response:

The utilities in question are a storm sewer and a water supply line. The location of the storm sewer is well defined since at least two manholes have been identified and the invert elevations of the sewer in these manholes have been measured. However. The location and invert elevation of the water supply line is less certain. Consequently, test pits will be excavated prior to trenching in this area to precisely locate the line. If necessary, either the line will be relocated to provide clearance for the new box culvert, or the alignment of the culvert will be changed prior to construction.

4. **Street Designation:** Confirm the street name as Parkwin Street or Parkwin Avenue. The Drawings and text use different designations.

Response:

The correct street name is Parkwin Avenue.

5. **Purpose of Geotextile and Potential Need for Signs:** The Workplan states that the geotextile fabric is used to define the boundary between the cover and former soil surface. Thus, during potential future excavation activities, an owner or contractor would be able to identify when the transition to native sediments occurred. However, there is potential for someone to reach the transition zone and not understand the purpose of the indicator geotextile. Solutia should

consider placing several signs at key locations to alert potential contractors and on-site personnel that the area has been lined and capped and that digging should proceed with caution. Any digging activities should be reviewed and approved by Solutia to ensure subsurface materials are not disturbed.

Response:

The covered area will be enclosed by a perimeter fence with locked gates and will be under the control of Solutia. Any proposed construction activities will be reviewed and approved by Solutia prior to construction. Consequently, it is highly unlikely that construction activities will be carried out in the covered area without full awareness of the significance of the fabric. Thus, warning signs are not considered to be necessary.

6. **Section 3.2, First Paragraph:** The text states that all identified Solutia owned property where PCB concentrations exceeded the screening level would be covered, unless "...such locations will be covered by other structures (e.g., a berm to be built on the northern half of the property). Based on this criterion, the extent of cover is shown on Figure 2."

   The stated criterion is unclear, particularly the example (berm) that is presented. Please clarify where the berm is located and why this area will not require cover or other stormwater runoff improvements.

   Response:

   The text has been revised to clarify that the berm itself will act as the cover in this area.

7. **Berm Elevation:** The Department recommends providing approximate elevations of the proposed berm at four locations for contractor guidance and to ensure that containment provisions of the impoundment are achieved.

   Response:

   The final design drawings in Attachment 2 contain the information necessary to allow the contractor to lay out and construct the work in accordance with the design.

8. **Raised Water Diversion:** A design detail view is needed for Raised Water Diversion shown in sheet SK-1. Also, please describe the purpose and function of this diversion in the text.

   Response:

   This detail is no longer included in the design.

9. **Outfall Construction:** A detail is needed for the outfall at Snow Creek. Please confirm that standard outfall provisions, such as rip-rap and energy dissipators are specified on the drawings and in the text to protect stream habitat during storm water events.

Response:

The discharge from the stormwater management system will be conveyed to an existing stormwater sewer running along the north side of Tenth Street. Consequently, no outfall into Snow Creek will be required.

10. **Horizontal Datum:** Solutia should consider providing a horizontal datum point on the drawings to establish the location of the pipeline and other design items.

Response:

The information required for the layout and construction of the work is contained in the final design drawings included in Attachment 2.

11. **Perforated Inlet Structure:** The operation of the perforated secondary inlet structure is unclear. What are the perforations for and what do they look like? Is it a cast in-place manhole with perforations at the top cover?

Response:

Details of the Perforated Secondary Inlet Structure are shown on Sheet G-9 in Attachment 2. The structure is a standard precast 8 ft. diameter manhole with a 4 ft. diameter riser. The perforations are 4 in. diameter holes. The structure will function as both an inlet and outlet, allowing ponded water to drain into the 42 in. diameter pipe during off-peak flow and allowing surcharge flow to backup into the impoundment during peak flow periods.

12. **Rim Elevations:** The rim elevation of the manhole at the intersection of West Tenth Street and Parkwin Avenue appears low. Verify that the stormwater flow intended to back up into the impoundment will not first surcharge this manhole.

Response:

The manhole outside of the berm at this intersection will be fitted with a bolted cover. Thus, while it will be surcharged during peak flow conditions, it will prevent flow from draining out of the structure and will allow the water to back up into the impoundment.

13. **Section 3.3, Second Paragraph:** The hydraulic capacity/flow scheme of the impoundment, perimeter ditch, 30 in by 54 in sewer, and emergency spillway are unclear. Please provide clarification in the text and drawings. Define the location and operation of the spillway. Is the perimeter ditch only located on the north and west sides of the berm? The approximate location should be shown on the plan view. It is unclear if the impoundment collects runoff from a portion of the covered area or from the entire area. Please clarify. Also, the spillway will reportedly allow for stormwater releases into the sewer system in the event of major storms. Please clarify to which sewer system the spillway will lead to and confirm that it does not lead to a sanitary sewer lines.

Response:

The text and drawings have been revised to provide the requested clarifications and additional information.

14. **Hydrological Analyses:** Additional information and results should be presented regarding the hydrological analyses that were conducted. The Workplan states that Solutia's analyses indicated that the peak discharge from Solutia-owned property resulting from a 100-year, 24 hour storm will be reduced by as much as 60 percent. However, specific flow rates and duration of storm events is not discussed. Thus, for the 100 year event(or other design event), the Workplan should list the flow handled by the proposed storm sewer, drainage ditches, overflow manholes, etc.

Response:

The text has been revised to provide the requested information. This information is also summarized in the response to Comment No. 2 above. The hydrological analyses, including peak discharge routing, are included in Attachment 1.

15. **Impoundment Percolation:** Please discuss the type of dynamic analysis conducted for the impoundment. In particular, for various storm events, what is the head on the impoundment and how long will the impoundment retain water. Address whether or not the operation of the impoundment has the potential to enhance percolation of stormwater, as a result of the additional head and retention time in the proposed impoundment.

Response:

Flood routing through the impoundment was performed using the U.S. Army Corps of Engineers HEC program. Analyses were performed for various storm events and the results are included in Attachment 1. The results show that the maximum head in the impoundment resulting from a 100-year, 24-hour storm event will be approximately 4 feet (Elevation 728). Consequently, the spillway crest elevation has been set one foot above this maximum pool elevation, at Elevation 729 and the top of berm elevation has been set one foot greater than this (Elevation 730) to provide one foot of freeboard. Since the outlet pipe is the same diameter as the inlet, the impoundment will drain very rapidly once the peak is past. It is estimated that the impoundment will drain in less than 48 hours after the design storm event. Thus, the ponded water will not be held in the impoundment long enough to materially alter the percolation into the subsurface soils.

16. **Impoundment Design:** Please confirm that geotechnical design provisions were considered to ensure structural viability of the impoundment at the design head.

Response:

Geotechnical analyses were carried out on the impoundment berm to ensure adequate factors of safety against slope failure and sliding.

17. **Engineering Certification:** Design drawings should be sealed by a Professional Engineer currently certified by the State of Alabama.

Response:

The design drawings included in Attachment 2 have been sealed by a Professional Engineer registered in the State of Alabama.

18. **Additional Designs:** Section 3.3 states that additional designs are being evaluated that may alter the configuration of the new pipeline. The final disposition of the design should be determined prior to Workplan approval. With the exception of minor changes implemented based on field conditions that may be encountered, the form, fit, and function of the design should be outlined in the Workplan. However, the Workplan implies that there may be utility interference's which remain unresolved at this time and that such interference's may affect invert elevations (and hence impede the flow capacity) of the proposed storm sewer. If this is the case, it appears that the success of the interim measures design, including the sewer line and the operation of the impoundment, may be significantly affected by the interference. This issue should be resolved prior to submittal of a revised Workplan.

Response:

As noted at the beginning of this letter, the current design is significantly more detailed from the conceptual design presented in the original Work Plan. These revisions were based on additional information obtained during the design and the drawings presented in Attachment 2 represent the final design of the Interim Measures described in this Work Plan. These drawings will be issued for construction.

We look forward to your early review and approval of this revised Work Plan. Construction of the Interim Measures described in this plan is scheduled to be substantially completed by September 30, 1998. Consequently, we propose to begin construction at the beginning of June, subject to your approval. If you have any question about the attached plan please call me at (205) 231-8404.

Sincerely,
SOLUTIA INC.

Alan G. Faust
Manager of Remedial Projects

Solutia Inc.
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Tel 205-231-8447

REVISED

SUPPLEMENTAL INTERIM MEASURES WORK PLAN

SOLUTIA ANNISTON FACILITY

Formerly the chemical businesses of Monsanto Company

1. INTRODUCTION

This supplemental Interim Measures Work Plan (IMWP) has been prepared pursuant to a letter to Monsanto, now Solutia Inc. (Solutia), from the Alabama Department of Environmental Management (ADEM) dated March 11, 1997. In that letter, ADEM informed Solutia that it had determined that certain Interim Measures previously proposed by Solutia were deemed appropriate to minimize the potential for constituents to leave Solutia's Anniston, Alabama Facility. ADEM also deemed these Interim Measures to be Best Management Practices (BMP) pursuant to the National Pollutant Discharge Elimination System (NPDES) Permit issued to the Facility on December 31, 1996. As such, this supplemental IMWP constitutes a portion of the BMP Plan for the Facility required by the NPDES Permit and is incorporated into that Plan by reference.

Detailed designs and procedures for the implementation of the first three measures defined above were provided to ADEM in an IMWP dated June 16, 1997. This IMWP was approved by ADEM in a letter dated July 28, 1997 and construction of those three Interim Measures was substantially completed by December 31, 1997. Upgrading of the in-plant stormwater system and diversion of non-contact cooling water to the in-plant wastewater treatment facility have also been completed. All major sewer lines conveying stormwater flow to NPDES monitoring point DSN 001 have been lined with a rigid resin impregnated felt lining and new piping has been installed in the Plant to convey non-contact cooling water to the in-plant waste water treatment facility. A final report describing the completed Interim Measures was submitted to the Department on March 31, 1998 in accordance with the requirements of Condition III.F.3.b of the Alabama Hazardous Wastes Management and Minimization Act (AHWWMA) Post-Closure Permit for the Facility.

Thus, the only Interim Measure which remains to be implemented is the containment of soils and sediments on property owned by Solutia downgradient of the West End Landfill. This supplemental IMWP identifies the objectives of this Interim Measure, provides details of the actions and procedures for implementation, and provides a schedule for implementation in accordance with the requirements of Condition III.F. of the Post Closure Permit..

2. EXISTING SURFACE WATER DRAINAGE PATTERNS

Currently, stormwater from the northern slopes of Coldwater Mountain flows north to Highway 202. A series of natural drainage swales conveys water down the side of the mountain and along the south side of the highway to a series of culverts which carry the water under the roadway. The individual drainage basins, which contribute flow to the individual culverts, were identified and discussed in the approved IMWP and are shown on the attached Figure 3.

The recently completed Interim Measures have altered the natural drainage patterns from the areas denoted as 2 and 3 on Figure 3. Runoff from any storm less than the 50-year, 24-hour storm on these areas flows to a ditch on the southern side of Highway 202 and is conveyed under the road by three culverts: a 36 in. diameter culvert located immediately east of Clydesdale Avenue, a 24 in. diameter culvert east of this and, farthest to the east, a 48 in. diameter culvert. These culverts are designated as monitoring points DSN 009, DSN 010 and DSN 011 respectively in the facility NPDES permit. The discharges from the three culverts are diverted into a detention basin (the Lower Detention Basin) which was completed in March 1997. The basin is designed to store the runoff from a 25 year, 24 hour storm falling on the South Landfill and to pass a 100 year, 24 hour storm on the same catchment area. Discharge from the basin occurs via an 18 in. diameter pipe which empties into a discharge structure on Tenth Street at a maximum rate of 16 cfs. The detention basin is also equipped with an emergency spillway which, when necessary, empties into the discharge structure on Tenth Street. For storms which exceed the intensity of a 50-year, 24-hour event, some runoff from Area 2 will flow under Highway 202 through a 4 ft. x 6 ft. box culvert located west of Clydesdale Avenue. The runoff then flows through the southeastern corner of the manufacturing portion of the Solutia property (the plant) into a ditch on the western side of Clydesdale Avenue and crosses under Clydesdale Avenue in a 4 ft. x 6 ft. box culvert. Once across Clydesdale, the flow is conveyed to the Tenth Street discharge structure in a 36 in. diameter HDPE pipe.

The specific drainage basin which contributes stormwater runoff to the area north of the West End Landfill and is the subject of this supplemental Work Plan is located south of the West End Landfill and west of the South Landfill. This basin is denoted as Area 1 on Figure 3. Runoff from

this area is conveyed under Highway 202 by a 4 ft. x 4 ft. box culvert located on the west side of Monsanto Drive. The inlet to this culvert is designated as monitoring point DSN 008 in the facility NPDES permit. The runoff is then directed through an open channel around the western and northern edges of the West End Landfill into a drainage ditch running along the western boundary of the Solutia Plant. The runoff is conveyed to the north under the railroad tracks by a 36 in. diameter culvert and then flows partially in open channel and partially in culvert north to Tenth Street, at which point it enters a storm sewer running eastward under Tenth Street. This sewer discharges to a ditch running easterly along the northern side of the railroad tracks into an unnamed tributary of Snow Creek

Hydrologic studies of this drainage basin (refer to Attachment 1) demonstrate that the culverts under Highway 202 and the railroad tracks are inadequate to pass the runoff from a significant storm event. As a result, stormwater ponds behind these two structures and the maximum flow which exits the culvert under the railroad tracks from any appreciable storm event is approximately 100 cubic feet per second (cfs). Consequently, stormwater control measures north of the railroad tracks need only be designed to accommodate this flow rate, together with flow contributions from the areas north of the tracks. The design flows into the system are discussed in the Section 3.3.

3. INTERIM MEASURES

3.1 Overview

The primary goal of the Interim Measures identified in this supplemental IMWP is to contain soils and sediments on property owned by Solutia downgradient of the West End landfill. Those areas that may act as potential sources of constituents and the mechanisms which could transport these materials offsite have been identified by an extensive soil and sediment sampling program conducted within AOC B since 1995. Soils and sediments in certain areas north of the tracks are potential sources of constituents. Previous sampling efforts conclusively demonstrate that the primary transport mechanism is surface water and, in particular, stormwater flows which exceed the capacity of the culvert systems in the drainage ways north and east of the Solutia plant. Because the affected soils and sediments are generally confined to the floodplain areas of the drainage ways, the implementation of a comprehensive stormwater management system and the isolation and containment of soils provide the best means of achieving the primary goal of the Interim Measures program. This program is based on the requirement that areas in which affected soils and sediments have been identified will be isolated and contained with appropriate covers to prevent offsite migration.

Details of the actions designed to fulfill this goal are provided in the following sections, while design drawings for the planned construction are included in Appendix A.

3.2 Soil Cover

A cover will be constructed on Solutia-owned property north of the railroad tracks. The objective of the cover is to isolate and contain potentially affected surficial soils and control stormwater drainage through this area. A large number of soil and sediment samples from within the area have been analyzed for PCBs. The results of these analyses are summarized on Figure 1 showing sample locations at which the PCB concentration was above or below a screening level of 5 mg/kg. The extent of the cover has been selected to include all of the sample locations on Solutia-owned property where PCB concentrations exceeded the screening level, unless such locations will be

covered by other permanent structures such as the perimeter berm to be built on the northern half of the property to create an impoundment basin. Since the soil berm will be an average of about 5 feet high over most of its length, it will function as a cover as well. Based on this criterion, the extent of the cover is shown on Figure 2.

Prior to constructing the cover, existing utilities which will be under the cover will either be rerouted or abandoned, unless those utilities will be required by properties not owned by Solutia. Meetings have been held with the various utility companies, and the only major utility which may require relocation is the electrical distribution system in the area to be covered.. If necessary, this system will be relocated outside of the work area. All other services will be discontinued by the utility companies.

The entire area within the cover limits shown on Figure 2 will be cleared, with the exception of established mature trees. A 6-oz weight, continuous filament, needle punched, non-woven geotextile will be installed in cleared areas to define the boundary between the cover and the former soil surface. Over the geotextile, a minimum of 14 inches of soil cover will be placed and a vegetative cover will be established by hydroseeding the cover soils. The existing drainage ditch will be covered by the same textile and backfilled with as much as 3 to 5 feet of clean fill.

Once the geotextile fabric is placed within a drainage ditch and the ditch is backfilled to original grade, a 40 mil HDPE geomembrane liner will be placed over the ditch area on Solutia-owned property and will be covered by the 14 in. thick soil cover. The width of the geomembrane will be a minimum of 20 feet to allow it to extend well past the edges of the ditch which, in most places, is less than 10 feet wide. In those areas where the cover abuts property not owned by Solutia, a drainage swale will be constructed near the edge of the cover to prevent runoff from Solutia's property from entering the adjacent properties.

The area to be covered is presently fenced and this fence will be maintained by Solutia as part of the normal Operations and Maintenance activities for this area. Further, no construction activities which involve excavation will be permitted without the prior approval of Solutia.

3.3 Stormwater Management

Stormwater runoff entering the site from the culvert under the railway tracks will flow into a 36 in. diameter welded HDPE pipe which will be connected to the existing 36 in. diameter with a sleeve connection. From there, the flow will be directed into a 42 in. diameter welded HDPE pipeline, through a combination of bends and manholes, to the corner of West Tenth Street and Parkwin Avenue, where it will transition into a 3 ft. x 6 ft. box culvert through a manhole structure. Flow from this new culvert will be directed into an existing 2 ft. x 5 ft. culvert which runs along the north side of Tenth Street, under Clydesdale Avenue, and which discharges into a tributary of Snow Creek east of Clydesdale Avenue and north of the railroad tracks.

An impoundment will be created by the construction of a low berm (maximum of 10 feet high) along West Tenth Street, Parkwin Avenue, and Duncan Avenue, as shown on the drawings included in Attachment 2. It will collect stormwater runoff from the covered area, as well as the overflow from a manhole structure to be constructed within the berm near the corner of West Tenth Street and Parkwin Avenue (the Secondary Inlet structure shown on the design plans included in Attachment 2). A perimeter ditch will be constructed on the outside of the berm along its northern and western sides to convey stormwater runoff from adjacent properties to a 30 in. x 54 in. sewer running eastwards under West Tenth Street. A perimeter ditch is not required on the eastern side of the berm since the natural drainage is to the east. The berm will be equipped with an emergency spillway on the north side which will allow for stormwater release into the storm sewer system in the event of major storms which exceed the 100-year, 24-hour design storm. In such a low probability event, flow over the spillway will be collected by a ditch on the northern side of the berm and conveyed along the southern side of Tenth Street by a 30 in. x 54 in. metal arch culvert. This arch transitions into a 36 in. diameter concrete culvert which crosses Tenth Street and is connected to the 2 ft. x 5 ft. concrete block culvert on the northern side of the street. The collection ditch on the northern side of the berm is designed to pond up to 5 ft. of water from the spillway overflow. Any spillway discharge which cannot be managed by this system will enter the surface drainage system in the surrounding area through a combination of overland sheet flow into existing drainage channels and flow into the neighboring stormwater sewers via curb inlets.

Hydrological analyses have been performed to evaluate the effect of routing stormwater flow through the proposed pipelines and impoundment and the results are provided in Attachment 1. These analyses indicate that the existing sewer system along West Tenth Street is inadequate to handle the runoff from a significant storm event. However, the peak discharge from a significant storm can be significantly reduced by routing the runoff through the impoundment and, in fact, the analyses demonstrate that the peak discharge from Solutia-owned property resulting from a 100-year, 24-hour storm will be reduced by as much as 60 percent. The flow contributions to the system from this design storm are as follows:

- Runoff from the catchment area south of the railroad tracks will be discharged at a maximum rate of 100 cfs from the 36 in. diameter culvert under the tracks. This flow will be conveyed into the existing 2 ft. x 5 ft. box culvert on the north side of Tenth Street by a 42 in. diameter HDPE pipeline.

- The peak discharge from the area to be covered between the railroad tracks and Tenth Street is estimated to be 50 cfs under the design storm conditions. This runoff will flow to the northeast as surface sheet flow and will collect in the impoundment area created by the perimeter dike. The ponded water will enter the box culvert along Tenth Street through the perforated Secondary Inlet structure to be constructed in the northeastern corner of the impoundment.

- The peak discharge from the area west of the berm is estimated to be 50 cfs and will be conveyed to the north side of the berm by the perimeter ditch constructed along the western and northern sides. Flow from this ditch will drain into the existing 30 in. x 54 in. metal arch culvert running along the southern side of Tenth Street and then into the 2 ft. x 5 ft. concrete block culvert along the northern side of the street via the 36 in. culvert under Tenth Street.

- The flow capacity of the 2 ft. x 5 ft. concrete culvert along Tenth Street is estimated to be 100 cfs. Since the total peak inflow to this culvert is likely to be about 200 cfs (100 cfs from the 42 in. pipeline, 50 cfs from the covered area, and 50 cfs from the area to the west

of the berm), the culvert will clearly be surcharged. The surcharge will be stored in the impoundment, which has been designed to detain and store that portion of the 100-year, 24-hour peak storm discharge from the 42 in. diameter pipeline and the covered area which exceeds the maximum capacity of the 2 ft. x 5 ft. culvert. The runoff from the covered area will flow directly into the impoundment by sheet flow, while the surcharge flow from the 42 in. diameter pipeline will enter the impoundment through the perforated Secondary Inlet structure. Thus, this structure will function as both an inlet as well as an outlet. Water stored in the impoundment will drain into the pipeline and be conveyed across Tenth Street when the capacity of the 2 ft. x 5 ft. culvert permits (i.e., the Secondary Inlet will function as an inlet structure). At other times, stormwater flowing in the pipeline which cannot be accommodated by the culvert will be stored in the impoundment (i.e., the Secondary Inlet will function as an outlet structure). Because the outlet pipe from the impoundment will be the same size as the inlet, water detained in the impoundment will begin to drain immediately after the peak discharge from the design storm is past. Consequently, the retention time in the impoundment will be short and the ponded water is expected to drain in less than 48 hours. The transient nature of the storage, together with the fine grained nature of the soils underlying the impoundment, will result in negligible percolation of the ponded water into these soils.

3.4 Fencing

A fence has been constructed around the perimeter of the areas be covered.

3.5 Reporting

All reporting requirements identified in Condition III.F of the Post-Closure Permit will be satisfied.

3.6 Operations and Maintenance

An Operations and Maintenance (O&M) Plan for the Interim Measures described in the approved IMWP has been submitted to ADEM for review and approval. Within 90 days of approval of this supplemental IMWP, the O&M Plan will be revised to include the supplemental measures.

3.6 Expected Benefits

The supplemental Interim Measures described in this Work Plan will achieve the following:

- manage stormwater runoff in such a way that the possibility of transport of soils and sediments from Solutia-owned property is minimized;

- prevent erosion and sediment transport from areas containing affected soils and sediments north of the facility;

- reduce the potential for surface water infiltration into soils on the north side; in particular, those soils in immediate proximity to the ditches where higher PCB concentrations were found. The potential for infiltration will be minimized by the presence of a low permeability geomembrane;

- prevent direct contact with affected materials;

- reduce the peak stormwater discharge from Solutia-owned property by approximately 60 percent.

The completion of these measures will assure appropriate management and containment of soil and sediments on property in and around the Solutia Anniston plant. The measures will satisfy the standards defined in OSWER Directive 9902.3-2a for the major technical components of remedial actions. The measures will be protective of human health and the environment in that they provide containment of the affected media, prevent direct contact with affected media and minimize the

potential for migration of constituents to the environment. In addition, since most of the affected properties in the area are currently owned by Solutia, access to these properties will be restricted.

4. SCHEDULE

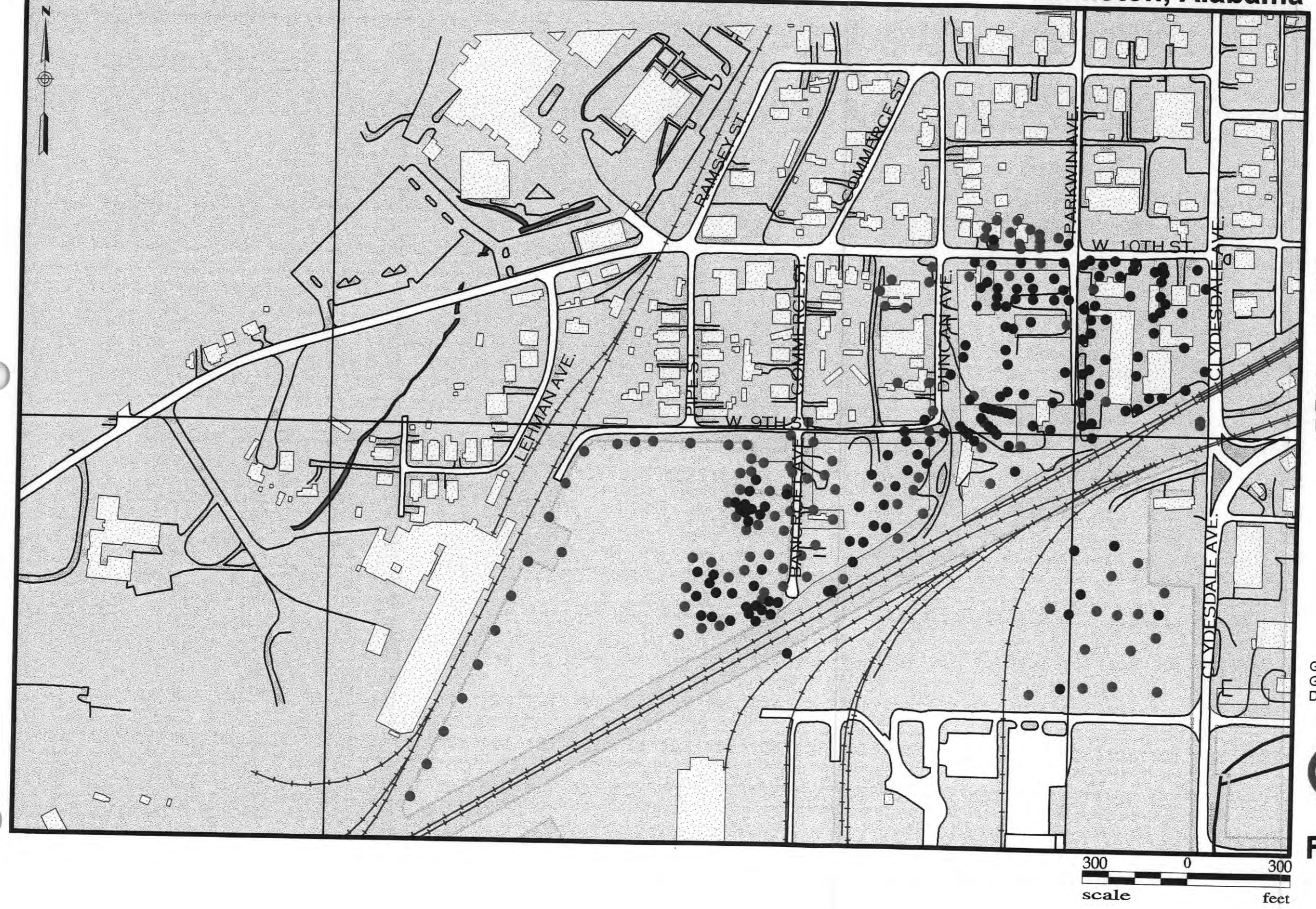
Construction of the supplemental Interim Measures identified in this Work Plan is scheduled for completion by September 30, 1998.

SOLUTIA

Applied Chemistry, Creative Solutions

Solutia Plant
Anniston, Alabama

SOIL/SEDIMENT SAMPLING LOCATIONS IN CONSTRUCTION AREA



LEGEND

- Soil/Sediment Sampling Point Above Screening Limit
- Soil/Sediment Sampling Point Below Screening Limit
- Railroad
- Building Structure
- Stream
- Solutia Property

GIS File No: ATLQU7013
Golder Project No: 943-3680-017
December 22, 1997

Golder Associates

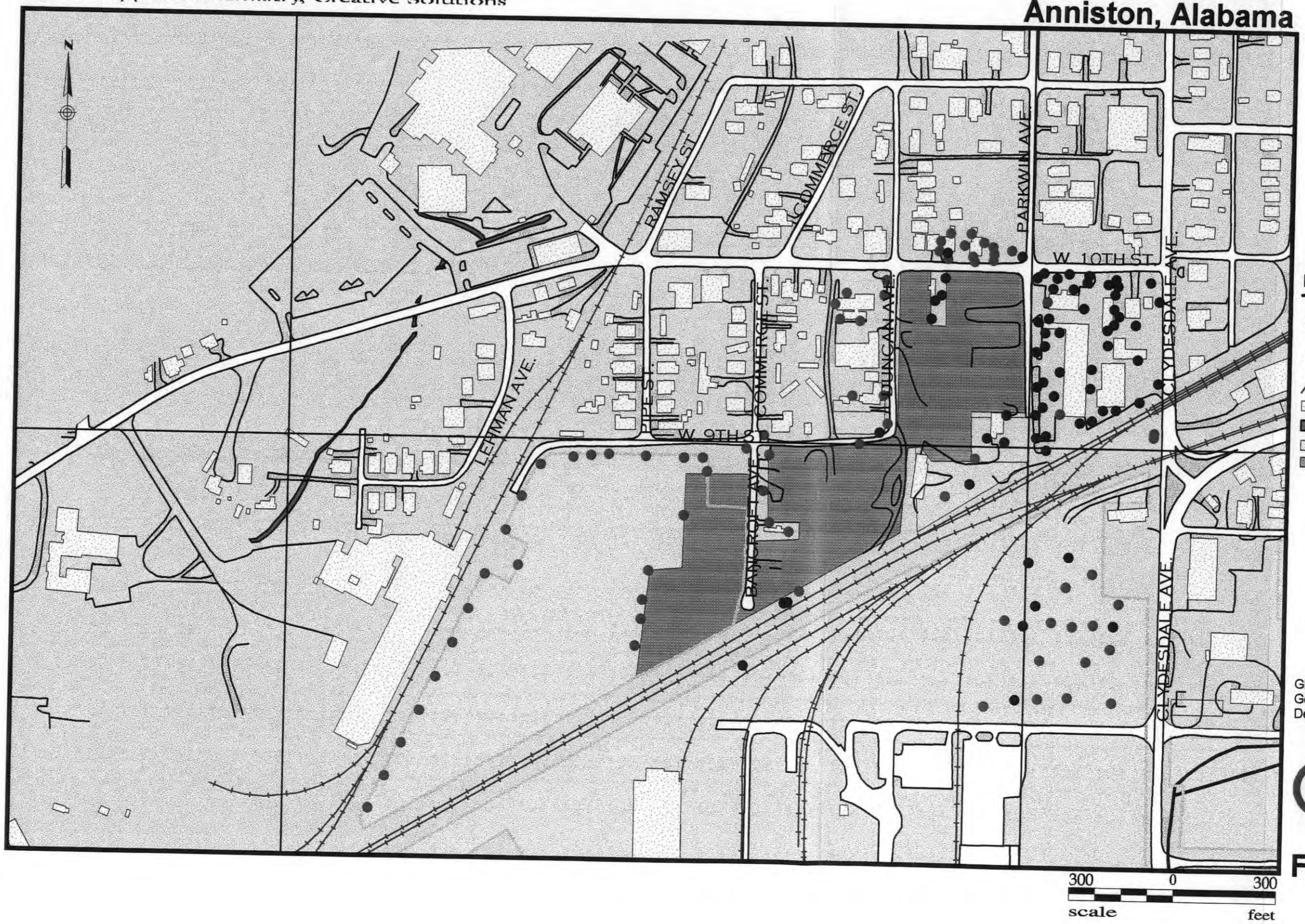
FIGURE 1

SOLUTIA

Applied Chemistry, Creative Solutions

Solutia Plant
Anniston, Alabama

NORTHSIDE STORMWATER CONTROL AND COVER PROJECT



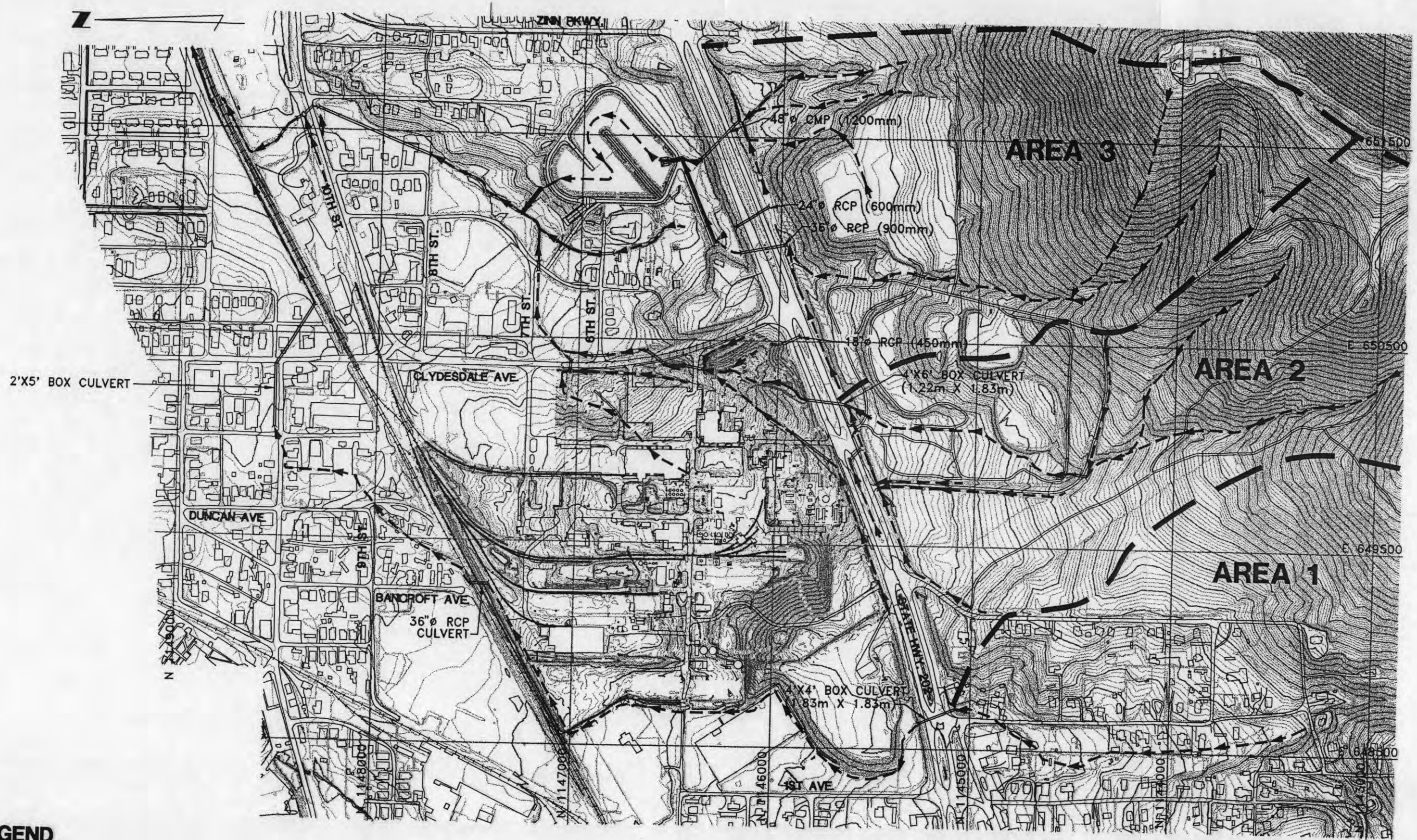
LEGEND

- Soil/Sediment Sampling Point Above Screening Limit
- Soil/Sediment Sampling Point Below Screening Limit
- Railroad
- Building Structure
- Stream
- Solutia Property
- Cover Limits

GIS File No: ATLQU7013
Golder Project No: 943-3680-017
December 22, 1997

Golder Associates

FIGURE 2



LEGEND

- EXISTING CONTOURS
- EXISTING ROADWAY
- EXISTING CULVERT
- EXISTING RUNOFF FLOW PATH
- DRAINAGE DIVIDE

SCALE IN FEET

0 500 1000

Golder Associates — Atlanta, Georgia

CLIENT/PROJECT: SOLUTIA, INC

TITLE: AREA DRAINAGE

DRAWN	RJS	DATE	5/98	JOB NO.	963-8294
CHECKED		SCALE	AS SHOWN	DWG. NO.	330
REVIEWED		FILE NO.	943-3680	REV. NO.	
				SUBTITLE	
				FIGURE NO.	3

Golder Associates

SUBJECT North Side Hydrology Analysis		
Job No. 9433680 039	Made by RBF	Date 12/6/97
Ref. Solutia/NSH/R	Checked	Sheet 1 of
	Reviewed	

OBJECTIVE:

Develop inflow hydrographs for use in the design of a stormwater control system as part of closure construction planning for the North Side Properties. Properties are located north of Solutia, Inc.'s Anniston, Alabama facility's operational boundary.

METHODS:

Use the Soil Conservation Service, TR-55 program to estimate runoff rates. Use a reservoir routing program (RK-4) to estimate discharge through major hydraulic controls (i.e. culverts).

GIVEN:

Topographic maps prepared for the drainage basin in 1995. Culvert dimensions and elevations. Rainfall data for Anniston (2-yr, 24 hr rain = 4 inches, 10-yr = 6 inches, 100-yr = 8 inches). Ground cover conditions.

ASSUMPTIONS:

Some assumptions have been made relative to culvert "overflow" conditions in order to model how stormwater would be directed when culvert capacity is exceeded. Based on our best interpretation of area topography, we have assumed that if the 4' x 4' box culvert capacity is exceeded, overflow would be directed to the west, and would not re-enter the basin. If the capacity of the 36 inch diameter culvert is reached, overflow would be directed to the east, into a channel which parallels the south side of the railroad tracks. We have assumed that this flow will not re-enter our basin.

RESULTS:

A table has been prepared to summarize the results of our hydrologic analysis. See Next Page.

Results Summary Table.

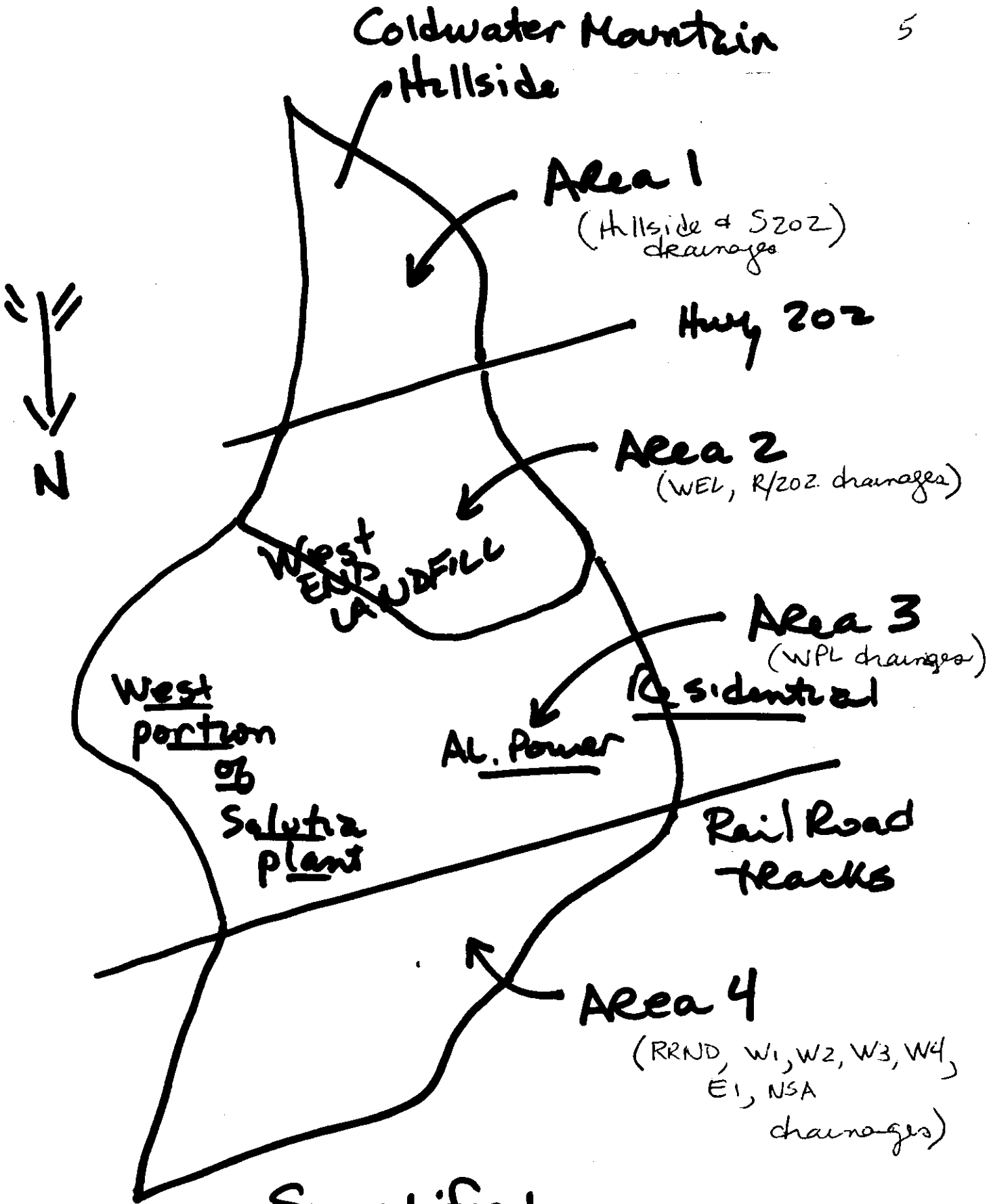
(100 yr, 24-hr storm)

Time (Hrs)	Basin Discharge (cfs)																	
	Hills	S202	Hills+ S202	4 x 4 Rting *Note 1*	WEL	R/202	WEL + R/202	WEL + R/202 + 4 x 4 *Note 2*	WPL	WPL + WEL + R/202 + 4 x 4	RailRd 36 " Rting *Note 3*	RRND	W1	W2	W3	W4	E1	NSA
11.0	28	1	29	0	1	0	1	1	9	10	0	0	1	0	0	0	0	2
11.3	38	1	39	37	2	0	2	39	13	52	44	1	1	0	1	0	1	2
11.6	53	2	55	52	2	1	3	55	19	74	69	1	1	0	1	0	1	3
11.9	95	6	101	90	5	4	9	99	53	152	97	6	2	1	4	1	7	14
12.0	156	11	167	127	9	7	16	143	106	249	97	11	2	1	8	3	13	27
12.1	283	21	304	170	17	11	28	198	202	400	97	18	3	3	15	5	20	50
12.2	512	32	544	203	29	7	36	239	306	545	97	11	6	4	16	5	13	55
12.3	776	32	808	238	37	2	39	277	306	583	97	4	10	6	10	3	4	33
12.4	879	22	901	280	36	2	38	318	208	526	97	3	15	6	5	2	3	17
12.5	843	13	856	280	27	1	28	308	128	436	97	2	19	4	3	1	2	11
12.6	668	9	677	280	19	1	20	300	89	389	97	2	22	3	2	1	2	9
12.7	494	7	501	280	14	1	15	295	66	361	97	2	21	2	2	1	2	7
12.8	376	5	381	280	10	1	11	291	52	343	97	1	19	2	1	1	2	6
13.0	233	4	237	280	7	1	8	288	36	324	97	1	13	1	1	0	1	5
13.2	160	3	163	251	5	1	6	257	30	287	97	1	9	1	1	0	1	4
13.4	123	3	126	238	4	1	5	243	26	269	97	1	6	1	1	0	1	4
13.6	101	2	103	222	3	0	3	225	23	248	97	1	5	1	1	0	1	3
13.8	88	2	90	202	3	0	3	205	21	226	97	1	4	0	1	0	1	3
14.0	78	2	80	175	3	0	3	178	19	197	97	1	3	0	1	0	1	3
14.3	68	2	70	78	2	0	2	80	17	97	97	1	2	0	1	0	1	2
14.6	60	2	62	63	2	0	2	65	15	80	83	1	2	0	1	0	1	2
15.0	53	1	54	55	2	0	2	57	14	71	72	1	2	0	1	0	1	2
15.5	48	1	49	50	2	0	2	52	13	65	66	0	2	0	1	0	1	2
16.0	43	1	44	45	2	0	2	47	11	58	60	0	1	0	0	0	0	2
16.5	38	1	39	40	1	0	1	41	10	51	53	0	1	0	0	0	0	1
17.0	35	1	36	36	1	0	1	37	9	46	47	0	1	0	0	0	0	1
17.5	33	1	34	34	1	0	1	35	9	44	44	0	1	0	0	0	0	1
18.0	32	1	33	33	1	0	1	34	8	42	42	0	1	0	0	0	0	1
19.0	27	1	28	28	1	0	1	29	7	36	36	0	1	0	0	0	0	1
20.0	23	1	24	24	1	0	1	25	6	31	31	0	1	0	0	0	0	1
22.0	20	1	21	21	1	0	1	22	5	27	27	0	1	0	0	0	0	1
26.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Note 1 : 4' x 4' box maximum capacity = 280 cfs. Excess Flow is routed to the west (into another basin). Excess flow therefore does not contribute to north side drainage.

Note 2 : At outlet of basin WEL, flow enters dual 48 inch culverts (ADS / smooth walled). Maximum flow capacity = 260 cfs. Overflow runs via sheet flow into basin WPLANT. Therefore no routing is performed.

Note 3 : The 36" diameter steel / concrete railroad culvert has a maximum capacity of 97 cfs at full head. Excess flow drains to the east along the southern side of railroad tracks (in ditch).



Simplified Sketch of Basin.

DRAINAGE AREA DATA

NORTH SIDE HYDROLOGY STUDY

Drainage Basin	Cover Type	Area Planix	Sq Ft	Acres	Flow Path Sheet	Shallow	Open C.
Hillside	Trees / Woods	143.70			150 ft	900 ft.	4,300 ft.
		35.00			25% slope	25 % Slope	At 5 ft/sec
		1.66					
		1.45					
		Total =					
		181.81	7,272,400.00	166.95			
	Residential	0.52					
	(1/2 Acre Lots)	2.80					
		3.05					
		9.50					
		13.50					
		1.20					
		Total =					
		30.57	1,222,800.00	28.07			
	Grass	0.60	24,000.00	0.55			
	Roads	0.16					
		0.27					
		0.42					
		0.32					
		0.12					
		0.21					
		0.10					
		0.10					
		0.10					
		Total =					
		1.80	72,000.00	1.65			

DRAINAGE AREA DATA

NORTH SIDE HYDROLOGY STUDY

Drainage Basin	Cover Type	Area Planix	Sq Ft	Acres	Flow Path Sheet	Shallow	Open C.
S202	Woods	2.20	88,000.00	2.02	100 ft. At 8% Slope	650 ft. At 12% Slope	NA
	Residential (1/2 Acre Lots)	1.80 1.40 Total = 3.20	128,000.00	2.94			
	Roads	0.13 0.10 Total = 0.23	9,200.00	0.21			
Roadway 202.00	Roads	0.20 0.20 0.10 Total = 0.50	20,000.00	0.46	30 ft. At 2% Slope	240 ft. At 2 % Slope	100 Ft. At 5 ft/sec
	Grass (Median)	0.30 0.35 Total = 0.65	26,000.00	0.60			
WEL	Grass	6.90	276,000.00	6.34	150 Ft. At 2% Slope "+" 40 Ft. At 33% Slope		550 Ft. At 5 ft/sec
	Road	0.20 0.10 Total = 0.30	12,000.00	0.28			

DRAINAGE AREA DATA

NORTH SIDE HYDROLOGY STUDY

Drainage Basin	Cover Type	Area Planix	Sq Ft	Acres	Flow Path Sheet	Shallow	Open C.
W. Plant	Grass	7.55			150 ft.	NA	1,950 Ft.
		1.00			At 2 % Slope		At 5 ft./sec
		1.00			"+"		
		3.50			40 Ft.		
		0.51			At 33% Slope		
		0.62					
		Total =					
		14.18	567,200.00	13.02			
	Gravel / Rock	2.90					
		0.45					
		4.62					
		4.35					
		4.52					
		3.95					
		1.79					
		Total =					
		22.58	903,200.00	20.73			
	Paved / Roof	0.37					
		0.70					
		1.00					
		2.35					
		0.13					
		Total =					
		4.55	182,000.00	4.18			
	Residential (1/2 Acre lots)	0.72					
		2.40					
		2.80					
		Total =					
		5.92	236,800.00	5.44			

DRAINAGE AREA DATA

NORTH SIDE HYDROLOGY STUDY

Drainage Basin	Cover Type	Area Planix	Sq Ft	Acres	Flow Path Sheet	Shallow	Open C.
W. Plant (Continued)	Roads	0.10 0.35 0.20 0.24 Total = 0.89	35,600.00	0.82			
RRND	Grass/Weeds	1.30	52,000.00	1.19	20 ft. At 33% Slope	NA	1,500 ft. At 5 ft/sec
	Gravel	1.00	40,000.00	0.92			
W1	Grass	6.44	257,600.00	5.91	150 ft. at .5% slope	850 ft. At 1% Slope	
W2	Residential (1/2 Acre Lots)	0.70 0.41 Total = 1.11	44,400.00	1.02	150 ft. at .5% slope	150 ft. At .5% slope	NA
	Roads	0.05	2,000.00	0.05			
W3	Residential (1/2 Acre Lots)	0.37 2.10 Total = 2.47	98,800.00	2.27	200 ft. at 3% slope	200 ft. at .5% slope	NA
	Roads	0.05	2,000.00	0.05			
W4	Residential	0.80	32,000.00	0.73	200 ft. at 2% slope	NA	NA
	Roads	0.02	800.00	0.02			

DRAINAGE AREA DATA

NORTH SIDE HYDROLOGY STUDY

Drainage Basin	Cover Type	Area Planix	Sq Ft	Acres	Flow Path Sheet	Shallow	Open C.
E1	Gravel	1.60	64,000.00	1.47	100 ft. at 2% slope	NA	NA
	Roof / Paved	0.10	4,000.00	0.09			
	Grass	0.02	800.00	0.02			
	Roads	0.30	12,000.00	0.28			
NSA	Grass	3.70 2.70 1.00 Total = 7.40	296,000.00	6.80	150 ft. at 2% Slope	NA	1100 ft. at 5 ft/sec
	Roads	0.20	8,000.00	0.18			

TR-55

AREA 1

Drainage from Areas South of Highway 202.

TR-55 CURVE NUMBER COMPUTATION

VERSION 1.11
Project : Solutia - North Side Hydrology User: tbf Date: 12-06-97
County : Calhoun State: Al Checked: ____ Date:

Subtitle: Drainage Areas South of 202
Subarea : Hills

COVER DESCRIPTION		Hydrologic Soil Group A	B	C	D
		Acres (CN)			
FULLY DEVELOPED URBAN AREAS (Veg Estab.)					
Open space (Lawns,parks etc.)					
Good condition; grass cover > 75%		-	-	-	.55(80)
Streets and roads					
Paved; open ditches (w/right-of-way)		-	-	-	1.65(93)
Residential districts (by average lot size)	Avg % imperv				
1/2 acre	25	-	-	-	28.1(85)
OTHER AGRICULTURAL LANDS					
Woods	good	-	-	-	167.(77)
Total Area (by Hydrologic Soil Group)					
197.					

====

SUBAREA: Hills TOTAL DRAINAGE AREA: 197.3 Acres WEIGHTED CURVE NUMBER:78

TR-55 CURVE NUMBER COMPUTATION

VERSION 1.11
Project : Solutia - North Side Hydrology User: tbf Date: 12-06-97
County : Calhoun State: Al Checked: ____ Date: _____
Subtitle: Drainage Areas South of 202
Subarea : S202

COVER DESCRIPTION		Hydrologic Soil Group A	B	C	D
		Acres (CN)			
FULLY DEVELOPED URBAN AREAS (Veg Estab.)					
Streets and roads					
Paved; open ditches (w/right-of-way)		-	-	-	.21(93)
Residential districts (by average lot size)	Avg % imperv				
1/2 acre	25	-	-	-	2.94(85)
OTHER AGRICULTURAL LANDS					
Woods	good	-	-	-	2.02(77)
Total Area (by Hydrologic Soil Group)					
5.17					

====

SUBAREA: S202 TOTAL DRAINAGE AREA: 5.17 Acres WEIGHTED CURVE NUMBER:82

TR-55 Tc and Tt THRU SUBAREA COMPUTATION

VERSION 1.11

Project : Solutia - North Side Hydrology User: tbf Date: 12-06-97

County : Calhoun State: Al Checked: ____ Date:

Subtitle: Drainage Areas South of 202

---------- Subarea #1 - Hills ----------

Flow Type	2 year rain	Length (ft)	Slope (ft/ft)	Surface code	n	Area (sq/ft)	Wp (ft)	Velocity (ft/sec)	Time (hr)
Sheet	4	150	.25	i					0.281
Shallow Concent'd		900	.25	u					0.031
Open Channel		4300						5	0.239

Time of Concentration = 0.55*

=====

---------- Subarea #2 - S202 ----------

Flow Type	2 year rain	Length (ft)	Slope (ft/ft)	Surface code	n	Area (sq/ft)	Wp (ft)	Velocity (ft/sec)	Time (hr)
Sheet	4	100	.08	i					0.320
Shallow Concent'd		650	.12	u					0.032

Time of Concentration = 0.35*

=====

--- Sheet Flow Surface Codes ---

A Smooth Surface
B Fallow (No Res.)
C Cultivated < 20 % Res.
D Cultivated > 20 % Res.
E Grass-Range, Short
F Grass, Dense
G Grass, Burmuda
H Woods, Light
I Woods, Dense

--- Shallow Concentrated --- Surface Codes ---

P Paved
U Unpaved

* - Generated for use by TABULAR method

TR-55 TABULAR DISCHARGE METHOD

VERSION 1.11
Project : Solutia - North Side Hydrology User: tbf Date: 12-06-97
County : Calhoun State: Al Checked: ____ Date:

Subtitle: Drainage Areas South of 202

Total watershed area: 0.316 sq mi Rainfall type: II Frequency: 10 years

	Subareas	
	Hills	S202
Area(sq mi)	0.31*	0.01*
Rainfall(in)	6.0	6.0
Curve number	78*	82*
Runoff(in)	3.58	3.99
Tc (hrs)	0.55*	0.35*
(Used)	0.50	0.30
TimeToOutlet	0.00	0.00
Ia/P	0.09	0.07
(Used)	0.10	0.10

Time	Total	Subarea Contribution to Total Flow (cfs)	
(hr)	Flow	Hills	S202
11.0	20	19	1
11.3	26	25	1
11.6	36	35	1
11.9	67	63	4
12.0	112	104	8
12.1	202	188	14
12.2	362	340	22P
12.3	537	515	22
12.4	599P	584P	15
12.5	568	559	9
12.6	450	444	6
12.7	333	328	5
12.8	253	249	4
13.0	157	154	3
13.2	108	106	2
13.4	84	82	2
13.6	69	67	2
13.8	59	58	1
14.0	53	52	1
14.3	46	45	1
14.6	41	40	1
15.0	36	35	1
15.5	33	32	1
16.0	30	29	1
16.5	26	25	1
17.0	24	23	1
17.5	23	22	1
18.0	22	21	1
19.0	19	18	1
20.0	15	15	0

22.0	13	13	0
26.0	0	0	0

P - Peak Flow * - value(s) provided from TR-55 system routines

TR-55 TABULAR DISCHARGE METHOD

VERSION 1.11
Project : Solutia - North Side Hydrology User: tbf Date: 12-06-97
County : Calhoun State: Al Checked: ____ Date:

Subtitle: Drainage Areas South of 202

Total watershed area: 0.316 sq mi Rainfall type: II Frequency: 100 years

	Subareas	
	Hills	S202
Area(sq mi)	0.31*	0.01*
Rainfall(in)	8.0	8.0
Curve number	78*	82*
Runoff(in)	5.39	5.86
Tc (hrs)	0.55*	0.35*
(Used)	0.50	0.30
TimeToOutlet	0.00	0.00
Ia/P	0.07	0.05
(Used)	0.10	0.10

Time	Total	Subarea Contribution to Total Flow (cfs)	
(hr)	Flow	Hills	S202
11.0	29	28	1
11.3	39	38	1
11.6	55	53	2
11.9	101	95	6
12.0	167	156	11
12.1	304	283	21
12.2	544	512	32P
12.3	808	776	32
12.4	901P	879P	22
12.5	856	843	13
12.6	677	668	9
12.7	501	494	7
12.8	381	376	5
13.0	237	233	4
13.2	163	160	3
13.4	126	123	3
13.6	103	101	2
13.8	90	88	2
14.0	80	78	2
14.3	70	68	2
14.6	62	60	2
15.0	54	53	1
15.5	49	48	1
16.0	44	43	1
16.5	39	38	1
17.0	36	35	1
17.5	34	33	1
18.0	33	32	1
19.0	28	27	1
20.0	24	23	1

22.0	21	20	1
26.0	0	0	0

P - Peak Flow * - value(s) provided from TR-55 system routines

TR-55

AREA 2

Drainage from 202 +
South portion of West End Landfill
(ending @ dual 48" culverts)

TR-55 CURVE NUMBER COMPUTATION

VERSION 1.11
Project : Solutia North Side Hydrology User: tbf Date: 12-06-97
County : Calhoun State: Al Checked: ____ Date: _____
Subtitle: Drainage from 202 and South portion of West End Landfill
Subarea : R/202

COVER DESCRIPTION	Hydrologic Soil Group A	B	C	D
	Acres (CN)			
FULLY DEVELOPED URBAN AREAS (Veg Estab.)				
Open space (Lawns,parks etc.)				
Good condition; grass cover > 75%	-	-	-	.6(80)
Streets and roads				
Paved; open ditches (w/right-of-way)	-	-	-	.46(93)

Total Area (by Hydrologic Soil Group)
1.06

====

SUBAREA: R/202 TOTAL DRAINAGE AREA: 1.06 Acres WEIGHTED CURVE NUMBER:86

TR-55 CURVE NUMBER COMPUTATION

VERSION 1.11
Project : Solutia North Side Hydrology User: tbf Date: 12-06-97
County : Calhoun State: Al Checked: ____ Date: _____
Subtitle: Drainage from 202 and South portion of West End Landfill
Subarea : WEL

COVER DESCRIPTION	Hydrologic Soil Group A	B	C	D
	Acres (CN)			
FULLY DEVELOPED URBAN AREAS (Veg Estab.)				
Open space (Lawns,parks etc.)				
Fair condition; grass cover 50% to 75%	-	-	-	6.34(84)
Streets and roads				
Paved; open ditches (w/right-of-way)	-	-	-	.26(93)

Total Area (by Hydrologic Soil Group)
6.6

====

SUBAREA: WEL TOTAL DRAINAGE AREA: 6.6 Acres WEIGHTED CURVE NUMBER:84

TR-55 Tc and Tt THRU SUBAREA COMPUTATION

VERSION 1.11
Project : Solutia North Side Hydrology User: tbf Date: 12-06-97
County : Calhoun State: Al Checked: ____ Date:

Subtitle: Drainage from 202 and South portion of West End Landfill

---------- Subarea #1 - R/202 ----------

Flow Type	2 year rain	Length (ft)	Slope (ft/ft)	Surface code	n	Area (sq/ft)	Wp (ft)	Velocity (ft/sec)	Time (hr)
Sheet	4	30	.02	a					0.007
Shallow Concent'd		240	.02	u					0.029
Open Channel		100						5	0.006

Time of Concentration = 0.04*

=====

---------- Subarea #2 - WEL ----------

Flow Type	2 year rain	Length (ft)	Slope (ft/ft)	Surface code	n	Area (sq/ft)	Wp (ft)	Velocity (ft/sec)	Time (hr)
Sheet	4	150	.02	f					0.294
Sheet		40	.33	f					0.033
Open Channel		550						5	0.031

Time of Concentration = 0.36*

=====

--- Sheet Flow Surface Codes ---

A Smooth Surface
B Fallow (No Res.)
C Cultivated < 20 % Res.
D Cultivated > 20 % Res.
E Grass-Range, Short
F Grass, Dense
G Grass, Burmuda
H Woods, Light
I Woods, Dense

--- Shallow Concentrated --- Surface Codes ---

P Paved
U Unpaved

* - Generated for use by TABULAR method

TR-55 TABULAR DISCHARGE METHOD

VERSION 1.11
Project : Solutia North Side Hydrology User: tbf Date: 12-06-97
County : Calhoun State: Al Checked: ____ Date:

Subtitle: Drainage from 202 and South portion of West End Landfill

Total watershed area: 0.012 sq mi Rainfall type: II Frequency: 10 years

---------- Subareas ----------

	R/202	WEL
Area(sq mi)	0.00*	0.01*
Rainfall(in)	6.0	6.0
Curve number	86*	84*
Runoff(in)	4.41	4.20
Tc (hrs)	0.04*	0.36*
(Used)	0.10	0.40
TimeToOutlet	0.00	0.00
Ia/P	0.05	0.06
(Used)	0.10	0.10

Time (hr)	Total Flow	Subarea Contribution to Total Flow (cfs) R/202	WEL
11.0	1	0	1
11.3	1	0	1
11.6	2	0	2
11.9	5	2	3
12.0	11	5	6
12.1	19	7P	12
12.2	25	5	20
12.3	28P	2	26P
12.4	26	1	25
12.5	20	1	19
12.6	14	1	13
12.7	10	1	9
12.8	8	1	7
13.0	5	0	5
13.2	3	0	3
13.4	3	0	3
13.6	2	0	2
13.8	2	0	2
14.0	2	0	2
14.3	2	0	2
14.6	1	0	1
15.0	1	0	1
15.5	1	0	1
16.0	1	0	1
16.5	1	0	1
17.0	1	0	1
17.5	1	0	1
18.0	1	0	1
19.0	1	0	1
20.0	1	0	1

22.0	1	0	1
26.0	0	0	0

P - Peak Flow * - value(s) provided from TR-55 system routines

TR-55 TABULAR DISCHARGE METHOD

VERSION 1.11
Project : Solutia North Side Hydrology User: tbf Date: 12-06-97
County : Calhoun State: Al Checked: ____ Date:

Subtitle: Drainage from 202 and South portion of West End Landfill

Total watershed area: 0.012 sq mi Rainfall type: II Frequency: 100 years

---------- Subareas ----------

	R/202	WEL
Area(sq mi)	0.00*	0.01*
Rainfall(in)	8.0	8.0
Curve number	86*	84*
Runoff(in)	6.33	6.10
Tc (hrs)	0.04*	0.36*
(Used)	0.10	0.40
TimeToOutlet	0.00	0.00
Ia/P	0.04	0.05
(Used)	0.10	0.10

Time (hr)	Total Flow	Subarea Contribution to Total Flow (cfs) R/202	WEL
11.0	1	0	1
11.3	2	0	2
11.6	3	1	2
11.9	9	4	5
12.0	16	7	9
12.1	28	11P	17
12.2	36	7	29
12.3	39P	2	37P
12.4	38	2	36
12.5	28	1	27
12.6	20	1	19
12.7	15	1	14
12.8	11	1	10
13.0	8	1	7
13.2	6	1	5
13.4	5	1	4
13.6	3	0	3
13.8	3	0	3
14.0	3	0	3
14.3	2	0	2
14.6	2	0	2
15.0	2	0	2
15.5	2	0	2
16.0	2	0	2
16.5	1	0	1
17.0	1	0	1
17.5	1	0	1
18.0	1	0	1
19.0	1	0	1
20.0	1	0	1

22.0	1	0	1
26.0	0	0	0

P - Peak Flow * - value(s) provided from TR-55 system routines

TR-55 AREA 3

Solutia Plant (West portion)
+
North portion of West End Landfill
and adjacent West areas.

TR-55 CURVE NUMBER COMPUTATION

VERSION 1.11
Project : Solutia North Side Hydrology User: tbf Date: 12-06-97
County : Calhoun State: AL Checked: ____ Date: ____
Subtitle: Plant and North portion of West End Landfill and west areas
Subarea : WPLT

COVER DESCRIPTION	Hydrologic Soil Group A	B	C	D
	Acres (CN)			
FULLY DEVELOPED URBAN AREAS (Veg Estab.)				
Open space (Lawns,parks etc.)				
Fair condition; grass cover 50% to 75%	-	-	-	13.(84)
Impervious Areas				
Paved parking lots, roofs, driveways	-	-	-	4.18(98)
Streets and roads				
Paved; open ditches (w/right-of-way)	-	-	-	.82(93)
Urban Districts Avg % imperv				
Industrial 72	-	-	20.7(91)	-
Residential districts Avg % imperv				
(by average lot size)				
1/2 acre 25	-	-	5.44(80)	-
Total Area (by Hydrologic Soil Group)			26.1	18
			====	====

SUBAREA: WPLT TOTAL DRAINAGE AREA: 44.14 Acres WEIGHTED CURVE NUMBER:88

TR-55 Tc and Tt THRU SUBAREA COMPUTATION

VERSION 1.11
Project : Solutia North Side Hydrology User: tbf Date: 12-06-97
County : Calhoun State: AL Checked: ____ Date: ____

Subtitle: Plant and North portion of West End Landfill and west areas

---------- Subarea #1 - WPLT ----------

Flow Type	2 year rain	Length (ft)	Slope (ft/ft)	Surface code	n	Area (sq/ft)	Wp (ft)	Velocity (ft/sec)	Time (hr)
Sheet	4	150	.02	e					0.191
Sheet		40	.33	e					0.022
Open Channel		1950						5	0.108

Time of Concentration = 0.32*

=====

--- Sheet Flow Surface Codes ---

A Smooth Surface	F Grass, Dense	--- Shallow Concentrated ---	
B Fallow (No Res.)	G Grass, Burmuda	---	Surface Codes ---
C Cultivated < 20 % Res.	H Woods, Light		P Paved
D Cultivated > 20 % Res.	I Woods, Dense		U Unpaved
E Grass-Range, Short			

* - Generated for use by TABULAR method

TR-55 TABULAR DISCHARGE METHOD

VERSION 1.11
Project : Solutia North Side Hydrology User: tbf Date: 12-06-97
County : Calhoun State: AL Checked: ____ Date:

Subtitle: Plant and North portion of West End Landfill and west areas

Total watershed area: 0.069 sq mi Rainfall type: II Frequency: 10 years

---------- Subareas ----------

	WPLT
Area(sq mi)	0.07*
Rainfall(in)	6.0
Curve number	88*
Runoff(in)	4.63
Tc (hrs)	0.32*
(Used)	0.30
TimeToOutlet	0.00
Ia/P	0.05
(Used)	0.10

Time (hr)	Total Flow	Subarea Contribution to Total Flow (cfs) WPLT
11.0	6	6
11.3	9	9
11.6	13	13
11.9	38	38
12.0	75	75
12.1	143	143
12.2	216P	216P
12.3	216	216
12.4	146	146
12.5	90	90
12.6	63	63
12.7	47	47
12.8	36	36
13.0	26	26
13.2	21	21
13.4	18	18
13.6	16	16
13.8	15	15
14.0	13	13
14.3	12	12
14.6	11	11
15.0	10	10
15.5	9	9
16.0	8	8
16.5	7	7
17.0	6	6
17.5	6	6
18.0	6	6
19.0	5	5
20.0	4	4

22.0	4	4
26.0	0	0

P - Peak Flow * - value(s) provided from TR-55 system routines

TR-55 TABULAR DISCHARGE METHOD

VERSION 1.11
Project : Solutia North Side Hydrology User: tbf Date: 12-06-97
County : Calhoun State: AL Checked: ____ Date: ____

Subtitle: Plant and North portion of West End Landfill and west areas

Total watershed area: 0.069 sq mi Rainfall type: II Frequency: 100 years

---------- Subareas ----------

	WPLT
Area(sq mi)	0.07*
Rainfall(in)	8.0
Curve number	88*
Runoff(in)	6.57
Tc (hrs)	0.32*
(Used)	0.30
TimeToOutlet	0.00
Ia/P	0.03
(Used)	0.10

Time (hr)	Total Flow	Subarea Contribution to Total Flow (cfs) WPLT
11.0	9	9
11.3	13	13
11.6	19	19
11.9	53	53
12.0	106	106
12.1	202	202
12.2	306P	306P
12.3	306	306
12.4	208	208
12.5	128	128
12.6	89	89
12.7	66	66
12.8	52	52
13.0	36	36
13.2	30	30
13.4	26	26
13.6	23	23
13.8	21	21
14.0	19	19
14.3	17	17
14.6	15	15
15.0	14	14
15.5	13	13
16.0	11	11
16.5	10	10
17.0	9	9
17.5	9	9
18.0	8	8
19.0	7	7
20.0	6	6

22.0	5	5
26.0	0	0

P - Peak Flow * - value(s) provided from TR-55 system routines

TR. 55

AREA 4

AReas North of
Rail Road TRacks
including Closure site.

TR-55 CURVE NUMBER COMPUTATION

VERSION 1.11
Project : Solutia North Side Drainage User: tbf Date: 12-06-97
County : Calhoun State: Al Checked: ____ Date:

Subtitle: Drainage From areas north of railroad including closure site
Subarea : RRND

COVER DESCRIPTION	Hydrologic Soil Group A	B	C	D
	Acres (CN)			
FULLY DEVELOPED URBAN AREAS (Veg Estab.)				
Streets and roads				
Gravel (w/ right-of-way)	-	-	.92(89)	-
OTHER AGRICULTURAL LANDS				
Brush - brush, weed, grass mix fair	-	-	1.19(70)	-
Total Area (by Hydrologic Soil Group)			2.11	

SUBAREA: RRND TOTAL DRAINAGE AREA: 2.11 Acres WEIGHTED CURVE NUMBER:78

TR-55 CURVE NUMBER COMPUTATION

VERSION 1.11
Project : Solutia North Side Drainage User: tbf Date: 12-06-97
County : Calhoun State: Al Checked: ____ Date: _____
Subtitle: Drainage From areas north of railroad including closure site
Subarea : W1

COVER DESCRIPTION	Hydrologic Soil Group A	B	C	D
	Acres (CN)			
FULLY DEVELOPED URBAN AREAS (Veg Estab.)				
Open space (Lawns,parks etc.)				
Fair condition; grass cover 50% to 75%	-	-	5.91(79)	-
Total Area (by Hydrologic Soil Group)			5.91	

SUBAREA: W1 TOTAL DRAINAGE AREA: 5.91 Acres WEIGHTED CURVE NUMBER:79

TR-55 CURVE NUMBER COMPUTATION

VERSION 1.11
Project : Solutia North Side Drainage User: tbf Date: 12-06-97
County : Calhoun State: Al Checked: ____ Date: _____
Subtitle: Drainage From areas north of railroad including closure site
Subarea : W2

COVER DESCRIPTION	Avg % imperv	Hydrologic Soil Group A	B	C	D
		Acres (CN)			
FULLY DEVELOPED URBAN AREAS (Veg Estab.)					
Streets and roads					
Paved; open ditches (w/right-of-way)		-	-	.05(92)	-
Residential districts (by average lot size)	Avg % imperv				
1/2 acre	25	-	-	1.02(80)	-
Total Area (by Hydrologic Soil Group)				1.07	

SUBAREA: W2 TOTAL DRAINAGE AREA: 1.07 Acres WEIGHTED CURVE NUMBER:81

TR-55 CURVE NUMBER COMPUTATION

VERSION 1.11
Project : Solutia North Side Drainage User: tbf Date: 12-06-97
County : Calhoun State: Al Checked: ____ Date: _____
Subtitle: Drainage From areas north of railroad including closure site
Subarea : W3

COVER DESCRIPTION	Avg % imperv	Hydrologic Soil Group A	B	C	D
		Acres (CN)			
FULLY DEVELOPED URBAN AREAS (Veg Estab.)					
Streets and roads					
Paved; open ditches (w/right-of-way)		-	-	.05(92)	-
Residential districts (by average lot size)	Avg % imperv				
1/2 acre	25	-	-	2.27(80)	-
Total Area (by Hydrologic Soil Group)				2.32	

SUBAREA: W3 TOTAL DRAINAGE AREA: 2.32 Acres WEIGHTED CURVE NUMBER:80

TR-55 CURVE NUMBER COMPUTATION

VERSION 1.11
Project : Solutia North Side Drainage User: tbf Date: 12-06-97
County : Calhoun State: Al Checked: ____ Date: ____
Subtitle: Drainage From areas north of railroad including closure site
Subarea : W4

Group COVER DESCRIPTION		Hydrologic Soil A	B	C	D
		Acres (CN)			
FULLY DEVELOPED URBAN AREAS (Veg Estab.)					
Streets and roads					
Paved; open ditches (w/right-of-way)		-	-	.02(92)	-
Residential districts (by average lot size)	Avg % imperv				
1/2 acre	25	-	-	.73(80)	-
Total Area (by Hydrologic Soil Group)				.75	

SUBAREA: W4 TOTAL DRAINAGE AREA: .75 Acres WEIGHTED CURVE NUMBER:80

TR-55 CURVE NUMBER COMPUTATION

VERSION 1.11
Project : Solutia North Side Drainage User: tbf Date: 12-06-97
County : Calhoun State: Al Checked: ____ Date: _____
Subtitle: Drainage From areas north of railroad including closure site
Subarea : E1

COVER DESCRIPTION	Hydrologic Soil Group A	B	C	D
	Acres (CN)			
FULLY DEVELOPED URBAN AREAS (Veg Estab.)				
Impervious Areas				
Paved parking lots, roofs, driveways	-	-	.09(98)	-
Streets and roads				
Paved; open ditches (w/right-of-way)	-	-	.28(92)	-
Urban Districts Avg % imperv				
Industrial 72	-	-	1.47(91)	-
Residential districts Avg % imperv				
(by average lot size)				
1/2 acre 25	-	-	.02(80)	-
Total Area (by Hydrologic Soil Group)			1.86	

SUBAREA: E1 TOTAL DRAINAGE AREA: 1.86 Acres WEIGHTED CURVE NUMBER:91

TR-55 CURVE NUMBER COMPUTATION

VERSION 1.11
Project : Solutia North Side Drainage User: tbf Date: 12-06-97
County : Calhoun State: Al Checked: ____ Date: _____
Subtitle: Drainage From areas north of railroad including closure site
Subarea : NSA

COVER DESCRIPTION	Hydrologic Soil Group A	B	C	D
	Acres (CN)			
FULLY DEVELOPED URBAN AREAS (Veg Estab.)				
Open space (Lawns,parks etc.)				
Fair condition; grass cover 50% to 75%	-	-	-	6.8(84)
Streets and roads				
Paved; open ditches (w/right-of-way)	-	-	.18(92)	.18(93)
Total Area (by Hydrologic Soil Group)			.18	6.98

SUBAREA: NSA TOTAL DRAINAGE AREA: 7.16 Acres WEIGHTED CURVE NUMBER:84

TR-55 Tc and Tt THRU SUBAREA COMPUTATION

VERSION 1.11

Project : Solutia North Side Drainage User: tbf Date: 12-06-97

County : Calhoun State: Al Checked: ____ Date: ____

Subtitle: Drainage From areas north of railroad including closure site

---------- Subarea #1 - RRND ----------

Flow Type	2 year rain	Length (ft)	Slope (ft/ft)	Surface code	n	Area (sq/ft)	Wp (ft)	Velocity (ft/sec)	Time (hr)
Sheet	4	20	.33	a					0.002
Open Channel		1500					5		0.083

Time of Concentration = 0.08*

=====

---------- Subarea #2 - W1 ----------

Flow Type	2 year rain	Length (ft)	Slope (ft/ft)	Surface code	n	Area (sq/ft)	Wp (ft)	Velocity (ft/sec)	Time (hr)
Sheet	4	150	.005	f					0.512
Shallow Concent'd		850	.01	u					0.146

Time of Concentration = 0.66*

=====

---------- Subarea #3 - W2 ----------

Flow Type	2 year rain	Length (ft)	Slope (ft/ft)	Surface code	n	Area (sq/ft)	Wp (ft)	Velocity (ft/sec)	Time (hr)
Sheet	4	150	.005	e					0.333
Shallow Concent'd		150	.005	u					0.037

Time of Concentration = 0.37*

=====

---------- Subarea #4 - W3 ----------

Flow Type 2 year Length Slope Surface n Area Wp
Velocity Time
rain (ft) (ft/ft) code (sq/ft) (ft)
(ft/sec) (hr)

Sheet 4 200 .03 e
0.205
Shallow Concent'd 200 .005 u
0.049
Time of Concentration =
0.25*

=====

---------- Subarea #5 - W4 ----------

Flow Type 2 year Length Slope Surface n Area Wp
Velocity Time
rain (ft) (ft/ft) code (sq/ft) (ft)
(ft/sec) (hr)

Sheet 4 200 .02 e
0.241
Time of Concentration =
0.24*

=====

* - Generated for use by TABULAR method

TR-55 Tc and Tt THRU SUBAREA COMPUTATION

VERSION 1.11

Project : Solutia North Side Drainage User: tbf Date: 12-06-97

County : Calhoun State: Al Checked: ____ Date: ____

Subtitle: Drainage From areas north of railroad including closure site

---------- Subarea #6 - E1 ----------

Flow Type	2 year rain	Length (ft)	Slope (ft/ft)	Surface code	n	Area (sq/ft)	Wp (ft)	Velocity (ft/sec)	Time (hr)
Sheet	4	100	.02	a					0.018
							Time of Concentration =		0.02*

=====

---------- Subarea #7 - NSA ----------

Flow Type	2 year rain	Length (ft)	Slope (ft/ft)	Surface code	n	Area (sq/ft)	Wp (ft)	Velocity (ft/sec)	Time (hr)
Sheet	4	150	.02	e					0.191
Open Channel		1100						5	0.061
							Time of Concentration =		0.25*

=====

--- Sheet Flow Surface Codes ---

A Smooth Surface
B Fallow (No Res.)
C Cultivated < 20 % Res.
D Cultivated > 20 % Res.
E Grass-Range, Short
F Grass, Dense
G Grass, Burmuda
H Woods, Light
I Woods, Dense

--- Shallow Concentrated ---

--- Surface Codes ---

P Paved
U Unpaved

* - Generated for use by TABULAR method

TR-55 TABULAR DISCHARGE METHOD

VERSION 1.11
Project : Solutia North Side Drainage User: ybf Date: 12-06-97
County : Calhoun State: Al Checked: ____ Date: ____

Subtitle: Drainage From areas north of railroad including closure site

Total watershed area: 0.033 sq mi Rainfall type: II Frequency: 10 years

	Subareas						
	RRND	W1	W2	W3	W4	E1	NSA
Area(sq mi)	0.00*	0.01*	0.00*	0.00*	0.00*	0.00*	0.01*
Rainfall(in)	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Curve number	78*	79*	81*	80*	80*	91*	84*
Runoff(in)	3.58	3.68	3.88	3.78	3.78	4.96	4.20
Tc (hrs)	0.08*	0.66*	0.37*	0.25*	0.24*	0.02*	0.25*
(Used)	0.10	0.75	0.40	0.20	0.20	0.10	0.20
TimeToOutlet	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Ia/P	0.09	0.09	0.08	0.08	0.08	0.03	0.06
(Used)	0.10	0.10	0.10	0.10	0.10	0.10	0.10

Time	Total	Subarea Contribution to Total Flow (cfs)						
(hr)	Flow	RRND	W1	W2	W3	W4	E1	NSA
11.0	1	0	0	0	0	0	0	1
11.3	2	0	1	0	0	0	0	1
11.6	6	1	1	0	1	0	1	2
11.9	24	4	1	0	3	1	5	10
12.0	47	8	2	1	6	2	9	19
12.1	79P	12P	2	2	10	3	15P	35
12.2	76	7	4	3	11P	4P	9	38P
12.3	49	3	7	4P	7	2	3	23
12.4	34	2	10	4	3	1	2	12
12.5	30	1	13	3	2	1	2	8
12.6	27	1	14P	2	2	1	1	6
12.7	23	1	14	1	1	0	1	5
12.8	21	1	13	1	1	0	1	4
13.0	16	1	9	1	1	0	1	3
13.2	12	1	6	0	1	0	1	3
13.4	10	1	4	0	1	0	1	3
13.6	8	1	3	0	1	0	1	2
13.8	7	0	3	0	1	0	1	2
14.0	6	0	2	0	1	0	1	2
14.3	4	0	2	0	0	0	0	2
14.6	3	0	1	0	0	0	0	2
15.0	2	0	1	0	0	0	0	1
15.5	2	0	1	0	0	0	0	1
16.0	2	0	1	0	0	0	0	1
16.5	2	0	1	0	0	0	0	1
17.0	2	0	1	0	0	0	0	1
17.5	2	0	1	0	0	0	0	1
18.0	2	0	1	0	0	0	0	1
19.0	2	0	1	0	0	0	0	1
20.0	2	0	1	0	0	0	0	1

22.0	1	0	0	0	0	0	0	1
26.0	0	0	0	0	0	0	0	0

P - Peak Flow * - value(s) provided from TR-55 system routines

TR-55 TABULAR DISCHARGE METHOD

VERSION 1.11

Project : Solutia North Side Drainage User: tbf Date: 12-06-97

County : Calhoun State: Al Checked: ____ Date: ____

Subtitle: Drainage From areas north of railroad including closure site

Total watershed area: 0.033 sq mi Rainfall type: II Frequency: 100 years

	Subareas						
	RRND	W1	W2	W3	W4	E1	NSA
Area(sq mi)	0.00*	0.01*	0.00*	0.00*	0.00*	0.00*	0.01*
Rainfall(in)	8.0	8.0	8.0	8.0	8.0	8.0	8.0
Curve number	78*	79*	81*	80*	80*	91*	84*
Runoff(in)	5.39	5.51	5.74	5.63	5.63	6.92	6.10
Tc (hrs)	0.08*	0.66*	0.37*	0.25*	0.24*	0.02*	0.25*
(Used)	0.10	0.75	0.40	0.20	0.20	0.10	0.20
TimeToOutlet	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Ia/P	0.07	0.07	0.06	0.06	0.06	0.02	0.05
(Used)	0.10	0.10	0.10	0.10	0.10	0.10	0.10

Time	Total	Subarea Contribution to Total Flow (cfs)						
(hr)	Flow	RRND	W1	W2	W3	W4	E1	NSA
11.0	3	0	1	0	0	0	0	2
11.3	6	1	1	0	1	0	1	2
11.6	7	1	1	0	1	0	1	3
11.9	35	6	2	1	4	1	7	14
12.0	65	11	2	1	8	3	13	27
12.1	114P	18P	3	3	15	5P	20P	50
12.2	110	11	6	4	16P	5	13	55P
12.3	70	4	10	6P	10	3	4	33
12.4	51	3	15	6	5	2	3	17
12.5	42	2	19	4	3	1	2	11
12.6	42	2	22P	3	3	1	2	9
12.7	37	2	21	2	2	1	2	7
12.8	33	1	19	2	2	1	2	6
13.0	22	1	13	1	1	0	1	5
13.2	17	1	9	1	1	0	1	4
13.4	14	1	6	1	1	0	1	4
13.6	12	1	5	1	1	0	1	3
13.8	10	1	4	0	1	0	1	3
14.0	9	1	3	0	1	0	1	3
14.3	7	1	2	0	1	0	1	2
14.6	7	1	2	0	1	0	1	2
15.0	7	1	2	0	1	0	1	2
15.5	6	0	2	0	1	0	1	2
16.0	3	0	1	0	0	0	0	2
16.5	2	0	1	0	0	0	0	1
17.0	2	0	1	0	0	0	0	1
17.5	2	0	1	0	0	0	0	1
18.0	2	0	1	0	0	0	0	1
19.0	2	0	1	0	0	0	0	1
20.0	2	0	1	0	0	0	0	1

22.0	2	0	1	0	0	0	0	1
26.0	0	0	0	0	0	0	0	0

P - Peak Flow * - value(s) provided from TR-55 system routines

□ o o o o o o o

Reservoir Routing / RK4 analysis

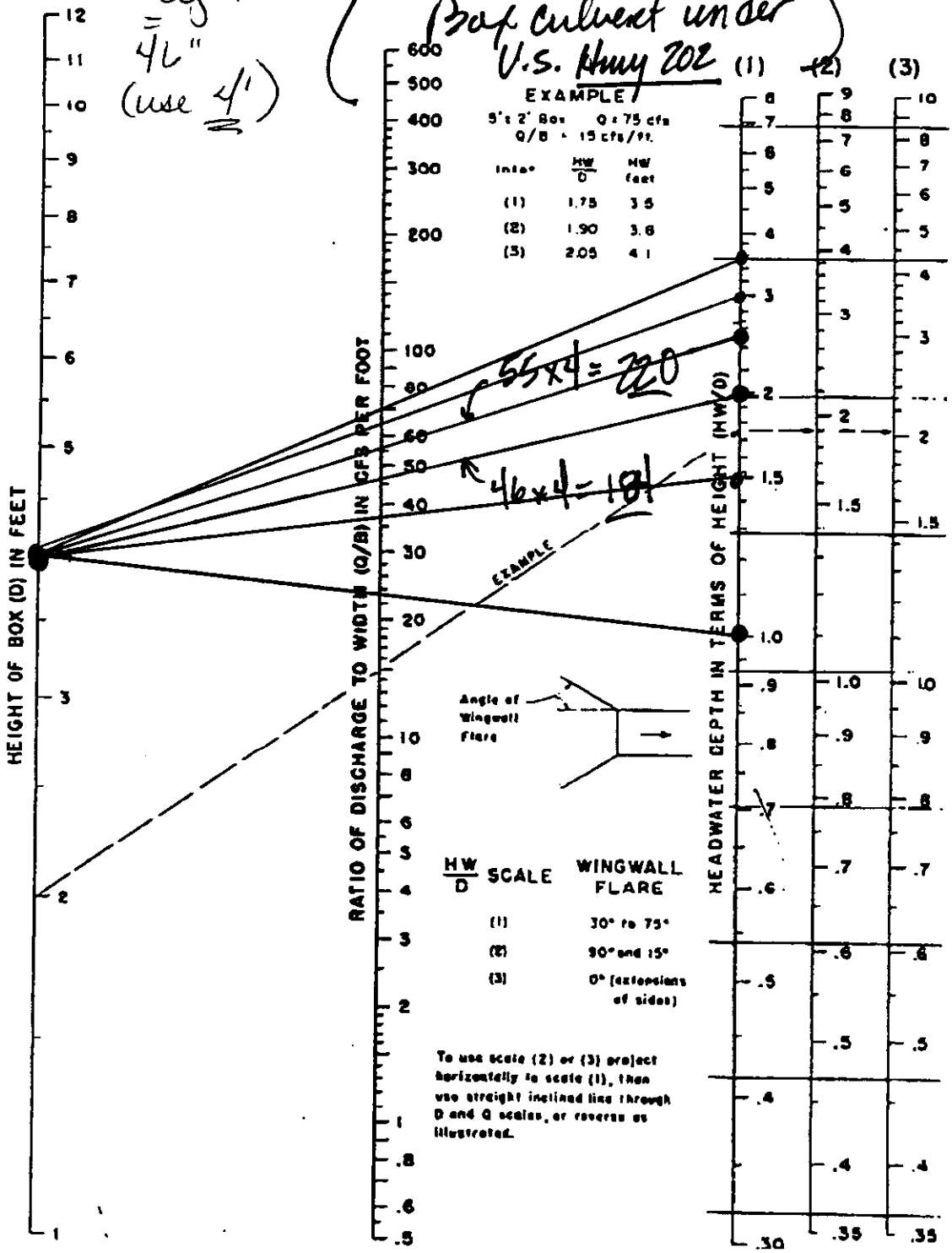
4' x 4' Box Culvert

(100-yr, 24 hr)
Storm

5)

{4'x4' Concrete Box culvert under U.S. Hwy 202

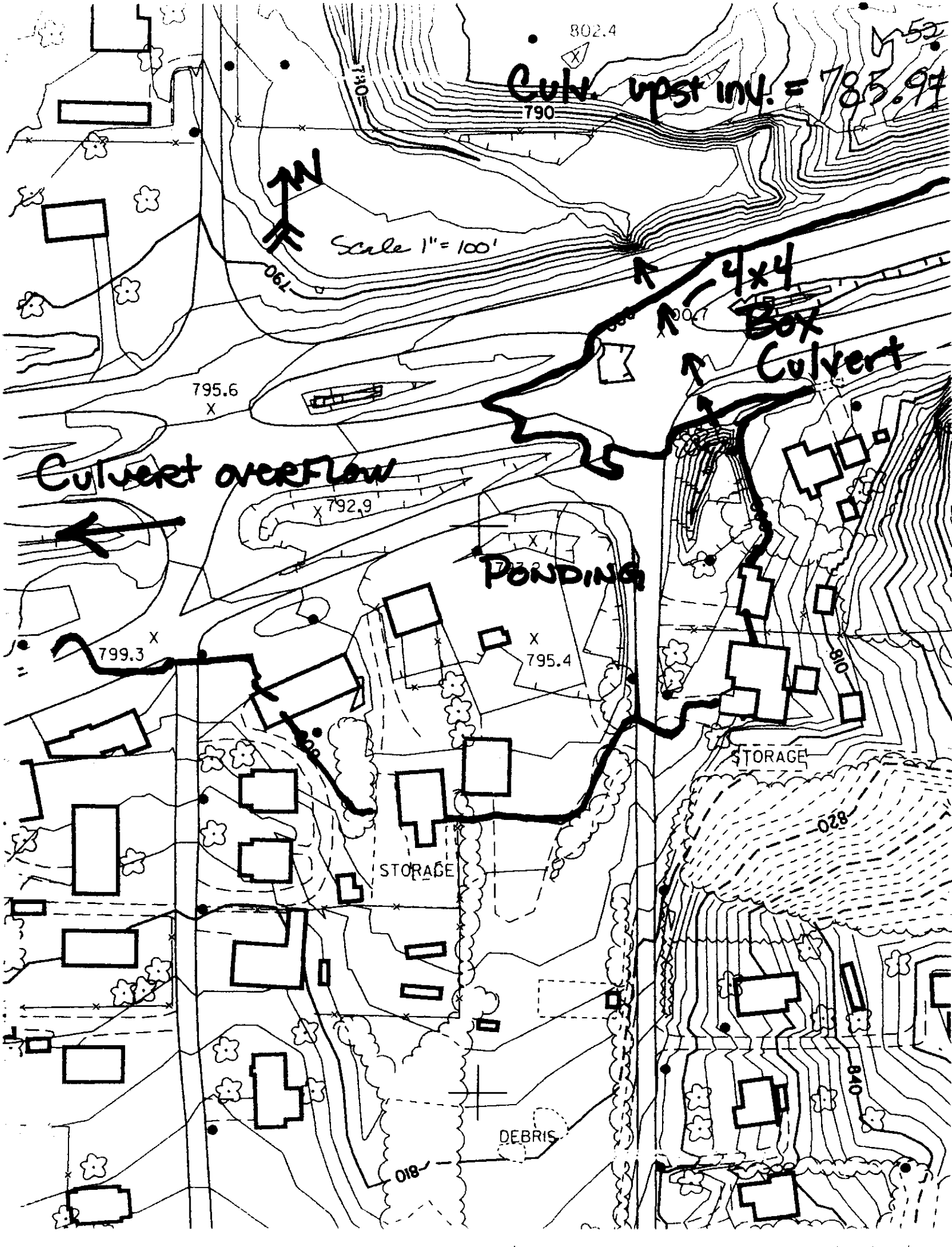
length = 46" (use 4')



BUREAU OF PUBLIC ROADS JAN. 1963

HEADWATER DEPTH FOR BOX CULVERTS WITH INLET CONTROL

CHART 7 - 14


802.4
Culv. upst inv. = 785.97
790
N
Scale 1" = 100'
4x4
Box
Culvert
795.6
Culvert overflow
792.9
PONDING
799.3
795.4
STORAGE
STORAGE
DEBRIS

Stage / Area relationship for
4' x 4' box culvert

Stage (ft)	Area (acres)
0	.1
2	.125
4	.15
6	.2
8	1.0
10	2.0
12	2.5
14	3.0

Stage Discharge Relationship for 4' x 4' box culvert. Note that Road overflow occurs after stage reaches 13 ft. approx.

Stage (ft)	Discharge (cfs)
0	0
4	96
6	148
8	184
10	220
12	256
14	1000

Inflow hydrograph
(into box culvert)

Time (hrs)	Inflow (cfs)
11	29
11.3	39
11.6	55
11.9	101
12.0	167
12.1	304
12.2	544
12.3	808
12.4	901
12.5	856
12.6	677
12.7	501
12.8	381
13.0	237
13.2	163
13.4	126
13.6	103
13.8	90
14.0	80
14.3	70
14.6	62
15.0	54
15.5	49
16.0	44
16.5	39
17.0	36
17.5	34
18.0	33
19.0	28
20.0	24
22.0	21
26.0	0

RESERVOIR ROUTING

FOURTH-ORDER RUNGE-KUTTA METHODS

GOLDER ASSOCIATES INC.
3730 CHAMBLEE-TUCKER ROAD
ATLANTA, GEORGIA 30341

PROJECT TITLE Solutia - North Side Drainag JOB NUMBER 943-3680

CODED BY tbf DATE 12/06/97

100-yr Storm / 4 x 4 box routing

TIME (min)	INFLOW (cfs)	HEAD (ft)	AREA (Acres)	dH (ft)	OUTFLOW (cfs)
.0	29.00	.00	.1	.00	.00
1.0	29.56	.34	.1	.34	8.09
2.0	30.11	.58	.1	.24	13.93
3.0	30.67	.76	.1	.18	18.26
4.0	31.22	.90	.1	.14	21.54
5.0	31.78	1.00	.1	.11	24.09
6.0	32.33	1.09	.1	.08	26.12
7.0	32.89	1.16	.1	.07	27.75
8.0	33.44	1.21	.1	.06	29.11
9.0	34.00	1.26	.1	.05	30.26
10.0	34.56	1.30	.1	.04	31.26
11.0	35.11	1.34	.1	.04	32.15
12.0	35.67	1.37	.1	.03	32.95
13.0	36.22	1.40	.1	.03	33.69
14.0	36.78	1.43	.1	.03	34.38
15.0	37.33	1.46	.1	.03	35.04
16.0	37.89	1.49	.1	.03	35.67
17.0	38.44	1.51	.1	.03	36.28
18.0	39.00	1.54	.1	.02	36.87
19.0	39.89	1.56	.1	.03	37.50
20.0	40.78	1.59	.1	.03	38.19
21.0	41.67	1.62	.1	.03	38.92
22.0	42.56	1.65	.1	.03	39.69
23.0	43.44	1.69	.1	.03	40.49
24.0	44.33	1.72	.1	.03	41.30
25.0	45.22	1.76	.1	.03	42.14
26.0	46.11	1.79	.1	.04	42.98
27.0	47.00	1.83	.1	.04	43.83
28.0	47.89	1.86	.1	.04	44.68
29.0	48.78	1.90	.1	.04	45.55
30.0	49.67	1.93	.1	.04	46.41

31.0	50.56	1.97	.1	.04	47.28
32.0	51.44	2.01	.1	.04	48.15
33.0	52.33	2.04	.1	.04	49.02
34.0	53.22	2.08	.1	.04	49.89
35.0	54.11	2.12	.1	.04	50.77
36.0	55.00	2.15	.1	.04	51.64
37.0	57.56	2.20	.1	.04	52.72
38.0	60.11	2.26	.1	.06	54.12
39.0	62.67	2.32	.1	.07	55.78
40.0	65.22	2.40	.1	.08	57.63
41.0	67.78	2.48	.1	.08	59.63
42.0	70.33	2.57	.1	.09	61.73
43.0	72.89	2.66	.1	.09	63.92
44.0	75.44	2.76	.1	.09	66.18
45.0	78.00	2.85	.1	.10	68.48
46.0	80.56	2.95	.1	.10	70.81
47.0	83.11	3.05	.1	.10	73.18
48.0	85.67	3.15	.1	.10	75.57
49.0	88.22	3.25	.1	.10	77.97
50.0	90.78	3.35	.1	.10	80.39
51.0	93.33	3.45	.1	.10	82.81
52.0	95.89	3.55	.1	.10	85.25
53.0	98.44	3.65	.1	.10	87.68
54.0	101.00	3.76	.1	.10	90.13
55.0	112.00	3.89	.1	.14	93.45
56.0	123.00	4.09	.2	.20	98.42
57.0	134.00	4.33	.2	.24	104.65
58.0	145.00	4.60	.2	.27	111.61
59.0	156.00	4.89	.2	.29	119.09
60.0	167.00	5.19	.2	.30	126.93
61.0	189.83	5.54	.2	.35	136.09
62.0	212.67	5.97	.2	.42	147.13
63.0	235.50	6.35	.3	.38	154.24
64.0	258.33	6.66	.5	.31	159.80
65.0	281.17	6.94	.6	.28	164.93
66.0	304.00	7.21	.7	.27	169.85
67.0	344.00	7.50	.8	.28	174.92
68.0	384.00	7.79	.9	.30	180.30
69.0	424.00	8.10	1.1	.31	185.88
70.0	464.00	8.42	1.2	.31	191.49
71.0	504.00	8.73	1.4	.31	197.07
72.0	544.00	9.04	1.5	.31	202.65
73.0	588.00	9.35	1.7	.31	208.25
74.0	632.00	9.66	1.8	.31	213.90
75.0	676.00	9.98	2.0	.32	219.58
76.0	720.00	10.30	2.1	.32	225.37
77.0	764.00	10.63	2.2	.33	231.39
78.0	808.00	10.98	2.2	.35	237.60
79.0	823.50	11.32	2.3	.35	243.83
80.0	839.00	11.66	2.4	.34	249.94
81.0	854.50	12.00	2.5	.33	255.93
82.0	870.00	12.29	2.6	.30	365.68
83.0	885.50	12.54	2.6	.25	457.14
84.0	901.00	12.75	2.7	.21	533.55
85.0	893.50	12.91	2.7	.17	596.22
86.0	886.00	13.05	2.8	.13	646.17
87.0	878.50	13.16	2.8	.11	685.94
88.0	871.00	13.24	2.8	.08	717.50
89.0	863.50	13.31	2.8	.07	742.37
90.0	856.00	13.36	2.8	.05	761.77

91.0	826.17	13.39	2.8	.03	774.77
92.0	796.33	13.41	2.9	.02	780.70
93.0	766.50	13.41	2.9	.00	780.74
94.0	736.67	13.40	2.8	-.01	775.87
95.0	706.83	13.37	2.8	-.02	766.88
96.0	677.00	13.34	2.8	-.03	754.43
97.0	647.67	13.30	2.8	-.04	739.10
98.0	618.33	13.25	2.8	-.05	721.39
99.0	589.00	13.20	2.8	-.05	701.67
100.0	559.67	13.14	2.8	-.06	680.24
101.0	530.33	13.08	2.8	-.06	657.38
102.0	501.00	13.01	2.8	-.06	633.30
103.0	481.00	12.95	2.7	-.07	609.02
104.0	461.00	12.89	2.7	-.06	585.34
105.0	441.00	12.82	2.7	-.06	562.17
106.0	421.00	12.76	2.7	-.06	539.42
107.0	401.00	12.70	2.7	-.06	517.04
108.0	381.00	12.64	2.7	-.06	494.96
109.0	369.00	12.59	2.6	-.06	473.86
110.0	357.00	12.53	2.6	-.05	454.26
111.0	345.00	12.48	2.6	-.05	435.93
112.0	333.00	12.44	2.6	-.05	418.65
113.0	321.00	12.39	2.6	-.04	402.24
114.0	309.00	12.35	2.6	-.04	386.56
115.0	297.00	12.31	2.6	-.04	371.49
116.0	285.00	12.27	2.6	-.04	356.91
117.0	273.00	12.23	2.6	-.04	342.76
118.0	261.00	12.20	2.5	-.04	328.95
119.0	249.00	12.16	2.5	-.04	315.42
120.0	237.00	12.12	2.5	-.04	302.13
121.0	230.83	12.09	2.5	-.03	289.59
122.0	224.67	12.06	2.5	-.03	278.19
123.0	218.50	12.03	2.5	-.03	267.72
124.0	212.33	12.01	2.5	-.03	258.03
125.0	206.17	11.98	2.5	-.03	255.63
126.0	200.00	11.95	2.5	-.03	255.11
127.0	193.83	11.92	2.5	-.03	254.53
128.0	187.67	11.88	2.5	-.04	253.90
129.0	181.50	11.84	2.5	-.04	253.20
130.0	175.33	11.80	2.5	-.04	252.45
131.0	169.17	11.76	2.4	-.04	251.64
132.0	163.00	11.71	2.4	-.05	250.78
133.0	159.92	11.66	2.4	-.05	249.87
134.0	156.83	11.61	2.4	-.05	248.93
135.0	153.75	11.55	2.4	-.05	247.97
136.0	150.67	11.50	2.4	-.06	246.97
137.0	147.58	11.44	2.4	-.06	245.95
138.0	144.50	11.38	2.3	-.06	244.91
139.0	141.42	11.32	2.3	-.06	243.83
140.0	138.33	11.26	2.3	-.06	242.73
141.0	135.25	11.20	2.3	-.06	241.60
142.0	132.17	11.14	2.3	-.06	240.44
143.0	129.08	11.07	2.3	-.07	239.25
144.0	126.00	11.00	2.3	-.07	238.03
145.0	124.08	10.93	2.2	-.07	236.78
146.0	122.17	10.86	2.2	-.07	235.52
147.0	120.25	10.79	2.2	-.07	234.25
148.0	118.33	10.72	2.2	-.07	232.95
149.0	116.42	10.65	2.2	-.07	231.64
150.0	114.50	10.57	2.1	-.07	230.31

151.0	112.58	10.50	2.1	-.07	228.96
152.0	110.67	10.42	2.1	-.08	227.59
153.0	108.75	10.34	2.1	-.08	226.21
154.0	106.83	10.27	2.1	-.08	224.80
155.0	104.92	10.19	2.0	-.08	223.37
156.0	103.00	10.11	2.0	-.08	221.93
157.0	101.92	10.03	2.0	-.08	220.47
158.0	100.83	9.94	2.0	-.08	219.00
159.0	99.75	9.86	1.9	-.08	217.50
160.0	98.67	9.78	1.9	-.08	215.97
161.0	97.58	9.69	1.8	-.09	214.42
162.0	96.50	9.60	1.8	-.09	212.83
163.0	95.42	9.51	1.8	-.09	211.21
164.0	94.33	9.42	1.7	-.09	209.56
165.0	93.25	9.33	1.7	-.09	207.87
166.0	92.17	9.23	1.6	-.10	206.14
167.0	91.08	9.13	1.6	-.10	204.37
168.0	90.00	9.03	1.5	-.10	202.55
169.0	89.17	8.93	1.5	-.10	200.69
170.0	88.33	8.82	1.4	-.11	198.77
171.0	87.50	8.71	1.4	-.11	196.80
172.0	86.67	8.60	1.3	-.11	194.77
173.0	85.83	8.48	1.2	-.12	192.67
174.0	85.00	8.36	1.2	-.12	190.50
175.0	84.17	8.24	1.1	-.13	188.24
176.0	83.33	8.10	1.1	-.13	185.88
177.0	82.50	7.97	1.0	-.14	183.40
178.0	81.67	7.82	.9	-.14	180.81
179.0	80.83	7.67	.9	-.15	178.10
180.0	80.00	7.51	.8	-.16	175.25
181.0	79.44	7.35	.7	-.17	172.23
182.0	78.89	7.17	.7	-.18	169.01
183.0	78.33	6.97	.6	-.19	165.50
184.0	77.78	6.76	.5	-.22	161.62
185.0	77.22	6.51	.4	-.25	157.13
186.0	76.67	6.19	.3	-.31	151.48
187.0	76.11	5.73	.2	-.46	140.98
188.0	75.56	5.29	.2	-.44	129.66
189.0	75.00	4.91	.2	-.38	119.72
190.0	74.44	4.58	.2	-.33	111.10
191.0	73.89	4.30	.2	-.28	103.73
192.0	73.33	4.06	.2	-.24	97.49
193.0	72.78	3.86	.1	-.20	92.55
194.0	72.22	3.69	.1	-.17	88.51
195.0	71.67	3.55	.1	-.14	85.13
196.0	71.11	3.43	.1	-.12	82.31
197.0	70.56	3.33	.1	-.10	79.92
198.0	70.00	3.25	.1	-.08	77.91
199.0	69.56	3.17	.1	-.07	76.20
200.0	69.11	3.11	.1	-.06	74.74
201.0	68.67	3.06	.1	-.05	73.50
202.0	68.22	3.02	.1	-.04	72.42
203.0	67.78	2.98	.1	-.04	71.47
204.0	67.33	2.94	.1	-.04	70.63
205.0	66.89	2.91	.1	-.03	69.87
206.0	66.44	2.88	.1	-.03	69.18
207.0	66.00	2.86	.1	-.03	68.54
208.0	65.56	2.83	.1	-.02	67.94
209.0	65.11	2.81	.1	-.02	67.37
210.0	64.67	2.78	.1	-.02	66.83

211.0	64.22	2.76	.1	-.02	66.31
212.0	63.78	2.74	.1	-.02	65.80
213.0	63.33	2.72	.1	-.02	65.31
214.0	62.89	2.70	.1	-.02	64.83
215.0	62.44	2.68	.1	-.02	64.35
216.0	62.00	2.66	.1	-.02	63.88
217.0	61.67	2.64	.1	-.02	63.43
218.0	61.33	2.63	.1	-.02	63.00
219.0	61.00	2.61	.1	-.02	62.60
220.0	60.67	2.59	.1	-.02	62.21
221.0	60.33	2.58	.1	-.02	61.83
222.0	60.00	2.56	.1	-.02	61.46
223.0	59.67	2.55	.1	-.02	61.10
224.0	59.33	2.53	.1	-.01	60.74
225.0	59.00	2.52	.1	-.01	60.39
226.0	58.67	2.50	.1	-.01	60.04
227.0	58.33	2.49	.1	-.01	59.70
228.0	58.00	2.47	.1	-.01	59.35
229.0	57.67	2.46	.1	-.01	59.01
230.0	57.33	2.44	.1	-.01	58.67
231.0	57.00	2.43	.1	-.01	58.33
232.0	56.67	2.42	.1	-.01	58.00
233.0	56.33	2.40	.1	-.01	57.66
234.0	56.00	2.39	.1	-.01	57.32
235.0	55.67	2.37	.1	-.01	56.99
236.0	55.33	2.36	.1	-.01	56.65
237.0	55.00	2.35	.1	-.01	56.31
238.0	54.67	2.33	.1	-.01	55.98
239.0	54.33	2.32	.1	-.01	55.64
240.0	54.00	2.30	.1	-.01	55.31
241.0	53.83	2.29	.1	-.01	54.99
242.0	53.67	2.28	.1	-.01	54.71
243.0	53.50	2.27	.1	-.01	54.45
244.0	53.33	2.26	.1	-.01	54.22
245.0	53.17	2.25	.1	-.01	54.00
246.0	53.00	2.24	.1	-.01	53.79
247.0	52.83	2.23	.1	-.01	53.59
248.0	52.67	2.22	.1	-.01	53.40
249.0	52.50	2.22	.1	-.01	53.21
250.0	52.33	2.21	.1	-.01	53.03
251.0	52.17	2.20	.1	-.01	52.85
252.0	52.00	2.19	.1	-.01	52.67
253.0	51.83	2.19	.1	-.01	52.50
254.0	51.67	2.18	.1	-.01	52.33
255.0	51.50	2.17	.1	-.01	52.16
256.0	51.33	2.17	.1	-.01	51.99
257.0	51.17	2.16	.1	-.01	51.82
258.0	51.00	2.15	.1	-.01	51.65
259.0	50.83	2.14	.1	-.01	51.48
260.0	50.67	2.14	.1	-.01	51.31
261.0	50.50	2.13	.1	-.01	51.14
262.0	50.33	2.12	.1	-.01	50.98
263.0	50.17	2.12	.1	-.01	50.81
264.0	50.00	2.11	.1	-.01	50.64
265.0	49.83	2.10	.1	-.01	50.47
266.0	49.67	2.10	.1	-.01	50.31
267.0	49.50	2.09	.1	-.01	50.14
268.0	49.33	2.08	.1	-.01	49.97
269.0	49.17	2.08	.1	-.01	49.80
270.0	49.00	2.07	.1	-.01	49.64

271.0	48.83	2.06	.1	-.01	49.47
272.0	48.67	2.05	.1	-.01	49.30
273.0	48.50	2.05	.1	-.01	49.13
274.0	48.33	2.04	.1	-.01	48.97
275.0	48.17	2.03	.1	-.01	48.80
276.0	48.00	2.03	.1	-.01	48.63
277.0	47.83	2.02	.1	-.01	48.47
278.0	47.67	2.01	.1	-.01	48.30
279.0	47.50	2.01	.1	-.01	48.13
280.0	47.33	2.00	.1	-.01	47.97
281.0	47.17	1.99	.1	-.01	47.80
282.0	47.00	1.98	.1	-.01	47.63
283.0	46.83	1.98	.1	-.01	47.46
284.0	46.67	1.97	.1	-.01	47.30
285.0	46.50	1.96	.1	-.01	47.13
286.0	46.33	1.96	.1	-.01	46.96
287.0	46.17	1.95	.1	-.01	46.80
288.0	46.00	1.94	.1	-.01	46.63
289.0	45.83	1.94	.1	-.01	46.46
290.0	45.67	1.93	.1	-.01	46.29
291.0	45.50	1.92	.1	-.01	46.13
292.0	45.33	1.91	.1	-.01	45.96
293.0	45.17	1.91	.1	-.01	45.79
294.0	45.00	1.90	.1	-.01	45.63
295.0	44.83	1.89	.1	-.01	45.46
296.0	44.67	1.89	.1	-.01	45.29
297.0	44.50	1.88	.1	-.01	45.12
298.0	44.33	1.87	.1	-.01	44.96
299.0	44.17	1.87	.1	-.01	44.79
300.0	44.00	1.86	.1	-.01	44.62
301.0	43.83	1.85	.1	-.01	44.46
302.0	43.67	1.85	.1	-.01	44.29
303.0	43.50	1.84	.1	-.01	44.12
304.0	43.33	1.83	.1	-.01	43.95
305.0	43.17	1.82	.1	-.01	43.79
306.0	43.00	1.82	.1	-.01	43.62
307.0	42.83	1.81	.1	-.01	43.45
308.0	42.67	1.80	.1	-.01	43.29
309.0	42.50	1.80	.1	-.01	43.12
310.0	42.33	1.79	.1	-.01	42.95
311.0	42.17	1.78	.1	-.01	42.78
312.0	42.00	1.78	.1	-.01	42.62
313.0	41.83	1.77	.1	-.01	42.45
314.0	41.67	1.76	.1	-.01	42.28
315.0	41.50	1.75	.1	-.01	42.12
316.0	41.33	1.75	.1	-.01	41.95
317.0	41.17	1.74	.1	-.01	41.78
318.0	41.00	1.73	.1	-.01	41.62
319.0	40.83	1.73	.1	-.01	41.45
320.0	40.67	1.72	.1	-.01	41.28
321.0	40.50	1.71	.1	-.01	41.11
322.0	40.33	1.71	.1	-.01	40.95
323.0	40.17	1.70	.1	-.01	40.78
324.0	40.00	1.69	.1	-.01	40.61
325.0	39.83	1.69	.1	-.01	40.45
326.0	39.67	1.68	.1	-.01	40.28
327.0	39.50	1.67	.1	-.01	40.11
328.0	39.33	1.66	.1	-.01	39.94
329.0	39.17	1.66	.1	-.01	39.78
330.0	39.00	1.65	.1	-.01	39.61

331.0	38.90	1.64	.1	-.01	39.45
332.0	38.80	1.64	.1	-.01	39.31
333.0	38.70	1.63	.1	-.01	39.17
334.0	38.60	1.63	.1	-.01	39.05
335.0	38.50	1.62	.1	.00	38.93
336.0	38.40	1.62	.1	.00	38.81
337.0	38.30	1.61	.1	.00	38.70
338.0	38.20	1.61	.1	.00	38.59
339.0	38.10	1.60	.1	.00	38.48
340.0	38.00	1.60	.1	.00	38.38
341.0	37.90	1.59	.1	.00	38.28
342.0	37.80	1.59	.1	.00	38.17
343.0	37.70	1.59	.1	.00	38.07
344.0	37.60	1.58	.1	.00	37.97
345.0	37.50	1.58	.1	.00	37.87
346.0	37.40	1.57	.1	.00	37.77
347.0	37.30	1.57	.1	.00	37.66
348.0	37.20	1.57	.1	.00	37.56
349.0	37.10	1.56	.1	.00	37.46
350.0	37.00	1.56	.1	.00	37.36
351.0	36.90	1.55	.1	.00	37.26
352.0	36.80	1.55	.1	.00	37.16
353.0	36.70	1.54	.1	.00	37.06
354.0	36.60	1.54	.1	.00	36.96
355.0	36.50	1.54	.1	.00	36.86
356.0	36.40	1.53	.1	.00	36.76
357.0	36.30	1.53	.1	.00	36.66
358.0	36.20	1.52	.1	.00	36.56
359.0	36.10	1.52	.1	.00	36.46
360.0	36.00	1.52	.1	.00	36.36
361.0	35.93	1.51	.1	.00	36.26
362.0	35.87	1.51	.1	.00	36.18
363.0	35.80	1.50	.1	.00	36.09
364.0	35.73	1.50	.1	.00	36.01
365.0	35.67	1.50	.1	.00	35.94
366.0	35.60	1.49	.1	.00	35.86
367.0	35.53	1.49	.1	.00	35.79
368.0	35.47	1.49	.1	.00	35.72
369.0	35.40	1.49	.1	.00	35.65
370.0	35.33	1.48	.1	.00	35.58
371.0	35.27	1.48	.1	.00	35.51
372.0	35.20	1.48	.1	.00	35.44
373.0	35.13	1.47	.1	.00	35.38
374.0	35.07	1.47	.1	.00	35.31
375.0	35.00	1.47	.1	.00	35.24
376.0	34.93	1.47	.1	.00	35.17
377.0	34.87	1.46	.1	.00	35.11
378.0	34.80	1.46	.1	.00	35.04
379.0	34.73	1.46	.1	.00	34.97
380.0	34.67	1.45	.1	.00	34.91
381.0	34.60	1.45	.1	.00	34.84
382.0	34.53	1.45	.1	.00	34.77
383.0	34.47	1.45	.1	.00	34.71
384.0	34.40	1.44	.1	.00	34.64
385.0	34.33	1.44	.1	.00	34.57
386.0	34.27	1.44	.1	.00	34.50
387.0	34.20	1.43	.1	.00	34.44
388.0	34.13	1.43	.1	.00	34.37
389.0	34.07	1.43	.1	.00	34.30
390.0	34.00	1.43	.1	.00	34.24

391.0	33.97	1.42	.1	.00	34.18
392.0	33.93	1.42	.1	.00	34.12
393.0	33.90	1.42	.1	.00	34.07
394.0	33.87	1.42	.1	.00	34.02
395.0	33.83	1.42	.1	.00	33.98
396.0	33.80	1.41	.1	.00	33.94
397.0	33.77	1.41	.1	.00	33.90
398.0	33.73	1.41	.1	.00	33.86
399.0	33.70	1.41	.1	.00	33.83
400.0	33.67	1.41	.1	.00	33.79
401.0	33.63	1.41	.1	.00	33.76
402.0	33.60	1.41	.1	.00	33.72
403.0	33.57	1.40	.1	.00	33.69
404.0	33.53	1.40	.1	.00	33.65
405.0	33.50	1.40	.1	.00	33.62
406.0	33.47	1.40	.1	.00	33.59
407.0	33.43	1.40	.1	.00	33.55
408.0	33.40	1.40	.1	.00	33.52
409.0	33.37	1.40	.1	.00	33.49
410.0	33.33	1.39	.1	.00	33.45
411.0	33.30	1.39	.1	.00	33.42
412.0	33.27	1.39	.1	.00	33.39
413.0	33.23	1.39	.1	.00	33.35
414.0	33.20	1.39	.1	.00	33.32
415.0	33.17	1.39	.1	.00	33.29
416.0	33.13	1.39	.1	.00	33.25
417.0	33.10	1.38	.1	.00	33.22
418.0	33.07	1.38	.1	.00	33.18
419.0	33.03	1.38	.1	.00	33.15
420.0	33.00	1.38	.1	.00	33.12
421.0	32.92	1.38	.1	.00	33.08
422.0	32.83	1.38	.1	.00	33.03
423.0	32.75	1.37	.1	.00	32.97
424.0	32.67	1.37	.1	.00	32.90
425.0	32.58	1.37	.1	.00	32.84
426.0	32.50	1.37	.1	.00	32.76
427.0	32.42	1.36	.1	.00	32.69
428.0	32.33	1.36	.1	.00	32.61
429.0	32.25	1.36	.1	.00	32.53
430.0	32.17	1.35	.1	.00	32.45
431.0	32.08	1.35	.1	.00	32.37
432.0	32.00	1.35	.1	.00	32.29
433.0	31.92	1.34	.1	.00	32.21
434.0	31.83	1.34	.1	.00	32.12
435.0	31.75	1.34	.1	.00	32.04
436.0	31.67	1.33	.1	.00	31.96
437.0	31.58	1.33	.1	.00	31.88
438.0	31.50	1.32	.1	.00	31.79
439.0	31.42	1.32	.1	.00	31.71
440.0	31.33	1.32	.1	.00	31.63
441.0	31.25	1.31	.1	.00	31.54
442.0	31.17	1.31	.1	.00	31.46
443.0	31.08	1.31	.1	.00	31.38
444.0	31.00	1.30	.1	.00	31.29
445.0	30.92	1.30	.1	.00	31.21
446.0	30.83	1.30	.1	.00	31.13
447.0	30.75	1.29	.1	.00	31.04
448.0	30.67	1.29	.1	.00	30.96
449.0	30.58	1.29	.1	.00	30.88
450.0	30.50	1.28	.1	.00	30.79

451.0	30.42	1.28	.1	.00	30.71
452.0	30.33	1.28	.1	.00	30.63
453.0	30.25	1.27	.1	.00	30.54
454.0	30.17	1.27	.1	.00	30.46
455.0	30.08	1.27	.1	.00	30.38
456.0	30.00	1.26	.1	.00	30.29
457.0	29.92	1.26	.1	.00	30.21
458.0	29.83	1.26	.1	.00	30.13
459.0	29.75	1.25	.1	.00	30.04
460.0	29.67	1.25	.1	.00	29.96
461.0	29.58	1.24	.1	.00	29.87
462.0	29.50	1.24	.1	.00	29.79
463.0	29.42	1.24	.1	.00	29.71
464.0	29.33	1.23	.1	.00	29.62
465.0	29.25	1.23	.1	.00	29.54
466.0	29.17	1.23	.1	.00	29.46
467.0	29.08	1.22	.1	.00	29.37
468.0	29.00	1.22	.1	.00	29.29
469.0	28.92	1.22	.1	.00	29.21
470.0	28.83	1.21	.1	.00	29.12
471.0	28.75	1.21	.1	.00	29.04
472.0	28.67	1.21	.1	.00	28.96
473.0	28.58	1.20	.1	.00	28.87
474.0	28.50	1.20	.1	.00	28.79
475.0	28.42	1.20	.1	.00	28.71
476.0	28.33	1.19	.1	.00	28.62
477.0	28.25	1.19	.1	.00	28.54
478.0	28.17	1.19	.1	.00	28.46
479.0	28.08	1.18	.1	.00	28.37
480.0	28.00	1.18	.1	.00	28.29
481.0	27.93	1.18	.1	.00	28.21
482.0	27.87	1.17	.1	.00	28.13
483.0	27.80	1.17	.1	.00	28.06
484.0	27.73	1.17	.1	.00	27.98
485.0	27.67	1.16	.1	.00	27.91
486.0	27.60	1.16	.1	.00	27.84
487.0	27.53	1.16	.1	.00	27.77
488.0	27.47	1.15	.1	.00	27.70
489.0	27.40	1.15	.1	.00	27.64
490.0	27.33	1.15	.1	.00	27.57
491.0	27.27	1.15	.1	.00	27.50
492.0	27.20	1.14	.1	.00	27.43
493.0	27.13	1.14	.1	.00	27.37
494.0	27.07	1.14	.1	.00	27.30
495.0	27.00	1.13	.1	.00	27.23
496.0	26.93	1.13	.1	.00	27.16
497.0	26.87	1.13	.1	.00	27.10
498.0	26.80	1.13	.1	.00	27.03
499.0	26.73	1.12	.1	.00	26.96
500.0	26.67	1.12	.1	.00	26.90
501.0	26.60	1.12	.1	.00	26.83
502.0	26.53	1.12	.1	.00	26.76
503.0	26.47	1.11	.1	.00	26.70
504.0	26.40	1.11	.1	.00	26.63
505.0	26.33	1.11	.1	.00	26.56
506.0	26.27	1.10	.1	.00	26.50
507.0	26.20	1.10	.1	.00	26.43
508.0	26.13	1.10	.1	.00	26.36
509.0	26.07	1.10	.1	.00	26.30
510.0	26.00	1.09	.1	.00	26.23

511.0	25.93	1.09	.1	.00	26.16
512.0	25.87	1.09	.1	.00	26.10
513.0	25.80	1.08	.1	.00	26.03
514.0	25.73	1.08	.1	.00	25.96
515.0	25.67	1.08	.1	.00	25.90
516.0	25.60	1.08	.1	.00	25.83
517.0	25.53	1.07	.1	.00	25.76
518.0	25.47	1.07	.1	.00	25.70
519.0	25.40	1.07	.1	.00	25.63
520.0	25.33	1.07	.1	.00	25.56
521.0	25.27	1.06	.1	.00	25.50
522.0	25.20	1.06	.1	.00	25.43
523.0	25.13	1.06	.1	.00	25.36
524.0	25.07	1.05	.1	.00	25.30
525.0	25.00	1.05	.1	.00	25.23
526.0	24.93	1.05	.1	.00	25.16
527.0	24.87	1.05	.1	.00	25.09
528.0	24.80	1.04	.1	.00	25.03
529.0	24.73	1.04	.1	.00	24.96
530.0	24.67	1.04	.1	.00	24.89
531.0	24.60	1.03	.1	.00	24.83
532.0	24.53	1.03	.1	.00	24.76
533.0	24.47	1.03	.1	.00	24.69
534.0	24.40	1.03	.1	.00	24.63
535.0	24.33	1.02	.1	.00	24.56
536.0	24.27	1.02	.1	.00	24.49
537.0	24.20	1.02	.1	.00	24.43
538.0	24.13	1.02	.1	.00	24.36
539.0	24.07	1.01	.1	.00	24.29
540.0	24.00	1.01	.1	.00	24.23
541.0	23.98	1.01	.1	.00	24.17
542.0	23.95	1.00	.1	.00	24.11
543.0	23.92	1.00	.1	.00	24.07
544.0	23.90	1.00	.1	.00	24.03
545.0	23.88	1.00	.1	.00	23.99
546.0	23.85	1.00	.1	.00	23.96
547.0	23.83	1.00	.1	.00	23.93
548.0	23.80	1.00	.1	.00	23.90
549.0	23.77	.99	.1	.00	23.87
550.0	23.75	.99	.1	.00	23.84
551.0	23.73	.99	.1	.00	23.82
552.0	23.70	.99	.1	.00	23.79
553.0	23.67	.99	.1	.00	23.76
554.0	23.65	.99	.1	.00	23.74
555.0	23.63	.99	.1	.00	23.71
556.0	23.60	.99	.1	.00	23.69
557.0	23.58	.99	.1	.00	23.66
558.0	23.55	.98	.1	.00	23.64
559.0	23.52	.98	.1	.00	23.61
560.0	23.50	.98	.1	.00	23.59
561.0	23.48	.98	.1	.00	23.56
562.0	23.45	.98	.1	.00	23.53
563.0	23.42	.98	.1	.00	23.51
564.0	23.40	.98	.1	.00	23.49
565.0	23.38	.98	.1	.00	23.46
566.0	23.35	.98	.1	.00	23.43
567.0	23.33	.98	.1	.00	23.41
568.0	23.30	.97	.1	.00	23.38
569.0	23.27	.97	.1	.00	23.36
570.0	23.25	.97	.1	.00	23.34

571.0	23.23	.97	.1	.00	23.31
572.0	23.20	.97	.1	.00	23.28
573.0	23.17	.97	.1	.00	23.26
574.0	23.15	.97	.1	.00	23.23
575.0	23.13	.97	.1	.00	23.21
576.0	23.10	.97	.1	.00	23.18
577.0	23.08	.97	.1	.00	23.16
578.0	23.05	.96	.1	.00	23.14
579.0	23.02	.96	.1	.00	23.11
580.0	23.00	.96	.1	.00	23.08
581.0	22.98	.96	.1	.00	23.06
582.0	22.95	.96	.1	.00	23.03
583.0	22.92	.96	.1	.00	23.01
584.0	22.90	.96	.1	.00	22.98
585.0	22.88	.96	.1	.00	22.96
586.0	22.85	.96	.1	.00	22.93
587.0	22.83	.95	.1	.00	22.91
588.0	22.80	.95	.1	.00	22.88
589.0	22.77	.95	.1	.00	22.86
590.0	22.75	.95	.1	.00	22.83
591.0	22.73	.95	.1	.00	22.81
592.0	22.70	.95	.1	.00	22.78
593.0	22.67	.95	.1	.00	22.76
594.0	22.65	.95	.1	.00	22.73
595.0	22.63	.95	.1	.00	22.71
596.0	22.60	.95	.1	.00	22.68
597.0	22.58	.94	.1	.00	22.66
598.0	22.55	.94	.1	.00	22.63
599.0	22.52	.94	.1	.00	22.61
600.0	22.50	.94	.1	.00	22.58
601.0	22.48	.94	.1	.00	22.56
602.0	22.45	.94	.1	.00	22.53
603.0	22.42	.94	.1	.00	22.51
604.0	22.40	.94	.1	.00	22.48
605.0	22.38	.94	.1	.00	22.46
606.0	22.35	.93	.1	.00	22.43
607.0	22.33	.93	.1	.00	22.41
608.0	22.30	.93	.1	.00	22.38
609.0	22.27	.93	.1	.00	22.36
610.0	22.25	.93	.1	.00	22.33
611.0	22.23	.93	.1	.00	22.31
612.0	22.20	.93	.1	.00	22.28
613.0	22.17	.93	.1	.00	22.26
614.0	22.15	.93	.1	.00	22.23
615.0	22.13	.93	.1	.00	22.21
616.0	22.10	.92	.1	.00	22.18
617.0	22.08	.92	.1	.00	22.16
618.0	22.05	.92	.1	.00	22.13
619.0	22.02	.92	.1	.00	22.11
620.0	22.00	.92	.1	.00	22.08
621.0	21.98	.92	.1	.00	22.06
622.0	21.95	.92	.1	.00	22.03
623.0	21.92	.92	.1	.00	22.01
624.0	21.90	.92	.1	.00	21.98
625.0	21.88	.91	.1	.00	21.96
626.0	21.85	.91	.1	.00	21.93
627.0	21.83	.91	.1	.00	21.91
628.0	21.80	.91	.1	.00	21.88
629.0	21.77	.91	.1	.00	21.86
630.0	21.75	.91	.1	.00	21.83

631.0	21.73	.91	.1	.00	21.81
632.0	21.70	.91	.1	.00	21.78
633.0	21.67	.91	.1	.00	21.76
634.0	21.65	.91	.1	.00	21.73
635.0	21.63	.90	.1	.00	21.71
636.0	21.60	.90	.1	.00	21.68
637.0	21.58	.90	.1	.00	21.66
638.0	21.55	.90	.1	.00	21.63
639.0	21.52	.90	.1	.00	21.61
640.0	21.50	.90	.1	.00	21.58
641.0	21.48	.90	.1	.00	21.56
642.0	21.45	.90	.1	.00	21.53
643.0	21.42	.90	.1	.00	21.51
644.0	21.40	.90	.1	.00	21.48
645.0	21.38	.89	.1	.00	21.46
646.0	21.35	.89	.1	.00	21.43
647.0	21.33	.89	.1	.00	21.41
648.0	21.30	.89	.1	.00	21.38
649.0	21.27	.89	.1	.00	21.36
650.0	21.25	.89	.1	.00	21.33
651.0	21.23	.89	.1	.00	21.31
652.0	21.20	.89	.1	.00	21.28
653.0	21.17	.89	.1	.00	21.26
654.0	21.15	.88	.1	.00	21.23
655.0	21.13	.88	.1	.00	21.21
656.0	21.10	.88	.1	.00	21.18
657.0	21.08	.88	.1	.00	21.16
658.0	21.05	.88	.1	.00	21.13
659.0	21.02	.88	.1	.00	21.11
660.0	21.00	.88	.1	.00	21.08
661.0	20.91	.88	.1	.00	21.05
662.0	20.83	.88	.1	.00	21.00
663.0	20.74	.87	.1	.00	20.95
664.0	20.65	.87	.1	.00	20.88
665.0	20.56	.87	.1	.00	20.81
666.0	20.48	.86	.1	.00	20.73
667.0	20.39	.86	.1	.00	20.66
668.0	20.30	.86	.1	.00	20.57
669.0	20.21	.85	.1	.00	20.49
670.0	20.13	.85	.1	.00	20.41
671.0	20.04	.85	.1	.00	20.32
672.0	19.95	.84	.1	.00	20.24
673.0	19.86	.84	.1	.00	20.15
674.0	19.77	.84	.1	.00	20.06
675.0	19.69	.83	.1	.00	19.98
676.0	19.60	.83	.1	.00	19.89
677.0	19.51	.83	.1	.00	19.80
678.0	19.42	.82	.1	.00	19.72
679.0	19.34	.82	.1	.00	19.63
680.0	19.25	.81	.1	.00	19.54
681.0	19.16	.81	.1	.00	19.45
682.0	19.08	.81	.1	.00	19.37
683.0	18.99	.80	.1	.00	19.28
684.0	18.90	.80	.1	.00	19.19
685.0	18.81	.80	.1	.00	19.10
686.0	18.73	.79	.1	.00	19.02
687.0	18.64	.79	.1	.00	18.93
688.0	18.55	.79	.1	.00	18.84
689.0	18.46	.78	.1	.00	18.75
690.0	18.38	.78	.1	.00	18.67

691.0	18.29	.77	.1	.00	18.58
692.0	18.20	.77	.1	.00	18.49
693.0	18.11	.77	.1	.00	18.40
694.0	18.02	.76	.1	.00	18.32
695.0	17.94	.76	.1	.00	18.23
696.0	17.85	.76	.1	.00	18.14
697.0	17.76	.75	.1	.00	18.05
698.0	17.67	.75	.1	.00	17.96
699.0	17.59	.74	.1	.00	17.88
700.0	17.50	.74	.1	.00	17.79
701.0	17.41	.74	.1	.00	17.70
702.0	17.33	.73	.1	.00	17.61
703.0	17.24	.73	.1	.00	17.53
704.0	17.15	.73	.1	.00	17.44
705.0	17.06	.72	.1	.00	17.35
706.0	16.98	.72	.1	.00	17.26
707.0	16.89	.72	.1	.00	17.18
708.0	16.80	.71	.1	.00	17.09
709.0	16.71	.71	.1	.00	17.00
710.0	16.63	.70	.1	.00	16.91
711.0	16.54	.70	.1	.00	16.83
712.0	16.45	.70	.1	.00	16.74
713.0	16.36	.69	.1	.00	16.65
714.0	16.27	.69	.1	.00	16.56
715.0	16.19	.69	.1	.00	16.48
716.0	16.10	.68	.1	.00	16.39
717.0	16.01	.68	.1	.00	16.30
718.0	15.93	.68	.1	.00	16.21
719.0	15.84	.67	.1	.00	16.12
720.0	15.75	.67	.1	.00	16.04
721.0	15.66	.66	.1	.00	15.95
722.0	15.57	.66	.1	.00	15.86
723.0	15.49	.66	.1	.00	15.77
724.0	15.40	.65	.1	.00	15.69
725.0	15.31	.65	.1	.00	15.60
726.0	15.22	.65	.1	.00	15.51
727.0	15.14	.64	.1	.00	15.42
728.0	15.05	.64	.1	.00	15.34
729.0	14.96	.64	.1	.00	15.25
730.0	14.88	.63	.1	.00	15.16
731.0	14.79	.63	.1	.00	15.07
732.0	14.70	.62	.1	.00	14.99
733.0	14.61	.62	.1	.00	14.90
734.0	14.52	.62	.1	.00	14.81
735.0	14.44	.61	.1	.00	14.72
736.0	14.35	.61	.1	.00	14.64
737.0	14.26	.61	.1	.00	14.55
738.0	14.18	.60	.1	.00	14.46
739.0	14.09	.60	.1	.00	14.37
740.0	14.00	.60	.1	.00	14.28
741.0	13.91	.59	.1	.00	14.20
742.0	13.82	.59	.1	.00	14.11
743.0	13.74	.58	.1	.00	14.02
744.0	13.65	.58	.1	.00	13.93
745.0	13.56	.58	.1	.00	13.85
746.0	13.48	.57	.1	.00	13.76
747.0	13.39	.57	.1	.00	13.67
748.0	13.30	.57	.1	.00	13.58
749.0	13.21	.56	.1	.00	13.50
750.0	13.13	.56	.1	.00	13.41

PEAK OUTFLOW RATE = 780.74 cfs AT TIME T = 93. min

MAXIMUM STAGE REACHED = 13.41 ft

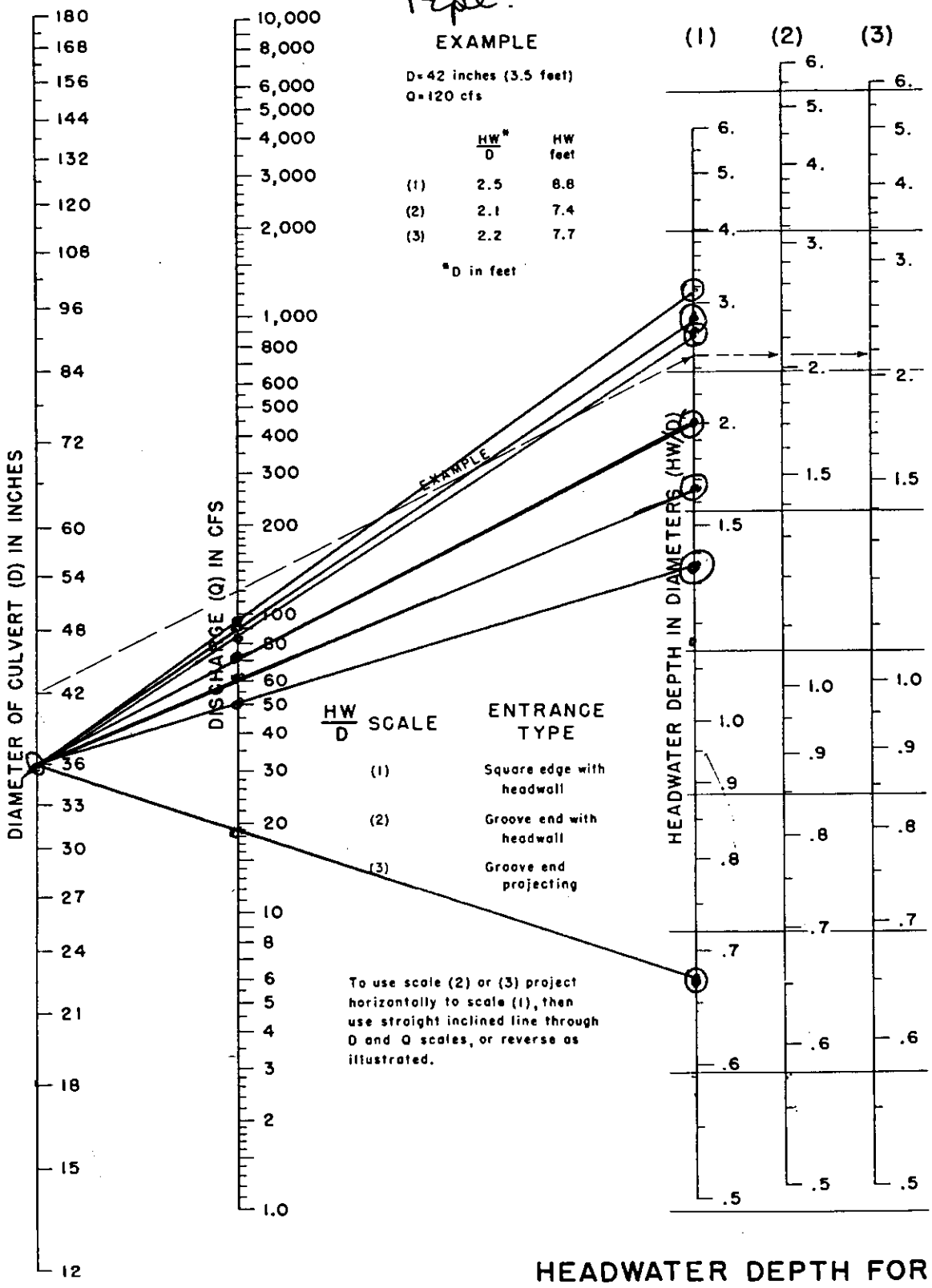
Reservoir Routing

RK4 Analysis.

(100-yr, 24hr) Storm

(36" ϕ Steel/Conc. Pipe Under Railroad Tracks)

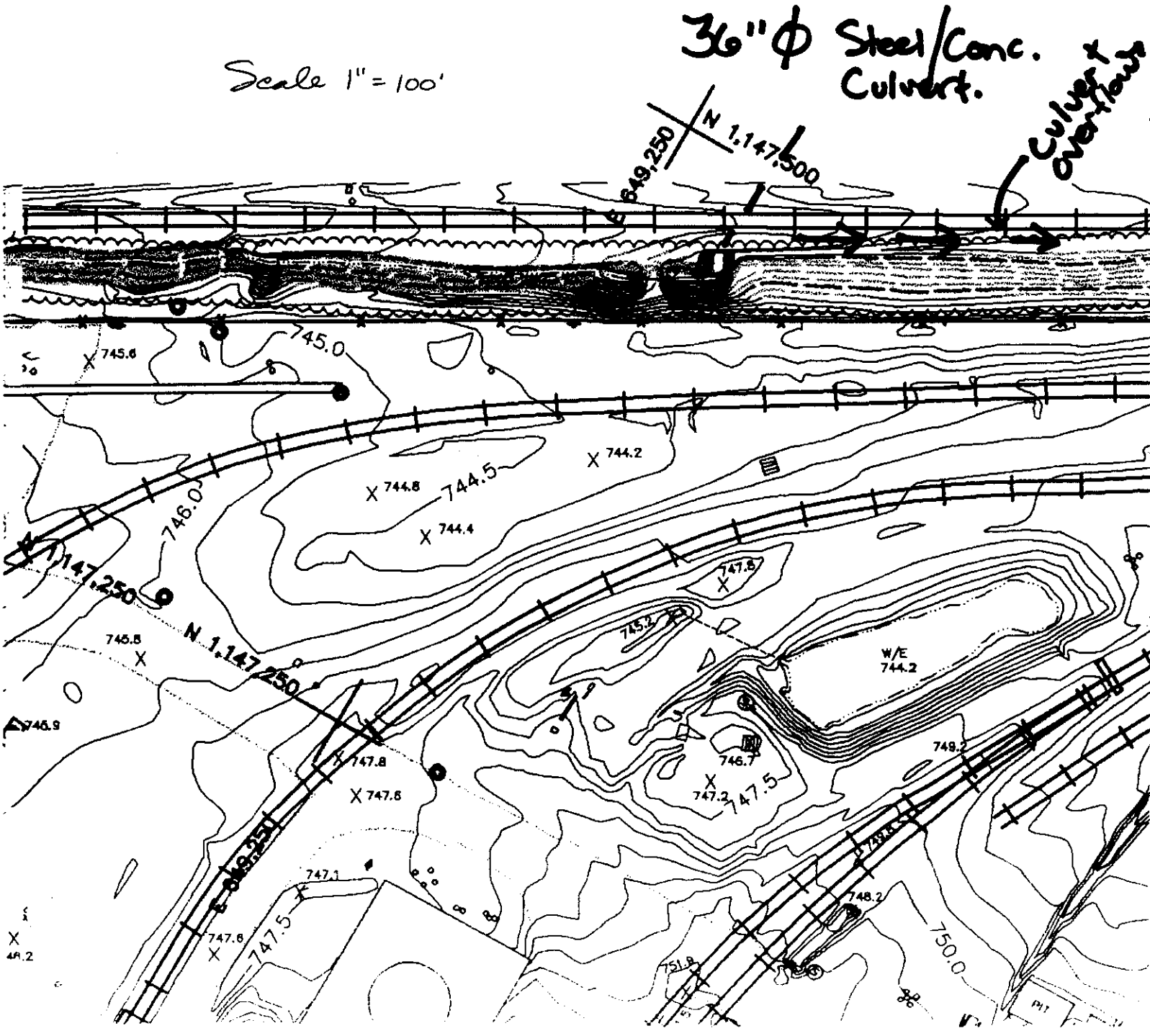
36" ∅ Steel / Concrete Pipe.



HEADWATER DEPTH FOR CONCRETE PIPE CULVERTS WITH INLET CONTROL

BUREAU OF PUBLIC ROADS JAN. 1963

Culv. inv. = 732.11 ft msl
(upst.)



Stage / Area relationship
for 36 " diam steel / conc.
Culvert under railroad tracks

Stage (ft)	Area (Acres)
0	.01
2	.05
4	.1
6	.15
8	.175
8.5	.25
10	.5

Stage / Discharge curve for
36 inch diam. Steel / concrete
culvert under railroad tracks.

Note that side / ditch flow will
occur after stage = 5 ft.
Maximum culvert discharge is
appoximately 97 cfs.

Stage (ft)	Discharge (cfs)
0	0
2	18
4	50
5	62
6	96
8	287
8.5	376
10	742

Inflow hydrograph
into railroad track culvert

Time (hrs)	Inflow (cfs)
11	10
11.3	52
11.6	74
11.9	152
12.0	249
12.1	400
12.2	545
12.3	583
12.4	526
12.5	436
12.6	389
12.7	361
12.8	343
13.0	324
13.2	287
13.4	269
13.6	248
13.8	226
14.0	197
14.3	97
14.6	80
15.0	71
15.5	65
16.0	58
16.5	51
17.0	46
17.5	44
18.0	42
19.0	36
20.0	31
22.0	27
26.0	0

RESERVOIR ROUTING

FOURTH-ORDER RUNGE-KUTTA METHODS

GOLDER ASSOCIATES INC.
3730 CHAMBLEE-TUCKER ROAD
ATLANTA, GEORGIA 30341

PROJECT TITLE Solutia - North Side Drainag JOB NUMBER 943-3680

CODED BY tbf DATE 12-6-97

Routing Through Rail Road Culvert / Side Channel

TIME (min)	INFLOW (cfs)	HEAD (ft)	AREA (Acres)	dH ' (ft)	OUTFLOW (cfs)
.0	10.00	.00	.0	.00	.00
1.0	12.33	.70	.0	.70	6.29
2.0	14.67	1.00	.0	.30	8.96
3.0	17.00	1.24	.0	.24	11.16
4.0	19.33	1.46	.0	.22	13.17
5.0	21.67	1.68	.0	.21	15.08
6.0	24.00	1.88	.0	.21	16.93
7.0	26.33	2.08	.1	.20	19.31
8.0	28.67	2.25	.1	.17	22.06
9.0	31.00	2.41	.1	.15	24.53
10.0	33.33	2.55	.1	.14	26.83
11.0	35.67	2.69	.1	.14	29.04
12.0	38.00	2.82	.1	.13	31.19
13.0	40.33	2.96	.1	.13	33.30
14.0	42.67	3.09	.1	.13	35.39
15.0	45.00	3.22	.1	.13	37.46
16.0	47.33	3.35	.1	.13	39.52
17.0	49.67	3.47	.1	.13	41.58
18.0	52.00	3.60	.1	.13	43.63
19.0	53.22	3.72	.1	.12	45.55
20.0	54.44	3.83	.1	.11	47.28
21.0	55.67	3.93	.1	.10	48.87
22.0	56.89	4.02	.1	.09	50.26
23.0	58.11	4.11	.1	.09	51.35
24.0	59.33	4.20	.1	.09	52.43
25.0	60.56	4.29	.1	.09	53.52
26.0	61.78	4.38	.1	.09	54.60
27.0	63.00	4.47	.1	.09	55.68
28.0	64.22	4.56	.1	.09	56.76
29.0	65.44	4.65	.1	.09	57.84

30.0	66.67	4.74	.1	.09	58.92
31.0	67.89	4.83	.1	.09	60.00
32.0	69.11	4.92	.1	.09	61.08
33.0	70.33	5.01	.1	.09	62.43
34.0	71.56	5.09	.1	.08	65.08
35.0	72.78	5.15	.1	.06	67.26
36.0	74.00	5.21	.1	.05	69.13
37.0	78.33	5.27	.1	.06	71.28
38.0	82.67	5.35	.1	.08	74.06
39.0	87.00	5.45	.1	.09	77.25
40.0	91.33	5.55	.1	.10	80.73
41.0	95.67	5.66	.1	.11	84.39
42.0	100.00	5.77	.1	.11	88.18
43.0	104.33	5.88	.1	.11	92.05
44.0	108.67	6.00	.1	.12	95.99
45.0	113.00	6.09	.2	.09	104.78
46.0	117.33	6.16	.2	.06	110.97
47.0	121.67	6.21	.2	.05	116.08
48.0	126.00	6.26	.2	.05	120.73
49.0	130.33	6.31	.2	.05	125.18
50.0	134.67	6.35	.2	.05	129.56
51.0	139.00	6.40	.2	.05	133.90
52.0	143.33	6.44	.2	.05	138.22
53.0	147.67	6.49	.2	.05	142.54
54.0	152.00	6.53	.2	.05	146.86
55.0	168.17	6.62	.2	.09	155.03
56.0	184.33	6.75	.2	.13	167.63
57.0	200.50	6.90	.2	.15	182.12
58.0	216.67	7.06	.2	.16	197.41
59.0	232.83	7.23	.2	.16	213.05
60.0	249.00	7.39	.2	.17	228.85
61.0	274.17	7.59	.2	.20	247.47
62.0	299.33	7.82	.2	.23	269.38
63.0	324.50	8.05	.2	.24	296.30
64.0	349.67	8.22	.2	.17	326.73
65.0	374.83	8.37	.2	.14	352.01
66.0	400.00	8.50	.2	.13	375.90
67.0	424.17	8.61	.3	.11	403.69
68.0	448.33	8.71	.3	.10	428.11
69.0	472.50	8.81	.3	.10	451.59
70.0	496.67	8.90	.3	.10	474.80
71.0	520.83	9.00	.3	.09	497.92
72.0	545.00	9.09	.3	.09	521.02
73.0	551.33	9.16	.4	.07	537.81
74.0	557.67	9.21	.4	.04	548.12
75.0	564.00	9.24	.4	.03	555.97
76.0	570.33	9.27	.4	.03	562.86
77.0	576.67	9.29	.4	.03	569.37
78.0	583.00	9.32	.4	.03	575.73
79.0	573.50	9.32	.4	.00	576.74
80.0	564.00	9.30	.4	-.02	571.66
81.0	554.50	9.27	.4	-.03	563.97
82.0	545.00	9.23	.4	-.04	555.13
83.0	535.50	9.20	.4	-.04	545.80
84.0	526.00	9.16	.4	-.04	536.26
85.0	511.00	9.11	.4	-.05	524.65
86.0	496.00	9.05	.3	-.06	510.75
87.0	481.00	8.99	.3	-.06	495.90
88.0	466.00	8.93	.3	-.06	480.67
89.0	451.00	8.87	.3	-.06	465.28

90.0	436.00	8.80	.3	-.06	449.82
91.0	428.17	8.75	.3	-.05	437.36
92.0	420.33	8.71	.3	-.04	427.85
93.0	412.50	8.68	.3	-.03	419.37
94.0	404.67	8.64	.3	-.03	411.24
95.0	396.83	8.61	.3	-.03	403.22
96.0	389.00	8.58	.3	-.03	395.24
97.0	384.33	8.55	.3	-.03	388.73
98.0	379.67	8.53	.3	-.02	383.47
99.0	375.00	8.51	.3	-.02	378.60
100.0	370.33	8.49	.2	-.02	374.33
101.0	365.67	8.47	.2	-.02	370.09
102.0	361.00	8.44	.2	-.03	365.55
103.0	358.00	8.42	.2	-.02	361.52
104.0	355.00	8.40	.2	-.02	358.12
105.0	352.00	8.38	.2	-.02	354.95
106.0	349.00	8.36	.2	-.02	351.87
107.0	346.00	8.35	.2	-.02	348.82
108.0	343.00	8.33	.2	-.02	345.78
109.0	341.42	8.32	.2	-.01	343.32
110.0	339.83	8.31	.2	-.01	341.43
111.0	338.25	8.30	.2	-.01	339.73
112.0	336.67	8.29	.2	-.01	338.10
113.0	335.08	8.28	.2	-.01	336.50
114.0	333.50	8.27	.2	-.01	334.90
115.0	331.92	8.26	.2	-.01	333.31
116.0	330.33	8.25	.2	-.01	331.71
117.0	328.75	8.24	.2	-.01	330.12
118.0	327.17	8.23	.2	-.01	328.53
119.0	325.58	8.22	.2	-.01	326.94
120.0	324.00	8.22	.2	-.01	325.35
121.0	320.92	8.20	.2	-.01	323.11
122.0	317.83	8.19	.2	-.02	320.28
123.0	314.75	8.17	.2	-.02	317.26
124.0	311.67	8.15	.2	-.02	314.17
125.0	308.58	8.14	.2	-.02	311.06
126.0	305.50	8.12	.2	-.02	307.95
127.0	302.42	8.10	.2	-.02	304.83
128.0	299.33	8.08	.2	-.02	301.72
129.0	296.25	8.07	.2	-.02	298.60
130.0	293.17	8.05	.2	-.02	295.48
131.0	290.08	8.03	.2	-.02	292.37
132.0	287.00	8.01	.2	-.02	289.25
133.0	285.50	8.00	.2	-.01	286.92
134.0	284.00	7.99	.2	-.01	285.72
135.0	282.50	7.97	.2	-.01	284.36
136.0	281.00	7.96	.2	-.02	282.93
137.0	279.50	7.94	.2	-.02	281.46
138.0	278.00	7.93	.2	-.02	279.97
139.0	276.50	7.91	.2	-.02	278.48
140.0	275.00	7.90	.2	-.02	276.98
141.0	273.50	7.88	.2	-.02	275.48
142.0	272.00	7.86	.2	-.02	273.98
143.0	270.50	7.85	.2	-.02	272.48
144.0	269.00	7.83	.2	-.02	270.97
145.0	267.25	7.82	.2	-.02	269.40
146.0	265.50	7.80	.2	-.02	267.73
147.0	263.75	7.78	.2	-.02	266.01
148.0	262.00	7.76	.2	-.02	264.28
149.0	260.25	7.74	.2	-.02	262.53

150.0	258.50	7.73	.2	-.02	260.78
151.0	256.75	7.71	.2	-.02	259.03
152.0	255.00	7.69	.2	-.02	257.28
153.0	253.25	7.67	.2	-.02	255.53
154.0	251.50	7.65	.2	-.02	253.77
155.0	249.75	7.63	.2	-.02	252.02
156.0	248.00	7.62	.2	-.02	250.27
157.0	246.17	7.60	.2	-.02	248.49
158.0	244.33	7.58	.2	-.02	246.68
159.0	242.50	7.56	.2	-.02	244.86
160.0	240.67	7.54	.2	-.02	243.02
161.0	238.83	7.52	.2	-.02	241.19
162.0	237.00	7.50	.2	-.02	239.36
163.0	235.17	7.48	.2	-.02	237.52
164.0	233.33	7.46	.2	-.02	235.68
165.0	231.50	7.44	.2	-.02	233.85
166.0	229.67	7.42	.2	-.02	232.01
167.0	227.83	7.40	.2	-.02	230.17
168.0	226.00	7.39	.2	-.02	228.34
169.0	223.58	7.36	.2	-.02	226.32
170.0	221.17	7.34	.2	-.02	224.08
171.0	218.75	7.32	.2	-.02	221.74
172.0	216.33	7.29	.2	-.02	219.36
173.0	213.92	7.27	.2	-.03	216.96
174.0	211.50	7.24	.2	-.03	214.54
175.0	209.08	7.22	.2	-.03	212.12
176.0	206.67	7.19	.2	-.03	209.70
177.0	204.25	7.17	.2	-.03	207.28
178.0	201.83	7.14	.2	-.03	204.86
179.0	199.42	7.11	.2	-.03	202.44
180.0	197.00	7.09	.2	-.03	200.01
181.0	191.44	7.05	.2	-.04	196.60
182.0	185.89	7.01	.2	-.05	191.99
183.0	180.33	6.95	.2	-.05	186.85
184.0	174.78	6.89	.2	-.06	181.46
185.0	169.22	6.84	.2	-.06	175.97
186.0	163.67	6.78	.2	-.06	170.42
187.0	158.11	6.72	.2	-.06	164.85
188.0	152.56	6.66	.2	-.06	159.27
189.0	147.00	6.60	.2	-.06	153.69
190.0	141.44	6.55	.2	-.06	148.10
191.0	135.89	6.49	.2	-.06	142.52
192.0	130.33	6.43	.2	-.06	136.93
193.0	124.78	6.37	.2	-.06	131.34
194.0	119.22	6.31	.2	-.06	125.76
195.0	113.67	6.25	.2	-.06	120.17
196.0	108.11	6.19	.2	-.06	114.59
197.0	102.56	6.14	.2	-.06	109.00
198.0	97.00	6.08	.2	-.06	103.41
199.0	96.06	6.04	.2	-.04	99.38
200.0	95.11	6.01	.2	-.02	97.14
201.0	94.17	6.00	.1	-.02	95.86
202.0	93.22	5.98	.1	-.02	95.27
203.0	92.28	5.96	.1	-.02	94.58
204.0	91.33	5.94	.1	-.02	93.83
205.0	90.39	5.91	.1	-.02	93.02
206.0	89.44	5.89	.1	-.03	92.17
207.0	88.50	5.86	.1	-.03	91.29
208.0	87.56	5.83	.1	-.03	90.39
209.0	86.61	5.81	.1	-.03	89.47

210.0	85.67	5.78	.1	-.03	88.54
211.0	84.72	5.75	.1	-.03	87.61
212.0	83.78	5.73	.1	-.03	86.66
213.0	82.83	5.70	.1	-.03	85.72
214.0	81.89	5.67	.1	-.03	84.77
215.0	80.94	5.64	.1	-.03	83.82
216.0	80.00	5.61	.1	-.03	82.86
217.0	79.63	5.59	.1	-.03	81.99
218.0	79.25	5.57	.1	-.02	81.26
219.0	78.88	5.55	.1	-.02	80.63
220.0	78.50	5.53	.1	-.02	80.07
221.0	78.13	5.52	.1	-.01	79.56
222.0	77.75	5.50	.1	-.01	79.09
223.0	77.38	5.49	.1	-.01	78.65
224.0	77.00	5.48	.1	-.01	78.22
225.0	76.63	5.46	.1	-.01	77.81
226.0	76.25	5.45	.1	-.01	77.41
227.0	75.88	5.44	.1	-.01	77.01
228.0	75.50	5.43	.1	-.01	76.62
229.0	75.13	5.42	.1	-.01	76.24
230.0	74.75	5.41	.1	-.01	75.85
231.0	74.38	5.40	.1	-.01	75.47
232.0	74.00	5.39	.1	-.01	75.09
233.0	73.63	5.37	.1	-.01	74.71
234.0	73.25	5.36	.1	-.01	74.33
235.0	72.88	5.35	.1	-.01	73.96
236.0	72.50	5.34	.1	-.01	73.58
237.0	72.13	5.33	.1	-.01	73.20
238.0	71.75	5.32	.1	-.01	72.82
239.0	71.38	5.31	.1	-.01	72.44
240.0	71.00	5.30	.1	-.01	72.07
241.0	70.80	5.29	.1	-.01	71.72
242.0	70.60	5.28	.1	-.01	71.41
243.0	70.40	5.27	.1	-.01	71.14
244.0	70.20	5.26	.1	-.01	70.88
245.0	70.00	5.25	.1	-.01	70.65
246.0	69.80	5.25	.1	-.01	70.42
247.0	69.60	5.24	.1	-.01	70.20
248.0	69.40	5.24	.1	-.01	69.99
249.0	69.20	5.23	.1	-.01	69.78
250.0	69.00	5.22	.1	-.01	69.57
251.0	68.80	5.22	.1	-.01	69.37
252.0	68.60	5.21	.1	-.01	69.17
253.0	68.40	5.20	.1	-.01	68.96
254.0	68.20	5.20	.1	-.01	68.76
255.0	68.00	5.19	.1	-.01	68.56
256.0	67.80	5.19	.1	-.01	68.36
257.0	67.60	5.18	.1	-.01	68.16
258.0	67.40	5.18	.1	-.01	67.95
259.0	67.20	5.17	.1	-.01	67.75
260.0	67.00	5.16	.1	-.01	67.55
261.0	66.80	5.16	.1	-.01	67.35
262.0	66.60	5.15	.1	-.01	67.15
263.0	66.40	5.15	.1	-.01	66.95
264.0	66.20	5.14	.1	-.01	66.75
265.0	66.00	5.13	.1	-.01	66.55
266.0	65.80	5.13	.1	-.01	66.35
267.0	65.60	5.12	.1	-.01	66.15
268.0	65.40	5.12	.1	-.01	65.95
269.0	65.20	5.11	.1	-.01	65.75

270.0	65.00	5.10	.1	-.01	65.55
271.0	64.77	5.10	.1	-.01	65.34
272.0	64.53	5.09	.1	-.01	65.13
273.0	64.30	5.09	.1	-.01	64.91
274.0	64.07	5.08	.1	-.01	64.68
275.0	63.83	5.07	.1	-.01	64.45
276.0	63.60	5.07	.1	-.01	64.22
277.0	63.37	5.06	.1	-.01	63.99
278.0	63.13	5.05	.1	-.01	63.76
279.0	62.90	5.04	.1	-.01	63.53
280.0	62.67	5.04	.1	-.01	63.29
281.0	62.43	5.03	.1	-.01	63.06
282.0	62.20	5.02	.1	-.01	62.83
283.0	61.97	5.02	.1	-.01	62.59
284.0	61.73	5.01	.1	-.01	62.36
285.0	61.50	5.00	.1	-.01	62.13
286.0	61.27	5.00	.1	-.01	61.96
287.0	61.03	4.99	.1	-.01	61.86
288.0	60.80	4.98	.1	-.01	61.74
289.0	60.57	4.97	.1	-.01	61.61
290.0	60.33	4.96	.1	-.01	61.46
291.0	60.10	4.94	.1	-.01	61.31
292.0	59.87	4.93	.1	-.01	61.14
293.0	59.63	4.91	.1	-.01	60.97
294.0	59.40	4.90	.1	-.02	60.78
295.0	59.17	4.88	.1	-.02	60.59
296.0	58.93	4.87	.1	-.02	60.40
297.0	58.70	4.85	.1	-.02	60.20
298.0	58.47	4.83	.1	-.02	59.99
299.0	58.23	4.81	.1	-.02	59.78
300.0	58.00	4.80	.1	-.02	59.57
301.0	57.77	4.78	.1	-.02	59.35
302.0	57.53	4.76	.1	-.02	59.13
303.0	57.30	4.74	.1	-.02	58.90
304.0	57.07	4.72	.1	-.02	58.68
305.0	56.83	4.70	.1	-.02	58.45
306.0	56.60	4.69	.1	-.02	58.23
307.0	56.37	4.67	.1	-.02	57.99
308.0	56.13	4.65	.1	-.02	57.76
309.0	55.90	4.63	.1	-.02	57.53
310.0	55.67	4.61	.1	-.02	57.30
311.0	55.43	4.59	.1	-.02	57.06
312.0	55.20	4.57	.1	-.02	56.83
313.0	54.97	4.55	.1	-.02	56.59
314.0	54.73	4.53	.1	-.02	56.36
315.0	54.50	4.51	.1	-.02	56.12
316.0	54.27	4.49	.1	-.02	55.88
317.0	54.03	4.47	.1	-.02	55.64
318.0	53.80	4.45	.1	-.02	55.40
319.0	53.57	4.43	.1	-.02	55.17
320.0	53.33	4.41	.1	-.02	54.93
321.0	53.10	4.39	.1	-.02	54.69
322.0	52.87	4.37	.1	-.02	54.45
323.0	52.63	4.35	.1	-.02	54.21
324.0	52.40	4.33	.1	-.02	53.97
325.0	52.17	4.31	.1	-.02	53.73
326.0	51.93	4.29	.1	-.02	53.49
327.0	51.70	4.27	.1	-.02	53.25
328.0	51.47	4.25	.1	-.02	53.01
329.0	51.23	4.23	.1	-.02	52.77

330.0	51.00	4.21	.1	-.02	52.53
331.0	50.83	4.19	.1	-.02	52.29
332.0	50.67	4.17	.1	-.02	52.07
333.0	50.50	4.15	.1	-.02	51.85
334.0	50.33	4.14	.1	-.02	51.64
335.0	50.17	4.12	.1	-.02	51.43
336.0	50.00	4.10	.1	-.02	51.23
337.0	49.83	4.09	.1	-.02	51.04
338.0	49.67	4.07	.1	-.02	50.84
339.0	49.50	4.05	.1	-.02	50.65
340.0	49.33	4.04	.1	-.02	50.47
341.0	49.17	4.02	.1	-.02	50.28
342.0	49.00	4.01	.1	-.02	50.10
343.0	48.83	3.99	.1	-.01	49.89
344.0	48.67	3.98	.1	-.01	49.67
345.0	48.50	3.97	.1	-.01	49.45
346.0	48.33	3.95	.1	-.01	49.24
347.0	48.17	3.94	.1	-.01	49.04
348.0	48.00	3.93	.1	-.01	48.85
349.0	47.83	3.92	.1	-.01	48.66
350.0	47.67	3.90	.1	-.01	48.48
351.0	47.50	3.89	.1	-.01	48.30
352.0	47.33	3.88	.1	-.01	48.12
353.0	47.17	3.87	.1	-.01	47.94
354.0	47.00	3.86	.1	-.01	47.76
355.0	46.83	3.85	.1	-.01	47.59
356.0	46.67	3.84	.1	-.01	47.42
357.0	46.50	3.83	.1	-.01	47.25
358.0	46.33	3.82	.1	-.01	47.07
359.0	46.17	3.81	.1	-.01	46.90
360.0	46.00	3.80	.1	-.01	46.73
361.0	45.93	3.79	.1	-.01	46.57
362.0	45.87	3.78	.1	-.01	46.43
363.0	45.80	3.77	.1	-.01	46.31
364.0	45.73	3.76	.1	-.01	46.19
365.0	45.67	3.76	.1	-.01	46.09
366.0	45.60	3.75	.1	-.01	46.00
367.0	45.53	3.74	.1	-.01	45.90
368.0	45.47	3.74	.1	-.01	45.82
369.0	45.40	3.73	.1	-.01	45.74
370.0	45.33	3.73	.1	.00	45.66
371.0	45.27	3.72	.1	.00	45.58
372.0	45.20	3.72	.1	.00	45.51
373.0	45.13	3.71	.1	.00	45.44
374.0	45.07	3.71	.1	.00	45.37
375.0	45.00	3.71	.1	.00	45.29
376.0	44.93	3.70	.1	.00	45.23
377.0	44.87	3.70	.1	.00	45.16
378.0	44.80	3.69	.1	.00	45.09
379.0	44.73	3.69	.1	.00	45.02
380.0	44.67	3.68	.1	.00	44.95
381.0	44.60	3.68	.1	.00	44.88
382.0	44.53	3.68	.1	.00	44.82
383.0	44.47	3.67	.1	.00	44.75
384.0	44.40	3.67	.1	.00	44.68
385.0	44.33	3.66	.1	.00	44.61
386.0	44.27	3.66	.1	.00	44.55
387.0	44.20	3.65	.1	.00	44.48
388.0	44.13	3.65	.1	.00	44.41
389.0	44.07	3.65	.1	.00	44.34

390.0	44.00	3.64	.1	.00	44.28
391.0	43.93	3.64	.1	.00	44.21
392.0	43.87	3.63	.1	.00	44.14
393.0	43.80	3.63	.1	.00	44.08
394.0	43.73	3.63	.1	.00	44.01
395.0	43.67	3.62	.1	.00	43.94
396.0	43.60	3.62	.1	.00	43.87
397.0	43.53	3.61	.1	.00	43.81
398.0	43.47	3.61	.1	.00	43.74
399.0	43.40	3.60	.1	.00	43.67
400.0	43.33	3.60	.1	.00	43.61
401.0	43.27	3.60	.1	.00	43.54
402.0	43.20	3.59	.1	.00	43.47
403.0	43.13	3.59	.1	.00	43.41
404.0	43.07	3.58	.1	.00	43.34
405.0	43.00	3.58	.1	.00	43.27
406.0	42.93	3.58	.1	.00	43.21
407.0	42.87	3.57	.1	.00	43.14
408.0	42.80	3.57	.1	.00	43.07
409.0	42.73	3.56	.1	.00	43.00
410.0	42.67	3.56	.1	.00	42.94
411.0	42.60	3.55	.1	.00	42.87
412.0	42.53	3.55	.1	.00	42.80
413.0	42.47	3.55	.1	.00	42.74
414.0	42.40	3.54	.1	.00	42.67
415.0	42.33	3.54	.1	.00	42.60
416.0	42.27	3.53	.1	.00	42.54
417.0	42.20	3.53	.1	.00	42.47
418.0	42.13	3.53	.1	.00	42.40
419.0	42.07	3.52	.1	.00	42.33
420.0	42.00	3.52	.1	.00	42.27
421.0	41.90	3.51	.1	.00	42.20
422.0	41.80	3.51	.1	.00	42.12
423.0	41.70	3.50	.1	-.01	42.04
424.0	41.60	3.50	.1	-.01	41.95
425.0	41.50	3.49	.1	-.01	41.86
426.0	41.40	3.49	.1	-.01	41.77
427.0	41.30	3.48	.1	-.01	41.67
428.0	41.20	3.47	.1	-.01	41.58
429.0	41.10	3.47	.1	-.01	41.48
430.0	41.00	3.46	.1	-.01	41.38
431.0	40.90	3.46	.1	-.01	41.29
432.0	40.80	3.45	.1	-.01	41.19
433.0	40.70	3.44	.1	-.01	41.09
434.0	40.60	3.44	.1	-.01	40.99
435.0	40.50	3.43	.1	-.01	40.89
436.0	40.40	3.42	.1	-.01	40.79
437.0	40.30	3.42	.1	-.01	40.69
438.0	40.20	3.41	.1	-.01	40.59
439.0	40.10	3.41	.1	-.01	40.49
440.0	40.00	3.40	.1	-.01	40.39
441.0	39.90	3.39	.1	-.01	40.29
442.0	39.80	3.39	.1	-.01	40.19
443.0	39.70	3.38	.1	-.01	40.09
444.0	39.60	3.37	.1	-.01	39.98
445.0	39.50	3.37	.1	-.01	39.88
446.0	39.40	3.36	.1	-.01	39.78
447.0	39.30	3.36	.1	-.01	39.68
448.0	39.20	3.35	.1	-.01	39.58
449.0	39.10	3.34	.1	-.01	39.48

450.0	39.00	3.34	.1	-.01	39.38
451.0	38.90	3.33	.1	-.01	39.28
452.0	38.80	3.32	.1	-.01	39.18
453.0	38.70	3.32	.1	-.01	39.08
454.0	38.60	3.31	.1	-.01	38.98
455.0	38.50	3.30	.1	-.01	38.88
456.0	38.40	3.30	.1	-.01	38.78
457.0	38.30	3.29	.1	-.01	38.68
458.0	38.20	3.29	.1	-.01	38.58
459.0	38.10	3.28	.1	-.01	38.47
460.0	38.00	3.27	.1	-.01	38.37
461.0	37.90	3.27	.1	-.01	38.27
462.0	37.80	3.26	.1	-.01	38.17
463.0	37.70	3.25	.1	-.01	38.07
464.0	37.60	3.25	.1	-.01	37.97
465.0	37.50	3.24	.1	-.01	37.87
466.0	37.40	3.24	.1	-.01	37.77
467.0	37.30	3.23	.1	-.01	37.67
468.0	37.20	3.22	.1	-.01	37.57
469.0	37.10	3.22	.1	-.01	37.47
470.0	37.00	3.21	.1	-.01	37.37
471.0	36.90	3.20	.1	-.01	37.27
472.0	36.80	3.20	.1	-.01	37.17
473.0	36.70	3.19	.1	-.01	37.06
474.0	36.60	3.19	.1	-.01	36.96
475.0	36.50	3.18	.1	-.01	36.86
476.0	36.40	3.17	.1	-.01	36.76
477.0	36.30	3.17	.1	-.01	36.66
478.0	36.20	3.16	.1	-.01	36.56
479.0	36.10	3.15	.1	-.01	36.46
480.0	36.00	3.15	.1	-.01	36.36
481.0	35.92	3.14	.1	-.01	36.26
482.0	35.83	3.14	.1	-.01	36.17
483.0	35.75	3.13	.1	-.01	36.07
484.0	35.67	3.12	.1	-.01	35.98
485.0	35.58	3.12	.1	-.01	35.89
486.0	35.50	3.11	.1	-.01	35.81
487.0	35.42	3.11	.1	-.01	35.72
488.0	35.33	3.10	.1	-.01	35.63
489.0	35.25	3.10	.1	-.01	35.55
490.0	35.17	3.09	.1	-.01	35.46
491.0	35.08	3.09	.1	-.01	35.38
492.0	35.00	3.08	.1	-.01	35.30
493.0	34.92	3.08	.1	-.01	35.21
494.0	34.83	3.07	.1	-.01	35.13
495.0	34.75	3.07	.1	-.01	35.04
496.0	34.67	3.06	.1	-.01	34.96
497.0	34.58	3.05	.1	-.01	34.87
498.0	34.50	3.05	.1	-.01	34.79
499.0	34.42	3.04	.1	-.01	34.71
500.0	34.33	3.04	.1	-.01	34.62
501.0	34.25	3.03	.1	-.01	34.54
502.0	34.17	3.03	.1	-.01	34.45
503.0	34.08	3.02	.1	-.01	34.37
504.0	34.00	3.02	.1	-.01	34.29
505.0	33.92	3.01	.1	-.01	34.20
506.0	33.83	3.01	.1	-.01	34.12
507.0	33.75	3.00	.1	-.01	34.04
508.0	33.67	3.00	.1	-.01	33.95
509.0	33.58	2.99	.1	-.01	33.87

510.0	33.50	2.99	.1	-.01	33.78
511.0	33.42	2.98	.1	-.01	33.70
512.0	33.33	2.98	.1	-.01	33.62
513.0	33.25	2.97	.1	-.01	33.53
514.0	33.17	2.97	.1	-.01	33.45
515.0	33.08	2.96	.1	-.01	33.36
516.0	33.00	2.96	.1	-.01	33.28
517.0	32.92	2.95	.1	-.01	33.20
518.0	32.83	2.94	.1	-.01	33.11
519.0	32.75	2.94	.1	-.01	33.03
520.0	32.67	2.93	.1	-.01	32.95
521.0	32.58	2.93	.1	-.01	32.86
522.0	32.50	2.92	.1	-.01	32.78
523.0	32.42	2.92	.1	-.01	32.69
524.0	32.33	2.91	.1	-.01	32.61
525.0	32.25	2.91	.1	-.01	32.53
526.0	32.17	2.90	.1	-.01	32.44
527.0	32.08	2.90	.1	-.01	32.36
528.0	32.00	2.89	.1	-.01	32.28
529.0	31.92	2.89	.1	-.01	32.19
530.0	31.83	2.88	.1	-.01	32.11
531.0	31.75	2.88	.1	-.01	32.02
532.0	31.67	2.87	.1	-.01	31.94
533.0	31.58	2.87	.1	-.01	31.86
534.0	31.50	2.86	.1	-.01	31.77
535.0	31.42	2.86	.1	-.01	31.69
536.0	31.33	2.85	.1	-.01	31.60
537.0	31.25	2.85	.1	-.01	31.52
538.0	31.17	2.84	.1	-.01	31.44
539.0	31.08	2.83	.1	-.01	31.35
540.0	31.00	2.83	.1	-.01	31.27
541.0	30.97	2.82	.1	.00	31.19
542.0	30.93	2.82	.1	.00	31.13
543.0	30.90	2.82	.1	.00	31.07
544.0	30.87	2.81	.1	.00	31.02
545.0	30.83	2.81	.1	.00	30.97
546.0	30.80	2.81	.1	.00	30.93
547.0	30.77	2.81	.1	.00	30.89
548.0	30.73	2.80	.1	.00	30.85
549.0	30.70	2.80	.1	.00	30.82
550.0	30.67	2.80	.1	.00	30.78
551.0	30.63	2.80	.1	.00	30.74
552.0	30.60	2.79	.1	.00	30.71
553.0	30.57	2.79	.1	.00	30.68
554.0	30.53	2.79	.1	.00	30.64
555.0	30.50	2.79	.1	.00	30.61
556.0	30.47	2.79	.1	.00	30.57
557.0	30.43	2.78	.1	.00	30.54
558.0	30.40	2.78	.1	.00	30.51
559.0	30.37	2.78	.1	.00	30.47
560.0	30.33	2.78	.1	.00	30.44
561.0	30.30	2.78	.1	.00	30.41
562.0	30.27	2.77	.1	.00	30.37
563.0	30.23	2.77	.1	.00	30.34
564.0	30.20	2.77	.1	.00	30.30
565.0	30.17	2.77	.1	.00	30.27
566.0	30.13	2.76	.1	.00	30.24
567.0	30.10	2.76	.1	.00	30.20
568.0	30.07	2.76	.1	.00	30.17
569.0	30.03	2.76	.1	.00	30.14

570.0	30.00	2.76	.1	.00	30.10
571.0	29.97	2.75	.1	.00	30.07
572.0	29.93	2.75	.1	.00	30.04
573.0	29.90	2.75	.1	.00	30.00
574.0	29.87	2.75	.1	.00	29.97
575.0	29.83	2.75	.1	.00	29.94
576.0	29.80	2.74	.1	.00	29.90
577.0	29.77	2.74	.1	.00	29.87
578.0	29.73	2.74	.1	.00	29.84
579.0	29.70	2.74	.1	.00	29.80
580.0	29.67	2.74	.1	.00	29.77
581.0	29.63	2.73	.1	.00	29.74
582.0	29.60	2.73	.1	.00	29.70
583.0	29.57	2.73	.1	.00	29.67
584.0	29.53	2.73	.1	.00	29.64
585.0	29.50	2.73	.1	.00	29.60
586.0	29.47	2.72	.1	.00	29.57
587.0	29.43	2.72	.1	.00	29.54
588.0	29.40	2.72	.1	.00	29.50
589.0	29.37	2.72	.1	.00	29.47
590.0	29.33	2.71	.1	.00	29.44
591.0	29.30	2.71	.1	.00	29.40
592.0	29.27	2.71	.1	.00	29.37
593.0	29.23	2.71	.1	.00	29.34
594.0	29.20	2.71	.1	.00	29.30
595.0	29.17	2.70	.1	.00	29.27
596.0	29.13	2.70	.1	.00	29.24
597.0	29.10	2.70	.1	.00	29.20
598.0	29.07	2.70	.1	.00	29.17
599.0	29.03	2.70	.1	.00	29.14
600.0	29.00	2.69	.1	.00	29.10
601.0	28.97	2.69	.1	.00	29.07
602.0	28.93	2.69	.1	.00	29.04
603.0	28.90	2.69	.1	.00	29.00
604.0	28.87	2.69	.1	.00	28.97
605.0	28.83	2.68	.1	.00	28.93
606.0	28.80	2.68	.1	.00	28.90
607.0	28.77	2.68	.1	.00	28.87
608.0	28.73	2.68	.1	.00	28.83
609.0	28.70	2.68	.1	.00	28.80
610.0	28.67	2.67	.1	.00	28.77
611.0	28.63	2.67	.1	.00	28.73
612.0	28.60	2.67	.1	.00	28.70
613.0	28.57	2.67	.1	.00	28.67
614.0	28.53	2.66	.1	.00	28.63
615.0	28.50	2.66	.1	.00	28.60
616.0	28.47	2.66	.1	.00	28.57
617.0	28.43	2.66	.1	.00	28.53
618.0	28.40	2.66	.1	.00	28.50
619.0	28.37	2.65	.1	.00	28.47
620.0	28.33	2.65	.1	.00	28.43
621.0	28.30	2.65	.1	.00	28.40
622.0	28.27	2.65	.1	.00	28.37
623.0	28.23	2.65	.1	.00	28.33
624.0	28.20	2.64	.1	.00	28.30
625.0	28.17	2.64	.1	.00	28.27
626.0	28.13	2.64	.1	.00	28.23
627.0	28.10	2.64	.1	.00	28.20
628.0	28.07	2.64	.1	.00	28.17
629.0	28.03	2.63	.1	.00	28.13

630.0	28.00	2.63	.1	.00	28.10
631.0	27.97	2.63	.1	.00	28.07
632.0	27.93	2.63	.1	.00	28.03
633.0	27.90	2.62	.1	.00	28.00
634.0	27.87	2.62	.1	.00	27.97
635.0	27.83	2.62	.1	.00	27.93
636.0	27.80	2.62	.1	.00	27.90
637.0	27.77	2.62	.1	.00	27.87
638.0	27.73	2.61	.1	.00	27.83
639.0	27.70	2.61	.1	.00	27.80
640.0	27.67	2.61	.1	.00	27.77
641.0	27.63	2.61	.1	.00	27.73
642.0	27.60	2.61	.1	.00	27.70
643.0	27.57	2.60	.1	.00	27.67
644.0	27.53	2.60	.1	.00	27.63
645.0	27.50	2.60	.1	.00	27.60
646.0	27.47	2.60	.1	.00	27.56
647.0	27.43	2.60	.1	.00	27.53
648.0	27.40	2.59	.1	.00	27.50
649.0	27.37	2.59	.1	.00	27.46
650.0	27.33	2.59	.1	.00	27.43
651.0	27.30	2.59	.1	.00	27.40
652.0	27.27	2.59	.1	.00	27.36
653.0	27.23	2.58	.1	.00	27.33
654.0	27.20	2.58	.1	.00	27.30
655.0	27.17	2.58	.1	.00	27.26
656.0	27.13	2.58	.1	.00	27.23
657.0	27.10	2.57	.1	.00	27.20
658.0	27.07	2.57	.1	.00	27.16
659.0	27.03	2.57	.1	.00	27.13
660.0	27.00	2.57	.1	.00	27.10
661.0	26.89	2.57	.1	.00	27.05
662.0	26.77	2.56	.1	.00	26.99
663.0	26.66	2.56	.1	.00	26.91
664.0	26.55	2.55	.1	-.01	26.82
665.0	26.44	2.55	.1	-.01	26.72
666.0	26.33	2.54	.1	-.01	26.62
667.0	26.21	2.53	.1	-.01	26.52
668.0	26.10	2.53	.1	-.01	26.41
669.0	25.99	2.52	.1	-.01	26.30
670.0	25.88	2.51	.1	-.01	26.19
671.0	25.76	2.50	.1	-.01	26.08
672.0	25.65	2.50	.1	-.01	25.97
673.0	25.54	2.49	.1	-.01	25.86
674.0	25.42	2.48	.1	-.01	25.74
675.0	25.31	2.48	.1	-.01	25.63
676.0	25.20	2.47	.1	-.01	25.52
677.0	25.09	2.46	.1	-.01	25.40
678.0	24.98	2.46	.1	-.01	25.29
679.0	24.86	2.45	.1	-.01	25.18
680.0	24.75	2.44	.1	-.01	25.06
681.0	24.64	2.43	.1	-.01	24.95
682.0	24.52	2.43	.1	-.01	24.84
683.0	24.41	2.42	.1	-.01	24.72
684.0	24.30	2.41	.1	-.01	24.61
685.0	24.19	2.41	.1	-.01	24.50
686.0	24.08	2.40	.1	-.01	24.38
687.0	23.96	2.39	.1	-.01	24.27
688.0	23.85	2.38	.1	-.01	24.16
689.0	23.74	2.38	.1	-.01	24.04

690.0	23.63	2.37	.1	-.01	23.93
691.0	23.51	2.36	.1	-.01	23.82
692.0	23.40	2.36	.1	-.01	23.70
693.0	23.29	2.35	.1	-.01	23.59
694.0	23.17	2.34	.1	-.01	23.48
695.0	23.06	2.34	.1	-.01	23.36
696.0	22.95	2.33	.1	-.01	23.25
697.0	22.84	2.32	.1	-.01	23.14
698.0	22.73	2.31	.1	-.01	23.02
699.0	22.61	2.31	.1	-.01	22.91
700.0	22.50	2.30	.1	-.01	22.80
701.0	22.39	2.29	.1	-.01	22.68
702.0	22.27	2.29	.1	-.01	22.57
703.0	22.16	2.28	.1	-.01	22.46
704.0	22.05	2.27	.1	-.01	22.34
705.0	21.94	2.26	.1	-.01	22.23
706.0	21.83	2.26	.1	-.01	22.12
707.0	21.71	2.25	.1	-.01	22.00
708.0	21.60	2.24	.1	-.01	21.89
709.0	21.49	2.24	.1	-.01	21.78
710.0	21.38	2.23	.1	-.01	21.66
711.0	21.26	2.22	.1	-.01	21.55
712.0	21.15	2.21	.1	-.01	21.43
713.0	21.04	2.21	.1	-.01	21.32
714.0	20.92	2.20	.1	-.01	21.21
715.0	20.81	2.19	.1	-.01	21.09
716.0	20.70	2.19	.1	-.01	20.98
717.0	20.59	2.18	.1	-.01	20.87
718.0	20.48	2.17	.1	-.01	20.75
719.0	20.36	2.17	.1	-.01	20.64
720.0	20.25	2.16	.1	-.01	20.53
721.0	20.14	2.15	.1	-.01	20.41
722.0	20.02	2.14	.1	-.01	20.30
723.0	19.91	2.14	.1	-.01	20.19
724.0	19.80	2.13	.1	-.01	20.07
725.0	19.69	2.12	.1	-.01	19.96
726.0	19.58	2.12	.1	-.01	19.85
727.0	19.46	2.11	.1	-.01	19.73
728.0	19.35	2.10	.1	-.01	19.62
729.0	19.24	2.09	.1	-.01	19.51
730.0	19.13	2.09	.1	-.01	19.39
731.0	19.01	2.08	.1	-.01	19.28
732.0	18.90	2.07	.1	-.01	19.17
733.0	18.79	2.07	.1	-.01	19.05
734.0	18.67	2.06	.1	-.01	18.94
735.0	18.56	2.05	.1	-.01	18.83
736.0	18.45	2.04	.1	-.01	18.71
737.0	18.34	2.04	.1	-.01	18.60
738.0	18.23	2.03	.1	-.01	18.49
739.0	18.11	2.02	.1	-.01	18.37
740.0	18.00	2.02	.1	-.01	18.26
741.0	17.89	2.01	.1	-.01	18.15
742.0	17.77	2.00	.1	-.01	18.03
743.0	17.66	1.99	.0	-.01	17.95
744.0	17.55	1.99	.0	-.01	17.87
745.0	17.44	1.98	.0	-.01	17.79
746.0	17.33	1.97	.0	-.01	17.70
747.0	17.21	1.96	.0	-.01	17.60
748.0	17.10	1.94	.0	-.01	17.50
749.0	16.99	1.93	.0	-.01	17.40

750.0	16.88	1.92	.0	-.01	17.29
751.0	16.76	1.91	.0	-.01	17.19
752.0	16.65	1.90	.0	-.01	17.08
753.0	16.54	1.88	.0	-.01	16.96
754.0	16.42	1.87	.0	-.01	16.85
755.0	16.31	1.86	.0	-.01	16.74
756.0	16.20	1.85	.0	-.01	16.63
757.0	16.09	1.84	.0	-.01	16.52
758.0	15.98	1.82	.0	-.01	16.40
759.0	15.86	1.81	.0	-.01	16.29
760.0	15.75	1.80	.0	-.01	16.17
761.0	15.64	1.78	.0	-.01	16.06
762.0	15.52	1.77	.0	-.01	15.94
763.0	15.41	1.76	.0	-.01	15.83
764.0	15.30	1.75	.0	-.01	15.72
765.0	15.19	1.73	.0	-.01	15.60
766.0	15.07	1.72	.0	-.01	15.49
767.0	14.96	1.71	.0	-.01	15.37
768.0	14.85	1.70	.0	-.01	15.26
769.0	14.74	1.68	.0	-.01	15.14
770.0	14.63	1.67	.0	-.01	15.03
771.0	14.51	1.66	.0	-.01	14.91
772.0	14.40	1.64	.0	-.01	14.80
773.0	14.29	1.63	.0	-.01	14.68
774.0	14.18	1.62	.0	-.01	14.57
775.0	14.06	1.61	.0	-.01	14.45
776.0	13.95	1.59	.0	-.01	14.34
777.0	13.84	1.58	.0	-.01	14.22
778.0	13.72	1.57	.0	-.01	14.11
779.0	13.61	1.55	.0	-.01	13.99
780.0	13.50	1.54	.0	-.01	13.88
781.0	13.39	1.53	.0	-.01	13.76
782.0	13.28	1.52	.0	-.01	13.65
783.0	13.16	1.50	.0	-.01	13.53
784.0	13.05	1.49	.0	-.01	13.42
785.0	12.94	1.48	.0	-.01	13.30
786.0	12.83	1.47	.0	-.01	13.19
787.0	12.71	1.45	.0	-.01	13.07
788.0	12.60	1.44	.0	-.01	12.96
789.0	12.49	1.43	.0	-.01	12.84
790.0	12.37	1.41	.0	-.01	12.73
791.0	12.26	1.40	.0	-.01	12.62
792.0	12.15	1.39	.0	-.01	12.50
793.0	12.04	1.38	.0	-.01	12.39
794.0	11.93	1.36	.0	-.01	12.27
795.0	11.81	1.35	.0	-.01	12.16
796.0	11.70	1.34	.0	-.01	12.04
797.0	11.59	1.33	.0	-.01	11.93
798.0	11.48	1.31	.0	-.01	11.81
799.0	11.36	1.30	.0	-.01	11.70
800.0	11.25	1.29	.0	-.01	11.58
801.0	11.14	1.27	.0	-.01	11.47
802.0	11.03	1.26	.0	-.01	11.35
803.0	10.91	1.25	.0	-.01	11.24
804.0	10.80	1.24	.0	-.01	11.12
805.0	10.69	1.22	.0	-.01	11.01
806.0	10.57	1.21	.0	-.01	10.89
807.0	10.46	1.20	.0	-.01	10.78
808.0	10.35	1.18	.0	-.01	10.66
809.0	10.24	1.17	.0	-.01	10.55

810.0	10.13	1.16	.0	-.01	10.43
811.0	10.01	1.15	.0	-.01	10.32
812.0	9.90	1.13	.0	-.01	10.20
813.0	9.79	1.12	.0	-.01	10.09
814.0	9.68	1.11	.0	-.01	9.97
815.0	9.56	1.10	.0	-.01	9.86
816.0	9.45	1.08	.0	-.01	9.74
817.0	9.34	1.07	.0	-.01	9.63
818.0	9.22	1.06	.0	-.01	9.51
819.0	9.11	1.04	.0	-.01	9.40
820.0	9.00	1.03	.0	-.01	9.28
821.0	8.89	1.02	.0	-.01	9.17
822.0	8.77	1.01	.0	-.01	9.05
823.0	8.66	.99	.0	-.01	8.94
824.0	8.55	.98	.0	-.01	8.82
825.0	8.44	.97	.0	-.01	8.71
826.0	8.32	.95	.0	-.01	8.59
827.0	8.21	.94	.0	-.01	8.48
828.0	8.10	.93	.0	-.01	8.37
829.0	7.99	.92	.0	-.01	8.25
830.0	7.88	.90	.0	-.01	8.14
831.0	7.76	.89	.0	-.01	8.02
832.0	7.65	.88	.0	-.01	7.91
833.0	7.54	.87	.0	-.01	7.79
834.0	7.42	.85	.0	-.01	7.68
835.0	7.31	.84	.0	-.01	7.56
836.0	7.20	.83	.0	-.01	7.45
837.0	7.09	.81	.0	-.01	7.33
838.0	6.97	.80	.0	-.01	7.22
839.0	6.86	.79	.0	-.01	7.10
840.0	6.75	.78	.0	-.01	6.99
841.0	6.64	.76	.0	-.01	6.87
842.0	6.53	.75	.0	-.01	6.76
843.0	6.41	.74	.0	-.01	6.64
844.0	6.30	.73	.0	-.01	6.53
845.0	6.19	.71	.0	-.01	6.41
846.0	6.08	.70	.0	-.01	6.30
847.0	5.96	.69	.0	-.01	6.18
848.0	5.85	.67	.0	-.01	6.07
849.0	5.74	.66	.0	-.01	5.95
850.0	5.62	.65	.0	-.01	5.84
851.0	5.51	.64	.0	-.01	5.72
852.0	5.40	.62	.0	-.01	5.61
853.0	5.29	.61	.0	-.01	5.49
854.0	5.17	.60	.0	-.01	5.38
855.0	5.06	.58	.0	-.01	5.26
856.0	4.95	.57	.0	-.01	5.15
857.0	4.84	.56	.0	-.01	5.03
858.0	4.73	.55	.0	-.01	4.92
859.0	4.61	.53	.0	-.01	4.80
860.0	4.50	.52	.0	-.01	4.69
861.0	4.39	.51	.0	-.01	4.57
862.0	4.28	.50	.0	-.01	4.46
863.0	4.16	.48	.0	-.01	4.34
864.0	4.05	.47	.0	-.01	4.23
865.0	3.94	.46	.0	-.01	4.12
866.0	3.82	.44	.0	-.01	4.00
867.0	3.71	.43	.0	-.01	3.89
868.0	3.60	.42	.0	-.01	3.77
869.0	3.49	.41	.0	-.01	3.66

870.0	3.38	.39	.0	-.01	3.54
871.0	3.26	.38	.0	-.01	3.43
872.0	3.15	.37	.0	-.01	3.31
873.0	3.04	.36	.0	-.01	3.20
874.0	2.93	.34	.0	-.01	3.08
875.0	2.81	.33	.0	-.01	2.97
876.0	2.70	.32	.0	-.01	2.85
877.0	2.59	.30	.0	-.01	2.74
878.0	2.47	.29	.0	-.01	2.62
879.0	2.36	.28	.0	-.01	2.51
880.0	2.25	.27	.0	-.01	2.39
881.0	2.14	.25	.0	-.01	2.28
882.0	2.02	.24	.0	-.01	2.16
883.0	1.91	.23	.0	-.01	2.05
884.0	1.80	.21	.0	-.01	1.93
885.0	1.69	.20	.0	-.01	1.82
886.0	1.58	.19	.0	-.01	1.70
887.0	1.46	.18	.0	-.01	1.59
888.0	1.35	.16	.0	-.01	1.47
889.0	1.24	.15	.0	-.01	1.36
890.0	1.13	.14	.0	-.01	1.24
891.0	1.01	.13	.0	-.01	1.13
892.0	.90	.11	.0	-.01	1.01
893.0	.79	.10	.0	-.01	.90
894.0	.67	.09	.0	-.01	.78
895.0	.56	.07	.0	-.01	.67
896.0	.45	.06	.0	-.01	.55
897.0	.34	.05	.0	-.01	.44
898.0	.22	.04	.0	-.01	.32
899.0	.11	.02	.0	-.01	.21
900.0	.00	.01	.0	-.01	.09
901.0	.00	.00	.0	-.01	.03
902.0	.00	.00	.0	.00	.01
903.0	.00	.00	.0	.00	.00
904.0	.00	.00	.0	.00	.00
905.0	.00	.00	.0	.00	.00
906.0	.00	.00	.0	.00	.00
907.0	.00	.00	.0	.00	.00
908.0	.00	.00	.0	.00	.00
909.0	.00	.00	.0	.00	.00
910.0	.00	.00	.0	.00	.00
911.0	.00	.00	.0	.00	.00
912.0	.00	.00	.0	.00	.00
913.0	.00	.00	.0	.00	.00
914.0	.00	.00	.0	.00	.00
915.0	.00	.00	.0	.00	.00
916.0	.00	.00	.0	.00	.00
917.0	.00	.00	.0	.00	.00
918.0	.00	.00	.0	.00	.00
919.0	.00	.00	.0	.00	.00
920.0	.00	.00	.0	.00	.00
921.0	.00	.00	.0	.00	.00
922.0	.00	.00	.0	.00	.00
923.0	.00	.00	.0	.00	.00
924.0	.00	.00	.0	.00	.00
925.0	.00	.00	.0	.00	.00
926.0	.00	.00	.0	.00	.00
927.0	.00	.00	.0	.00	.00
928.0	.00	.00	.0	.00	.00
929.0	.00	.00	.0	.00	.00

930.0	.00	.00	.0	.00	.00
931.0	.00	.00	.0	.00	.00
932.0	.00	.00	.0	.00	.00
933.0	.00	.00	.0	.00	.00
934.0	.00	.00	.0	.00	.00
935.0	.00	.00	.0	.00	.00
936.0	.00	.00	.0	.00	.00
937.0	.00	.00	.0	.00	.00
938.0	.00	.00	.0	.00	.00
939.0	.00	.00	.0	.00	.00
940.0	.00	.00	.0	.00	.00
941.0	.00	.00	.0	.00	.00
942.0	.00	.00	.0	.00	.00
943.0	.00	.00	.0	.00	.00
944.0	.00	.00	.0	.00	.00
945.0	.00	.00	.0	.00	.00
946.0	.00	.00	.0	.00	.00
947.0	.00	.00	.0	.00	.00
948.0	.00	.00	.0	.00	.00
949.0	.00	.00	.0	.00	.00
950.0	.00	.00	.0	.00	.00
951.0	.00	.00	.0	.00	.00
952.0	.00	.00	.0	.00	.00
953.0	.00	.00	.0	.00	.00
954.0	.00	.00	.0	.00	.00
955.0	.00	.00	.0	.00	.00
956.0	.00	.00	.0	.00	.00
957.0	.00	.00	.0	.00	.00
958.0	.00	.00	.0	.00	.00
959.0	.00	.00	.0	.00	.00
960.0	.00	.00	.0	.00	.00
961.0	.00	.00	.0	.00	.00
962.0	.00	.00	.0	.00	.00
963.0	.00	.00	.0	.00	.00
964.0	.00	.00	.0	.00	.00
965.0	.00	.00	.0	.00	.00
966.0	.00	.00	.0	.00	.00
967.0	.00	.00	.0	.00	.00
968.0	.00	.00	.0	.00	.00
969.0	.00	.00	.0	.00	.00
970.0	.00	.00	.0	.00	.00
971.0	.00	.00	.0	.00	.00
972.0	.00	.00	.0	.00	.00
973.0	.00	.00	.0	.00	.00
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987.0	.00	.00	.0	.00	.00
988.0	.00	.00	.0	.00	.00
989.0	.00	.00	.0	.00	.00

990.0	.00	.00	.0	.00	.00
991.0	.00	.00	.0	.00	.00
992.0	.00	.00	.0	.00	.00
993.0	.00	.00	.0	.00	.00
994.0	.00	.00	.0	.00	.00
995.0	.00	.00	.0	.00	.00
996.0	.00	.00	.0	.00	.00
997.0	.00	.00	.0	.00	.00
998.0	.00	.00	.0	.00	.00
999.0	.00	.00	.0	.00	.00
1000.0	.00	.00	.0	.00	.00

PEAK OUTFLOW RATE = 576.74 cfs AT TIME T = 79. min

MAXIMUM STAGE REACHED = 9.32 ft

Results Summary TABLE!

Time (Hrs)	Basin Discharge (cfs)																	
	Hills	S202	Hills+ S202	4 x 4 Rting *Note 1*	WEL	R/202	WEL + R/202	WEL + R/202 + 4 x 4 *Note 2*	WPL	WPL + WEL + R/202 + 4 x 4	RailRd 36 " Rting *Note 3*	RRND	W1	W2	W3	W4	E1	NSA
11.0	28	1	29	0	1	0	1	1	9	10	0	0	1	0	0	0	0	2
11.3	38	1	39	37	2	0	2	39	13	52	44	1	1	0	1	0	1	2
11.6	53	2	55	52	2	1	3	55	19	74	69	1	1	0	1	0	1	3
11.9	95	6	101	90	5	4	9	99	53	152	97	6	2	1	4	1	7	14
12.0	156	11	167	127	9	7	16	143	106	249	97	11	2	1	8	3	13	27
12.1	283	21	304	170	17	11	28	198	202	400	97	18	3	3	15	5	20	50
12.2	512	32	544	203	29	7	36	239	306	545	97	11	6	4	16	5	13	55
12.3	776	32	808	238	37	2	39	277	306	583	97	4	10	6	10	3	4	33
12.4	879	22	901	280	36	2	38	318	208	526	97	3	15	6	5	2	3	17
12.5	843	13	856	280	27	1	28	308	128	436	97	2	19	4	3	1	2	11
12.6	668	9	677	280	19	1	20	300	89	389	97	2	22	3	2	1	2	9
12.7	494	7	501	280	14	1	15	295	66	361	97	2	21	2	2	1	2	7
12.8	376	5	381	280	10	1	11	291	52	343	97	1	19	2	1	1	2	6
13.0	233	4	237	280	7	1	8	288	36	324	97	1	13	1	1	0	1	5
13.2	160	3	163	251	5	1	6	257	30	287	97	1	9	1	1	0	1	4
13.4	123	3	126	238	4	1	5	243	26	269	97	1	6	1	1	0	1	4
13.6	101	2	103	222	3	0	3	225	23	248	97	1	5	1	1	0	1	3
13.8	88	2	90	202	3	0	3	205	21	226	97	1	4	0	1	0	1	3
14.0	78	2	80	175	3	0	3	178	19	197	97	1	3	0	1	0	1	3
14.3	68	2	70	78	2	0	2	80	17	97	97	1	2	0	1	0	1	2
14.6	60	2	62	63	2	0	2	65	15	80	83	1	2	0	1	0	1	2
15.0	53	1	54	55	2	0	2	57	14	71	72	1	2	0	1	0	1	2
15.5	48	1	49	50	2	0	2	52	13	65	66	0	2	0	1	0	1	2
16.0	43	1	44	45	2	0	2	47	11	58	60	0	1	0	0	0	0	2
16.5	38	1	39	40	1	0	1	41	10	51	53	0	1	0	0	0	0	1
17.0	35	1	36	36	1	0	1	37	9	46	47	0	1	0	0	0	0	1
17.5	33	1	34	34	1	0	1	35	9	44	44	0	1	0	0	0	0	1
18.0	32	1	33	33	1	0	1	34	8	42	42	0	1	0	0	0	0	1
19.0	27	1	28	28	1	0	1	29	7	36	36	0	1	0	0	0	0	1
20.0	23	1	24	24	1	0	1	25	6	31	31	0	1	0	0	0	0	1
22.0	20	1	21	21	1	0	1	22	5	27	27	0	1	0	0	0	0	1
26.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Note 1 : 4' x 4' box maximum capacity = 280 cfs. Excess Flow is routed to the west (into another basin). Excess flow therefore does not contribute to north side drainage.

Note 2 : At outlet of basin WEL, flow enters dual 48 inch culverts (ADS / smooth walled). Maximum flow capacity = 260 cfs. Overflow runs via sheet flow into basin WPLANT. Therefore no routing is performed.

Note 3 : The 36" diameter steel / concrete railroad culvert has a maximum capacity of 97 cfs at full head. Excess flow drains to the east along the southern side of railroad tracks (in ditch).

SCS TR-55 Reference info.

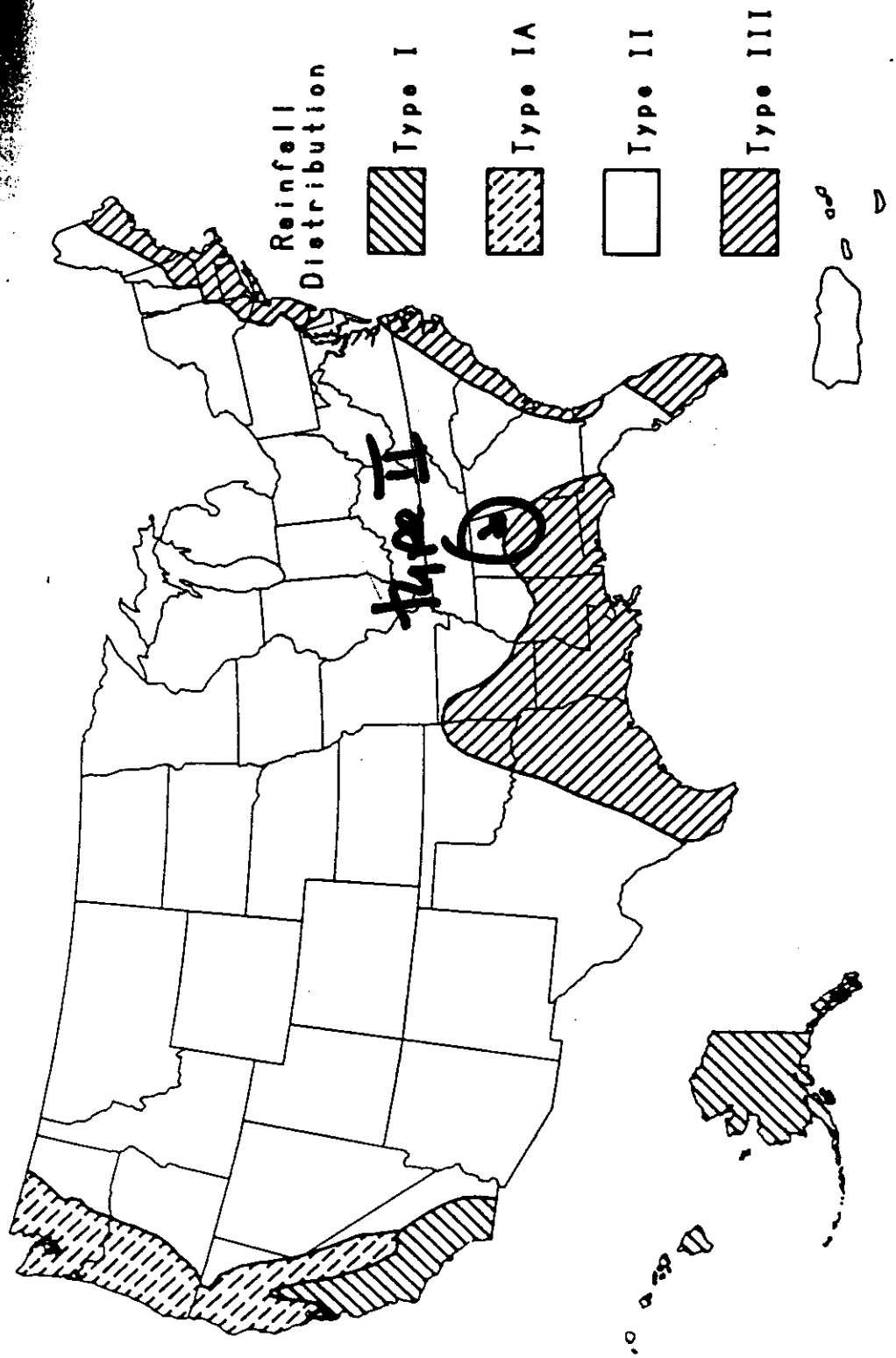


Figure B-2.—Approximate geographic boundaries for SCS rainfall distributions.

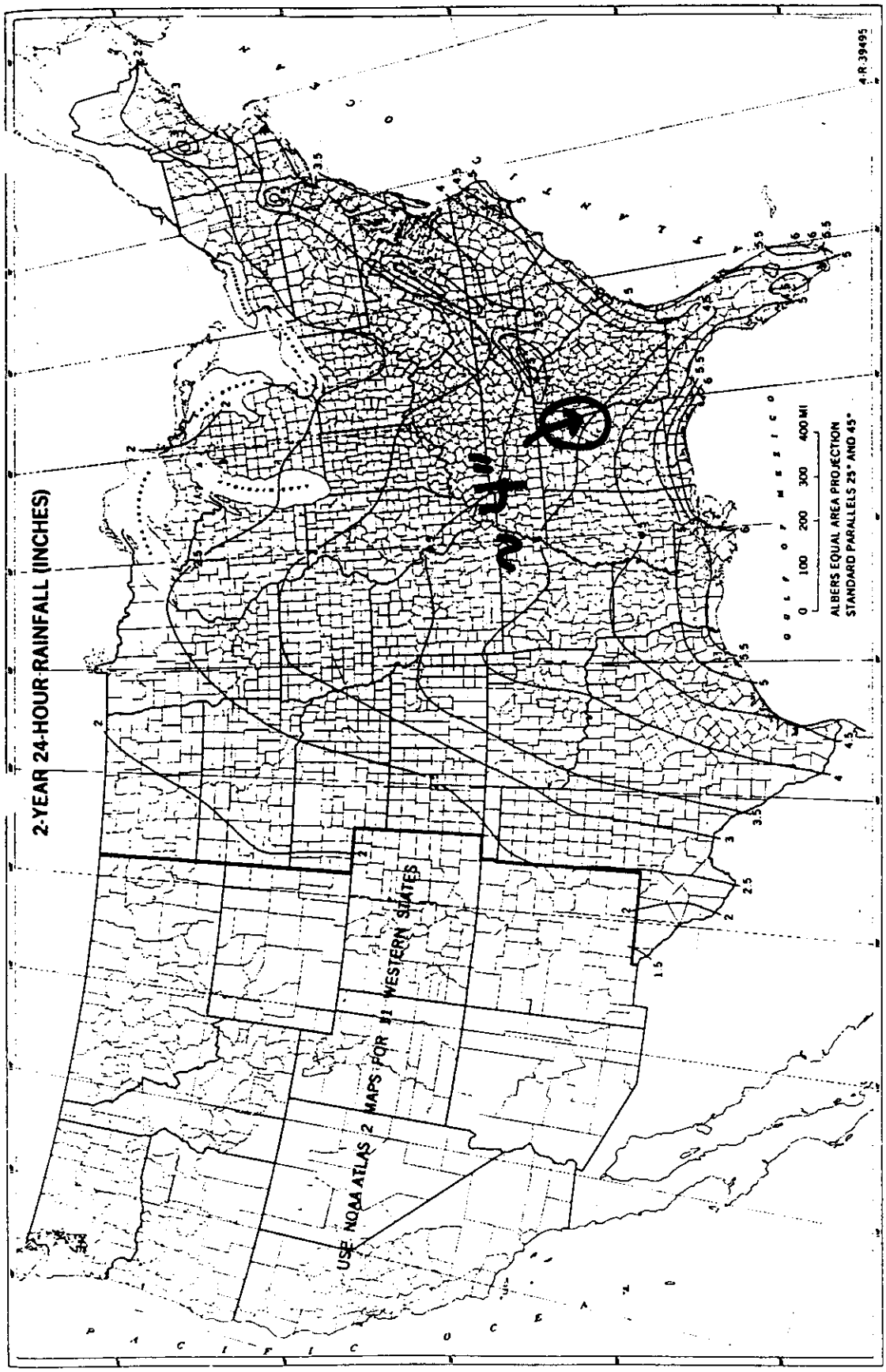


Figure B-3.—Two-year, 24-hour rainfall.

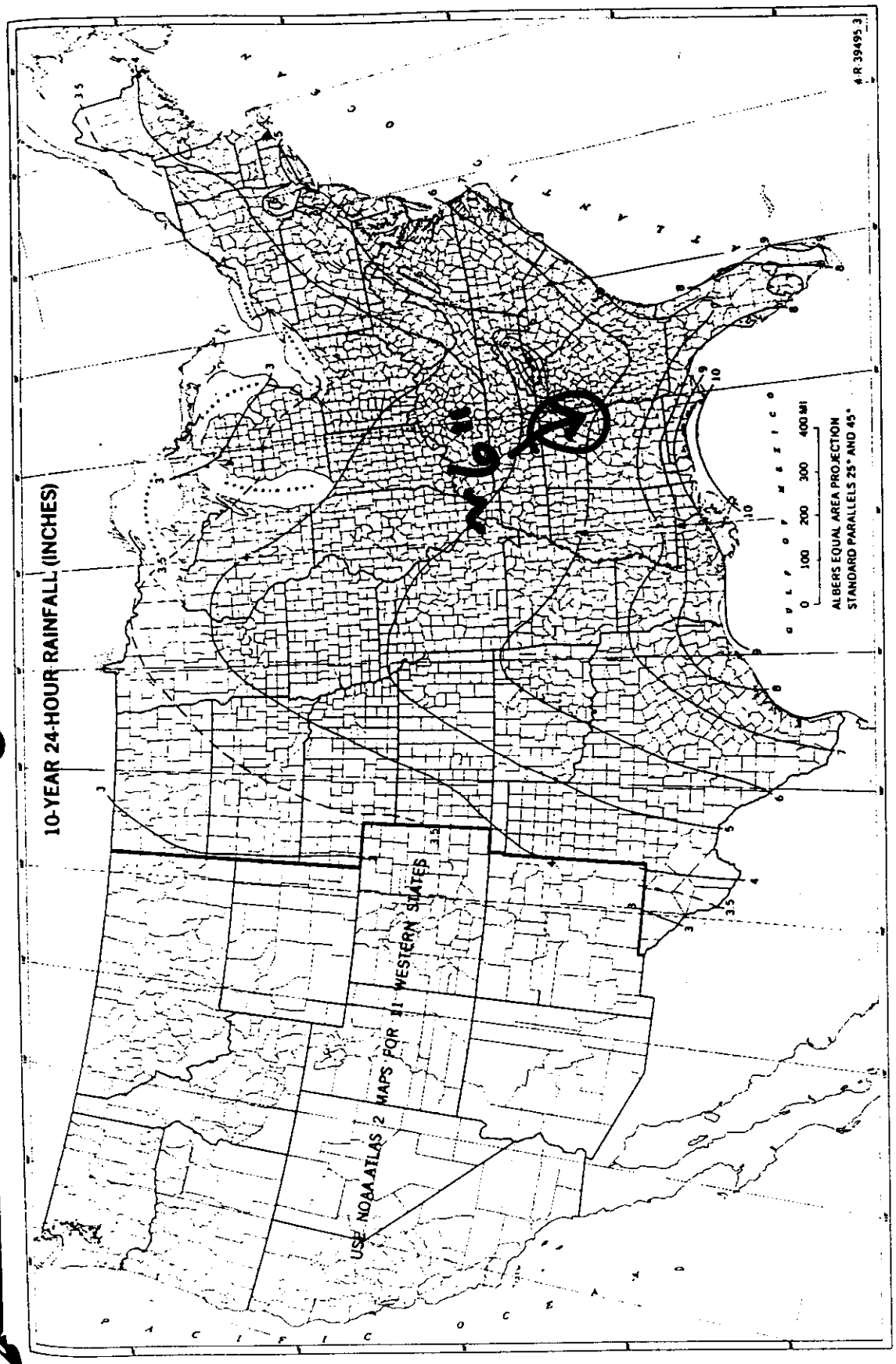


Figure B-5.—Ten-year, 24-hour rainfall.

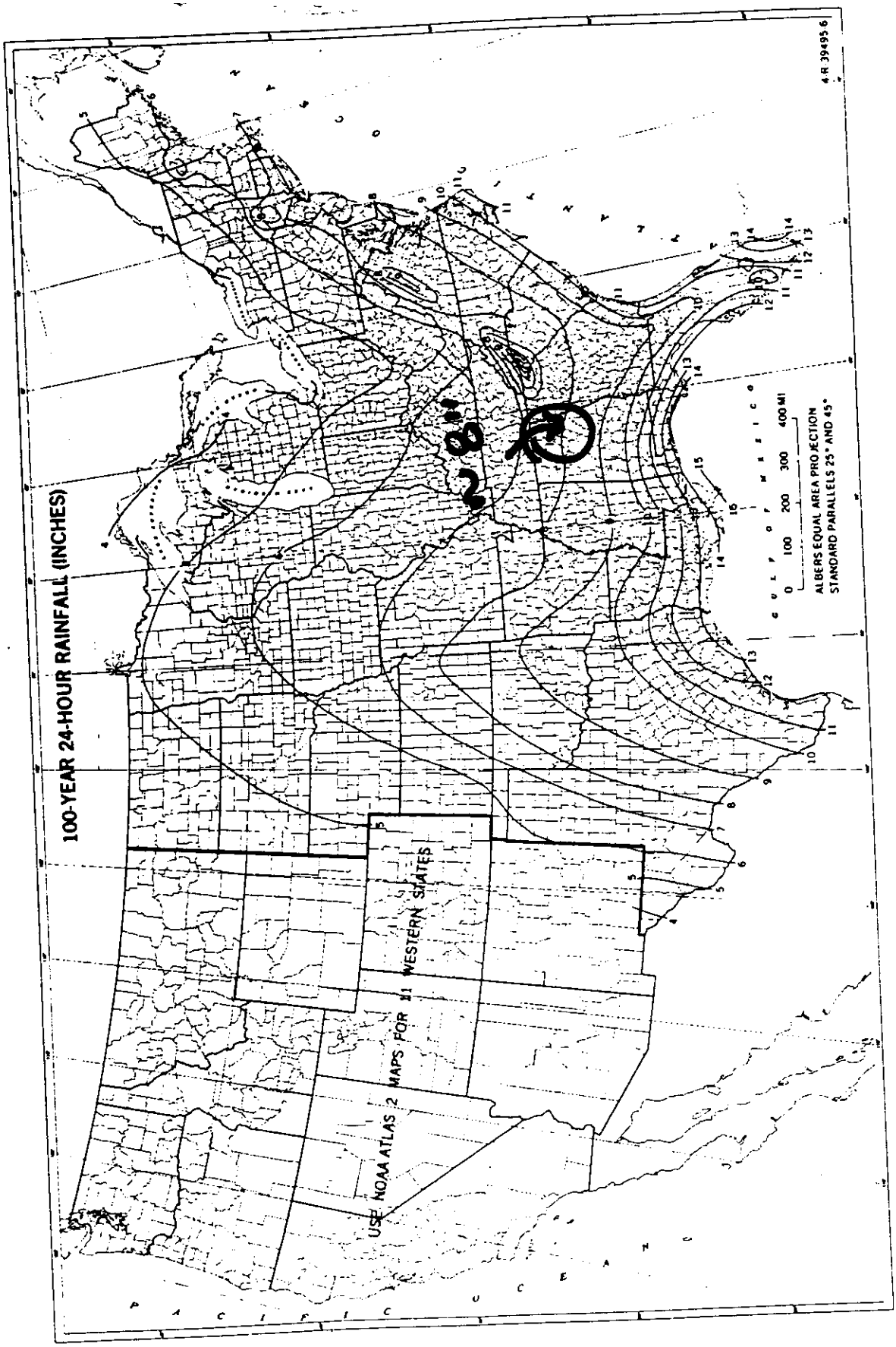


Figure B-8.—One-hundred-year, 24-hour rainfall.


School
FcC2
LsB2
AND
10th St.
104
LeA
LoA
CkC
LsB2
SOUTHERN
Drainage Basin
~ Site
PLANT
AbD3
AcB2
PkA1
AcB2
First Wesleyan
Church
Letchers
JeB2
AsA
AcC2
AbD3
AdE
JfD
JfB
PkA
The Peoples
Church
AbD3
AbC3
JeB2
JeD2
AdE
LINE

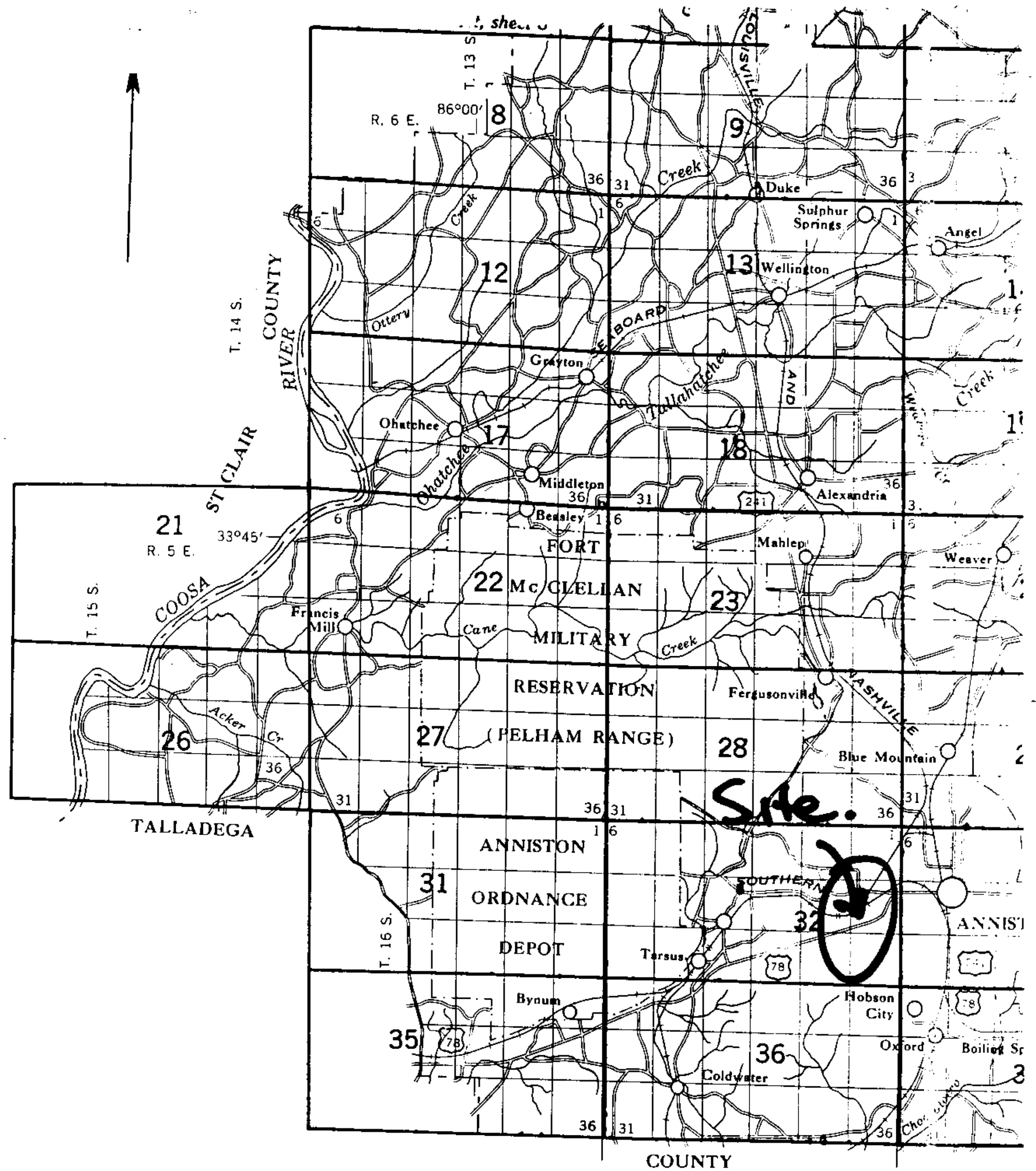
Series 1958, No. 9

Issued September 1961

SOIL SURVEY

Calhoun County Alabama

UNITED STATES DEPARTMENT OF AGRICULTURE
Soil Conservation Service
In cooperation with
ALABAMA DEPARTMENT OF AGRICULTURE AND INDUSTRIES
ALABAMA AGRICULTURAL EXPERIMENT STATION



FORT McCLELLAN MILITARY RESERVATION (PELHAM RANGE)
ANNISTON ORDNANCE DEPOT
Site.
ST CLAIR COUNTY
COOSA RIVER
TALLADEGA COUNTY
R. 6 E.
R. 5 E.
T. 13 S.
T. 14 S.
T. 15 S.
T. 16 S.
86°00′
33°45′
Duke
Sulphur Springs
Angel
Wellington
Grayton
Ohatchee
Middleton
Alexandria
Beasley
Mahlep
Weaver
Francis Mill
Fergusonville
Blue Mountain
Tarsus
Bynum
Coldwater
Hobson City
Oxford
SEABOARD
AND
NASHVILLE
SOUTHERN
Tallahatchee
Ohatchee
Otter
Cane
Creek
Acker Cr

102.

SCS Soil Info.

Soil ID	Desc.	Hyd. Group
Ss	Stony Rough Land / Sandstone	~D
JfB	Jefferson Stony fine Sandy loam	B/C
JfD	Jefferson Stony fine Sandy loam	B/C
AbD3	Anniston Gravely Clay loam	B/C
JeB2	Jefferson fine Sandy loam (gravelly)	
PkA	Philo & Stendal Soils	B/C
LcA	Lee Silt loam & Cherty silt loam	D

∴ note for conserv. use only a C or a D designator as appropriate in TR 55 analysis.

> Area where cover = Type D Always.

OBJECTIVE:

Est. Flow Into 10th St. 2' x 5' Box Culvert.

Methods:

Use Hydrology info + Pond info (from O'Brien & Gere)
+ Box Culvert Capacity Equations.

Results:

Flow (peak) to Box Culvert ~ 100 cfs.

Box Culvert Capacity ~ 100 cfs

∴ System OK thru 100-yr. storm event.

inflow hydrograph {good for either option — (pond A used here)}

Time (hrs)	Q cfs RR	RRND	NSA	Σ =
11.0	0	0	2	2
11.3	44	1	2	47
11.6	69	1	3	73
11.9	97	6	14	117
12.0	97	11	27	135
12.1	97	18	50	165
12.2	97	11	55	163
12.3	97	4	33	134
12.4	97	3	17	117
12.5	97	2	11	110
12.6	97	2	9	108
12.7	97	2	7	106
12.8	97	1	6	104
13.0	97	1	5	103
13.2	97	1	4	102
13.4	97	1	4	102
13.6	97	1	3	101
13.8	97	1	3	101
14.0	97	1	3	101
14.3	97	1	2	100
14.6	83	1	2	86
15.0	72	1	2	75

Cont. next pg

Time (cont)	Q RR	RRND	NSA	Σ
15.5	66	0	2	68
16.0	60	0	1	61
16.5	53	0	1	54
17.0	47	0	1	48
17.5	44	0	1	45
18.0	42	0	1	43
19.0	36	0	1	37
20.0	31	0	1	32
22.0	27	0	1	28
26.0	0	0	0	0

Assume Basins W1, W2, W3, W4 & E1 are routed Around pond and that the can somehow be added into CMP pipe arch such that System Capacity is Not impacted.

Worksheet
Worksheet for Rectangular Channel

Project Description	
Project File	c:\haestad\fmw\box10th.fm2
Worksheet	culvert capacity
Flow Element	Rectangular Channel
Method	Manning's Formula
Solve For	Discharge

10th St.
Box Culvert
Capacity

Input Data		
Mannings Coefficient	0.013	
Channel Slope	0.006000	ft/ft
Depth	2.00	ft
Bottom Width	5.00	ft

Results		
Discharge	94.98	cfs
Flow Area	10.00	ft²
Wetted Perimeter	9.00	ft
Top Width	5.00	ft
Critical Depth	2.24	ft
Critical Slope	0.004416	ft/ft
Velocity	9.50	ft/s
Velocity Head	1.40	ft
Specific Energy	3.40	ft
Froude Number	1.18	
Flow is supercritical.		

← approx capacity of culvert.
(95 ~ 100 cfs)

Time (Hrs)	Sub Basins Discharging to Box Culvert						Peak Pond Discharge (From Obrien & Gere)	Total Discharge
	W1 (cfs)	W2 (cfs)	W3 (cfs)	W4 (cfs)	E1 (cfs)	sub Total		
11.0	1	0	0	0	0	1	*	*
11.3	1	0	1	0	1	3	*	*
11.6	1	0	1	0	1	3	*	*
11.9	2	1	4	1	7	15	*	*
12.0	2	1	8	3	13	27	*	*
12.1	3	3	15	5	20	46	50	96
12.2	6	4	16	5	13	44	*	*
12.3	10	6	10	3	4	33	*	*
12.4	15	6	5	2	3	31	*	*
12.5	19	4	3	1	2	29	*	*
12.6	22	3	2	1	2	30	*	*
12.7	21	2	2	1	2	28	*	*
12.8	19	2	1	1	2	25	*	*
13.0	13	1	1	0	1	16	*	*
13.2	9	1	1	0	1	12	*	*
13.4	6	1	1	0	1	9	*	*
13.6	5	1	1	0	1	8	*	*
13.8	4	0	1	0	1	6	*	*
14.0	3	0	1	0	1	5	*	*
14.3	2	0	1	0	1	4	*	*
14.6	2	0	1	0	1	4	*	*
15.0	2	0	1	0	1	4	*	*
15.5	2	0	1	0	1	4	*	*
16.0	1	0	0	0	0	1	*	*
16.5	1	0	0	0	0	1	*	*
17.0	1	0	0	0	0	1	*	*
17.5	1	0	0	0	0	1	*	*
18.0	1	0	0	0	0	1	*	*
19.0	1	0	0	0	0	1	*	*
20.0	1	0	0	0	0	1	*	*
22.0	1	0	0	0	0	1	*	*
26.0	0	0	0	0	0	0	*	*

* max disch. into culvert.

96 ~ 100 cfs.

Note : Pond hydrology performed by O'Brien & Gere, Inc.
Peak Pond Discharge = 50 cfs during a 100-yr storm

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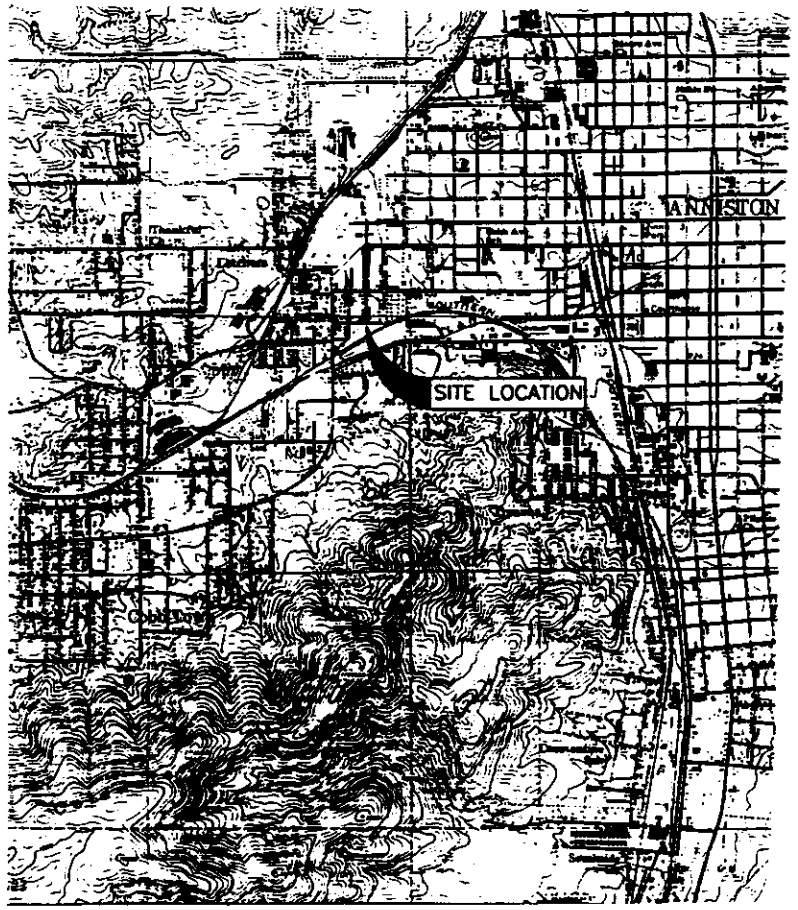
CONSTRUCTION DRAWINGS

NORTHSIDE AND MISCELLANEOUS PROPERTIES CLOSURE DESIGN



LOCATION PLAN
NOT TO SCALE

CONTRACT NO. S-8013

SOLUTIA INC.
ANNISTON, ALABAMA

O'BRIEN & GERE
ENGINEERS INC.

ALABAMA REGISTERED No. 16984 PROFESSIONAL ENGINEER DEAN L. PALMER
5/18/98

INDEX TO DRAWINGS

2600.037-005

5/9/98

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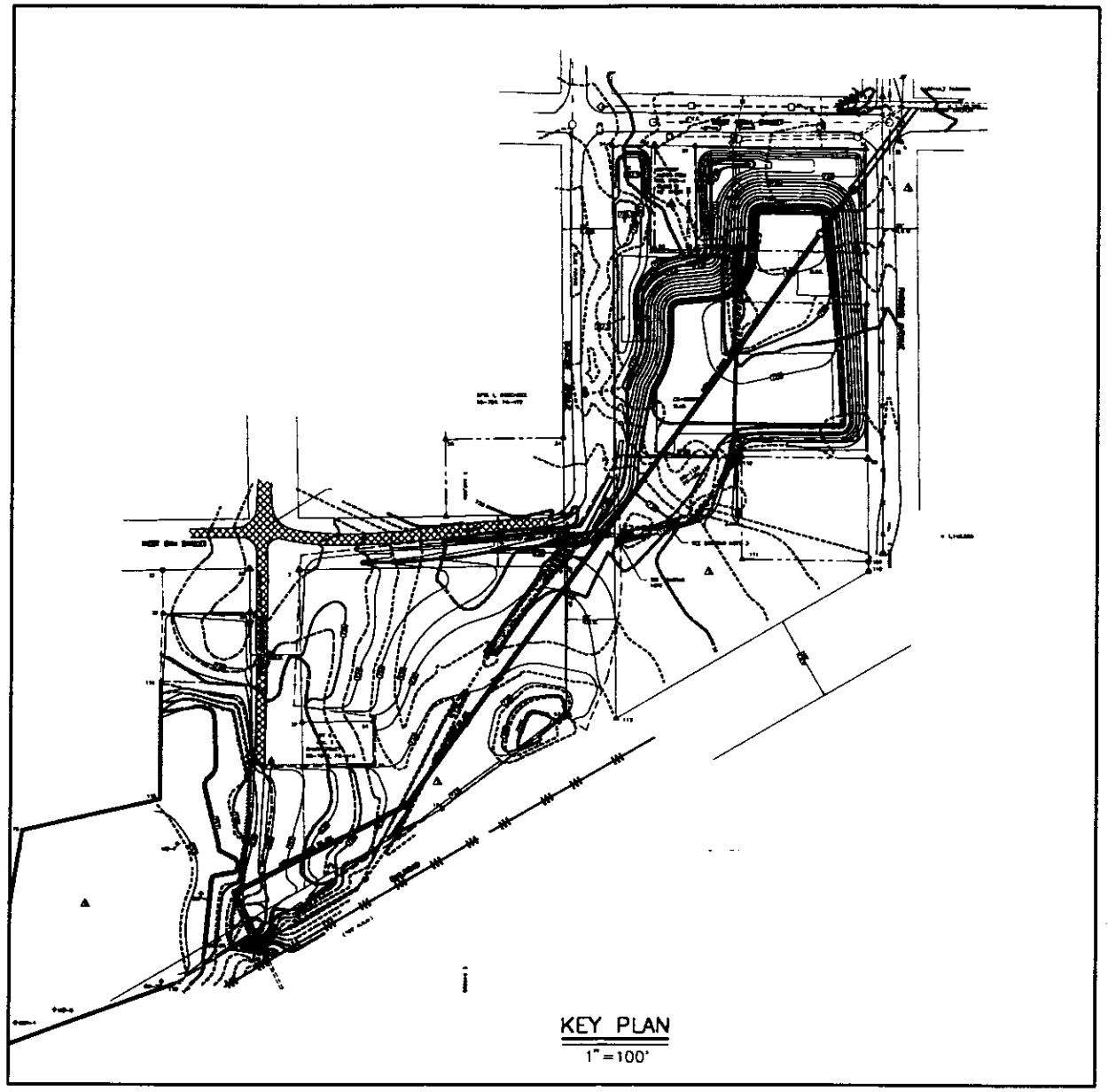

KEY PLAN
1"=100'

GENERAL NOTES

SURVEY AND MAPPING:

1. EXISTING TOPOGRAPHIC FEATURES, BOUNDARY INFORMATION AND EXISTING UTILITY LOCATIONS TAKEN FROM A TOPOGRAPHIC MAP PREPARED BY ALMON ASSOCIATES, INC. - DATED 12/3/97, JOB NO. 96-088.09
2. TOPOGRAPHIC BENCH MARK MP#3 ELEVATION 729.33 CHISELED SQUARE IN S/W CORNER OF OVERHEAD SIGNAL ON RAILROAD 200'± WEST OF CLYDESDALE CROSSING.

ALABAMA STATE SPECIFICATIONS:

1. ANY REFERENCE TO ALABAMA DOT STANDARD SPECIFICATIONS IS LIMITED IN SCOPE TO TECHNICAL ENGINEERING AND CONSTRUCTION WORK, MATERIALS DETAILS, PROCEDURES, ETC. ALL REFERENCES TO THE ALABAMA DOT OR ADMINISTRATIVE OFFICERS OR EMPLOYEES THEREOF ARE NULL AND VOID WITH RESPECT TO LEGAL OR CONTRACTUAL RESPONSIBILITIES.
2. FOR CLARIFICATION, WHERE THE STATE OF ALABAMA OR THE ALABAMA DOT OR ADMINISTATIVE OFFICERS OR EMPLOYEES THEREOF ARE NAMED IN THE STANDARD SPECIFICATIONS, SUCH REFERENCES SHALL BE TAKEN TO MEAN EITHER ENGINEER OR OWNER.
3. CONTRACTOR SHALL OBTAIN MATERIALS TO BE INCORPORATED INTO THE WORK FROM ALABAMA DOT APPROVED SOURCES WHERE ALABAMA DOT MATERIALS ARE SHOWN ON THE CONTRACT DRAWINGS. THE CONTRACTOR SHALL OBTAIN AND SUBMIT A MANUFACTURER'S MATERIAL CERTIFICATION TO THE ENGINEER FOR EACH MATERIAL ITEM, AS SPECIFIED - SHOP DRAWINGS, PRODUCT DATA AND SAMPLES OF THE GENERAL REQUIREMENTS, INDICATING THAT THE RESPECTIVE ITEM MEETS THE APPLICABLE ALABAMA DOT OR SPECIAL SPECIFICATIONS INCLUDED IN THIS CONTRACT.
4. THE CONTRACTOR IS ADVISED THAT THE METHOD OF MEASUREMENT AND BASIS OF PAYMENT FOR INDIVIDUAL ALABAMA DOT ITEM NUMBERS DOES NOT REFLECT THE OWNER'S METHOD OF MEASUREMENT AND/OR BASIS OF PAYMENT.

GENERAL UTILITY:

1. PLANS SHOW APPROXIMATE LOCATIONS OF KNOWN UTILITIES ONLY. THE CONTRACTOR IS RESPONSIBLE FOR HAVING ALL UTILITIES WITHIN THE LIMITS OF WORK STAKED PRIOR TO THE START OF CONSTRUCTION.
2. THE CONTRACTOR SHALL VERIFY THE LOCATIONS AND ELEVATIONS OF ALL EXISTING UTILITIES TO REMAIN IN SERVICE PRIOR TO THE START OF CONSTRUCTION. THE ALABAMA LINE LOCATION CENTER TO BE NOTIFIED 72 HOURS PRIOR TO COMMENCEMENT OF CONSTRUCTION (1-800-292-8525).
3. THE CONTRACTOR SHALL COORDINATE ALL WORK AFFECTING UTILITIES WITH THE OWNER AND CONSTRUCTION MANAGER, AND WITH THE RESPECTIVE UTILITY OWNER. ALL DETAILS OF CONSTRUCTION AND/OR RELOCATION OF AFFECTED UTILITIES SHALL BE APPROVED BY THE OWNER AND OTHER APPROVING AGENCIES.
4. THE CONTRACTOR SHALL BE RESPONSIBLE FOR REPAIR AND/OR REPLACEMENT OF ALL DAMAGES TO EXISTING UTILITIES AT NO ADDITIONAL COST TO THE OWNER. CONTRACTOR TO COORDINATE WITH OWNER'S REPRESENTATIVE FOR EXISTING UTILITIES TO REMAIN IN SERVICE AND EXISTING UTILITIES SCHEDULED FOR ABANDONMENT. THE CONTRACTOR SHALL COORDINATE WITH THE OWNER'S REPRESENTATIVE FOR ABANDONMENT/REMOVAL PROCEDURES OF EXISTING UTILITIES, STRUCTURES AND ROADWAYS.

GRADING:

1. AREAS TO BE FILLED SHALL BE CLEARED OF VEGETATION UTILITY POLES, FENCES AND ANY OTHER OBJECTIONABLE MATERIALS. COORDINATE DISPOSAL WITH CONSTRUCTION MANAGER.
2. THE CONTRACTOR SHALL COORDINATE WITH SOLUTIA FOR THE REMOVAL AND/OR PROTECTION OF EXISTING TREES WITHIN THE COVER LIMITS.
3. ALL FILLS SHALL BE COMPACTED AS SPECIFIED TO REDUCE EROSION, SLIPPAGE, SETTLEMENT, SUBSIDENCE OR OTHER RELATED PROBLEMS.
4. ALL FILL SHALL BE PLACED AND COMPACTED IN LAYERS NOT TO EXCEED 8 INCHES IN THICKNESS UNLESS A GREATER THICKNESS IS ALLOWED BY THE ENGINEER, UPON DEMONSTRATION BY THE CONTRACTOR THAT THE MATERIALS AND COMPACTIVE EFFORT ARE ADEQUATE TO OBTAIN THE REQUIRED DENSITY.
5. WHERE COVER MATERIAL IS PLACED OVER EXISTING PAVED AREAS OR CONCRETE PADS, THE CONTRACTOR SHALL BREAK THE EXISTING PAVEMENT ON A 10' HORIZONTAL GRID. THE HOLES SHALL PENETRATE INTO THE EXISTING SUBBASE GRANULAR COURSE.
6. MINIMUM ALLOWABLE SLOPE OF COVER MATERIAL 1:V TO 3:H FOR THE FILL MATERIAL TO BE ADEQUATELY MAINTAINED ON LINER.
7. BERM IS TO BE PLACED ON NATIVE SOIL AND IN ACCORDANCE WITH SPECIFICATION 02297.
8. WHERE THE PROPOSED BERM IS LOCATED OVER AN EXISTING CONCRETE SLAB, THE CONTRACTOR SHALL REMOVE A 10' WIDE STRIP OF CONCRETE AND BASE MATERIAL TO NATIVE SOIL. KEY BERM MATERIAL INTO THE REMOVED PORTION OF THE SLAB. MATERIALS REMOVED SHALL BE DISPOSED ON SITE AT THE DIIRECTION OF THE OWNERS REPRESENTATIVE.
9. THE WORKING AREA OF THE BORROW PIT SHALL NOT EXCEED 5 ACRES.

EROSION CONTROL:

1. SOIL EROSION AND SEDIMENT CONTROL FACILITIES SHALL BE CONSTRUCTED PRIOR TO DISTURBANCE AND MAINTAINED DURING CONSTRUCTION AND REMOVED, REGRADED, SEEDED AND MULCHED (WHERE NECESSARY) UPON COMPLETION OF CONSTRUCTION. PERIMETER SWALES SHALL BE CONSTRUCTED PRIOR TO EARTHWORK ACTIVITIES. STONE CHECK DAMS SHALL REMAIN IN PLACE UPON COMPLETION OF CONSTRUCTION.
2. AN ADEQUATE RESERVE OF EROSION CONTROL MATERIALS SHALL BE ON SITE AT ALL TIMES FOR EMERGENCY OR ROUTINE REPLACEMENT AND SHALL INCLUDE MATERIALS TO REPAIR SILT FENCES, HAYBALES, MULCH AND OTHER DEVICES USED TO STABILIZE THE SITE.
3. THE AREAS OF CONSTRUCTION SHALL REMAIN IN STABLE CONDITION AT THE CLOSE OF EACH CONSTRUCTION DAY. EROSION CONTROL FACILITIES SHALL BE MONITORED AT THIS TIME, AND MAINTAINED, REPAIRED OR REPLACED AS DETERMINED BY THE OWNER'S REPRESENTATIVE.
4. TEMPORARY EROSION CONTROL STRUCTURES TO BE CLEANED WHEN THEY REACH 50% CAPACITY AS DETERMINED BY THE OWNER'S REPRESENTATIVE. CONTRACTOR SHALL COORDINATE WITH OWNER'S REPRESENTATIVE FOR DISPOSAL OF MATERIAL PRIOR TO RESEEDING BOTTOM OF BASIN. CONTRACTOR SHALL REMOVE ALL ACCUMULATED SEDIMENT.
5. THE LOCATION OF EXISTING SPRINGS OR GROUNDWATER SEEPAGE WHICH ARE NOT CONTROLLED BY THE STORMWATER SYSTEM AND SITE GRADING SHOWN ON THESE PLANS SHALL BE BROUGHT TO THE ATTENTION OF THE OWNER'S REPRESENTATIVE.
6. SILT FENCES SHALL BE INSTALLED AT TOES OF SLOPES IN DRAINAGE ALONG PROPERTY LINES AND AT OTHER LOCATIONS NEEDED TO PREVENT AND CONTROL EROSION OF THE SITE DURING CONSTRUCTION AS SHOWN OR DIRECTED BY THE OWNER'S REPRESENTATIVE.
7. THE CONTRACTOR SHALL PREVENT THE DEPOSITION OF MATERIALS ONTO TRAVERSED PUBLIC THOROUGHFARE(S) CAUSED BY HIS OPERATIONS BY INSTALLING AND MAINTAINING A STABILIZED CONSTRUCTION ENTRANCE, AND BY WASHING ALL VEHICLE WHEELS IN A SAFE DISPOSAL AREA. THE CONTRACTOR SHALL REMOVE IMMEDIATELY ALL MATERIALS DEPOSITED ONTO PUBLIC THOROUGHFARE(S) CAUSED BY HIS OPERATIONS. THE CONTRACTOR IS NOTIFIED THAT IN WET WEATHER, OR MUDDY CONDITIONS, WASHING OF VEHICLE WHEELS IS MANDATORY. THIS APPLIES TO THE NORTHSIDE, WESTSIDE LANDFILL, AND BETHEL CHURCH PROPERTIES AS WELL AS THE BORROW PIT AREA.
8. ON-SITE SOIL STOCKPILE AREAS SHOULD NOT BE LOCATED WITHIN 50 FEET OF A CATCH BASIN OR INLET. STOCKPILE AREAS TO BE SURROUNDED WITH SILT FENCE. OR OTHER EROSION CONTROL MEASURES AS ORDERED BY THE OWNER'S REPRESENTATIVE.
9. THE CONTRACTOR SHALL HAVE A WATER TRUCK OR OTHER ACCEPTABLE ALTERNATIVE DEDICATED TO CONTROLLING DUST AVAILABLE AT ALL TIMES.
10. THE CONTRACTOR SHALL DRAPE FILTER FABRIC OVER THE INSIDE OF THE PERIMETER FENCE FOR DUST CONTROL.

GENERAL:

1. THE CONTRACTOR IS RESPONSIBLE FOR OBTAINING ALL APPLICABLE STATE, COUNTY, AND CITY PERMITS ASSOCIATED WITH CONSTRUCTION ACTIVITIES INCLUDING BUT NOT LIMITED TO ROAD CUT PERMITS. THE CONTRACTOR SHALL COORDINATE WITH THE OWNER'S REPRESENTATIVE CONCERNING WHAT PERMITS WILL BE REQUIRED PRIOR TO THE START OF WORK.
2. THE CONTRACTOR SHALL DEVELOP A TRAFFIC CONTROL/PROTECTION PLAN FOR THE WORK TO BE PERFORMED AND SUBMIT IT TO THE OWNER'S REPRESENTATIVE PRIOR TO THE INSTITUTION OF WORK ON SITE. THE TRAFFIC PLAN SHALL MAKE ALLOWANCES FOR A FLAG MAN TO BE PRESENT AT THE BORROW PIT ENTRANCE/EXIT DURING PERIODS WHEN COVER SOIL IS BEING HAULED FROM THE AREA.
3. THE CONTRACTOR SHALL MAINTAIN VEHICLE ACCESS AT ALL TIMES TO ANNISTON IRON WORKS LOCATED AT THE SOUTHERN END OF PARKWIN AVENUE.
4. THE CONTRACTOR SHALL MAINTAIN ALL PERIMETER FENCING TO THE MAXIMUM EXTENT POSSIBLE THROUGHOUT CONSTRUCTION. WHERE FENCING IS REQUIRED TO BE TEMPORARILY TAKEN DOWN TO ACCOMMODATE CONSTRUCTION ACTIVITIES, THE CONTRACTOR SHALL BE REQUIRED TO MAINTAIN AND SECURE THE OPENING ON A NIGHTLY BASIS.

⚠

LEGEND

IRON PIPE SET BY ALMON	STREET LIGHT
IRON PIPE SET BY OTHERS	GUY ANCHOR
REBAR SET BY ALMON	TELEPHONE BOX
REBAR SET BY OTHERS	EVERGREEN
CONCRETE MONUMENT SET BY ALMON	TREE TO REMAIN
CONCRETE MONUMENT SET BY OTHERS	WATER LINE
HUB SET BY ALMON ASSOC.	STEAM LINE
HUB SET BY OTHERS	GAS LINE
CURB INLET	U.G. ELECT. LINE
STEAM BOX	U.G. TELEPHONE LINE
YARD INLET	POWER BOX
SANITARY SEWER MANHOLE	TELEPHONE BOOTH
STORM SEWER MANHOLE	TELEPHONE MH
SIGN	WATER MH
GAS VALVE	POST INDICATOR VALVE
GAS METER	WATER METER
FIRE HYDRANT	RETAINING WALL
WATER VALVE	GUARD RAIL
WATER HYDRANT	FENCE
TRAFFIC LIGHT	SBO STRAW BALE DIKE
TELEPHONE POLE	SF SILT FENCE
POWER POLE	
MONITORING WELL	

ALABAMA REGISTERED No. 10584 PROFESSIONAL ENGINEER DEAN L. PALMER
5/11/98

NO.	DATE	REVISION	INIT.
1	5/11/98	REVISED PER ADDENDUM NO. 1	KFR
0	4/13/98	ISSUED FOR CONSTRUCTION	KFR

1"=100' 100 0 100 200

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O'BRIEN & GERE ENGINEERS INC.

SOLUTIA INC.
NORTHSIDE PROPERTIES CLOSURE DESIGN
ANNISTON ALABAMA

GENERAL

PLAN, NOTES & LEGEND

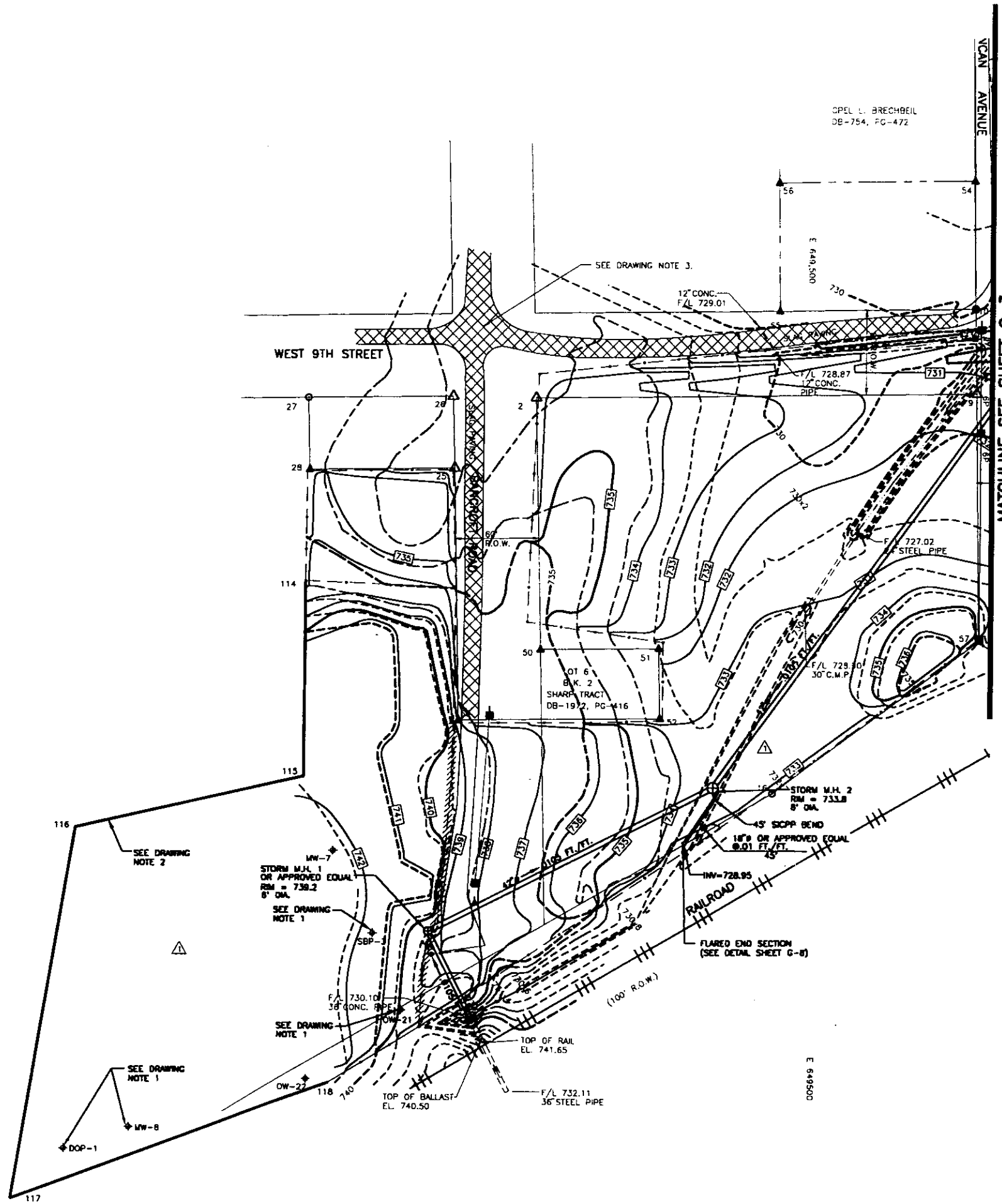
IN CHARGE OF Dean L. Palmer
DESIGNED BY TJS CHECKED BY AJC
DRAWN BY KFR

FILE NO. 2600.037-006
DATE MAY 11, 1998

G-1

5/7/98

I:\DIV83\PROJECTS\SOLUTIA\DWG\007.DWG



PLAN
1"=40'

DRAWING NOTES

1. CONTRACTOR SHALL PROTECT EXISTING MONITORING WELLS FROM DAMAGE AND CONSTRUCT MONITORING WELL PROTECTION IN ACCORDANCE WITH THE DETAIL ON SHEET G-6.
2. CONTRACTOR SHALL EXTEND COVER TO APPROXIMATE LIMIT AS SHOWN. COORDINATE WITH OWNER'S REPRESTATIVE.
3. NO CONSTRUCTION TRAFFIC ALLOWED.
4. CONTRACTOR TO RELOCATE FENCE TO LOCATIONS SHOWN ON PLANS IF ANY FENCE IS REMOVED FOR CONSTRUCTION.

PT.NO.	NORTHING	EASTING	DESCRIPTOR
2	1147960.144	649299.339	REBAR FOUND
9	1147964.152	649614.891	REBAR FOUND
10	1148024.090	649613.711	COTTON PICKER SPINDLE
16	1147678.435	649470.670	I.P.F.
25	1147910.075	649240.814	REBAR FOUND
26	1147961.127	649239.567	REBAR FOUND
27	1147959.645	649135.705	I.P.F.
28	1147908.590	649136.954	REBAR SET
41	1148513.458	649965.645	REBAR FOUND
50	1147780.860	649303.422	REBAR SET
51	1147781.931	649387.915	REBAR SET
52	1147731.922	649389.055	REBAR SET
53	1147730.091	649244.563	REBAR SET
54	1148114.084	649612.664	REBAR SET
55	1148022.312	649473.763	REBAR SET
56	1148112.306	649472.671	REBAR SET
57	1147787.668	649617.275	REBAR SET
84	1148453.083	649718.994	REBAR FOUND
89	1148089.973	649973.738	REBAR FOUND
94	1148453.775	649668.519	REBAR SET
95	1148449.592	649970.091	REBAR SET
96	1148332.619	649719.381	REBAR FOUND
97	1148452.426	649766.990	REBAR SET
98	1148332.434	649768.424	REBAR SET
99	1148088.796	649672.698	I.P.F.
105	1148329.598	649971.307	REBAR SET
106	1148269.601	649971.916	REBAR SET
107	1148331.963	649822.186	1" I.P.F.
108	1148271.809	649822.592	I.P.F.
109	1147969.979	649974.955	CPS IN PAVEMENT
110	1147958.130	649975.076	CPS IN PAVEMENT
111	1147972.062	649824.970	REBAR SET
112	1148092.055	649823.753	REBAR SET
113	1147784.684	649676.165	REBAR SET
114	1147829.210	649134.396	COORD. PT. GRADING LIMIT
115	1147689.474	649134.151	COORD. PT. GRADING LIMIT
116	1147652.754	648970.517	COORD. PT. GRADING LIMIT
117	1147389.867	648926.269	COORD. PT. GRADING LIMIT
118	1147471.947	649152.987	COORD. PT. GRADING LIMIT

NO.	DATE	REVISION	INIT.
1	5/11/98	REVISED PER ADDENDUM NO. 1	DLP
0	4/13/98	ISSUED FOR CONSTRUCTION	

1"=40' 40 0 40 80

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ALABAMA REGISTERED No. 16584 PROFESSIONAL ENGINEER DEAN L. PALMER

Dean L. Palmer 5/18/98

O'BRIEN & GERE ENGINEERS INC.

SOLUTIA INC.
NORTHSIDE PROPERTIES CLOSURE DESIGN
ANNISTON ALABAMA

GENERAL

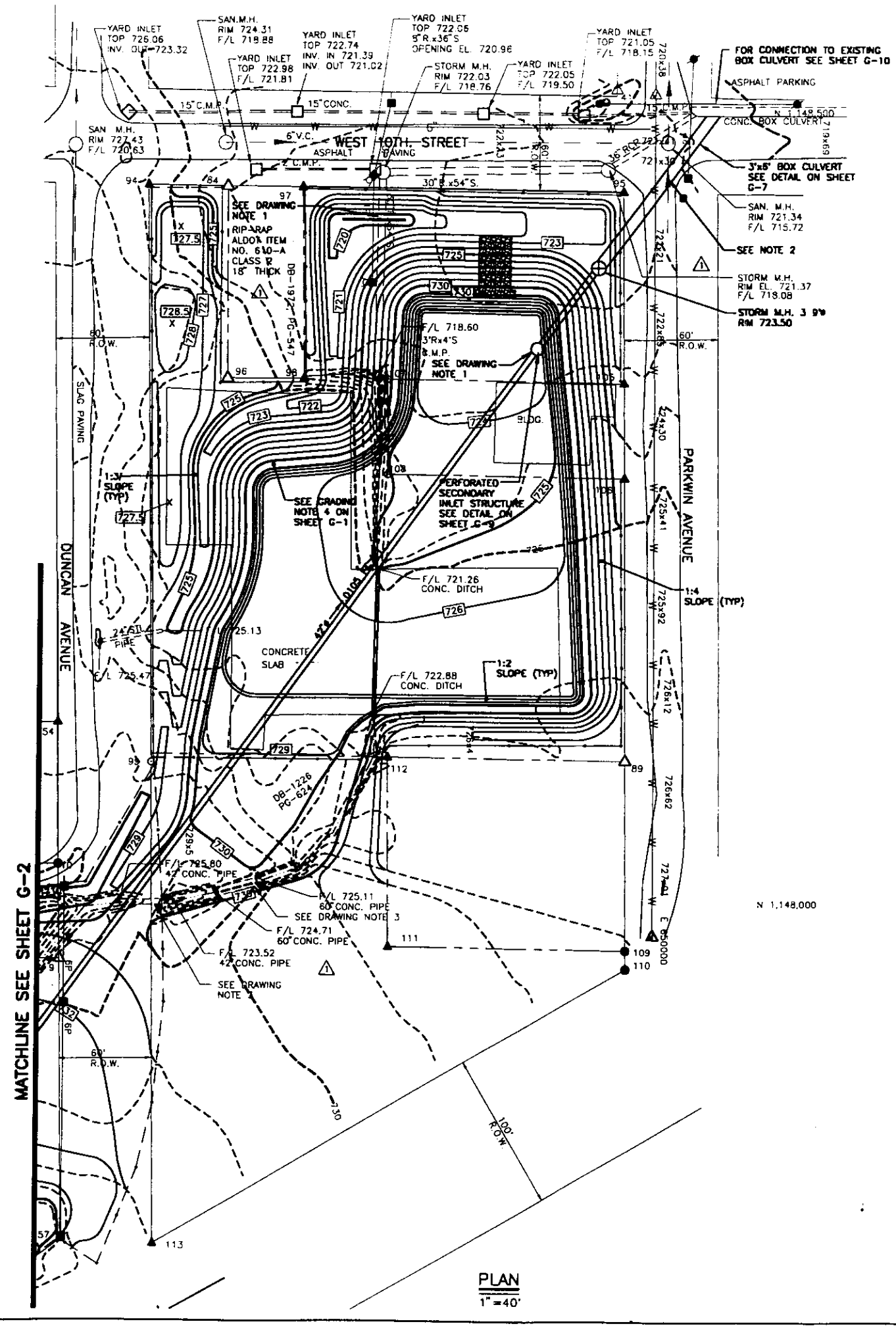
GRADING PLAN

IN CHARGE OF Dean L. Palmer
DESIGNED BY TJS CHECKED BY AJC
DRAWN BY KFR
FILE NO. 2600.037-007
DATE MAY 11, 1998

G-2

5/11/98

I:\DM83\PROJECTS\SOLUTIA\DWG\007.DWG



PLAN
1"=40'

DRAWING NOTES

1. CONTRACTOR SHALL CUT A 24"x24" OPENING IN EXISTING 30"x54" METAL PIPE AND WELD (3) #4 BARS 6" ON CENTER EACH WAY TO THE OPENING. THE CONTRACTOR SHALL FILL THE REMAINING CULVERT SOUTH OF THE OPENING, BENEATH THE BERM FOOTPRINT WITH CONCRETE.
2. CONTRACTOR SHALL LAY BOX CULVERT SO THAT THERE IS NO JOINT WITHIN 5' OF THE EXISTING WATERLINE. IF THERE IS LESS THAN 18" HORIZONTAL SEPARATION BETWEEN BOX CULVERT AND WATERLINE, THE CONTRACTOR SHALL ENCASE THE WATERLINE 10' ON EITHER SIDE OF THE BOX CULVERT, PER THE DETAIL ON SHEET G-9.
3. ABANDON AND PLUG EXISTING 42 INCH AND 60 INCH CONCRETE PIPES PER OWNERS REPRESENTATIVE'S DIRECTION. ⚠1

PT.NO.	NORTHING	EASTING	DESCRIPTOR
2	1147960.144	649299.339	REBAR FOUND
9	1147964.152	649614.891	REBAR FOUND
10	1148024.090	649613.711	COTTON PICKER SPINDLE
16	1147678.435	649470.670	I.P.F.
25	1147910.075	649240.814	REBAR FOUND
26	1147961.127	649239.567	REBAR FOUND
27	1147959.645	649135.705	I.P.F.
28	1147908.590	649136.954	REBAR SET
41	1148513.458	649965.645	REBAR FOUND
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52	1147731.922	649389.055	REBAR SET
53	1147730.091	649244.563	REBAR SET
54	1148114.084	649612.664	REBAR SET
55	1148022.312	649473.763	REBAR SET
56	1148112.306	649472.671	REBAR SET
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117	1147389.867	648926.269	COORD. PT. GRADING LIMIT
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1"=40' 40 0 40 80

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ALABAMA REGISTERED No. 16584 PROFESSIONAL ENGINEER DEAN L. PALMER

Dean L. Palmer 5/18/98

O'BRIEN & GERE ENGINEERS INC.

SOLUTIA INC.
NORTHSIDE PROPERTIES CLOSURE DESIGN
ANNISTON ALABAMA

GENERAL

GRADING PLAN

IN CHARGE OF Dean L. Palmer
DESIGNED BY TJS CHECKED BY AJC
DRAWN BY KFR
FILE NO. 2600.037-008
DATE MAY 11, 1998

G-3

5/11/98

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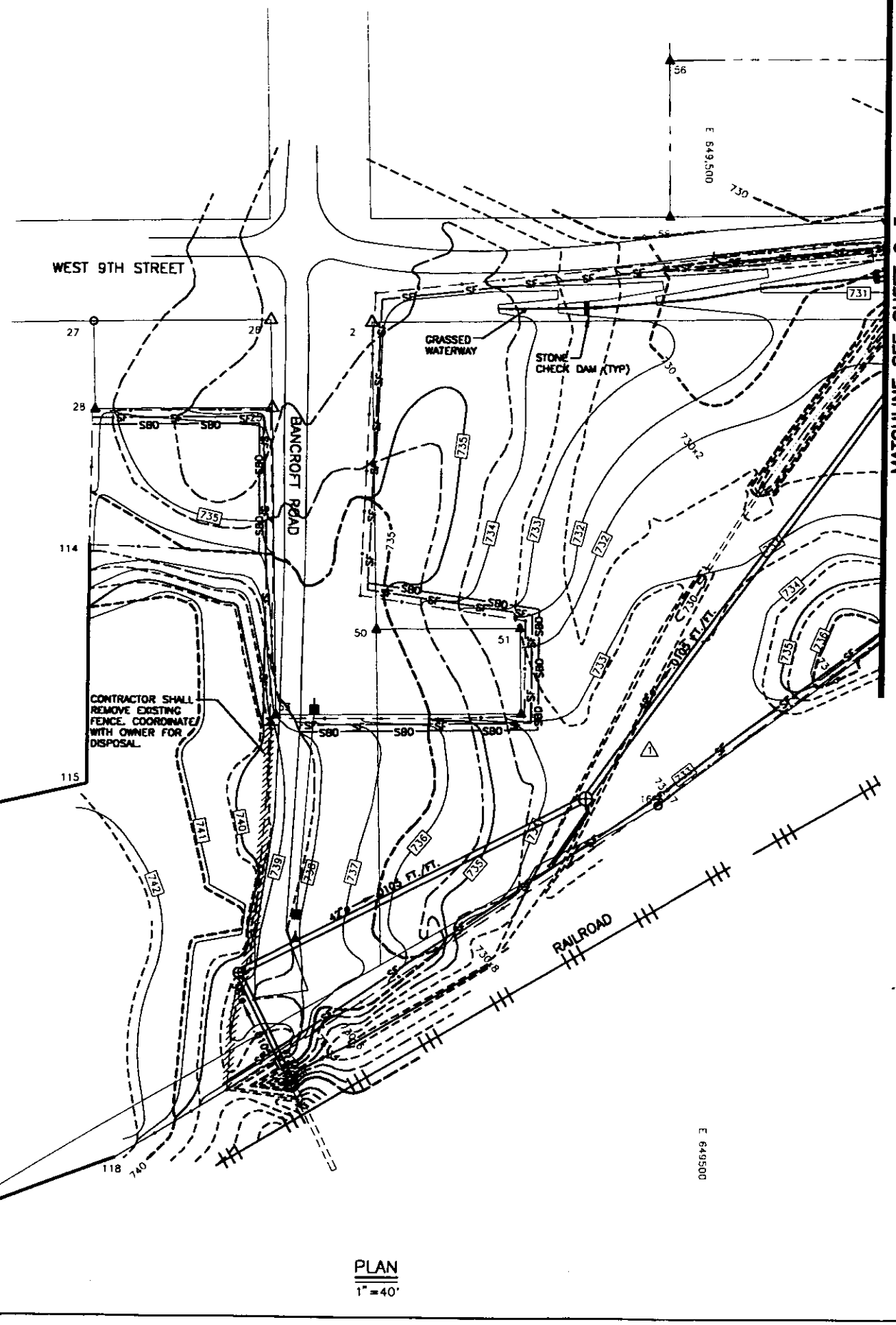

PLAN
1" = 40'

NO.	DATE	REVISION	INIT.
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0	4/13/98	ISSUED FOR CONSTRUCTION	DLP

1" = 40' 40 0 40 80

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ALABAMA REGISTERED No. 16584 PROFESSIONAL ENGINEER DEAN L. PALMER

Dean L. Palmer 5/18/98

O'BRIEN & GERE ENGINEERS INC.

SOLUTIA INC.
NORTHSIDE PROPERTIES CLOSURE DESIGN
ANNISTON ALABAMA

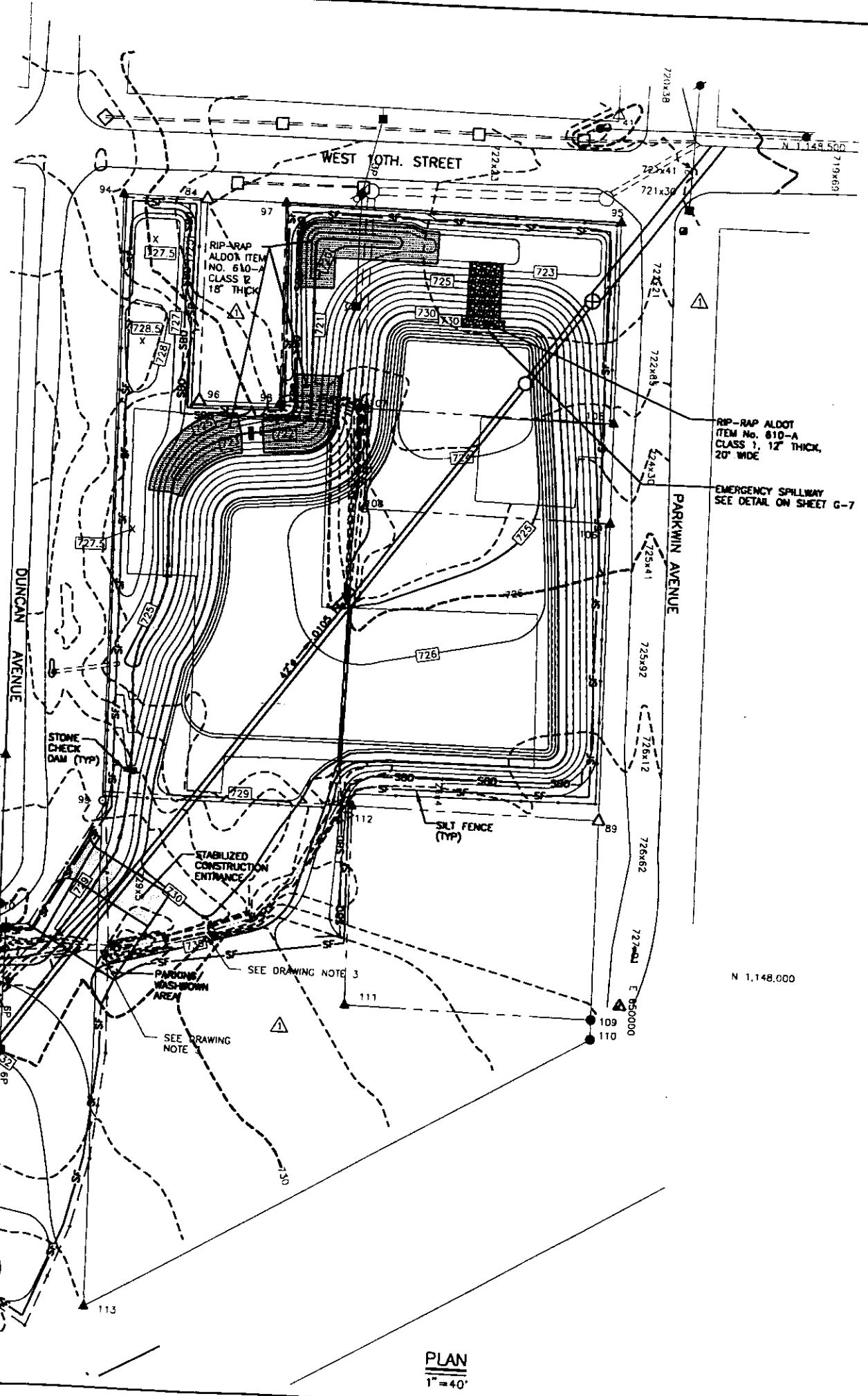
GENERAL
EROSION & SEDIMENT CONTROL PLAN

IN CHARGE OF Dean L. Palmer
DESIGNED BY TJS CHECKED BY AJC
DRAWN BY KFR

FILE NO. 2600.037-009
DATE MAY 11, 1998

G-4

5/11/98



PLAN
1"=40'

DRAWING NOTES

1. CONTRACTOR SHALL PROTECT PERFORATED CONCRETE RISER WITH FILTER FABRIC DRAPED OVER THE OUTSIDE AND FIRMLY ATTACHED. THE FILTER FABRIC SHALL BE REMOVED AFTER COMPLETION OF CONSTRUCTION ACTIVITIES & SITE VEGETATION HAS BEEN RE-ESTABLISHED.

NO.	DATE	REVISION	INIT.
1	5/11/98	REVISED PER ADDENDUM NO. 1	
0	4/13/98	ISSUED FOR CONSTRUCTION	

1"=40' 40 0 40 80

O'BRIEN & GERE ENGINEERS INC.

SOLUTIA INC.
NORTHSIDE PROPERTIES CLOSURE DESIGN
ANNISTON ALABAMA

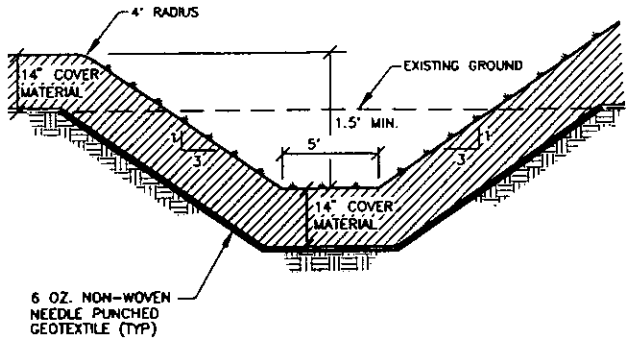
GENERAL
EROSION & SEDIMENT CONTROL PLAN

IN CHARGE OF Dean L Palmer
DESIGNED BY TJS CHECKED BY AJC
DRAWN BY KFR
FILE NO. 2600.037-010
DATE MAY 11, 1998
G-5

ALABAMA REGISTERED No. 16584 PROFESSIONAL ENGINEER DEAN L. PALMER

Dean L Palmer 5/18/98

5/11/98

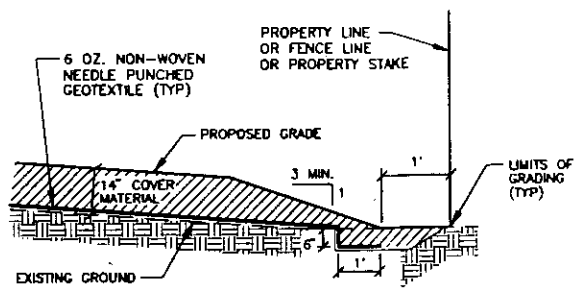


NOTES:

1. SIDE SLOPES ADJACENT TO BERM SHALL BE 1V TO 4H.

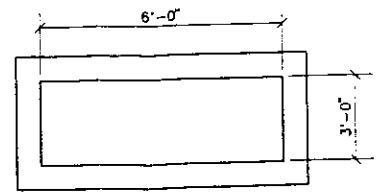
TYPICAL GRASSED SWALE DETAIL

NOT TO SCALE



TYPICAL COVER MATERIAL & GEOTEXTILE TIE-IN DETAIL

NOT TO SCALE



SPECIFICATIONS

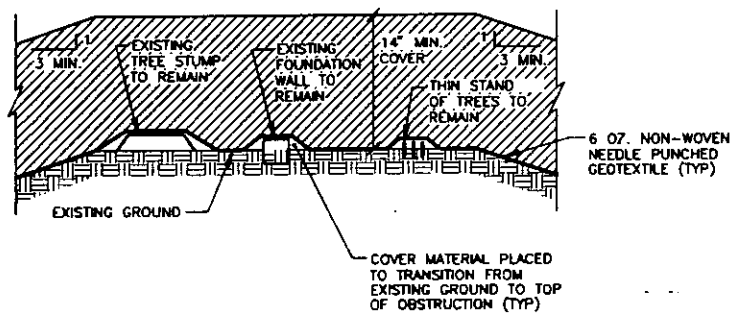
CONCRETE	4000 PSI @ 28 DAYS
ENTRAINED AIR	5%-9%
STEEL	ASTM A496-A615 GRADE 60-60 KSI
DESIGN LOADING	AASHTO HS-20-44 WITH 30% IMPACT AND EQUIVALENT SOIL PRESSURE OF 130 (PSF). FLOATATION FORCES NOT ACCOUNTED FOR

NOTES:

1. REINFORCED STEEL CONFORMS TO LATEST ASTM A185 SPECIFICATION 0.12 SQ. IN./LINEAL FT. AND 0.12 SQ. IN. (BOTH WAYS) IN BASE SLAB.
2. CONCRETE COMPRESSIVE STRENGTH 4000 PSI MINIMUM.
3. DESIGN SPECIFICATIONS CONFORM TO LATEST ASTM C890-91 SPEC. FOR PRECAST REINFORCED CONCRETE.

BOX CULVERT

NOT TO SCALE

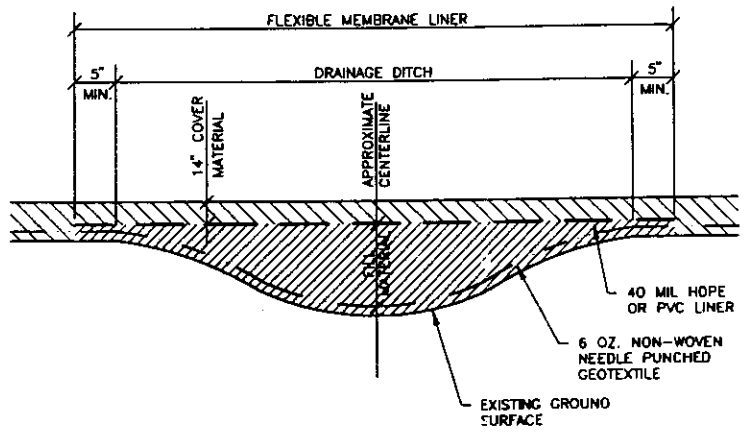


COVER DETAIL

NOT TO SCALE

NOTES:

1. GEOTEXTILE SEAMS SHALL BE OVERLAPPED A MINIMUM OF 24 INCHES. ⚠1

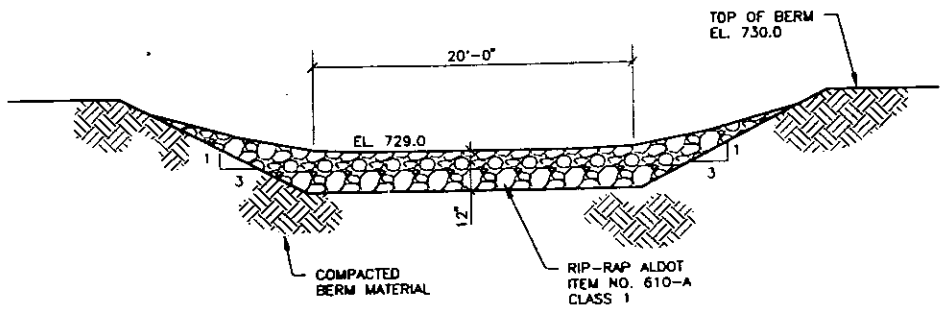


CHANNEL FILL / TYPICAL SECTION

NOT TO SCALE

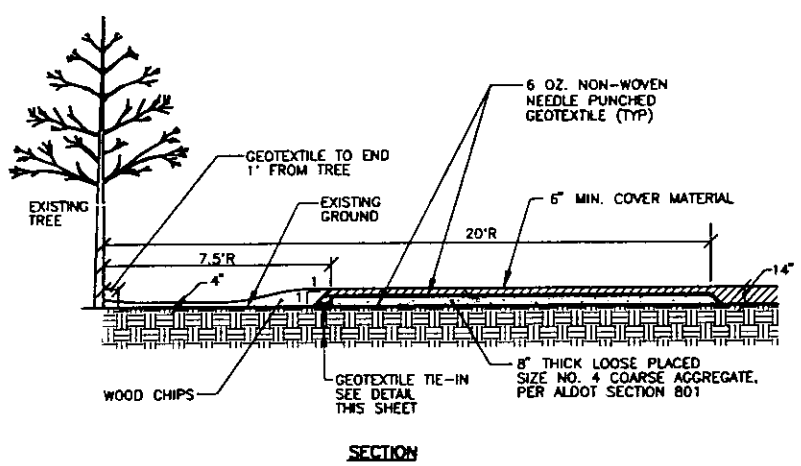
NOTES:

1. GEOMEMBRANE LINER PANELS SHALL BE OVERLAPPED A MINIMUM OF 36 INCHES IN THE DOWN STREAM DIRECTION. ⚠1



EMERGENCY SPILLWAY DETAIL

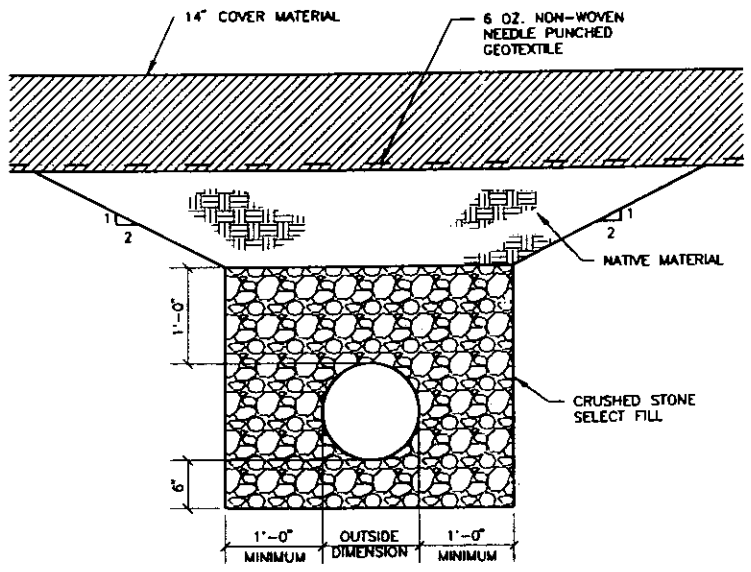
NOT TO SCALE



SECTION

COVER TREATMENT AT TREES TO REMAIN

NOT TO SCALE



STORM SEWER TRENCH DETAIL

NOT TO SCALE

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ALABAMA REGISTERED No. 16584 PROFESSIONAL ENGINEER DEAN L. PALMER

Dean L. Palmer 5/18/98

NO.	DATE	REVISION	INIT.
1	5/11/98	REVISED PER ADDENDUM NO. 1	dlp
0	4/13/98	ISSUED FOR CONSTRUCTION	dlp

NOT TO SCALE

O'BRIEN & GERE ENGINEERS INC.

SOLUTIA INC.
NORTHSIDE PROPERTIES CLOSURE DESIGN
ANNISTON ALABAMA

GENERAL

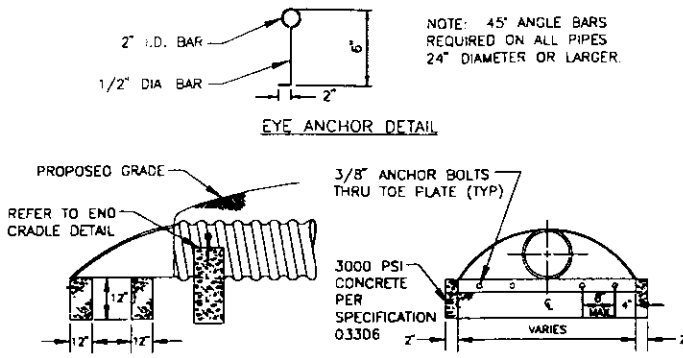
MISCELLANEOUS DETAILS

IN CHARGE OF Dean L. Palmer
DESIGNED BY TJS CHECKED BY AJC
DRAWN BY KFR/JMA

FILE NO. 2600.037-011
DATE MAY 11, 1998

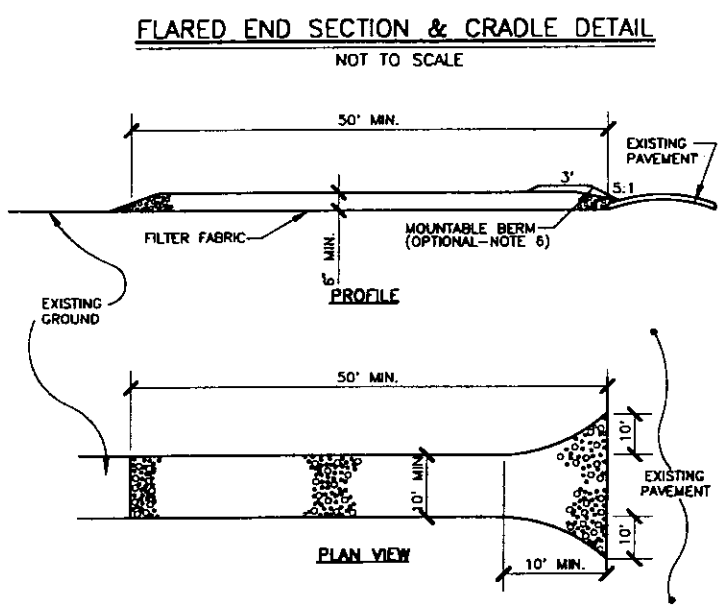
G-7

5/11/98



FLARED END SECTION & CRADLE DETAIL

NOT TO SCALE

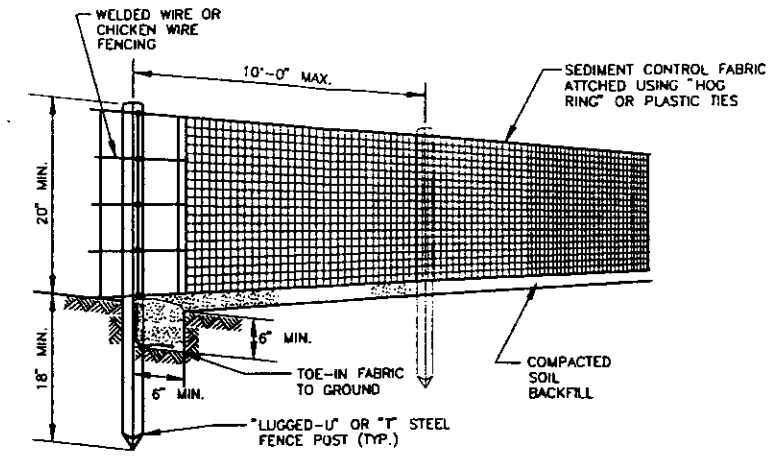


STABILIZED CONSTRUCTION ENTRANCE DETAIL

NOT TO SCALE

CONSTRUCTION SPECIFICATIONS

1. STONE SIZE - USE 2" STONE, OR RECLAIMED OR RECYCLED CONCRETE EQUIVALENT.
2. LENGTH-AS REQUIRED, BUT NOT LESS THAN 50 FEET
3. THICKNESS - NOT LESS THAN SIX(6) INCHES
4. WIDTH-TWELVE(12) FOOT MINIMUM, BUT NOT LESS THAN THE FULL WIDTH AT POINTS WHERE EGRESS OCCURS.
5. FILTER CLOTH - WILL BE PLACED OVER THE ENTIRE AREA PRIOR TO PLACING OF STONE.
6. SURFACE WATER - ALL SURFACE WATER FLOWING OR DIVERTED TOWARDS CONSTRUCTION ENTRANCES SHALL BE PIPED ACROSS THE ENTRANCE. IF PIPING IS IMPRACTICAL, A MOUNTABLE BERM WITH 5:1 SLOPES WILL BE PERMITTED.
7. MAINTENANCE - THE ENTRANCE SHALL BE MAINTAINED IN A CONDITION WHICH WILL PREVENT TRACKING OR FLOWING OF SEDIMENT ONTO PUBLIC RIGHTS-OF-WAY. THIS MAY REQUIRE PERIODIC TOP DRESSING WITH ADDITIONAL STONE AS CONDITIONS DEMAND AND REPAIR AND/OR CLEANOUT OF ANY MEASURES USED TO TRAP SEDIMENT. ALL SEDIMENT SPILLED, DROPPED, WASHED OR TRACKED ONTO PUBLIC RIGHTS-OF-WAY MUST BE REMOVED IMMEDIATELY.
8. WASHING - WHEELS SHALL BE CLEANED TO REMOVE SEDIMENT PRIOR TO ENTRANCE ONTO PUBLIC RIGHTS-OF-WAY. WHEN WASHING IS REQUIRED, IT SHALL BE DONE ON AN AREA STABILIZED WITH STONE AND WHICH DRAINS INTO AN APPROVED SEDIMENT TRAPPING DEVICE. THE CONTRACTOR IS NOTIFIED THAT IN WET WEATHER, OR MUDDY CONDITIONS, WASHING VEHICLE WHEELS IS MANDATORY.
9. PERIODIC INSPECTION AND NEEDED MAINTENANCE SHALL BE PROVIDED AFTER EACH RAIN.



1. WOVEN WIRE FENCE TO BE FASTENED SECURELY TO FENCE POSTS WITH WIRE TIES OR STAPLES.
2. FILTER CLOTH TO BE FASTENED SECURELY TO WOVEN WIRE FENCE WITH TIES SPACED EVERY 24" AT TOP AND MID SECTION.
3. WHEN TWO SECTIONS OF FILTER CLOTH ADJOIN EACH OTHER THEY SHALL BE OVER-LAPPED BY SIX INCHES AND FOLDED.
4. MAINTENANCE SHALL BE PERFORMED AS NEEDED AND MATERIAL REMOVED WHEN "BULGES" DEVELOP IN THE SILT FENCE.
4. FENCE TO BE ALIGNED ALONG CONTOUR AS CLOSELY AS POSSIBLE.

POSTS : STEEL EITHER T OR U TYPE OR 2" HARDWOOD

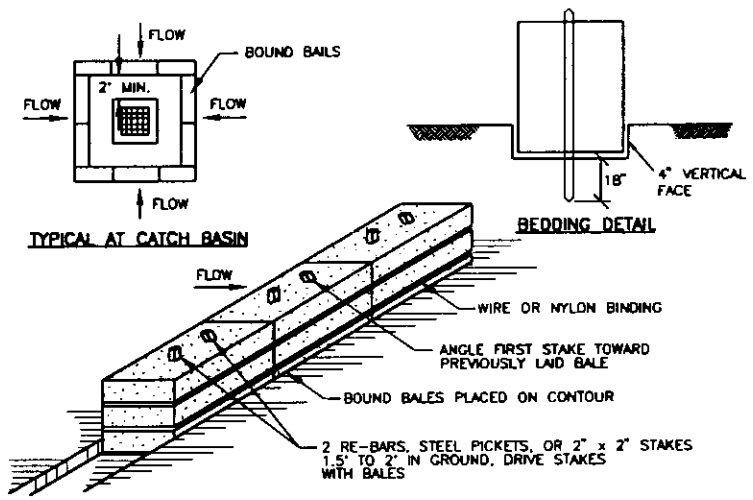
FENCE : WOVEN WIRE 14.5 GAUGE 6" MAX MESH OPENING

FILTER CLOTH : MINIMUM TENSILE STRENGTH OF 120 LBS. (ASTM D-16826)

PREFABRICATED UNIT : MIRAFI ENVIROFENCE, OR APPROVED EQUAL

SILT FENCE DETAIL

NOT TO SCALE

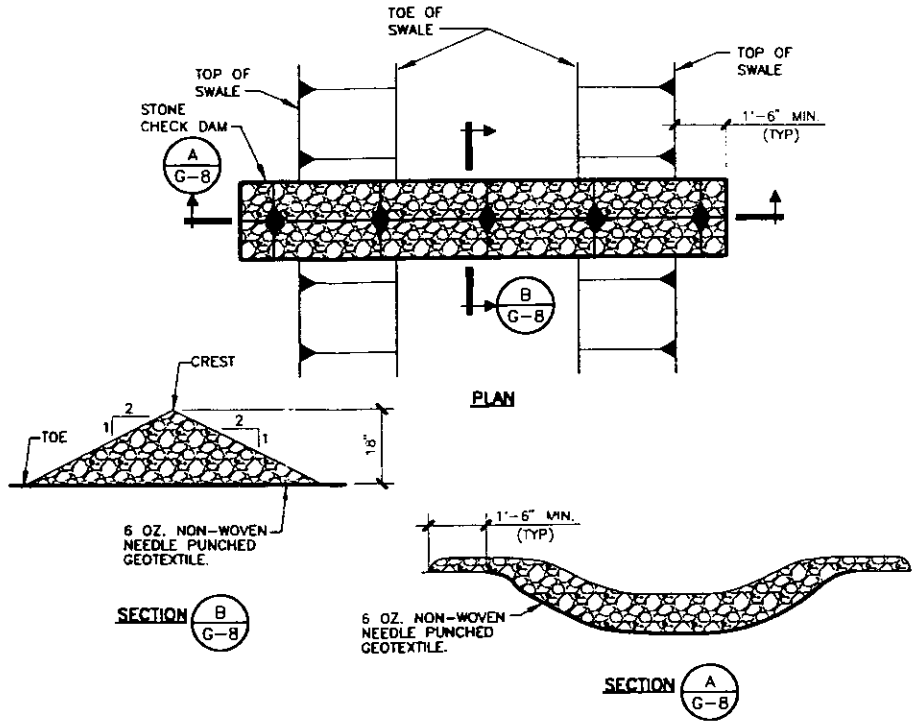


STRAW BALE DIKE DETAIL

NOT TO SCALE

CONSTRUCTION SPECIFICATIONS

1. BALES SHALL BE PLACED PRIOR TO CONSTRUCTION AT THE TOE OF A SLOPE OR ON THE CONTOUR AND IN A ROW WITH ENDS TIGHTLY ABUTTING THE ADJACENT BALES.
2. EACH BALE SHALL BE EMBEDDED IN THE SOIL A MINIMUM OF 4 INCHES, AND PLACED SO THE BINDINGS ARE HORIZONTAL.
3. BALES SHALL BE SECURELY ANCHORED IN PLACE BY EITHER TWO STAKES OR RE-BARS DRIVEN THROUGH THE BALE. THE FIRST STAKE IN EACH BALE SHALL BE DRIVEN TOWARD THE PREVIOUSLY LAID BALE AT AN ANGLE TO FORCE THE THE BALES TOGETHER. STAKES SHALL BE DRIVEN FLUSH WITH THE BALE.
4. INSPECTION SHALL BE FREQUENT AND REPAIR OR REPLACEMENT SHALL BE MADE PROMPTLY AS NEEDED.
5. UPON COMPLETION OF CONSTRUCTION AND STABILIZATION OF ALL DISTURBED AREAS, SILTATION CONTROL MEASURES ARE TO BE REMOVED.



CHECK DAM DETAIL

NOT TO SCALE

CONSTRUCTION SPECIFICATIONS

1. STONE WILL BE PLACED ON A FILTER FABRIC FOUNDATION TO THE LINES, GRADES AND LOCATIONS SHOWN IN THE PLAN.
2. SET SPACING OF CHECK DAMS TO ASSURE THAT THE ELEVATIONS OF THE CREST OF THE DOWNSTREAM DAM IS AT THE SAME ELEVATION OF THE TOE OF THE UPSTREAM DAM.
3. EXTEND THE STONE A MINIMUM OF 1.5' BEYOND THE DITCH BANKS TO PREVENT CUTTING AROUND THE DAM.
4. PROTECT THE CHANNEL DOWNSTREAM OF THE LOWEST CHECK DAM FROM SCOUR AND EROSION WITH STONE OR LINER AS APPROPRIATE.

NO.	DATE	REVISION	INIT.
1	5/11/98	REVISED PER ADDENDUM NO. 1	
0	4/13/98	ISSUED FOR CONSTRUCTION	

NOT TO SCALE

O'BRIEN & GERE ENGINEERS INC.

SOLUTIA INC.
NORTHSIDE PROPERTIES CLOSURE DESIGN
ANNISTON ALABAMA

GENERAL

MISCELLANEOUS DETAILS

ALABAMA REGISTERED No. 16584 PROFESSIONAL ENGINEER DEAN L. PALMER

Dean L. Palmer 5/18/98

IN CHARGE OF Dean L. Palmer
DESIGNED BY TJS CHECKED BY AJC
DRAWN BY KFR/JMA

FILE NO. 2600.037-012
DATE MAY 11, 1998

G-8

5/11/98

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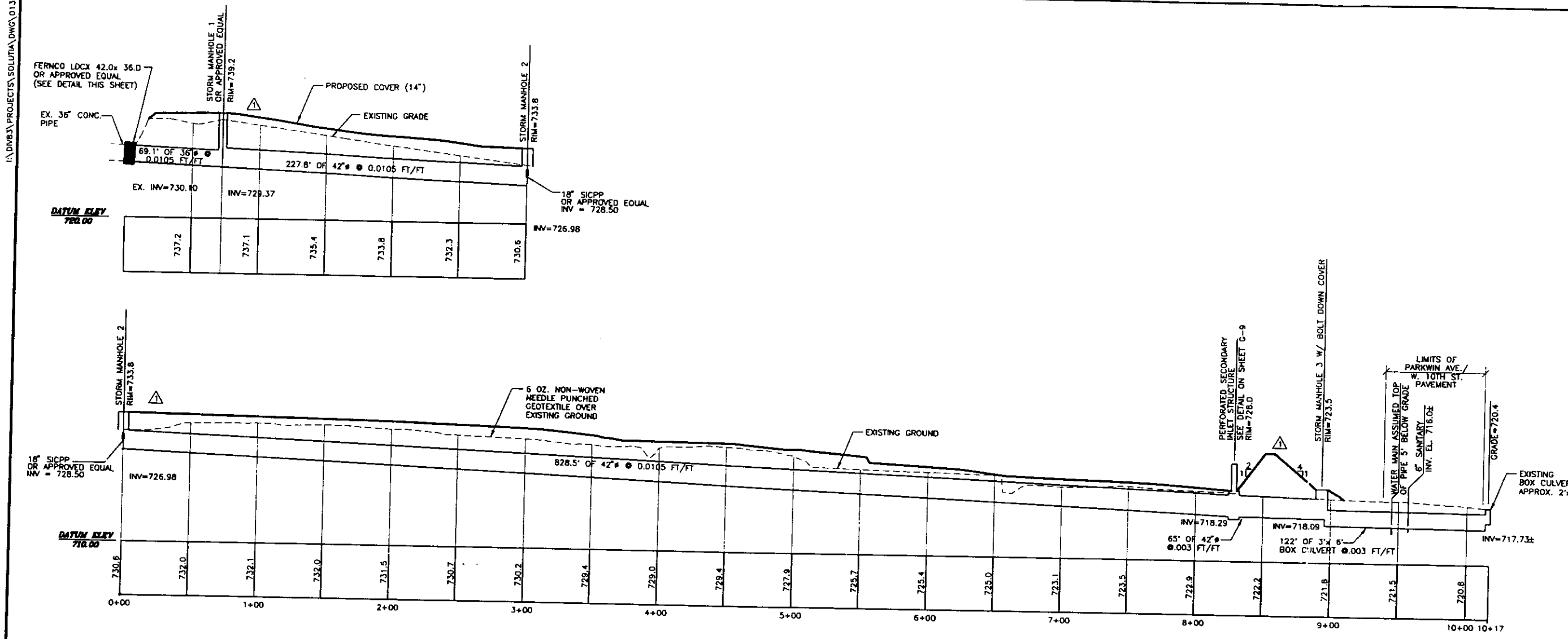
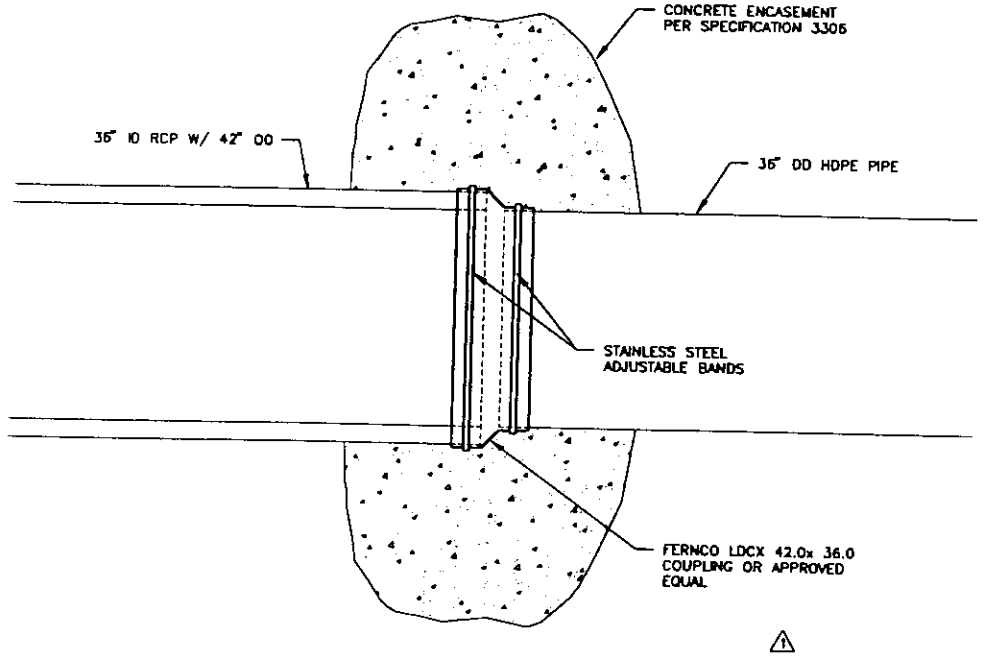


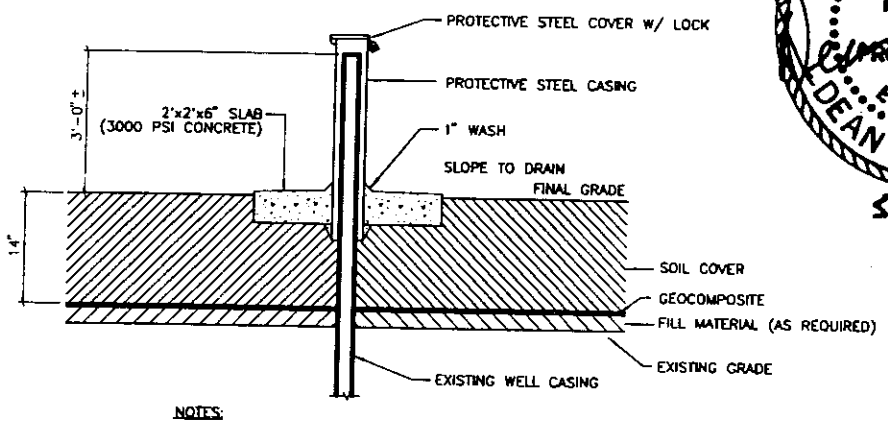
PROFILE

SCALE: HORZ. 1"=40'
VERT. 1"=10'



EXISTING/NEW PIPE INTERCONNECT DETAIL

NOT TO SCALE



NOTES:

1. INSTALL CONCRETE SLAB AROUND ALL MONITORING WELLS, AS DIRECTED BY THE OWNERS REPRESENTATIVE.
2. REMOVE AND ADJUST EXISTING PROTECTIVE WELL BOLLARDS AS DIRECTED BY THE OWNERS REPRESENTATIVE.

TYPICAL MONITORING WELL MODIFICATION DETAIL

NOT TO SCLAE

ALABAMA REGISTERED No. 16586 PROFESSIONAL ENGINEER DEAN L. PALMER
5/11/98

NO.	DATE	REVISION	INIT.
1	5/11/98	REVISED PER ADDENDUM NO. 1	DLP
0	4/13/98	ISSUED FOR CONSTRUCTION	DLP

HORZ. 1"=40' 40 0 40 80
VERT. 1"=10' 10 0 10 20

O'BRIEN & GERE ENGINEERS INC.

SOLUTIA INC.
NORTHSIDE PROPERTIES CLOSURE DESIGN
ANNISTON ALABAMA

GENERAL

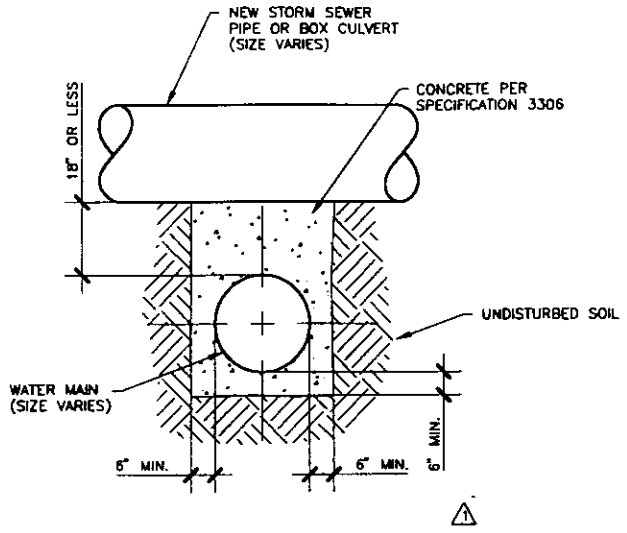
STORM SEWER PROFILE & MISCELLANEOUS DETAILS

IN CHARGE OF Dean L Palmer
DESIGNED BY TJS CHECKED BY AJC
DRAWN BY KFR/JMA

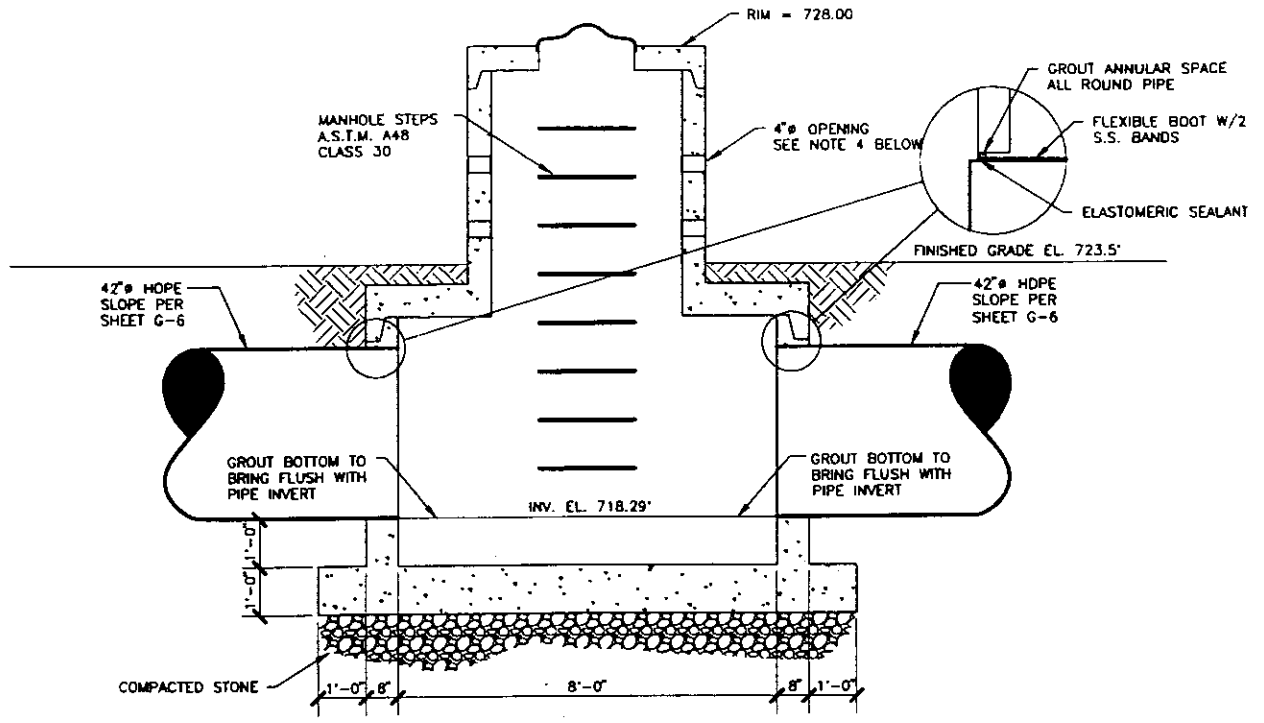
FILE NO. 2600.037-013
DATE MAY 11, 1998

G-6

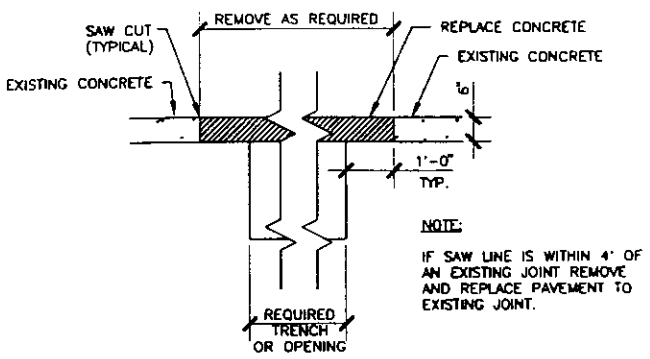
5/11/98



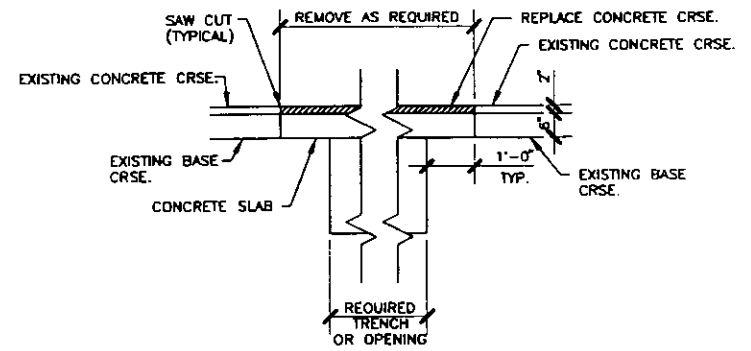
CONCRETE ENCASEMENT DETAIL
1/2" = 1'-0"



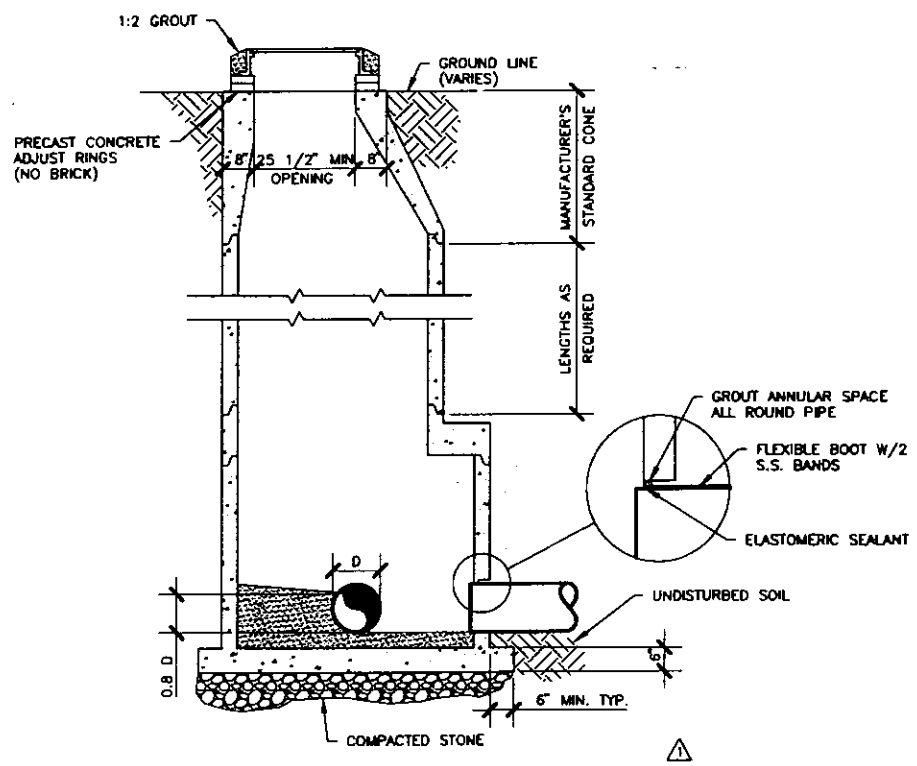
SECTION (2 / G-8)
1/2" = 1'-0"



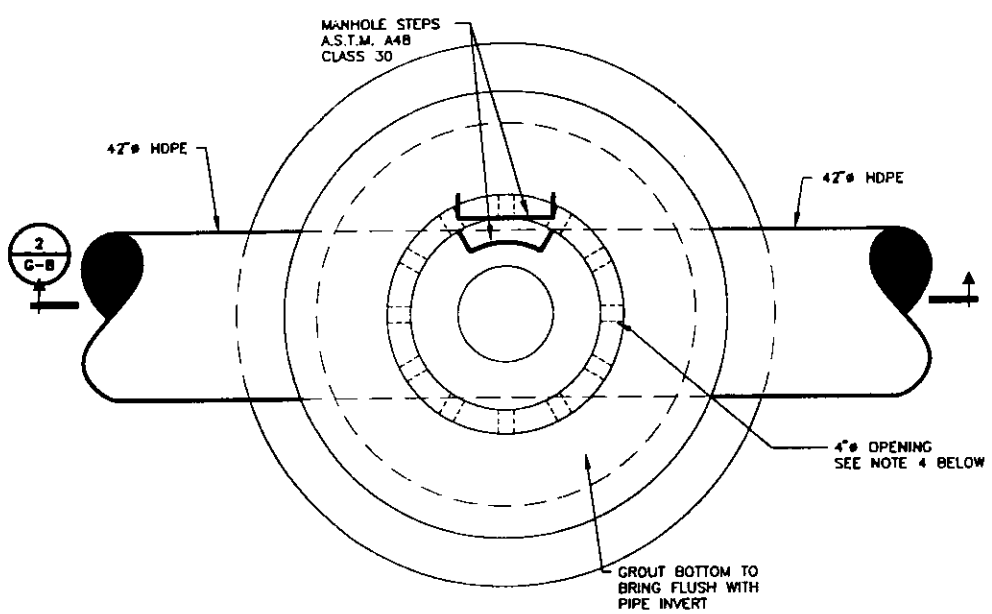
RIGID PAVEMENT DETAIL
1/2" = 1'-0"



FLEXIBLE PAVEMENT DETAIL
1/2" = 1'-0"



STANDARD PRECAST CONCRETE MANHOLE
1/2" = 1'-0"



PERFORATED SECONDARY INLET STRUCTURE
1/2" = 1'-0"

SPECIFICATIONS

CONCRETE	4000 PSI @ 28 DAYS
ENTRAINED AIR	5%-9%
STEEL	ASTM A496-A615 GRADE 60-60 KSI
DESIGN LOADING	AASHTO HS-20-44 WITH 30% IMPACT AND EQUIVALENT SOIL PRESSURE OF 130 (PSF) FLOATATION FORCES NOT ACCOUNTED FOR

NOTES:

1. REINFORCED STEEL CONFORMS TO LATEST ASTM A185 SPECIFICATION 0.12 SQ. IN./LINEAL FT. AND 0.12 SQ. IN. (BOTH WAYS) IN BASE SLAB.
2. CONCREE COMPRESSIVE STRENGTH 4000 PSI MINIMUM.
3. DESIGN SPECIFICATIONS CONFORM TO LATEST ASTM C890-91 SPEC. FOR PRECAST REINFORCED CONCRETE.
4. PROVIDE 4"ø FACTORY CAST OPENINGS AT 60° SET 12" VERTICALLY CENTER TO CENTER OFFSET 30°.

ALABAMA REGISTERED No. 16534 PROFESSIONAL ENGINEER DEAN L. PALMER 5/18/98

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SCALE AS SHOWN

O'BRIEN & GERE ENGINEERS INC.

SOLUTIA INC.
NORTHSIDE PROPERTIES CLOSURE DESIGN
ANNISTION ALABAMA

GENERAL

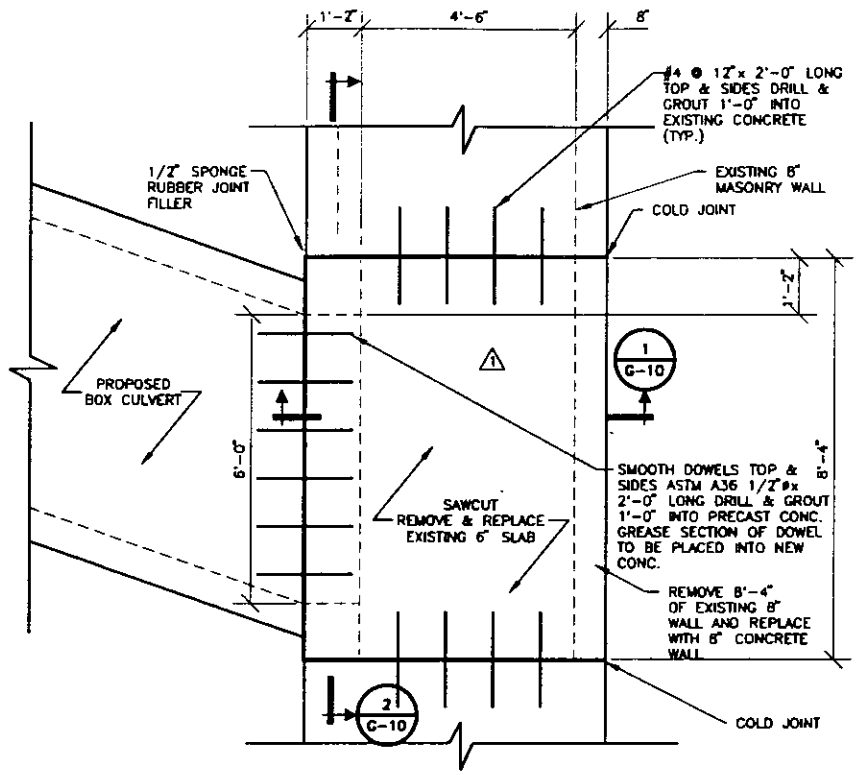
MISCELLANEOUS DETAILS

IN CHARGE OF Dean L. Palmer
DESIGNED BY TJS CHECKED BY AJC
DRAWN BY JMA

FILE NO. 2600.037-014
DATE MAY 11, 1998

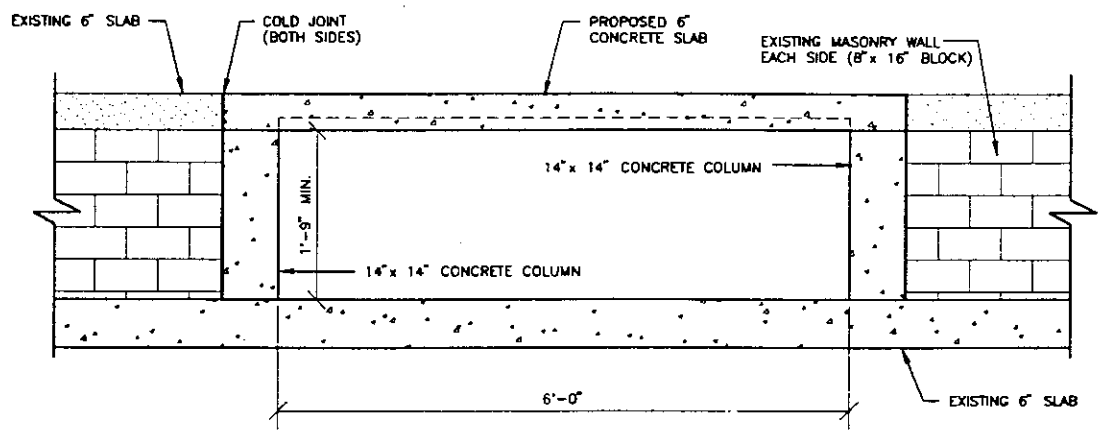
G-9

DWG PATH: I:\DIV15\PROJECTS\2600037\DWG\D16.DWG



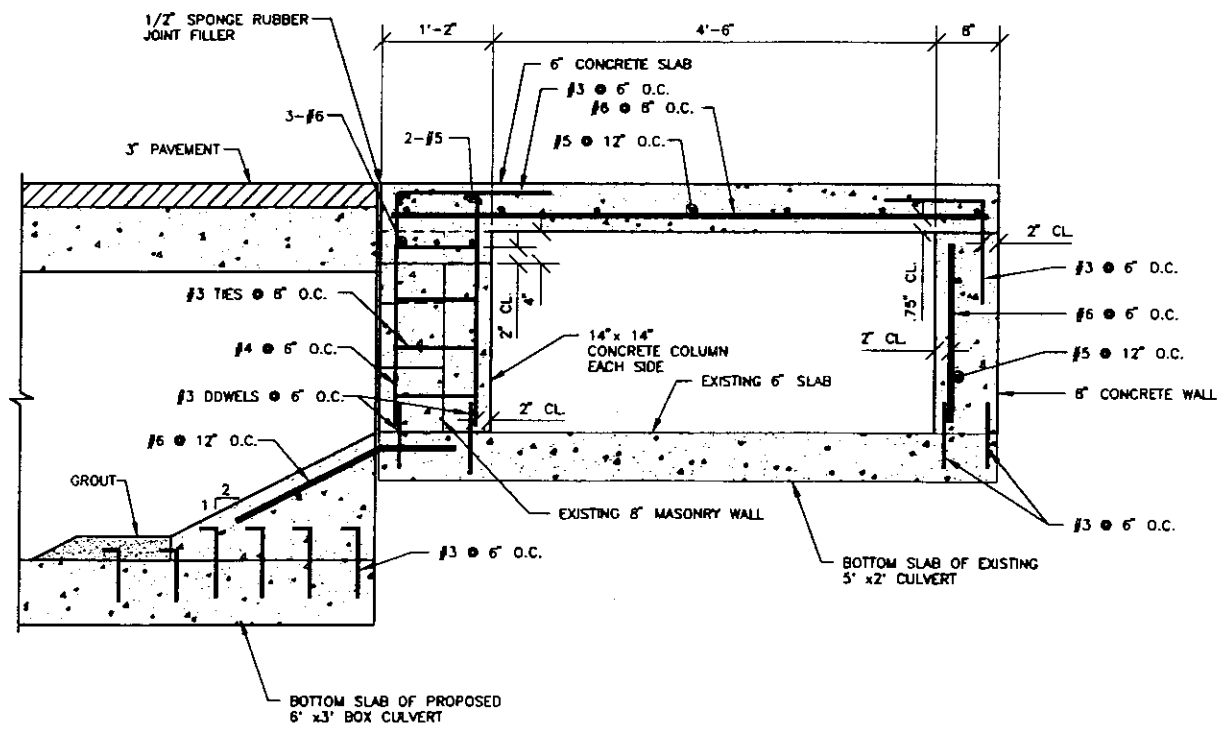
BOX CULVERT JUNCTION PLAN

1/2" = 1'-0"



SECTION 2 / G-10

1" = 1'-0"



SECTION 1 / G-10

1" = 1'-0"

PLOT DATE: 5/11/98

SPECIFICATIONS:

CONCRETE WORK SHALL FOLLOW ACI 301 CONCRETE REINFORCING AND ACCESSORIES SHALL FOLLOW ACI 315.

CONCRETE	4,000 PSI @ 28 DAYS
ENTRAINED AIR	5% – 7%
STEEL – DEFORMED BARS	ASTM A 615, GRADE 60
STEEL – WELDED WIRE MESH	ANSI/ASTM A 185

NOTES:

1. CHAMFER EXPOSED CORNERS OF CONCRETE 3/4 INCH.
2. CAST IN PLACE CONCRETE COVER FOR REINFORCING UNLESS OTHERWISE NOTED (UON), ON DETAILS SHALL CONFORM TO THE FOLLOWING:
   - CONCRETE AGAINST EARTH 3 INCHES
   - CONCRETE TANKS 2 INCHES
   - CONCRETE EXPOSED TO EARTH OR WEATHER
     - #6 BAR & LARGER 2 INCHES
     - #5 BAR & SMALLER 1 1/2 INCHES
   - CONCRETE NOT EXPOSED TO EARTH OR WEATHER
     - BEAMS, COLUMNS 2 INCHES
     - SLABS, WALL, & JOISTS (#11 BAR & SMALLER) 1 1/2 INCHES
3. HOLD REINFORCING BARS AT CORRECT DISTANCE FROM FORMS AND EARTH WITH CHAIRS, SPACERS, AND TIES. (PLASTIC TIP LEGS AT EXPOSED CONCRETE)
4. IN ANY APPROVED CONSTRUCTION JOINT PROVIDE A SHEAR KEY 1 1/2 INCHES DEEP x 1/3 THE JOINT WIDTH. ALSO PROVIDE A TENSION CLASS "B" LAP OF REINFORCING.
5. SLAB, BEAM, AND JOIST TOP REINFORCING CONTINUOUS OVER A SUPPORT SHALL EXTEND TO THE 1/3 POINT OF THE CLEAR SPAN. SLAB, BEAM, AND JOIST TOP REINFORCING AT A DISCONTINUOUS END SHALL TERMINATE IN A STANDARD 90 DEGREE HOOK INTO SUPPORTING BEAMS AND WALLS.
6. CONCRETE BEAMS SHALL BE MONOLITHIC WITH SLABS.
7. MINIMUM DOWELS FROM CONCRETE WALLS TO TOP OF CONCRETE SLAB SHALL BE, UON.
   - #4 @ 16 INCH IN THE DIRECTION OF MAIN SLAB REINFORCING.
   - #3 @ 16 INCH IN THE DIRECTION OF TEMPERATURE REINFORCING.
   - EXTEND TO DOWELS TO THE 1/4 POINT OF SLAB SPAN.
8. AT CONCRETE BEAMS PROVIDE A MINIMUM OF 2–#4 TOP (STIRRUP SUPPORT) BARS LAPPED 18 INCHES WITH TOP NEGATIVE REINFORCING BAR UON.
9. CONCRETE BEAMS WITH TOP BARS WHERE NO STIRRUPS ARE CALLED FOR SHALL HAVE #3 STIRRUPS AT 12 INCHES.
10. NO LAPS OF BOTTOM BARS PERMITTED IN STRUCTURAL SLABS.
11. WHERE MAIN SLAB REINFORCING IS PARALLEL TO A BEAM, ADD 1–#3 x 6 FOOT AT 18 INCH O.C. OVER BEAM.
12. GROUT FOR DOWELS EUCO NON–SHRINK GROUT AS MANUFACTURED BY EUCLID CHEMICAL COMPANY OR EQUAL.

⚠

NO.	DATE	REVISION	INIT.
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SCALE AS SHOWN

THIS DRAWING WAS PREPARED AT THE SCALE INDICATED IN THE TITLE BLOCK. INACCURACIES IN THE STATED SCALE MAY BE INTRODUCED WHEN DRAWINGS ARE REPRODUCED BY ANY MEANS. USE THE GRAPHIC SCALE BAR IN THE TITLE BLOCK TO DETERMINE THE ACTUAL SCALE OF THIS DRAWING.

IT IS A VIOLATION OF LAW FOR ANY PERSON, UNLESS ACTING UNDER THE DIRECTION OF A LICENSED ENGINEER, TO ALTER THIS DOCUMENT.

ALABAMA REGISTERED No. 16584 PROFESSIONAL ENGINEER DEAN L. PALMER

Dean L Palmer 5/18/98

O'BRIEN & GERE ENGINEERS INC.

SOLUTIA INC.
NORTHSIDE PROPERTIES CLOSURE DESIGN
ANNISTION ALABAMA

GENERAL

MISCELLANEOUS DETAILS

IN CHARGE OF Dean L Palmer
DESIGNED BY TJS CHECKED BY AJC
DRAWN BY JMA

FILE NO. 2600.037-016
DATE MAY 11, 1998

G–10

I, Angela Butler, am responsible for filing documents in the

(Name of file) Solutia, Inc. file. The attached document,

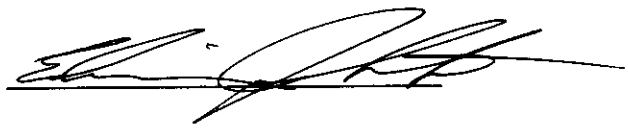
(Name of document) Supplemental Interim Measures Work Plan

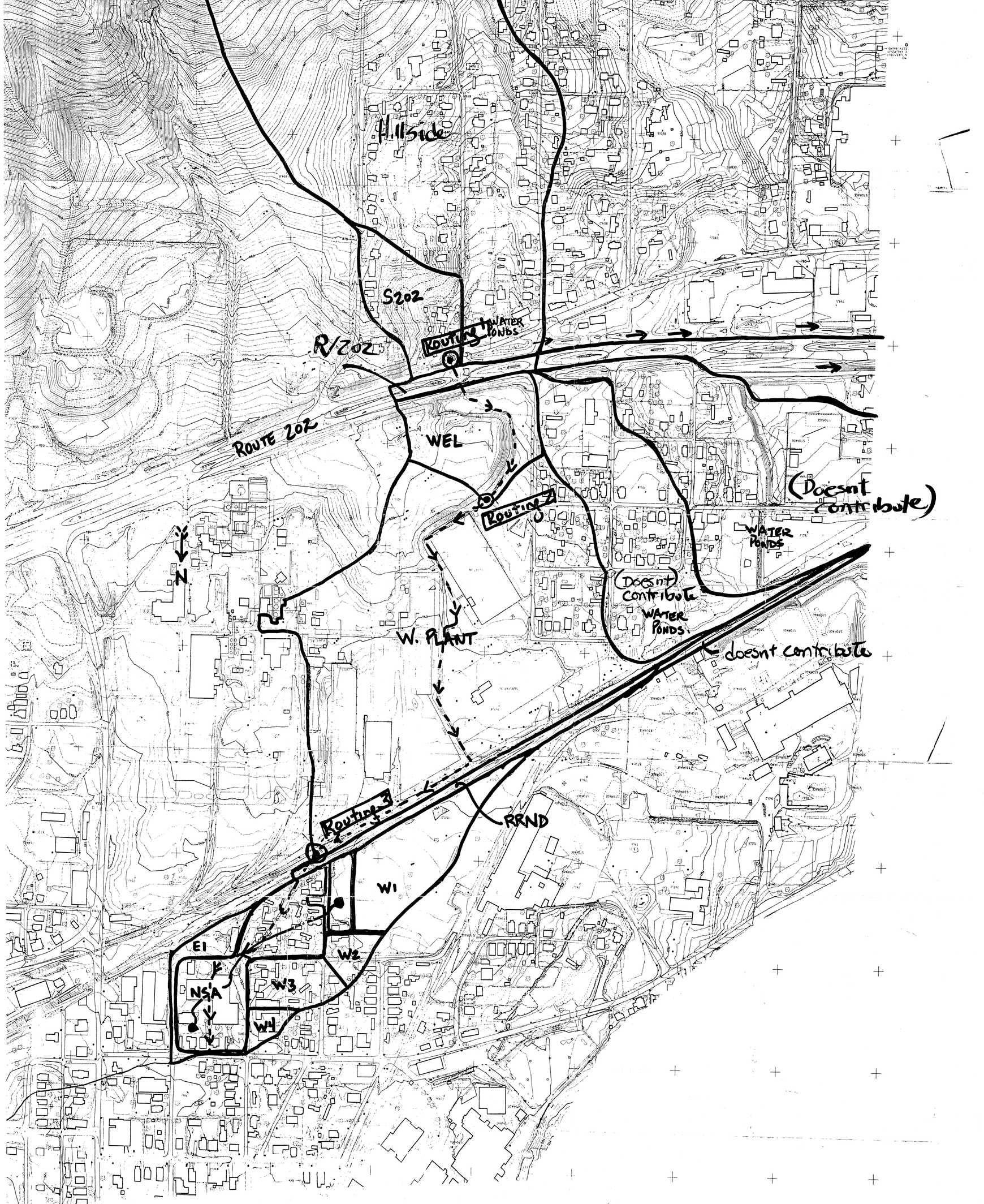
was originally submitted to the Alabama Department of Environmental Management in a 3-ring binder.

For ease of filing, only the binder has changed. No material has changed in the document. No other alterations have been made to said document, and it is otherwise in its original form as submitted to the Alabama Department of Environmental Management.

Angela Butler
Angela Butler

Done this 8th day of Sept., 1998.

Witness: 


Hillside
S202
R/202
ROUTE 5
WATER PONDS
ROUTE 202
WEL
ROUTE 2
(Doesnt contribute)
WATER PONDS
N
(Doesnt contribute
WATER PONDS
W. PLANT
doesnt contribute
ROUTE 3
RRND
W1
E1
W2
NSA
W3
W4