



Planning Division
Development Permit Application

29799 SW Town Center Loop E, Wilsonville, OR 97070
Phone: 503.682.4960 Fax: 503.682.7025
Web: www.ci.wilsonville.or.us

Final action on development application or zone change is required within 120 days in accordance with provisions of ORS 227.175

A pre application conference is normally required prior to submittal of an application. Please visit the City's website for submittal requirements

Pre-Application Meeting Date: _____

Incomplete applications will not be scheduled for public hearing until all of the required materials are submitted.

Applicant:

Name: Remo Douglas
Company: West Linn-Wilsonville School Dist.
Mailing Address: 22210 SW Stafford Road
City, State, Zip: Tualatin, OR 97062
Phone: 503.673.7988 Fax: NA
E-mail: douglasr@wlwv.k12.or.us

Authorized Representative:

Name: Keith Liden
Company: Keith Liden Planning Consultant
Mailing Address: 4012 SW 36th Place
City, State, Zip: Portland, OR 97221
Phone: 503.757.5501 Fax: NA
E-mail: keith.liden@gmail.com

Property Owner:

Name: Same
Company:
Mailing Address:
City, State, Zip:
Phone: Fax:
E-mail:

Property Owner's Signature:

[Signature]
Printed Name: Remo Douglas Date: 9-16-20

Applicant's Signature: (if different from Property Owner)

Printed Name: Date:

Site Location and Description:

Project Address if Available: 11055 SW Wilsonville Road Suite/Unit
Project Location:
Tax Map #(s): 22A Tax Lot #(s): 500 County: [] Washington [x] Clackamas

Request:

Minor remodeling to the existing 86,613 sf middle school including: 1) 1,760 sf storage/restroom addition; 2) 1,288 sf detached greenhouse classroom; 3) New front building entry & admin. offices; and 4) electronic reader board sign.

Project Type: Class I [] Class II [] Class III [x]

[] Residential [] Commercial [] Industrial [x] Other: Public Facility

Application Type(s):

- [] Annexation [] Appeal [] Comp Plan Map Amend [] Parks Plan Review
[] Final Plat [] Major Partition [] Minor Partition [] Request to Modify Conditions
[] Plan Amendment [] Planned Development [] Preliminary Plat [] Site Design Review
[] Request for Special Meeting [] Request for Time Extension [x] Signs [] Stage II Final Plan
[] SROZ/SRIR Review [] Staff Interpretation [] Stage I Master Plan [] Variance
[] Type C Tree Removal Plan [] Tree Permit (B or C) [] Temporary Use [] Other (describe)
[] Villebois SAP [] Villebois PDP [] Villebois FDP
[] Zone Map Amendment [x] Waiver(s) [] Conditional Use



WOOD MIDDLE SCHOOL
Stage I and II Site Design Review,
Class III Sign Permit and Waiver
September 17, 2020

APPLICATION SUMMARY

For Site Design Review approval to construct an addition and detached greenhouse for Wood Middle School along with replacement of selected windows and entryways. In addition, a Class III Sign Permit and waiver is requested to install an electronic reader board on an existing monument sign.

GENERAL INFORMATION

Location

11055 SW Wilsonville Road (3S 1W, Section 22A, Tax Lot 500). Its location is shown in Figure 1.

Comprehensive Plan and Zoning Designation

The plan designation is Public, and the zoning is PF - Public Facilities.

Applicant and Owner

Remo Douglas
West Linn-Wilsonville School District
22210 SW Stafford Road
Tualatin, OR 97062
Phone: 503.673.7988
E-mail: douglasr@wlwv.k12.or.us

Applicant's Representatives

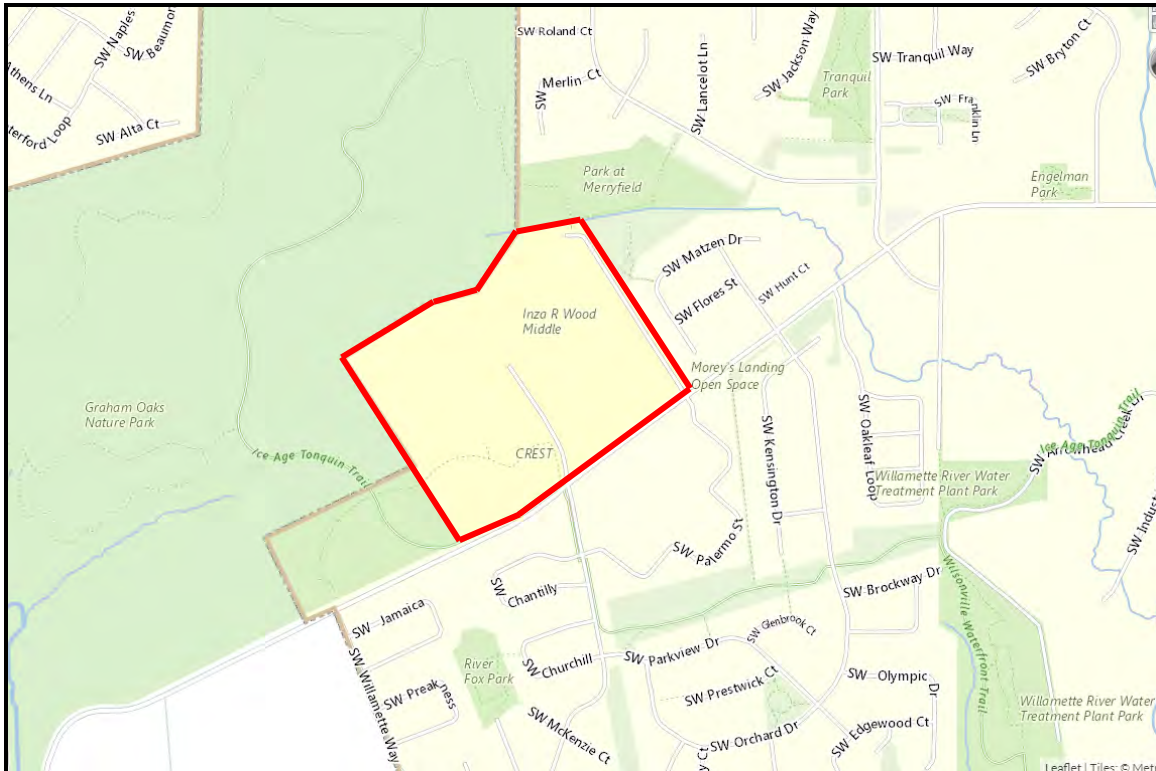
Keith Liden, AICP
4021 SW 36th Place
Portland, OR 97221
Phone: 503.757.5501
E-mail: keith.liden@gmail.com

Rebecca Grant
Associate Director
IBI Group
907 SW Harvey Milk Street
Portland, OR 97205
Phone: 503.419.1606
E-mail: rebecca.grant@IBIGroup.com

Plan Sheets and Supporting Information

Identification	Description
G0000	Cover Page
G1201	Site Plan
A1100	Floor Plan - Existing
A1101	Floor Plan - Proposed
A1401	Overall Roof Plan
A2201	Sector/Enlarged Elevations
A2202	Sector/Enlarged Elevations
A2203	Sector/Enlarged Elevations
A5110	New Electronic Reader Board at Existing Monument Sign
A8001	Materials Board
C1100	Existing Conditions and Demolition Plan
C1210	Preliminary Site and Utility Plan
C1230	Grading and Erosion Control Plan
E0301	Site Plan – Lighting
Attachment A	Preliminary Storm Drainage Report, Wood MS Remodel
Attachment B	Wall Mount Light Fixture Specifications
Attachment C	Reader Board Sign Specifications

Figure 1: Vicinity Map



Source: Metro

BACKGROUND INFORMATION

Site Description

The site is developed with Wood Middle School, including an 86,613 square foot building, driveway, parking, and play fields as shown on Sheets C1100 and G1201. The entire site is 38.65 acres, and it is shared with Boones Ferry Primary School, which is located in the western portion of the property. Two driveways provide access to the property. The eastern driveway primarily serves Wood Middle School, and the western driveway serves both schools and the CREST Center.

Improvements on the property include parking, athletic fields, playgrounds, and lawn. There are two monument signs along the Wilsonville Road frontage to identify Wood Middle School and Boones Ferry Primary School to the west. A sign is located at each of the two driveway entrances to the school property. A Significant Resource Overlay Zone (SROZ) is located on the northern edge of the property (Sheet C1100).

Surrounding Area Description

The plan and zoning designations and current land use of the surrounding area are summarized in Table 1.

**Table 1
Land Use Summary**

<i>Properties in the Vicinity</i>	<i>In City?</i>	<i>Plan Designation</i>	<i>Zone Designation</i>	<i>Land Use</i>
<u>Subject Property</u> 3S 1W 22A, TL 500 (38.65 acre school site owned by school district)	Yes	Public	PF – Public Facility	Wood Middle and Boones Ferry Primary Schools
<u>Surrounding Properties</u>				
Northwest	No	Clackamas Co. - Agriculture	County EFU	Graham Oaks Nature Park
East/Northeast	Yes	Wilsonville - Residential	PDR – Planned Development Residential	Single family residences, open space
South	Yes	Wilsonville – Public and Residential	City – PF, PDR	Single family residences
Southwest	Yes	Public	PF	Graham Oaks Nature Park
West	No	Clackamas Co. - Agriculture	County EFU	Graham Oaks Nature Park

PROPOSED IMPROVEMENTS

The District proposes several improvements to the middle school.

Administration Area Relocation

Relocate the administration area to the building perimeter with a secure vestibule entry. This will include new window openings to accommodate relocated offices that match existing windows. The building footprint and floor area will not change with these improvements (Sheets G1201, A1101, A2202 and A8001).

Classroom Relocation and New Makerspace Classroom

Classrooms that are displaced by the relocated administrative offices will be moved to the vacated administration offices footprint. This will include provision of a new maker space classroom (Sheet A1101). This will not affect the building floor area or the enrollment capacity of the school. The maker space is an educational support space. It is not a teaching station and will not increase capacity.

New Storage Room and Concessions

The district proposes to construct a building addition including a single occupant restroom, storage room, and concession stand near the performing arts classrooms, gymnasiums, and the track and athletic field (Sheets G1201, A1101 and A2201). This building addition will be approximately 1,760 square feet and a maximum height of 15 feet. Because it is located within a corner of the building, its front yard setback is greater than that of the existing building (Sheet G1201). As illustrated on Sheets A2201 and A8001, the finish materials will match the existing exterior.

New Instructional Greenhouse

A new instructional greenhouse of approximately 1,288 square feet is also proposed to be located southeast of the existing building and west of the existing parking lot on the east side of the property. This building addition will have a maximum height of approximately 14.5 feet with a setback of over 150 feet to the eastern property line (Sheet G1201). The base of the greenhouse will be finished with the same brick as the exterior of the middle school building (Sheet A2203).

New Rain Garden and Landscaping Restoration

To accommodate the additional stormwater runoff generated by the two building additions, new hardscaping, and utility improvements totaling 8,133 square feet, a new rain garden is proposed on the west side of the school building (Sheet C1210). The sizing and design of the rain garden is explained in the Preliminary Storm Drainage Report, Wood MS Remodel by 3J Consulting (Attachment A). In addition, disturbed landscaped areas shall be restored as indicated on Sheet C1210.

Rooftop Mechanical Equipment

The replacement of rooftop equipment is proposed. The replacement mechanical rooftop units will be in the same location as the existing units. The existing units are not screened and are not visible from the ground. The new rooftop mechanical unit on the addition will be screened and will not be visible from the ground (Sheets A1401, A2201 and A8001).

Exterior Lighting

The existing exterior lighting for the site is proposed to remain unchanged with the exception of three new exterior wall-mounted fixtures for the new storage room and concessions addition (Sheet E0301). They are intended to illuminate the new building doorways, and they will have virtually no impact on the overall exterior light levels for the school.

Although they are exempt from exterior lighting requirements, the light fixtures selected satisfy the prescriptive method described in Section 4.199 of the development code. As noted on Sheet

E0301, the fixtures will be 15 watts with the light directed downward with a 45-degree beam angle. The full specifications for the fixtures are provided with this application (Attachment B).

Monument Sign – Electronic Reader Board

The District proposes to modify the monument sign for Wood Middle School at the southeast corner of the property by replacing the existing manual reader board with an electronic reader board of the same size. The remainder of the sign is proposed to remain the same as illustrated on Sheet A5110, with an overall height of 6 feet, approximately 24 square-foot reader board, and total sign area of approximately 36 square feet. The nearest residence is over 100 feet to the east, and it is buffered by a solid fence and vegetation. Residences are also located on the south side of Wilsonville Road.

The electronic reader board sign is proposed to have the following operating characteristics:

- A design for text only that will not display graphics or animations. Text will be displayed in one color of red with a maximum potential brightness of 4,500 nits (for comparison, a home TV brightness is up to 1,500 nits), which is within the standard recommendation for brightness levels of outdoor displays (see Attachment C).
- The replacement of the existing manual reader board sign with an electronic one will allow for real-time updates to the signage outside the school, an example of how this may be helpful would be in the event of inclement weather or cancellation of scheduled events.

A waiver to the provisions of Section 4.156.06(.01) D. is requested to allow a sign capable of digitally changeable copy.

CONSISTENCY WITH THE WILSONVILLE ZONING CODE

The relevant criteria are listed followed by findings, which demonstrate that the application is consistent with the code requirements. The findings are organized to first address criteria relevant to the building additions and modifications followed by criteria related to the Class III sign waiver.

Building Improvements

4.136 PF – Public Facility Zone.

(.02) K. Uses Permitted Outright. Public schools are listed as a permitted use in the PF Zone.

(.04) Dimensional Standards. The proposed school meets the applicable standards in this section because:

- The property is over 60 acres, exceeding the minimum 1-acre lot size.
- The existing front yard setback of over 290 feet will not be affected.
- The existing rear and side yard setbacks greatly exceed the city's minimum standards, and the proposed greenhouse reduce the eastern side yard setback slightly. However, the minimum side yard setback of 10 feet will be exceeded by a distance of over 150 feet.

- The minimum street frontage is over 1,700 feet, exceeding the 75-foot minimum standard.
- The maximum height standard of 35 feet will be met by the building addition (maximum height of 15 feet) and the greenhouse (maximum height of 14.5 feet).

(.05) Off-Street Parking. In previous land use approvals, the school was found to satisfy the applicable standards in this section. The parking standards will continue to be satisfied because no change is proposed for the existing parking, and the proposed improvements will not create additional school capacity or cause an increase in staff.

(.06) Signs. The proposed monument sign modification and related waiver are addressed later in this narrative.

(.07) Corner Vision. In previous land use approvals, the school was found to satisfy the applicable standards in this section. The driveway locations and design will not be amended as part of this application. In addition, the existing monument sign will only be modified to feature an electronic reader board, and its dimensions and location will remain unchanged, retaining adequate sight distance.

(.08) B Special Regulations. This code section states that minor changes to an approved master plan, which “do not have off-site impact or increase visitor capacity may be reviewed by the Planning Director.” The proposed improvements to the middle school qualify as a minor change to an approved master plan because they will not increase enrollment capacity, and they will simply improve the condition, security, and usability of the existing facilities for school programs and the general public.

4.139 Significant Resource Overlay Zone (SROZ).

The provisions of this code section are not applicable because the SROZ, which is located along the northern edge of the property, will be avoided.

4.140 Planned Development Regulations.

(.09) J. 1. Location and design are consistent with the Comprehensive Plan. Previous planning actions by the city along with previous development approvals for this site have all been completed in a manner deemed by the city to be consistent with its Comprehensive Plan and implementing ordinances.

(.09) J. 2 b. Essential government service. As an essential government service (defined in Section 4.001(256)), schools are exempt from meeting the Level of Service D requirement. A traffic impact study waiver has been requested from the City Engineer because the volume of traffic generated by the primary and middle schools will not be increased by these improvements.

4.154 General Regulations – On-site Pedestrian Access and Circulation.

(.01) On-site Pedestrian Access and Circulation. This section contains a number of standards in Subsection B, which are satisfied by the proposed improvements because:

1. The existing pedestrian pathway system will not be changed, and it will continue to provide the same level of connectivity and convenience.
2. The connections will continue to be as safe and direct as found on the site presently.
3. Vehicles and pedestrians will continue to be separated.
4. Crosswalks will be retained to allow safe and convenient locations for pedestrians to cross the internal driveway system.
5. The walkways will continue to be paved.
6. Wayfinding will continue to be clear and obvious.

4.155 Parking, Loading, and Bicycle Parking.

The existing school complex was designed in a manner consistent with the criteria of this section. The proposed improvements will not alter, reduce, or affect the existing parking, loading, or bicycle parking in any way.

4.171 Protection of Natural and Other Features.

(.02) General Terrain Preparation. This section contains a number of standards in Subsections A, B and C, which are satisfied by the proposed improvements because:

1. The two work areas, which change the building coverage, are the storage/concessions addition and the detached greenhouse. To accommodate stormwater runoff associated with these new impervious areas, a new detention and treatment facility is proposed near the western building entrance. No natural features, terrain, floodplains, or similarly significant areas will be affected.
2. During construction, all building and other code requirements will be satisfied.
3. As noted above, this project will only affect small areas of existing lawn surrounding the school, and sensitive areas, trees, and other natural features will not be affected or compromised.

(.03) – (.11) Remaining Subsections. The remaining subsections are not relevant because the proposed improvements will not be located in hazard, wooded, sensitive, or culturally significant areas.

4.175 Public Safety and Crime Prevention.

The provisions of this section call for appropriate design and lighting to deter crime. The existing school complex was designed in a manner consistent with these criteria. The secure building entry is proposed to enhance the security of students, staff, and the public. Finally, the doorways for the storage, restroom, and concessions addition will have wall mounted fixtures to create safe evening conditions.

4.176 Landscaping, Screening and Buffering.

(.02) Landscaping and Screening Standards. Because the improvements are well within the 38+ acre site, the general landscaping standards are required. The standards in this section will continue to be satisfied because only a minor amount of the existing landscaping will be disturbed by the proposed storage/concessions and greenhouse additions.

(.03) Landscaped Area. The school site continues to have well over a minimum of 15% of the area devoted to landscaping.

(.04) Buffering and screening. The school building is well screened from surrounding properties by virtue of distance, fences, and existing landscaping. Also, the district proposes to use exterior materials and finishes that are consistent with the existing building exterior. The proposed improvements will have a minimal impact on the existing landscaping, and replacement landscaping is proposed for affected areas.

(.05) Sight-Obscuring Fence or Planting. This section is not relevant because this type of screening is not necessary or required.

(.06) Plant Materials. This section specifies the minimum sizes and coverage for new landscaping. This section is not relevant because only small areas of existing lawn will be affected and replaced following construction.

(.07) Installation and Maintenance. The installation requirements will be followed, and an irrigation system is currently available.

(.08) Landscaping on Corner Lots. Not applicable because this is not on a corner lot.

(.09) Landscape Plans. This section requires landscape plans. The re-landscaping is shown on the civil engineering sheets, and it will include restoration of lawn following construction. The small rain garden shall be planted according to city requirements.

(.10) Completion of Landscaping. The district shall continue to maintain landscaping as required by this section.

(.11) Street Trees Not Typically Part of Site Landscaping. This section segregates street trees from other landscaping requirements. Because no existing street trees will be affected, this section is not relevant.

(.12) Mitigation and restoration plantings. The only disturbed areas will be the small lawn areas and the new stormwater detention and treatment facility. All will be restored as shown on Sheet C1210.

4.177 Street Improvement Standards

This section is not applicable because the property currently satisfies the requirements of this section, and no changes are proposed to the Wilsonville Road frontage or the existing access.

4.179 Mixed Solid Waste and Recyclables Storage

This section is not applicable because the property currently satisfies the requirements of this section, and no changes are proposed to the current solid waste and recycling, which is all handled for both schools at Boones Ferry Primary School. Although no change is proposed to these facilities or the access to them, city staff requested that the District contact Republic Services to review the proposal and comment. This was done in August, a case number was assigned

(#110189258), and company representatives contacted the District on September 16th to review the existing facilities. It is anticipated that a response from Republic Services will be forthcoming.

4.199 Outdoor Lighting

4.199.20 Applicability. The outdoor lighting requirements are not applicable to the three exterior fixtures because they are required exit lighting for the exterior doors to the storage/concession addition. (Subsection (.02) F.).

4.300 Underground Utilities

The property currently satisfies the requirement of this section to have underground utilities. No above ground utilities are proposed.

4.400 Purpose – Site Design Review.

(.01) Discourage excessive uniformity and poor design. The school property has proven to be a significant community asset. The design of the building and site improvements will not be affected except for what is proposed in this application.

(.02) A number of objectives are noted in the purpose section. These are addressed below:

- A. *Proper function.* As noted above, the current site plan was approved by the city because of its appropriate and functional design. The proposed improvements simply build upon this design by retaining all of its current functionality and adding additional security.
- B. *Encourage originality, flexibility, and innovation.* The design of the school and these facility enhancements demonstrate the district's commitment to innovation, improved instructional methods, and continuing to improve the site's value to its students and the community.
- C. *Discourage drab, inharmonious developments.* The existing facility was approved by the city, and it has proven to be an excellent design, which now will be further improved with the additions and exterior upgrades and finishes.
- D. *Conserve the city's beauty.* The architectural integrity of the facility will be maintained by matching the architectural style and exterior finishes to be consistent with the existing school.
- E. *Promote businesses and industry.* A quality education program is the cornerstone for attracting business and industry to a community. These improvements demonstrate the district's continued commitment to provide a safe and functional facility that meets community needs.
- F. *Property values.* The proposed improvements will be well within the property and should not have any negative impact on surrounding properties or their value. In fact, the proposed improvements are supported by the community to provide schools that are safe functional, and support quality educational programs and activities.

- G. *Adequate public facilities.* School enrollment capacity is currently sufficient and these improvements will not increase that capacity. Therefore, the proposed improvements will essentially have no impact on public facilities and services because the overall use of the site will not increase.
- H. *Pleasant environments.* The existing landscaping open space on the site will be retained or enhanced, maintaining the visual appeal for the neighborhood.
- I. *Foster civic pride.* In addition to education, the school serves as a community center, fostering civic pride. In particular, these enhancements will provide improved security and educational opportunities for the community.
- J. *Sustain comfort, health, tranquility and contentment of residents.* Quality educational and recreational facilities are certainly a contributing factor to achieving this objective.

4.421 Criteria and Application of Design Standards.

(.01) *Evaluation Standards.* The standards of this section are addressed below:

- A. *Preservation of landscape.* The general appearance of the landscape will be retained, and landscaped areas within and immediately surrounding the building addition and greenhouse will be restored.
- B. *Relation of proposed building to the environment.* This standard is satisfied because the areas of work are a significant distance from any natural or environmentally sensitive areas.
- C. *Drives, parking and circulation.* Pedestrian, bicycle, vehicle, bus, and emergency access have been successfully accommodated by retaining separate and convenient routes for pedestrians and bicyclists on site. The proposed improvements will have no impact on circulation.
- D. *Surface water drainage.* As described in this application, the storm drainage system is designed to accommodate stormwater runoff related to the new artificial field.
- E. *Utility service.* All on-site utilities will continue to be placed underground.
- F. *Advertising features.* No advertising features are proposed. The existing and proposed reader board elements of the monument sign have been, and will continue to be, solely intended to keep the community informed regarding school activities and events.
- G. *Special features.* The proposed improvements will not affect existing special facilities on the site. As noted above, the locations of the building additions are a significant distance from any environmentally sensitive areas.

(.03) Guidance by the purpose statement. The purpose statement in Section 4.400 is also used to evaluate development proposals. The purpose statement and related objectives are addressed above.

4.430 Mixed Solid Waste and Recycling Areas.

The standards of this section are not relevant because these facilities have been previously approved by the city, and no changes are proposed. Waste and recycling are handled for both schools in one shared location at Boones Ferry Primary School. The existing driveway and circulation system will not be modified or affected in any way by the proposed improvements. The waste hauler will continue to have appropriate access.

4.450 Installation of Landscaping.

The proposed landscaping associated with the rain garden and replacement lawn following construction shall be installed subject to city approval. The District has demonstrated a long-standing commitment to properly maintain its facilities, including landscaping. This level of maintenance shall continue.

Class III Sign Waiver

4.156 Signs

4.156.02(.06) Class III Sign Permits. The city staff indicated that because an electronic reader board sign is not permitted, Section 4.156.02(.06) Class III Sign Permit applies to this application because approval of a waiver is required.

4.156.02(.05) E. This section contains three criteria that must be satisfied:

1. *The proposed signage is compatible with surrounding developments or uses.* The modified monument sign continues to be consistent with the original design approved by the city. It will enhance daytime identification of school events and notices in a manner that will continue to be complementary to the building's architecture and exterior finish materials. Other than the replacement of the manual reader board with an electronic one, the materials and the finish of the sign will remain as it is today.
2. *The proposed signage will not create a nuisance.* The sign will continue to complement the materials and colors of the school building façade. Because the sign will be a significant distance from any nearby residences, it will have no detrimental impact on surrounding properties.
3. *Pay special attention to the interface between signs and other site elements.* The Wood Middle School and Boones Ferry Primary School campus landscaping and signs were carefully designed by the District and approved by the DRB. The proposed modified monument sign will continue to be consistent with design and location of the original.

4.156.02(.08) A. Waivers

As noted above, the reader board portion of the existing sign is proposed to be replaced with an electronic changeable copy sign. This section lists four criteria that must be satisfied to receive a waiver:

1. *Improved sign design and functionality.* The sign design and location will be very similar to the previously approved monument sign. The only difference is the replacement of the manual reader board with an electronic one. The electronic display offers significant advantages by allowing easy message changes and regulation of the sign's operation.
2. *Signs that are more compatible and complementary than signs allowed without the waiver.* The sign design and location will remain unchanged. The electronic reader board display will have a similar visual appearance to the previously approved manual reader board backlit display. It will not have graphics or flashing displays of any kind.
3. *The waiver will result in a sign or signs that improve, or at least do not negatively impact, public safety, especially traffic safety.* The current sign location will be retained, allowing for proper visibility near the intersection of the parking lot driveway and Wilsonville Road. As noted above, the electronic display will not be overly bright, animated, or distracting in any way that could compromise traffic safety.
4. *Sign content is not being considered when determining whether or not to grant a waiver.* The sign content will obviously change with each school announcement. The primary consideration should be the proposed absence of any graphics or animation (proposed reader board will not even have this capability), which could become detrimental to surrounding properties or traffic safety.

CONCLUSION

The proposed improvements satisfy all of the relevant criteria for Site Design Review and sign waiver approval as demonstrated above.



First American Title Insurance Company of Oregon

Clackamas (OR)

Prepared For:

Prepared By:

Customer Service Department
 1700 SW Fourth Avenue - Portland, Oregon 97201-5512
 Phone: (503) 222-3651 Fax: (503) 790-7872

OWNERSHIP INFORMATION

Owner	: West Linn-Wils Sch Dist#3j	Ref Parcel Number	: R31W22A 00500
CoOwner	:	T: 03S	R: 01W S: 22 Q: 253
Site Address	: 11055 SW Wilsonville Rd Wilsonville 97070	Parcel Number	: 00817272
Mail Address	: 11055 SW Wilsonville Rd Wilsonville Or 97070	County	: Clackamas (OR)
Telephone	: Owner: 503-682-0101 Tenant:		

SALES AND LOAN INFORMATION

Transferred	:	Loan Amount	:
Document #	: 79-05357	Lender	:
Sale Price	:	Loan Type	:
Deed Type	:	Interest Rate	:
% Owned	:	Vesting Type	:

PROPERTY DESCRIPTION

Map Page & Grid : 744 J3
 Census : Tract: 227.01 Block: 5
 Improvement Type : 601 Schools
 Subdivision/Plat :
 Neighborhood Cd : W575
 Land Use : 401 Tract, Tract Land, Improved
 Legal : INZA WOOD MIDDLE SCHL ORD #16694
 : ORD 2560 1979 FARM USE REMOVED MSD
 : 1-1-79

ASSESSMENT AND TAX INFORMATION

Land : \$298,090
 Structure : \$4,333,850
 Total : \$4,631,940
 % Improved : 94
 98-99 Taxes :
 Exempt Amount : \$4,631,940
 Exempt Type : Other
 Levy Code : 003023
 Millage Rate : 17.2306

PROPERTY CHARACTERISTICS

Bedrooms	:	Building SF	:	Stories	:
Bathrooms	:	1st Floor SF	:	Garage SF	:
Fireplace	:	Above Ground SF	:	Lot Acres	: 19.24
Heat Type	:	Upper Finished SF	:	Lot SF	: 838,094
Interior Material:	:	Unfin Upper Story	:	Year Built	: 1980
Exterior Finish	:	Upper Total SF	:	Year Appraised	: 1995
Floor Cover	:	Finished SF	:	Appraisal Area	: 5
Roof Type	:	Basement Fin SF	:	School District	: 003
Roof Shape	:	Basement Unfin SF	:	Utility District	:
Foundation	:	Basement Total SF	:		

This title information has been furnished, without charge, in conformance with the guidelines approved by the State of Oregon Insurance Commissioner. The Insurance Division cautions intermediaries that this service is designed to benefit the ultimate insureds. Indiscriminate use only benefiting intermediaries will not be permitted. Said services may be discontinued. No liability is assumed for any errors in this report.

N.E. 1/4 SEC. 22 T.3S. R.1W. W.M.
CLACKAMAS COUNTY

3 1W 22A
WILSONVILLE

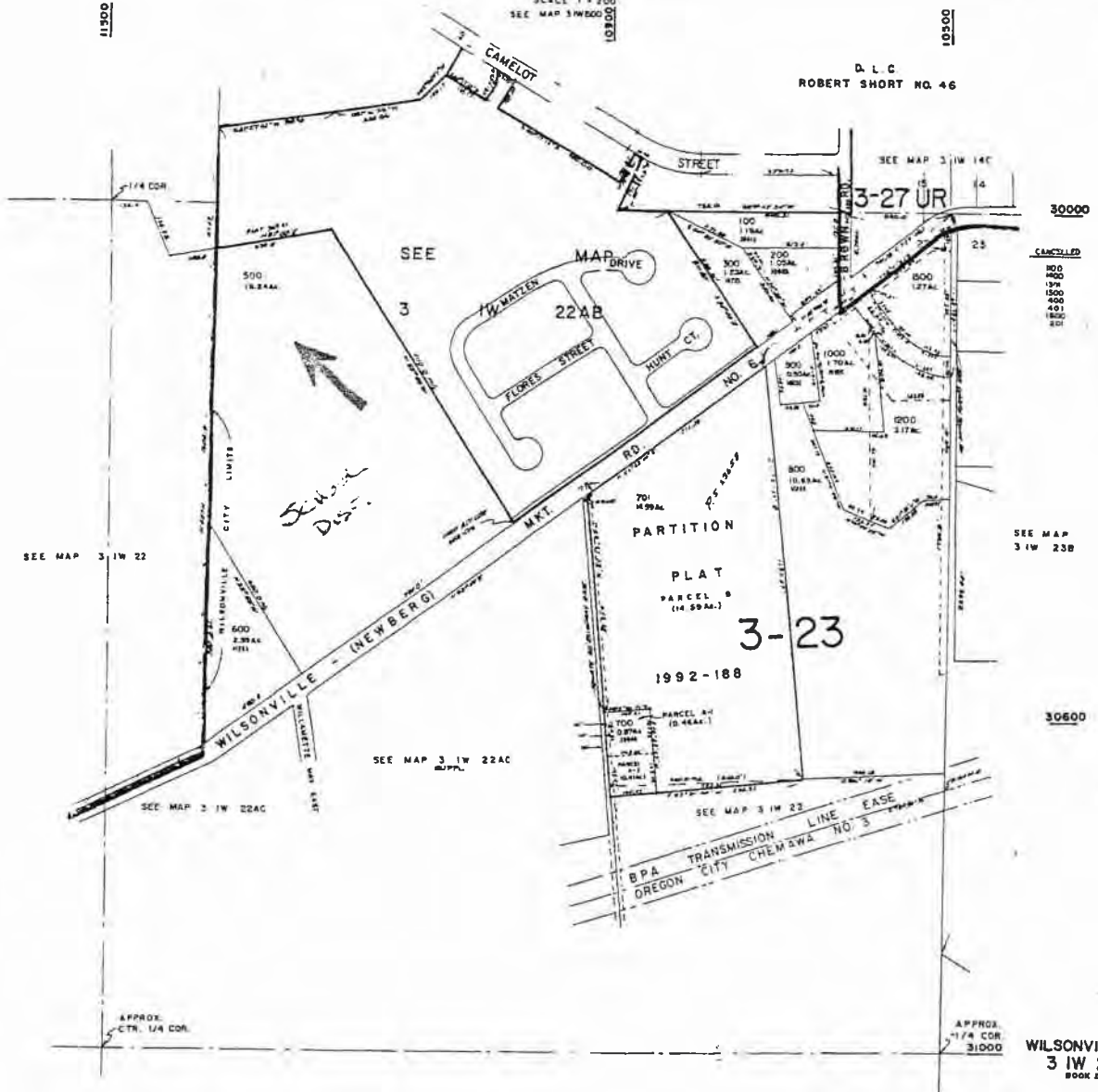
SEE MAP 3 1W 15DC

SCALE 1" = 200'
SEE MAP 3 1W 20DC

11900

10500

D. L. C.
ROBERT SHORT NO. 46



30000

CANCELED
800
801
802
803
804
805
806
807
808
809
810
811
812
813
814
815
816
817
818
819
820
821
822
823
824

SEE MAP
3 1W 23B

30600

WILSONVILLE
3 1W 22A
BOOK 28

SEE MAP 3 1W 22

SEE MAP 3 1W 22AC
SUPPL.

SEE MAP 3 1W 22

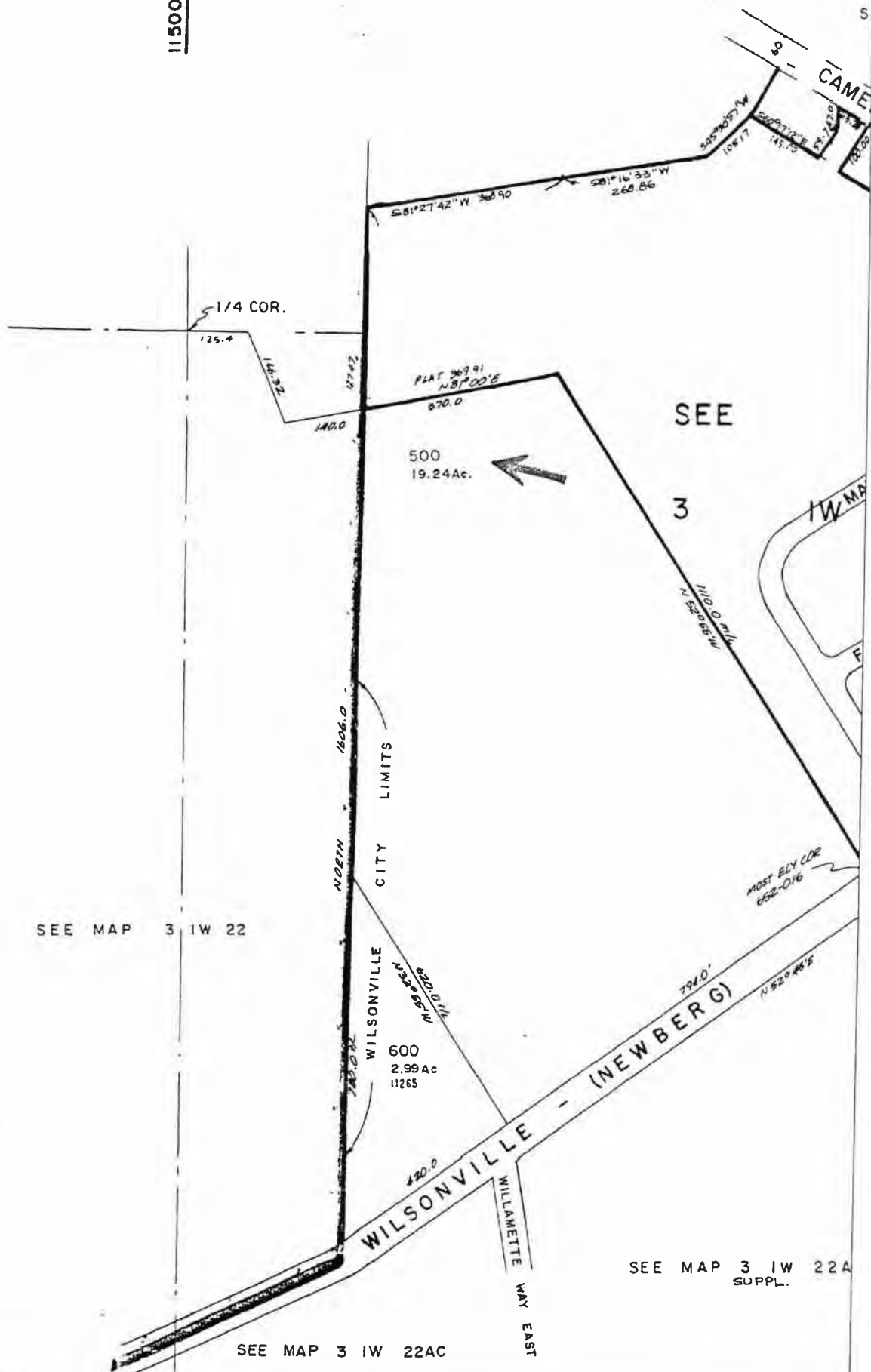
APPROX.
CTR. 1/4 COR.

APPROX.
1/4 COR.
31000

N.E. 1/4 S
CLA

SEE MAP -3 1W 15DC

11500



SEE MAP 3 1W 22

SEE MAP 3 1W 22A
SUPPL.

SEE MAP 3 1W 22AC

AGREEMENT

THIS AGREEMENT made and entered into this 7th day of February, 1979, by and between ROBERT STETZEL, hereinafter called "Seller" and WEST LINN SCHOOL DISTRICT NO. 3 J, CLACKAMAS COUNTY, hereinafter called "Buyer".

The parties agree as follows:

SALE AND DESCRIPTION:

Seller agrees to sell and Buyer agrees to purchase the following described real property located in Clackamas County, Oregon:

See Exhibit "A" attached hereto and incorporated herein by this reference.

PRICE AND TERMS:

The purchase price of the property, which Buyer agrees to pay is \$161,616 payable as follows:

- (1) The sum of \$2,000 which has previously been paid as option money.
- (2) The sum of \$44,616 which is paid upon execution hereof.
- (3) The remaining balance of \$115,000 shall be paid in annual installments of not less than \$23,000 each, plus interest at the rate of seven percent (7%) per annum on the unpaid balances, the first of such installments to be paid on the 16th day of January, 1980, and subsequent installments to be paid annually until the entire purchase price,

Page 1. AGREEMENT

HIBCARD, CALDWELL, CARRING, BOWEN & SCHULTZ
A PROFESSIONAL CORPORATION
ATTORNEYS AT LAW
P O BOX 547 - 710 CENTER STREET
OREGON CITY OREGON

79 5357

22, 3 1W 7/500

Recorded By
Title Insurance Company
No. A443485

2/100

including both principal and interest, is paid in full. The entire purchase price may be paid at any time.

TAXES AND OTHER PUBLIC CHARGES:

Taxes for the current tax year shall be prorated as of the date of this agreement. Buyer agrees to pay and assume all future public liens, charges, taxes and assessments hereafter made upon said premises.

POSSESSION:

Buyer shall have the right to the possession of the foregoing premises as of the date of this agreement. Seller shall have the right to cultivate and remove any growing crops upon the premises to and including the 15th day of July, 1979.

CONVEYANCES:

Upon the payment of the entire purchase price of the property as provided herein and performance by the Buyer of all of the other terms, conditions and provisions hereof, Seller shall forthwith execute and deliver to Buyer a warranty deed conveying the property aforesaid to Buyer, Buyer's heirs, successors, or assigns forever, free and clear of all liens and encumbrances except those now of record and those placed upon the property or suffered by the Buyer subsequent to the date of this agreement.

TITLE INSURANCE:

Seller agrees, at Seller's own expense and within ten (10) days from the date of this agreement, to furnish unto

Page 2. AGREEMENT

HIBBARD, CALDWELL, CARRING, BOWEN & SCHULTE
A PROFESSIONAL CORPORATION
ATTORNEYS AT LAW
P O BOX 487 - 7th CENTER STREET
OREGON CITY OREGON

2

L

the Buyer, a Purchaser's policy of title insurance in an amount equal to the purchase price showing marketable title in and to said premises in the Seller as of the date of this agreement save and except the usual printed exceptions and building and zoning restrictions.

ENTIRE AGREEMENT:

This written agreement constitutes the entire agreement between the parties relating to the subject matter hereof. It supersedes prior memoranda, earnest money agreements, options and all other prior documents made by the parties in connection with the transaction described herein. All oral agreements and understandings of the parties respecting the subject matter of the agreement have been integrated herein. It is the intention of the parties that no other agreement, written or oral, concerning the subject matter of this agreement, shall be effective nor binding upon either Seller or Buyer unless set forth herein or specifically referred to herein.

DEFAULT AND FORECLOSURE:

In the event the Buyer shall fail to perform any of the terms of this agreement, time of payment and performance being of the essence, the Seller shall, at Seller's option, subject to the requirements of notice as herein provided, have the following rights:

- (a) To foreclose this agreement by strict foreclosure;
- (b) To declare the full unpaid balance of the purchase price immediately due and payable;

3

L

(c) To specifically enforce the terms of this agreement by suit in equity;

Buyer shall not be deemed in default for failure to perform any covenant or condition of this agreement, other than the failure to make payments as provided for herein, until notice of said default has been given by Seller to Buyer and Buyer shall have failed to remedy said default within thirty (30) days after the giving of the notice.

If the Buyer shall fail to make payments as herein provided and said failure shall continue for more than thirty (30) days after the payment becomes due, Buyer shall be deemed in default and Seller shall not be obligated to give notice to Buyer of a declaration of said default.

ATTORNEYS FEES:

In the event suit or action shall be brought by either of the parties hereto for the enforcement of any of the covenants or conditions on the part of either of the parties to be kept or performed, or in case suit or action is instituted by the Seller to foreclose this agreement, the unsuccessful party agrees to pay to the successful party in such litigation, such sum as the court may adjudge reasonable as attorneys fees to be allowed the successful party in such suit or action, including any appeal therefrom.

NOTICES:

Notice for all the purposes of this agreement shall be deemed to have been given by the deposit in the mails of a

4

L

certified letter containing said notice and addressed to
Robert Stetzel, ^{716 Vine Maple Dr.} ~~11265 S.W. Wilsonville Road,~~ ^{Wilsonville} ~~Wilsonville,~~ ⁹⁷¹¹⁵
Oregon ~~97070~~ with respect to the Seller, and to West Linn
School District, Administration Building, West Linn, Oregon
97068 with respect to the Buyer.

WAIVER OF PROVISIONS:

The failure on the part of the Seller at any time to
require performance by the Buyer of any provisions hereof
shall, in no way, affect Seller's right hereunder to enforce
the same nor shall any waiver by the said Seller of any
breach of any provisions hereof be held to be a waiver of
any succeeding breach of any provision as a waiver of the
provision itself.

UNTIL A CHANGE IS REQUESTED, ALL TAX STATEMENTS SHALL
BE SENT TO THE FOLLOWING ADDRESS: West Linn School District,
Administration Building, West Linn, Oregon 97068.

IN WITNESS WHEREOF the parties have hereunto set their
hands the day and year first hereinabove written

SELLER: Robert Stetzel
Robert Stetzel

BUYER: WEST LINN SCHOOL DISTRICT NO. 3 J,
CLACKAMAS COUNTY
By Deborah A. Cox
Superintendent

5

STATE OF OREGON)
County of Clackamas) ss

On this 7 day of February, 1979, personally appeared ROBERT STETZEL and acknowledged the foregoing instrument to be his voluntary act and deed.

Carolyn Gallagher
Notary Public for Oregon
My commission expires: 2/28/82

STATE OF OREGON)
County of Clackamas) ss

On this 7 day of February, 1979, personally appeared Weston S. Cook who, being duly sworn says that he is the Superintendent of WEST LINN SCHOOL DISTRICT NO. 3 J, CLACKAMAS COUNTY, and that said instrument was signed and sealed by authority of its Board of Education; and acknowledged said instrument to be its voluntary act and deed.

Carolyn Gallagher
Notary Public for Oregon
My commission expires: 2/28/82

AFTER RECORDING, RETURN TO: Title Insurance Company of Oregon
Escrow#443485 cg

6

L

Order No. 443485

EXHIBIT "A"

Beginning at the section corner 15, 16, 21 and 22, Township 3 South, Range 1 West, W.M. in County of Clackamas, State of Oregon, and running thence North 89° 48' East 2790.00 feet along the North line of Section 22 to a point; thence South 26° 00' East 166.32 feet to a point; thence North 81° 00' East 140.00 feet to the true point of beginning of the parcel herein described; thence North 81° 00' East 370.00 feet; thence South 32° 55' East 1110.00 feet to a point on the Northwesterly line of the Wilsonville Highway; thence South 52° 45' West along the Northwesterly line of said Wilsonville Highway a distance of 794 feet to the most Easterly corner of that certain tract of land as described in deed to Robert A Stetzel, et ux recorded April 14, 1966 in Book 672, Page 129 Deed Records; thence North 32° 55' West along the Northeasterly line of said Stetzel tract a distance of 620 feet, more or less, to a point of intersection of said Northeasterly line with the Easterly line of that certain tract of land owned by the State of Oregon, thence North along said Easterly line a distance of 826 feet, more or less, to the true point of beginning.

STATE OF OREGON)
County of Clackamas) ss.

I, George D. Poppen, County Clerk, Ex Officio Recorder of Conveyances and Ex Officio Clerk of the Circuit Court of the State of Oregon, for the County of Clackamas, do hereby certify that the within instrument of writing was received for and recorded in the records of said county at

7 FEB 20

7

Witness my hand and seal affixed.
George D. Poppen
GEORGE D. POPPEN
County Clerk

Recording Certificate
CCP N4 79 5357

43C

KNOW ALL MEN BY THESE PRESENTS, That GERHARD MATZEN and BLENDA W. MATZEN, husband and wife

(STATE MARITAL STATUS)

hereinafter called the grantor, in consideration of TEN and NO/100 - (\$10.00) - Dollars, and other valuable considerations

to grantor paid by ROBERT A. STETZEL and MELLIE R. STETZEL, husband and wife, hereinafter called the grantee,

does hereby grant, bargain, sell and convey unto the said grantee and grantee's heirs, successors and assigns, that certain real property, with the tenements, hereditaments and appurtenances thereunto belonging or appertaining, situated in the County of Clackamas and State of Oregon, described as follows, to-wit:

Beginning at the section corner 15, 16, 21 and 22, Township 3 South, Range 1 West, W.M. and running thence N 89° 48' E 2790.00 feet along the North line of Section 22 to a point; thence S 26° 00' E 106.32 feet to a point; thence N 81° 00' E 140.00 feet to the true point of beginning of the parcel herein described; thence N 81° 00' E 370.00 feet; thence S 32° 55' E 1110.00 feet to a point on the northwesterly line of the Wilsonville Highway; thence Southwesterly 1214.00 feet along the northwesterly line of Wilsonville Highway to a point on the easterly line of property owned by the State of Oregon; thence North 1606.00 feet along the easterly line of said State of Oregon property to the true point of beginning of the parcel herein described.

To Have and to Hold the above described and granted premises unto the said grantee and grantee's heirs, successors and assigns forever.

And said grantor hereby covenants to and with said grantee and grantee's heirs, successors and assigns, that grantor is lawfully seized in fee simple of the above granted premises, free from all encumbrances EXCEPT SUBJECT TO easements, conditions and restrictions of public record; zoning and use restrictions; rights of the public in any portion within roads,

and that grantor will warrant and forever defend the above granted premises and every part and parcel thereof against the lawful claims and demands of all persons whomsoever.

In construing this deed and where the context so requires, the singular includes the plural. WITNESS grantor's hand and seal this 9 day of Feb., 19 65.

Gerhard Matzen (SEAL)
Blenda W. Matzen (SEAL)
(SEAL)
(SEAL)

(ORS 93 490)

STATE OF OREGON, County of Clackamas) ss. 9 Feb., 19 65.
Personally appeared the above named Gerhard Matzen and Blenda W. Matzen, husband and wife
and acknowledged the foregoing instrument to be their voluntary act and deed.

Before me:
Notary Public for Oregon
My commission expires by Commission Expires May 16, 1967

WARRANTY DEED

Gerhard Matzen, et ux

TO

Robert A. Stetzel, et ux

AFTER RECORDING RETURN TO

No

STATE OF OREGON
County of Clackamas

I, George D. Poppen, County Clerk, Ex-Officio Recorder of Conveyances and Ex-Officio Clerk of the Circuit Court of the State of Oregon, for the County of Clackamas, do hereby certify that the within instrument of writing was received for and recorded in the records of said county at



Recording Certificate
78 52808
CCP-84

78 52808



First American Title Insurance Company of Oregon

Clackamas (OR)

Prepared For: _____ Prepared By: _____
 Customer Service Department
 1700 SW Fourth Avenue - Portland, Oregon 97201-5512
 Phone: (503) 222-3651 Fax: (503) 790-7872

OWNERSHIP INFORMATION

Hull Joan B
 Ref Parcel Number : R31W22A 00600
 T: 03S R: 01W S: 22 Q: 253
 Address : 11265 SW Wilsonville Rd Wilsonville 97070
 Parcel Number : 00817281
 Address : 11265 SW Wilsonville Rd Wilsonville Or 97070
 Owner: 503-682-0397 Tenant: _____ County : Clackamas (OR)

SALES AND LOAN INFORMATION

Effective Date : 03/16/93
 Instrument # : 93-16914
 Lender : _____
 Loan Type : _____
 Interest Rate : _____
 Vesting Type : _____

*Current info
 for Parker/Hull
 triangle piece
 by wood 4.16
 for*

PROPERTY DESCRIPTION

Zone & Grid : 744 J3
 Tract: 227.01 Block: 5
 Instrument Type : 141 Sgl Family, R1-4, 1-Story
 Easement/Plat : _____
 Flood Zone Cd : W575
 Description : 541 Agr. Farm Land, Improved, Unzoned
 : UNZONED FARM - POTENTIAL ADDITIONAL
 : TAX LIABILITY R V SHORT DLC TL
 : 1-3-1 ORD #16694 ORD 2560 MSD 1-...

ASSESSMENT AND TAX INFORMATION

Land : \$50,180
 Structure : \$162,460
 Total : \$212,640
 % Improved : 76
 98-99 Taxes : \$2,653.34
 Exempt Amount : _____
 Exempt Type : _____
 Levy Code : 003023
 Millage Rate : 17.2306

PROPERTY CHARACTERISTICS

Stories : 3	Building SF : 2,370	Stories : 1
Basement : 2.00	1st Floor SF : 2,370	Garage SF : _____
Backed : _____	Above Ground SF : 2,370	Lot Acres : 2.99
Forced Air-Oil : _____	Upper Finished SF : _____	Lot SF : 130,244
Material: Drywall	Unfin Upper Story : _____	Year Built : 1966
Finish : Tongue\groove	Upper Total SF : _____	Year Appraised : 1995
Floor : Carpet	Finished SF : 2,370	Appraisal Area : 5
Roof : Wood Shake Med	Basement Fin SF : _____	School District : 003
Exterior : Gable	Basement Unfin SF : _____	Utility District : _____
Foundation : Concrete	Basement Total SF : _____	

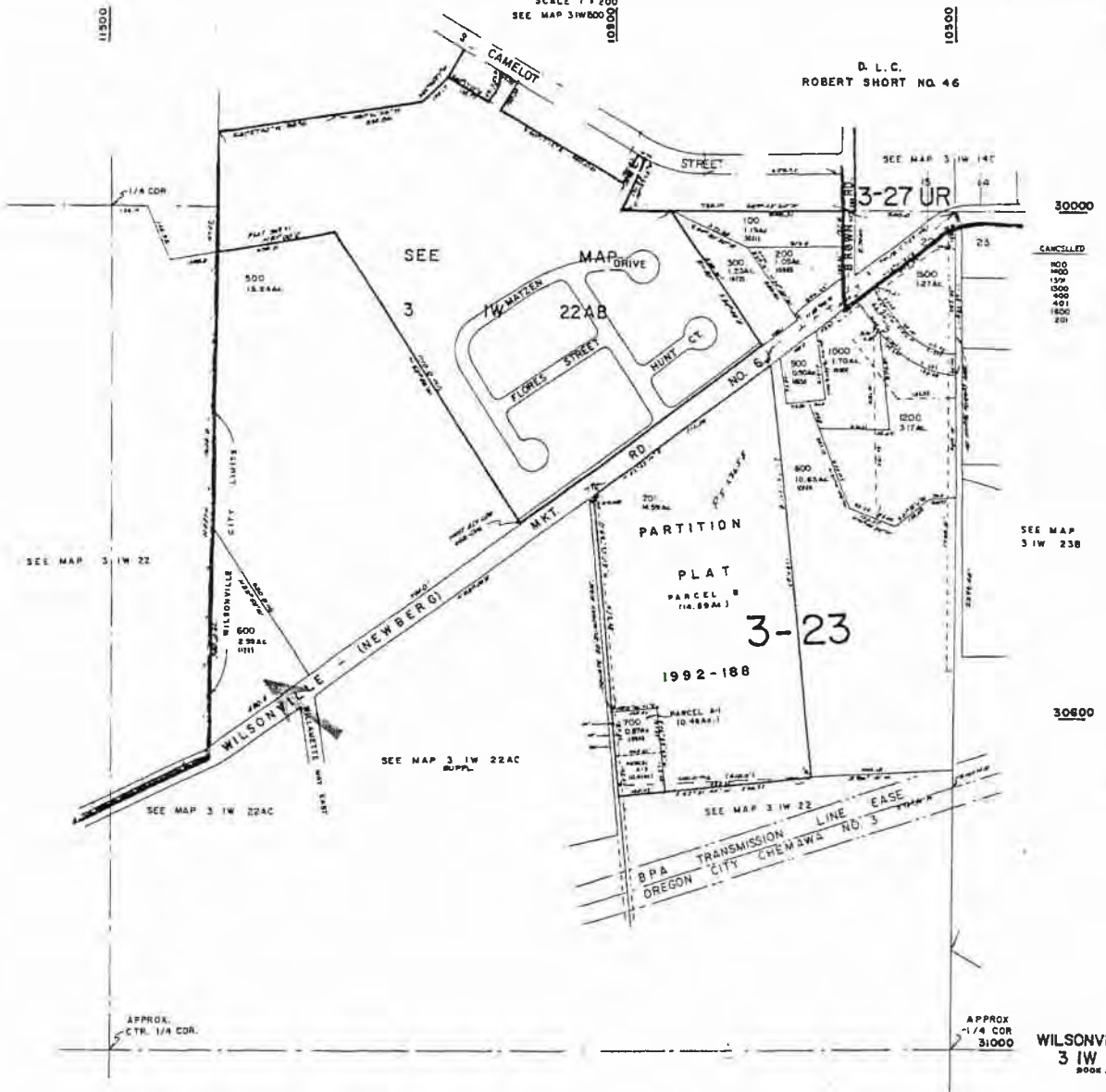
Roger

This title information has been furnished, without charge, in conformance with the guidelines approved by the State of Oregon Insurance Commissioner. The Insurance Division cautions intermediaries that this service is designed to benefit the ultimate insureds. Indiscriminate use only benefiting intermediaries will not be permitted. Said services may be discontinued. No liability is assumed for any errors in this report.

N.E. 1/4 SEC. 22 T.3S. R.1W. W.M.
CLACKAMAS COUNTY
SCALE 1" = 200'
SEE MAP 31W 100C

3 1W 22A
WILSONVILLE

D. L. C.
ROBERT SHORT NO. 46



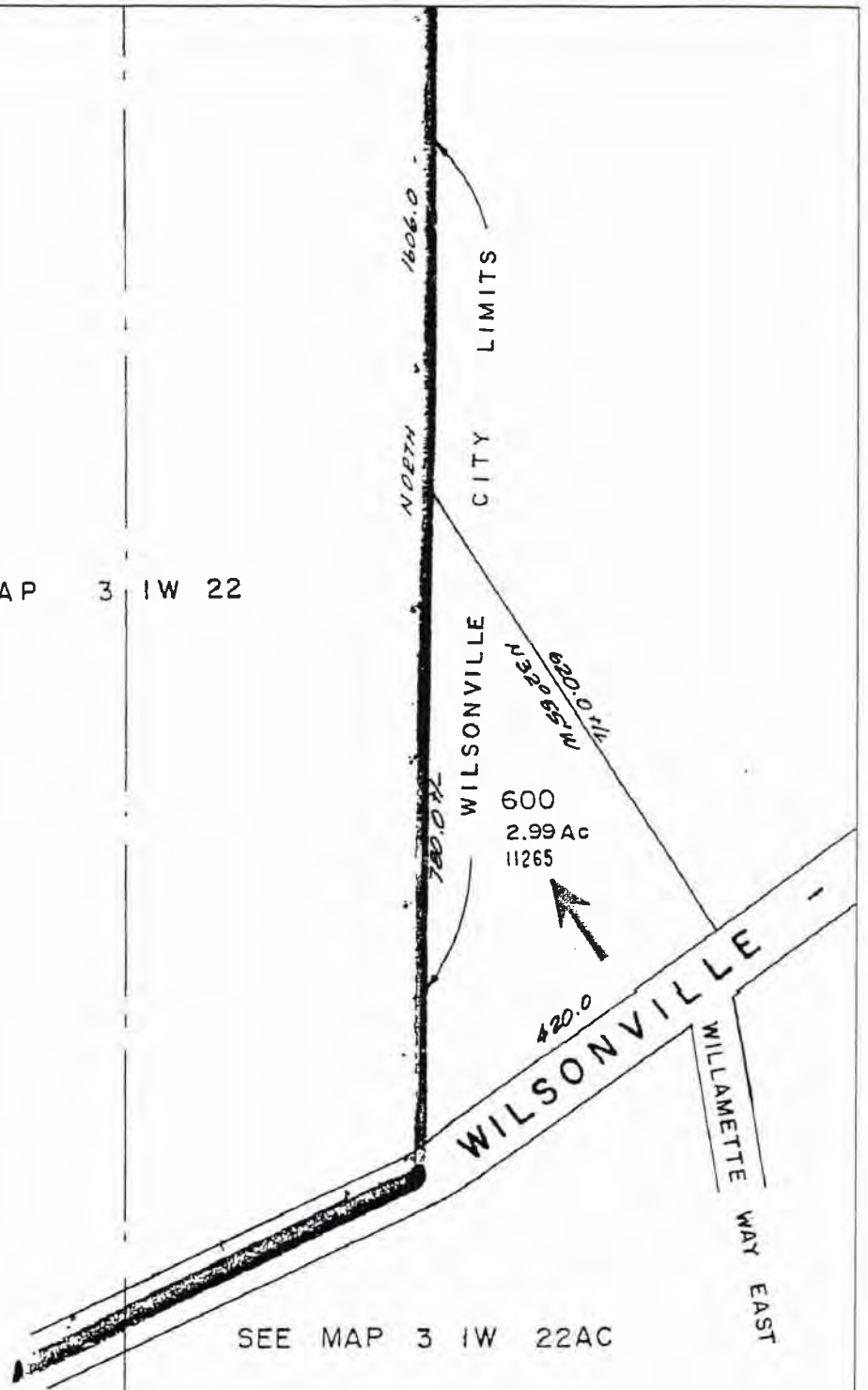
30000
CANCELLED
800
1000
1500
2000
2500
3000
3500
4000
4500
5000

SEE MAP
3 1W 23B

30800

APPROX
1/4 COR
31000
WILSONVILLE
3 1W 22A
BOOK 28

SEE MAP 3 1W 22



QUITCLAIM DEED

KNOW ALL MEN BY THESE PRESENTS, That

AUSTIN L. HULL

hereinafter called grantor,

for ~~JOAN B. HULL~~ hereinafter stated, does hereby remise, release, and quitclaim unto JOAN B. HULL all of his right, title and interest

hereinafter called grantee, and unto grantee's heirs, successors and assigns all of the grantor's right, title and interest in that certain real property with the tenements, hereditaments and appurtenances thereunto belonging or in any-wise appertaining, situated in the County of Clackamas, State of Oregon, described as follows, to-wit:

A tract of land in Section 22, T.3S., R.1W., W.M., in the County of Clackamas, State of Oregon, described as follows:

Beginning at the most southerly corner of that certain tract of land described in that Contract of Sale to Robert A. Stetzel, et ux, recorded January 20, 1965, in Book 652, Page 16, Deed Records, Clackamas County, Oregon, said point being on the northwesterly line of the Wilsonville Highway; thence Northeasterly along the northwesterly line of said Wilsonville Highway and the boundary line of said Stetzel tract, 420.0 feet; thence North 32 degrees 55' West parallel to the easterly line of said Stetzel tract, 620.0 feet, more or less, to a point of intersection with the westerly line of said Stetzel tract; thence Southerly along the easterly line of said Stetzel tract, 780.0 feet, more or less, to the point of beginning.

(If space insufficient, continue description on reverse side)

To Have and to Hold the same unto the said grantee and grantee's heirs, successors and assigns forever.

The true and actual consideration paid for this transfer, stated in terms of dollars, is \$ None

However, the actual consideration consists of or includes other property or value given or promised which is the principal consideration (indicate which) (The sentence between the symbols @, if not applicable, should be deleted. See ORS 93.030.)

In construing this deed and where the context so requires, the singular includes the plural and all grammatical changes shall be implied to make the provisions hereof apply equally to corporations and to individuals.

In Witness Whereof, the grantor has executed this instrument this 3rd day of March, 1993; if a corporate grantor, it has caused its name to be signed and seal affixed by its officers duly authorized thereto by order of its board of directors.

(If executed by a corporation, affix corporate seal)

OFFICIAL SEAL CAROLYN J. WILLGUTS NOTARY PUBLIC - OREGON COMMISSION NO. 010436 MY COMMISSION EXPIRES OCT 24, 1995

STATE OF OREGON, County of Marion, Feb 8 1993

Personally appeared the above named Marilyn Johansen

STATE OF OREGON, County of Washington, March 3, 1993

Personally appeared Donald L. Hull and Carolyn J. Willguts who, being duly sworn, each for himself and not one for the other, did say that the former is the grantor and that the latter is the secretary of the corporation.

and acknowledged the foregoing instrument to be her voluntary act and deed.

OFFICIAL SEAL ANGELA K. KEENE NOTARY PUBLIC - OREGON COMMISSION NO. 010436 MY COMMISSION EXPIRES OCT 13, 1995

and that the seal affixed to the foregoing instrument is the corporate seal of said corporation and that said instrument was signed and sealed in the presence of said corporation by its duly authorized officers, and each of them acknowledged said instrument to be its voluntary act and deed.

ANGELA K. KEENE (SEAL) Notary Public for Oregon My commission expires: 10/13/95

AUSTIN L. HULL Grantor's Name and Address

JOAN B. HULL 11265 SW WILSONVILLE RD. WILSONVILLE, OR 97070

After recording return to:

JOAN B. HULL 11265 SW WILSONVILLE RD. WILSONVILLE, OR 97070

Until a copy of this deed is received, all documents shall be sent to the following address:

JOAN B. HULL 11265 SW WILSONVILLE RD. WILSONVILLE, OR 97070

SPACE RESERVED FOR RECORDER'S USE

ANGELA K. KEENE NOTARY PUBLIC - OREGON My Commission Expires 10/13/95

the within instrument was received for record on the 3rd day of March, 1993 at 3 o'clock P.M., and recorded in book/reel/volume No. 16914 on page 1 or as document/lea/file/instrument/microfilm No. 16914 Record of Deeds of said county.

Witness my hand and seal of County affixed.

NAME TITLE By Carolyn J. Willguts Deputy

2

STATE OF OREGON
County of Clatsop
I, John Kaufman, County Clerk, for the County of Clatsop, do hereby certify that the instrument of writing was received for recording in the records of said county at

93 MAR 16 AM 9:57



Witness my hand and the seal of the County of Clatsop, Oregon, this 16th day of March, 1993.
John Kaufman
JOHN KAUFMAN
County Clerk

Recording Certificate
CCP-81, Rev. 6-91

93 16914

ATTACHMENT A
Preliminary Storm Report

3J CONSULTING

CIVIL ENGINEERING | WATER RESOURCES | COMMUNITY PLANNING

PRELIMINARY STORM DRAINAGE REPORT

Wood MS Remodel
11055 SW Wilsonville Road
Wilsonville, OR 97070

Planning DB No.: TBD

August 12, 2020

Prepared For:

West Linn-Wilsonville School District (WLW)
22210 SW Stafford Rd
Tualatin, OR 97062



EXPIRES: 12/31/22

Prepared By:

3J Consulting, Inc.
9600 SW Nimbus Avenue, Suite 100
Beaverton, Oregon 97008
Project No: 20617
PJP

TABLE OF CONTENTS

DESIGNER'S CERTIFICATION & STATEMENT	1
EXECUTIVE SUMMARY	2
PROJECT DESCRIPTION	3
EXISTING CONDITIONS	3
Existing Site	3
Existing Drainage.....	3
Flood Map	4
Soils.....	4
Infiltration	4
Existing Basin Areas	4
Existing Hydrology.....	5
DEVELOPED CONDITIONS	5
Developed Site & Drainage.....	5
Developed Basin Areas	5
Developed Hydrology.....	5
Stormwater Management Strategy.....	5
Downstream Analysis	6
Conveyance Analysis.....	7
CONCLUSIONS	8
REFERENCES	8
TECHNICAL APPENDIX	9

LIST OF FIGURES

Figure 1 - Vicinity Map	3
-------------------------------	---

LIST OF TABLES

Table 1 - Onsite Soils	4
Table 2 - Existing Basin Areas.....	4
Table 3 - Developed Basin Areas	5
Table 4 - Downstream Analysis Basin Areas.....	7

DESIGNER'S CERTIFICATION & STATEMENT

I hereby certify that this Preliminary Storm Drainage Report for Wood MS Remodel has been prepared by me or under my supervision and meets minimum standards of the City of Wilsonville and normal standards of engineering practice. I hereby acknowledge and agree that the jurisdiction does not and will not assume liability for the sufficiency, suitability, or performance of drainage facilities designed by me.



EXECUTIVE SUMMARY

The project site is located at 11055 SW Wilsonville Road, at the existing Wood Middle School in Wilsonville, Oregon (taxlot 31W22A 00500), and falls within the jurisdiction of the City of Wilsonville. The West Linn-Wilsonville School District (WLWV) proposes a 1,785-sf building addition, a 1,290-sf greenhouse, appurtenant hardscaping and utility improvements. In total, the project results in the creation or modification of 8,133 sf of impervious area.

Per the City of Wilsonville's Stormwater & Surface Water Standards (2015), this project is required to implement stormwater management facilities and a Rain Garden is proposed to meet compliance. This facility will manage an equivalent amount of impervious area elsewhere onsite. The Rain Garden was sized using the BMP Sizing Tool. An Operations & Maintenance Plan will be included with the Final Storm Drainage Report.

A Downstream Analysis was performed to demonstrate that the downstream system has capacity for the project site's runoff during the 25-yr storm event.

A Conveyance Analysis of the onsite storm drain system will be included with the Final Storm Drainage Report.

The purpose of this report is to accomplish the following:

- Describe existing and developed site conditions;
- Describe the proposed stormwater management strategy; and,
- Demonstrate compliance with the City of Wilsonville Stormwater & Surface Water Standards (2015).



PROJECT DESCRIPTION

The project site is located at 11055 SW Wilsonville Road, at the existing Wood Middle School in Wilsonville, Oregon (taxlot 31W22A 00500), and falls within the jurisdiction of the City of Wilsonville. The West Linn-Wilsonville School District (WLWV) proposes a 1,785-sf building addition, a 1,290-sf greenhouse, appurtenant hardscaping and utility improvements. In total, the project results in the creation or modification of 8,133 sf of impervious area. The project's current land use as a school will remain unchanged.

Per the City of Wilsonville's Stormwater & Surface Water Standards (2015), stormwater management facilities are required when a project creates or replaces more than 5,000 sf of impervious area. Due to the disturbed areas being distributed across the property, a Rain Garden is proposed to treat and manage runoff from an equivalent or greater amount of impervious area elsewhere onsite. The facility was sized via the WES BMP Sizing Tool and will be located near the greenhouse on the west side of the school and will manage runoff from a nearby parking area.

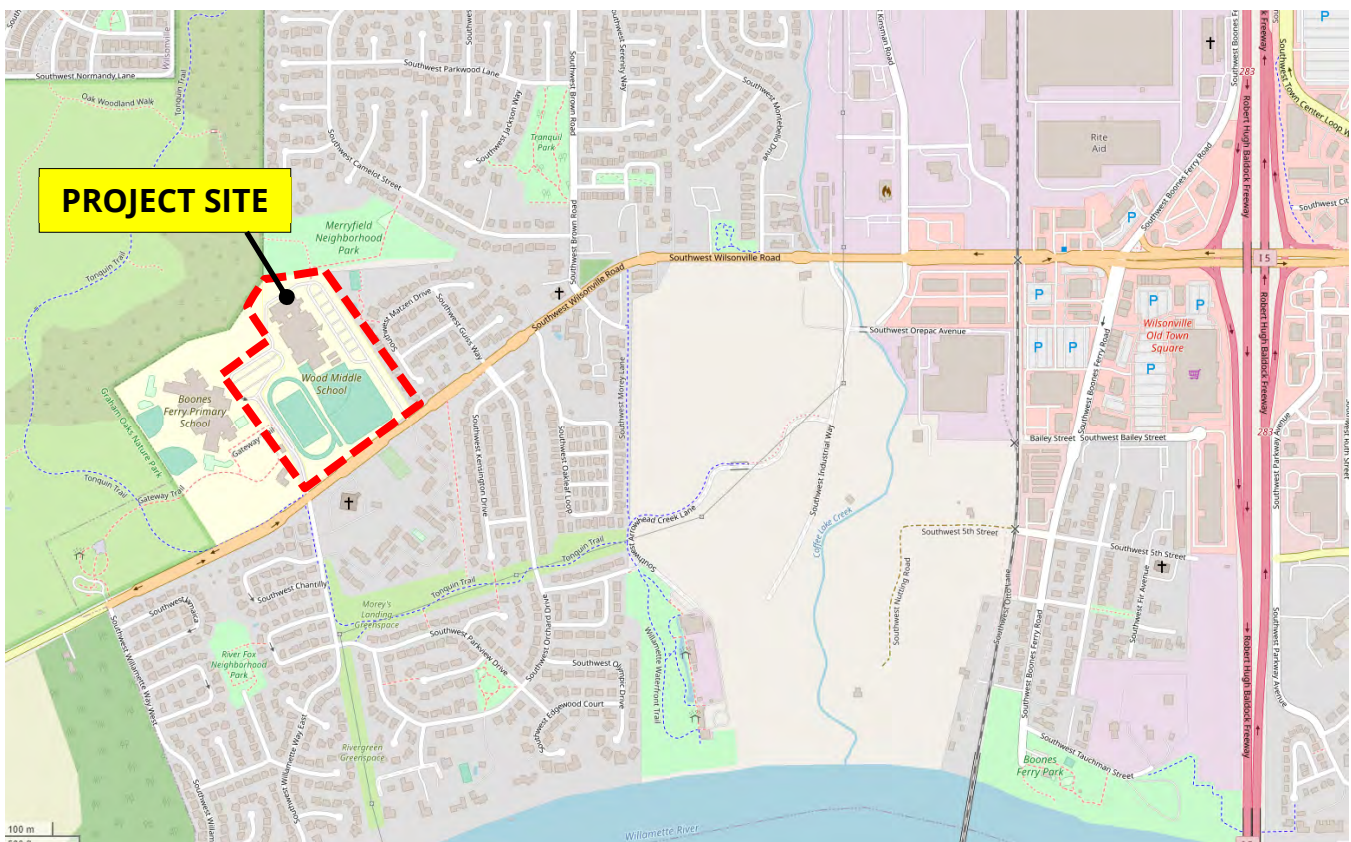


Figure 1 - Vicinity Map

EXISTING CONDITIONS

Existing Site

The existing site is Inza R. Woods Middle School.

Existing Drainage

The site generally drains from south to north with elevations ranging from 173-181 feet. Surface runoff drains to two main branches of an existing onsite storm drain system. Runoff from the property discharges at



multiple locations; however, the point of discharge relevant to this project is within Arrowhead Creek along the northern boundary of the property (See Technical Appendix: Exhibits – Developed Conditions).

The east portion of the site drains to conveyances, which flow to a Stormceptor Manhole for treatment. The southwest portion of the site drains to conveyances, which discharge to an onsite Dry Pond. Both the Stormceptor and Dry Pond discharge to an existing flow control manhole which releases flow to Arrowhead Creek to the north. Arrowhead Creek is natural and unlined.

Emergency Overflow

The existing onsite pond and flow control manhole are close to the property’s local low point. In emergency situations, large flows would overtop the northern bank of pond and discharge directly into Arrowhead Creek. The crest of the pond is at elevation 173 and the school’s finish floor elevation is at least 176.3. This project will not alter this emergency overflow route.

Flood Map

The site is located within Zone X (unshaded) per flood insurance rate map (FIRM) community-panel number 41005C0241D (See Technical Appendix: Exhibits – National Flood Hazard Layer FIRMette). FEMA’s definition of Zone X (un-shaded) is an area of minimal flood hazard.

Soils

The soil types, as classified by the NRCS Web Soil Survey, are identified in Table 1 (See Technical Appendix: Exhibits – Hydrologic Soil Group).

Soil Type	Hydrologic Soil Group	Site Coverage (%)
Aloha Silt Loam	C/D	92.8
Dayton Silt Loam	D	7.2

Table 1 – Onsite Soils

A majority of the site is underlain with C/D soils and the areas of coinciding with D soils are predominantly impervious are occupied by the onsite pond. Therefore, for simplicity, the site is modeled assuming C soils.

Infiltration

Infiltration testing was not performed because onsite soils are C and D types, which are unlikely to have measurable infiltration rates. Onsite infiltration rates are assumed to be 0 in/hr and the proposed stormwater facility will be lined.

Existing Basin Areas

The project will modify several areas on the property. Table 2 below quantifies the existing pervious and impervious areas affected by this project.

Existing Basin Areas	Area (sf)
Pervious	3,314
Impervious	6,401
Total Disturbed	9,715

Table 2 – Existing Basin Areas

The project also proposes trenching in pervious areas in which the cover will be replaced in kind; therefore, these pervious areas are not included in the total disturbed area.



Existing Hydrology

In compliance with City Standards, XPSTORM was used to perform the Santa Barbara Urban Hydrograph (SBUH) method to deterring the peak runoff rate for the 25-yr design storm (4.0" falling in 24 hours; NRCS Type IA distribution).

Curve Numbers

Runoff curve numbers (CN) were selected from Table 2-2 of the TR-55 Manual, which depend of land cover type and hydrologic soil group. CNs for pervious and impervious areas were determined to be 74 (lawn in good conditions, C soils) and 98, respectively. See Technical Appendix: Exhibits – CN.

Time of Concentration

Since the disturbed area is distributed and cumulatively small, the time of concentration was assumed to be 5 minutes.

25-yr Runoff Rate

The 25-yr peak runoff rate was evaluated to be 0.163 cfs (See Technical Appendix: Hydrographs – Existing).

DEVELOPED CONDITIONS

Developed Site & Drainage

The project proposes a building addition, greenhouse, Rain Garden, utility improvements, hardscaping and landscaping. A majority of the property will remain in place; general drainage patterns and the discharge location are maintained.

Developed Basin Areas

Table 3 below quantifies the developed pervious and impervious areas for this project.

Developed Basin Areas	Area (sf)
Pervious	1,582
Impervious	8,133
Total Disturbed	9,715

Table 3 – Developed Basin Areas

Developed Hydrology

The methodology and parameters used for determining the existing 25-yr peak runoff rate still apply, with basins areas only changing. The developed 25-yr peak runoff rate was evaluated to be 0.188 cfs (See Technical Appendix: Hydrographs – Developed).

Stormwater Management Strategy

Design Guidelines & Methodology

The City of Wilsonville requires the implementation of Low Impact Design (LID) facilities to manage runoff to accomplish the following:

- Treatment – Water quality facilities shall be designed to capture and treat 80% of the average annual runoff volume to the MEP with the goal of 70% total suspended soils (TSS) removal.
- Flow Control – The developed flow-duration curve shall be less than or equal to the predeveloped flow-duration curve for all storm events between the 42% of the 2-yr and 10-yr events.

To comply with these requirements, the BMP Sizing Tool was used to determine the minimum dimensions for the proposed BMP.



Proposed Facility

As mentioned previously, the project disturbs multiple areas on the property. To comply with City stormwater management requirements, a Filtration Rain Garden is proposed on the west side of the building to treat a contributing impervious area (CIA) greater than or equal to the cumulative impervious area created or modified by this project. The CIA to the Rain Garden is 9,434 sf, which exceeds the required 8,133 sf. The latter area requires a Rain Garden with a minimum area of 446 sf. The planned Rain Garden area is 480 sf (See Technical Appendix: WES BMP Sizing Report). For Flow Control compliance, the Rain Garden will have a low flow orifice with a 0.8" diameter.

Operations & Maintenance Plan

An Operations & Maintenance (O&M) Plan will be included with the Final Storm Drainage Report.

Downstream Analysis

Design Guidelines

Per City Standards, a downstream analysis must be performed to verify that the downstream system has the capacity to convey the 25-yr design storm. The proposed development area is 9,715 sf; the total contributing drainage area to the discharge location is 347,497 sf. As a result, the development area constitutes approximately 3% of the total contributing drainage area. Per City Standards, the downstream analysis will continue for one-quarter mile downstream of this projects discharge location (See Technical Appendix: Downstream Analysis – Wilsonville GIS).

Model Overview

In compliance with City Standards, XPSTORM was used to perform the Santa Barbara Urban Hydrograph (SBUH) method and dynamic wave routing for the hydrologic and hydraulic analyses, respectively. The downstream system was analyzed for the 25-yr design storm (4.0" falling in 24 hours; NRCS Type IA).

Basin Overview

Seven (7) basins, denoted as Basins A through G, were delineated for the Downstream Analysis (See Technical Appendix: Downstream Analysis – Basin Exhibit). This project affects Basin A & B, specifically increasing the impervious areas of Basin A and B by 72 sf (0.002 ac) and 1660 sf (0.04 ac), respectively.

Basins C, D and F are undeveloped, consisting of areas within the Graham Oaks Nature Park and the Park at Merryfield.

Basins E & G consists of single-family residential developments, as designated on wilsonvillemaps.com, which concurs with the current Wilsonville Comprehensive Plan. The minimum lot size measured within each basin was 7,500 sf (0.17 ac). For conservativeness, Basins E & G were modeled with an assumed impervious coverage of 65% (per the TR-55 Manual), which is typically associated with 0.125-ac lots (higher density).

Table 4 below outlines the hydrologic characteristics for each basin.



Basin	Total Area (ac)	Imp. Area (ac)	Pervious Area (ac)	Pervious CN	Tc (min)
A	4.18	3.08	1.10	79	5
B	3.80	2.67	1.14	79	5
C	102.7	0.00	102.7	73	75
D	2.68	0.00	2.68	73	35
E	5.44	3.53	1.90	78	5
F	9.39	0.00	9.39	73	46
G	23.94	15.56	8.38	73	15

Table 4 - Downstream Analysis Basin Areas

The curve numbers (CN) and times of concentration (Tc) are explained in the following subsections.

Curve Numbers

Runoff curve numbers (CN) were selected from Table 2-2 of the TR-55 Manual, which depend of land cover type and hydrologic soil group. The basins are underlain by soil types B, C and D (See Technical Appendix: Downstream Analysis - HSG). The basins have land cover types varying from lawn, woods-grass combination or woods. When basins are underlain by more than one soil type, a spatially weighted average CN was evaluated.

Despite the soil type, impervious areas are modeled with a CN of 98. Lawn areas coinciding with soils B, C and D are associated with CNs of 69, 79 and 84, respectively. Wood-grass combination areas coinciding with soils B, C and D are associated with CNs of 58, 72 and 79, respectively. Wood areas coinciding with soils B, C and D are associated with CNs of 55, 70 and 77, respectively. See Technical Appendix: Downstream Analysis - CN.

Time of Concentration

Each basin was assigned a reasonable time of concentration (Tc) based on basin size and imperviousness. Typically, smaller and more impervious Basins A, B and E were assigned a Tc of 5 minutes. The larger Basin G contains multiple single-family residential developments and some undeveloped/vacant lots; therefore, this basin was assigned a Tc of 15 minutes. The Tc's for undeveloped Basins C, D and F were evaluated to be 75, 35 and 46 minutes per TR-55 methodologies (See Technical Appendix: Downstream Analysis - Tc).

Downstream System Overview

As-builts documents were referenced to model the existing onsite pond and flow control manhole, which will remain in place (See Technical Appendix: As-Built Documents). The downstream system was modeled based on information collected from the City's GIS (wilsonvillemaps.com). For the portions of the downstream system in Arrowhead Creek, the reaches of the creek were modeled as triangular open channels. The side slopes of the channels were estimated based on cross sections taken along the creek using lidar-based data publicly available through the State of Oregon Department of Geology and Mineral Industries (DOGAMI). Chapter 8 of the ODOT Hydraulics Manual (2014) was referenced to select Manning's n coefficients for each conveyance.

Downstream Analysis Results

For the 25-yr design storm, all conveyances were determined to have sufficient capacity (See Technical Appendix: Downstream Analysis - Conveyance Data). The minimum freeboard in the downstream system was evaluated to be 2.06 ft.

Conveyance Analysis

Per City Standards, the onsite conveyance system shall be designed to convey and contain at least the peak runoff for the 25-yr design storm. Furthermore, structures must be demonstrated to provide a minimum of



1 foot of freeboard between the hydraulic grade line and the top of the structure or finish grade above pipe for the 25-yr developed peak rate of runoff. The Conveyance Analysis will be included with the Final Storm Drainage Report to demonstrate.

CONCLUSIONS

This report sufficiently describes the existing site conditions, developed site conditions and the proposed stormwater management strategy.

The proposed Rain Garden is sized to comply with the City's stormwater management requirements. An O&M Plan of the private stormwater BMP will be included with the Final Storm Drainage Report.

The Downstream Analysis demonstrated that the downstream system has sufficient capacity to convey runoff from the project site.

A Conveyance Analysis of the onsite storm drain system will be included with the Final Storm Drainage Report.

REFERENCES

1. *Stormwater & Surface Water Standards*. City of Wilsonville, June 2015
2. *ODOT Hydraulics Manual*. ODOT, April 2014
3. *Urban Hydrology for Small Watersheds (Technical Release 55)*. USDA, June 1986



TECHNICAL APPENDIX

Exhibits

- National Flood Hazard Layer FIRMette
- Hydrologic Soil Group – Clackamas County
- Curve Numbers
- Developed Conditions Exhibit
- Impervious Area Threshold Determination Form

Drawings

- Sheet C100 – Existing Conditions & Demolition Plan
- Sheet C210 – Preliminary Site & Utility Plan
- Sheet C230 – Grading & Erosion Control Plan

Hydrographs

- Existing & Developed

WES BMP Sizing Report

Downstream Analysis

- Wilsonville GIS
- Hydrologic Soil Group (HSG)
- Curve Numbers (CN)
- Time of Concentration (Tc)
- Basin Exhibit
- XPSTORM Hydraulic Layout
- XPSTORM Runoff Data
- XPSTORM Conveyance Data

As-Built Documents

- As-built Plans – SJO, July 2004
 - o Sheets C4.1, C5.1, C5.3 & C6.3
- “Wood Middle School Addition Stormwater Management Report” – SJO, June 2004

Operations & Maintenance Plan – Will be Included with Final Drainage Report

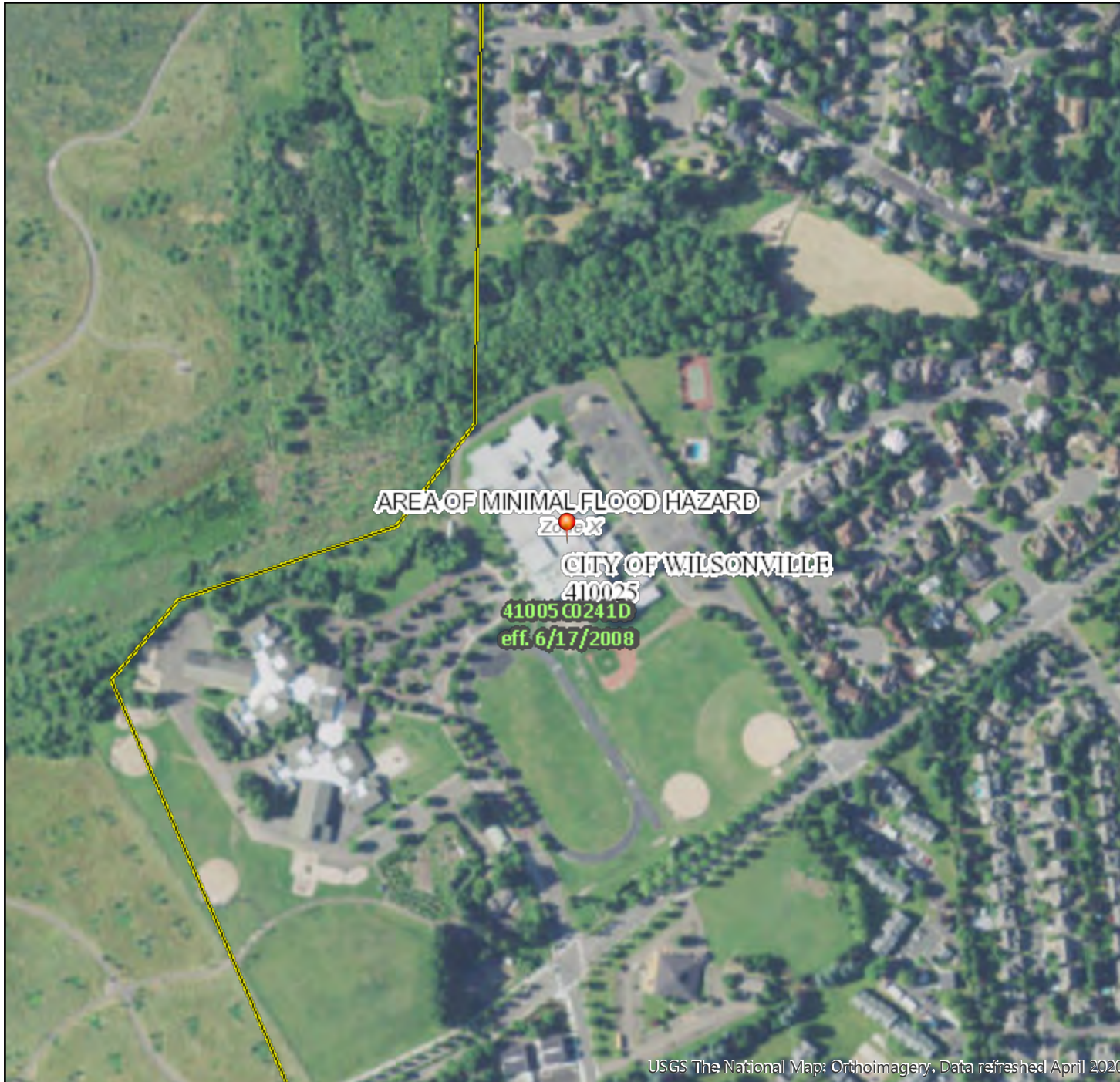


EXHIBITS

National Flood Hazard Layer FIRMMette



122 47 53 W 45 18 18 N



0 250 500 1,000 1,500 2,000 Feet

USGS The National Map: Orthoimagery. Data refreshed April 2020

1:6,000

122 47 15 W 45 17 53 N

Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS		Without Base Flood Elevation (BFE) <i>Zone A, V, A99</i>
		With BFE or Depth <i>Zone AE, AO, AH, VE, AR</i>
		Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD		0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile <i>Zone X</i>
		Future Conditions 1% Annual Chance Flood Hazard <i>Zone X</i>
		Area with Reduced Flood Risk due to Levee. See Notes. <i>Zone X</i>
		Area with Flood Risk due to Levee <i>Zone D</i>

OTHER AREAS		NO SCREEN Area of Minimal Flood Hazard <i>Zone X</i>
		Effective LOMRs
		Area of Undetermined Flood Hazard <i>Zone D</i>
GENERAL STRUCTURES		Channel, Culvert, or Storm Sewer
		Levee, Dike, or Floodwall

OTHER FEATURES		20.2 Cross Sections with 1% Annual Chance
		17.5 Water Surface Elevation
		Coastal Transect
		Base Flood Elevation Line (BFE)
		Limit of Study
		Jurisdiction Boundary
OTHER FEATURES		Coastal Transect Baseline
		Profile Baseline
		Hydrographic Feature

MAP PANELS		Digital Data Available
		No Digital Data Available
		Unmapped
		The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

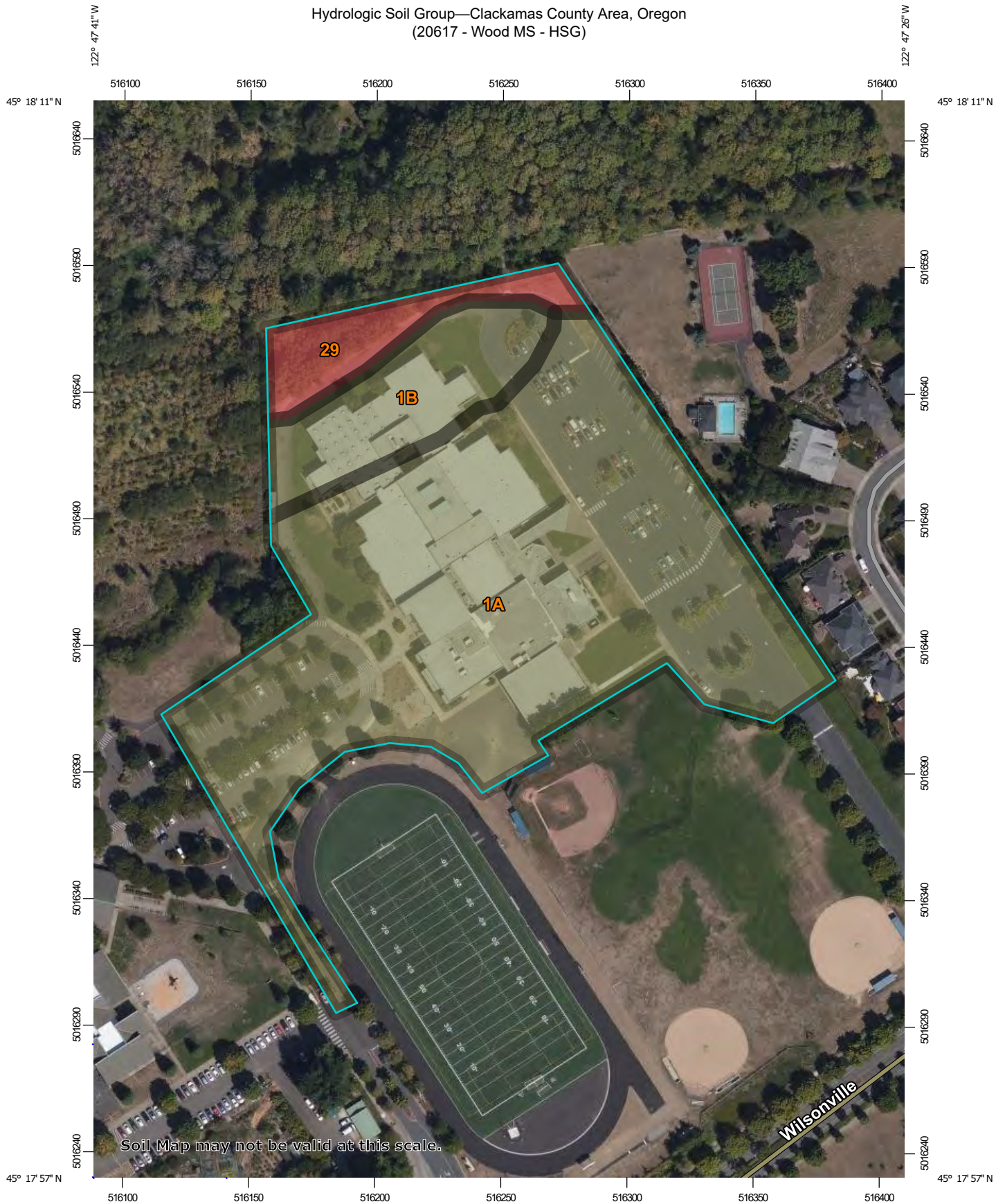


This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

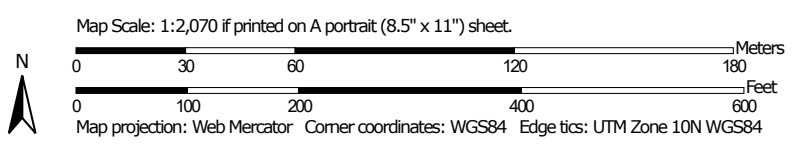
The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on **7/2/2020 at 10:21 PM** and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.

Hydrologic Soil Group—Clackamas County Area, Oregon
(20617 - Wood MS - HSG)



Soil Map may not be valid at this scale.



MAP LEGEND

Area of Interest (AOI)









 Area of Interest (AOI)

Soils

Soil Rating Polygons





 A
 A/D
 B
 B/D
 C
 C/D
 D
 Not rated or not available

Soil Rating Lines

 A
 A/D
 B
 B/D
 C
 C/D
 D
 Not rated or not available

Soil Rating Points






 A
 A/D
 B
 B/D

 C
 C/D
 D
 Not rated or not available


Water Features

 Streams and Canals

Transportation

 Rails
 Interstate Highways
 US Routes
 Major Roads
 Local Roads

Background

 Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:20,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
 Web Soil Survey URL:
 Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Clackamas County Area, Oregon
 Survey Area Data: Version 16, Jun 11, 2020

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Aug 1, 2019—Sep 12, 2019

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
1A	Aloha silt loam, 0 to 3 percent slopes	C/D	6.6	79.6%
1B	Aloha silt loam, 3 to 6 percent slopes	C/D	1.1	13.1%
29	Dayton silt loam	D	0.6	7.2%
Totals for Area of Interest			8.3	100.0%

Description

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Rating Options

Aggregation Method: Dominant Condition

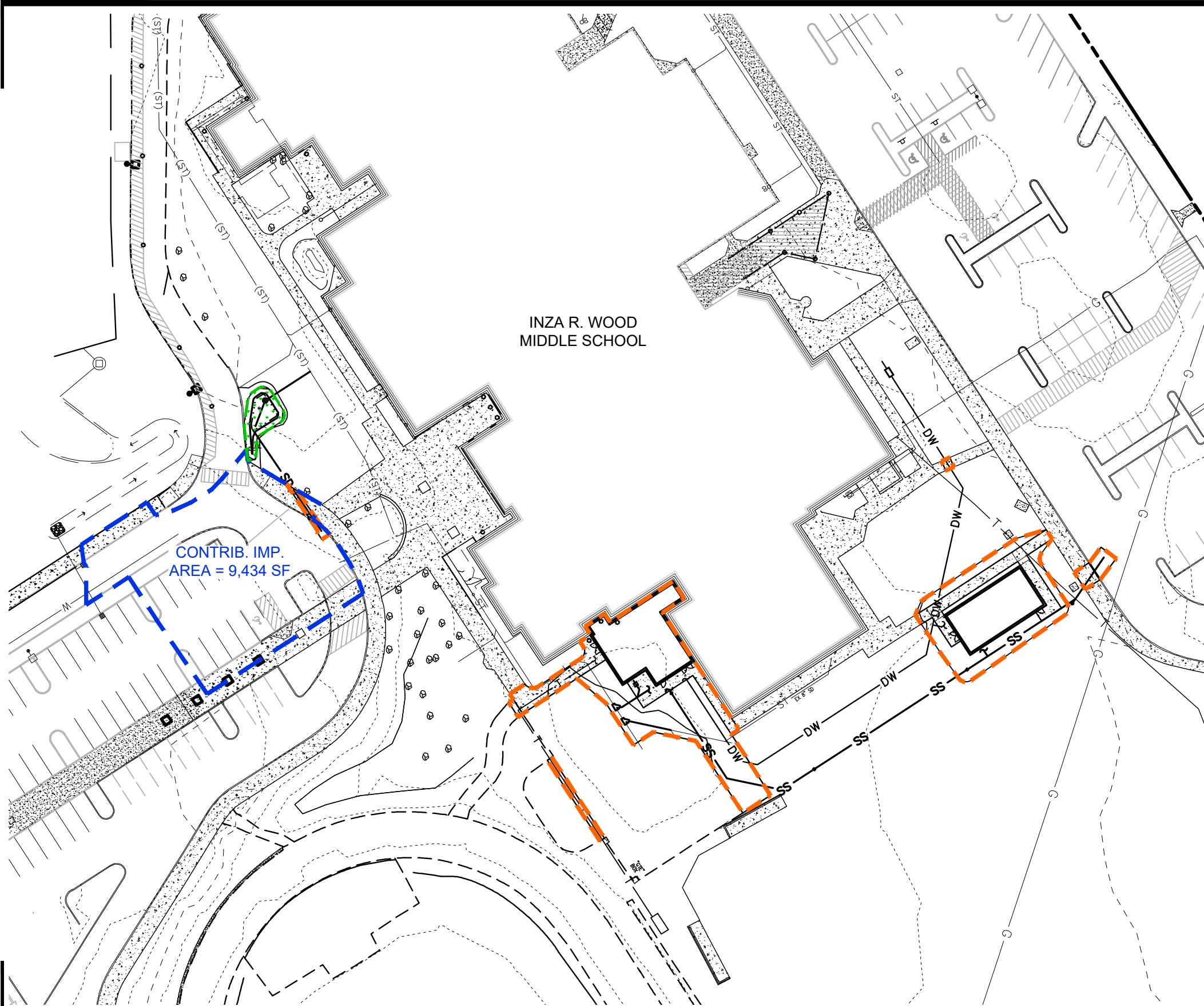
Component Percent Cutoff: None Specified

Tie-break Rule: Higher

Table 2-2a Runoff curve numbers for urban areas ^{1/}

Cover description	Average percent impervious area ^{2/}	Curve numbers for hydrologic soil group			
		A	B	C	D
Fully developed urban areas (vegetation established)					
Open space (lawns, parks, golf courses, cemeteries, etc.) ^{3/} :					
Poor condition (grass cover < 50%)		68	79	86	89
Fair condition (grass cover 50% to 75%)		49	69	79	84
Good condition (grass cover > 75%)		39	61	74	80
Impervious areas:					
Paved parking lots, roofs, driveways, etc. (excluding right-of-way)		98	98	98	98
Streets and roads:					
Paved; curbs and storm sewers (excluding right-of-way)		98	98	98	98
Paved; open ditches (including right-of-way)		83	89	92	93
Gravel (including right-of-way)		76	85	89	91
Dirt (including right-of-way)		72	82	87	89
Western desert urban areas:					
Natural desert landscaping (pervious areas only) ^{4/}		63	77	85	88
Artificial desert landscaping (impervious weed barrier, desert shrub with 1- to 2-inch sand or gravel mulch and basin borders)		96	96	96	96
Urban districts:					
Commercial and business	85	89	92	94	95
Industrial	72	81	88	91	93
Residential districts by average lot size:					
1/8 acre or less (town houses)	65	77	85	90	92
1/4 acre	38	61	75	83	87
1/3 acre	30	57	72	81	86
1/2 acre	25	54	70	80	85
1 acre	20	51	68	79	84
2 acres	12	46	65	77	82
Developing urban areas					
Newly graded areas					
(pervious areas only, no vegetation) ^{5/}		77	86	91	94
Idle lands (CN's are determined using cover types similar to those in table 2-2c).					

¹ Average runoff condition, and $I_a = 0.2S$.² The average percent impervious area shown was used to develop the composite CN's. Other assumptions are as follows: impervious areas are directly connected to the drainage system, impervious areas have a CN of 98, and pervious areas are considered equivalent to open space in good hydrologic condition. CN's for other combinations of conditions may be computed using figure 2-3 or 2-4.³ CN's shown are equivalent to those of pasture. Composite CN's may be computed for other combinations of open space cover type.⁴ Composite CN's for natural desert landscaping should be computed using figures 2-3 or 2-4 based on the impervious area percentage (CN = 98) and the pervious area CN. The pervious area CN's are assumed equivalent to desert shrub in poor hydrologic condition.⁵ Composite CN's to use for the design of temporary measures during grading and construction should be computed using figure 2-3 or 2-4 based on the degree of development (impervious area percentage) and the CN's for the newly graded pervious areas.



LEGEND

- - - - - DISTURBED AREA BOUNDARY
- - - - - BASIN W/ EQUIV. OR GREATER IMPERVIOUS AREA REQUIRING MANAGEMENT
- PROPOSED RAIN GARDEN

DEVELOPED SITE

DEVELOPED PERVIOUS AREA =	1,582 SF
DEVELOPED IMPERVIOUS AREA =	8,133 SF
TOTAL DISTURBED AREA =	9,715 SF

RAIN GARDEN AREA = 480 SF

CONTRIB. IMP.
AREA = 9,434 SF

INZA R. WOOD
MIDDLE SCHOOL



08/12/20

IMPERVIOUS AREA THRESHOLD DETERMINATION FORM

1. TOTAL NEW AND REPLACED IMPERVIOUS AREA, SF: Box 1

2. APPLY IMPERVIOUS REDUCTION METHODS:

2a. Pervious Pavement, SF: Box 2a

2b. Green Roof, SF: Box 2b

2c. Tree Credit - Applies to NON single family residential developments only. NOTE: Maximum total tree credit allowed is 10% of the Impervious Area in BOX 1:

New Trees

To receive credit, trees must be planted in excess of Planning Division (landscaping) requirements. New evergreen trees must be at least 6 feet tall at the time of planting and new deciduous trees must be at least 2-inch caliper (diameter at 4 feet high). Trees must be planted within 25-feet of ground-level impervious surfaces. New trees cannot be credited against rooftop surfaces or pervious pavement. New trees must be selected from tree species included in Appendix A unless otherwise approved.

Number of new trees meeting criteria x 100 sf each, SF: Box 2c

2d. Existing Tree Canopy

To receive credit, existing tree canopy must be preserved during and after construction (recorded on property deed). Existing trees cannot be credited against rooftop surfaces or pervious pavement. Minimum tree size to receive credit is 6-inch caliper. No credit will be given for existing trees located in vegetative buffers or other requirements of the Planning Division. Tree canopy is measured as the area under the tree drip-line and that is within 25 feet of ground-level impervious surfaces.

SF of existing tree canopy that meets criteria: Box 2d

2e. Total Tree Credit (Box 2c + 2d), OR 10% of Box 1, whichever is SMALLER: Box 2e

3. TOTAL IMPERVIOUS AREA REDUCTION, (Sum of Boxes 2a, 2b, and 2e), SF Box 3

4. PROPOSED IMPERVIOUS AREA, (Box 1 minus Box 3), SF (compare to thresholds): Box 4

Impervious Area Threshold Determination Form

CITY OF
WILSONVILLE



PUBLIC WORKS STANDARDS

DRAWING NUMBER: ST-6000

DRAWN BY: SR

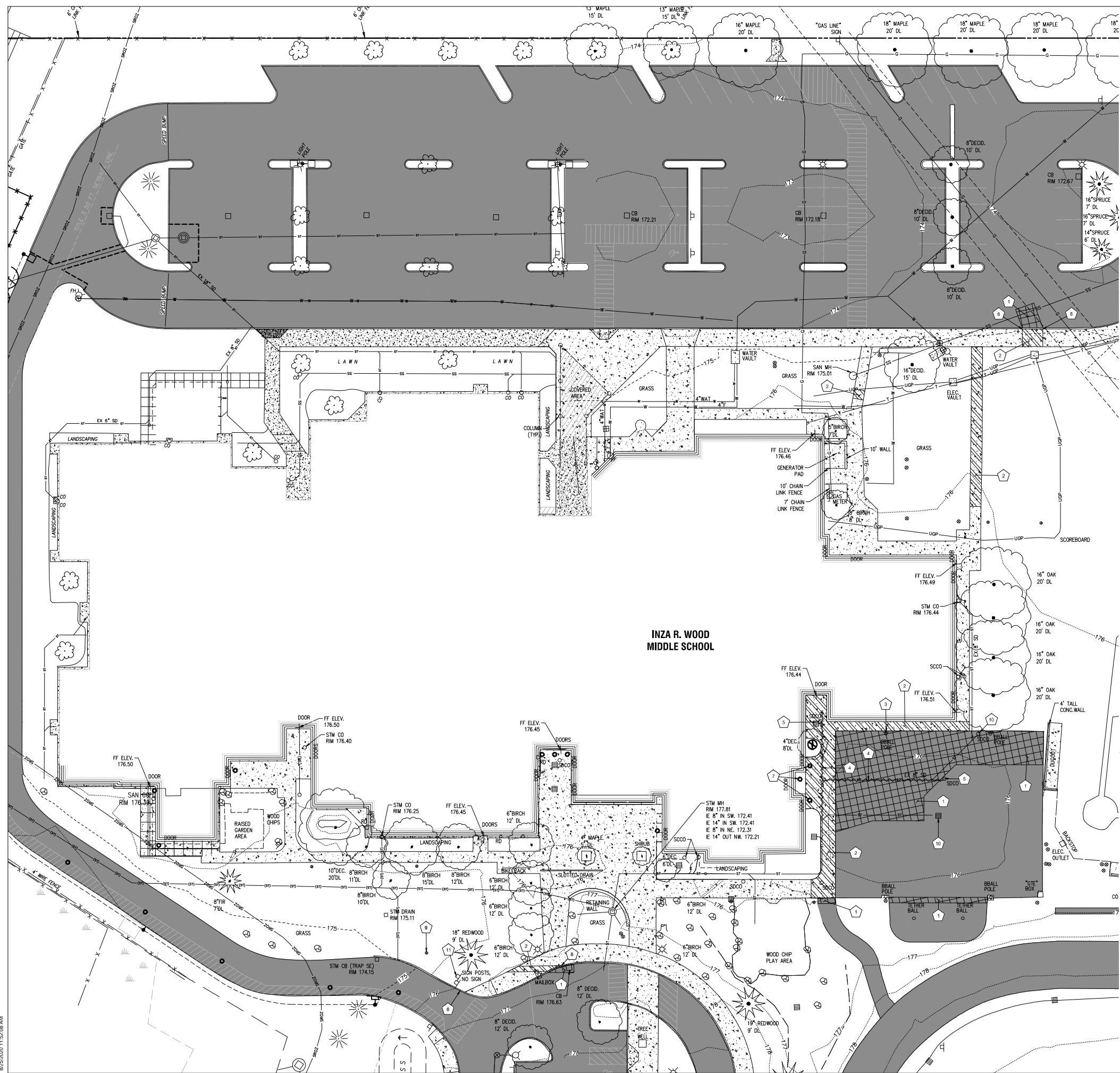
SCALE: N.T.S.

FILE NAME: ST-6000.DWG

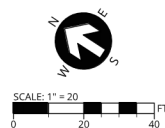
APPROVED BY: NK

DATE: 10/10/14

DRAWINGS



**INZA R. WOOD
MIDDLE SCHOOL**



LEGEND

— SROZ	SIGNIFICANT RESOURCE OVERLAY ZONE
—	CURB
—	EDGE OF PAVEMENT
— G — G	GAS
— OP —	OVERHEAD POWER
— SS —	SANITARY SEWER
— (SS) —	SANITARY SEWER (RECORD DRAWING)
— ST —	STORM SEWER
— (ST) —	STORM SEWER (RECORD DRAWING)
— T —	UNDERGROUND COMMUNICATIONS
— UGP —	UNDERGROUND POWER
— TV —	UNDERGROUND TV
— W —	WATER
—	ASPHALT
—	CONCRETE
—	AREA DRAIN (TRAP)
—	FIRE HYDRANT
—	LIGHT POLE
—	SIGN
—	TRAFFIC BOX
—	WATER METER
—	WATER SPRINKLER
—	WATER VALVE
—	TREE
—	TREE TO BE REMOVED
—	PIPE TO BE REMOVED

- SURVEYOR NOTES**
- UTILITY INFORMATION SHOWN ON THIS MAP IS BASED UPON OBSERVED FEATURES. NO WARRANTIES ARE MADE REGARDING THE ACCURACY OR COMPLETENESS OF THE UTILITY INFORMATION SHOWN. ADDITIONAL UTILITIES MAY EXIST. INTERESTED PARTIES ARE HEREBY ADVISED THAT UTILITY LOCATIONS SHOULD BE VERIFIED PRIOR TO DESIGN OR CONSTRUCTION OF ANY CRITICAL ITEMS.
 - VERTICAL DATUM: NAVD 88.
 - CONTOUR INTERVAL IS ONE FOOT.
 - TOPOGRAPHIC FEATURES SHOWN ON THIS MAP WERE LOCATED USING STANDARD PRECISION TOPOGRAPHIC MAPPING PROCEDURES. THIRD PARTY USERS OF DATA FROM THIS MAP PROVIDED VIA AUTOCAD DRAWING FILES OR DATA EXCHANGE FILES SHOULD NOT RELY ON ANY AUTOCAD GENERATED INFORMATION WHICH IS BEYOND THE LIMITS OF PRECISION OF THIS MAP. THIRD PARTIES USING DATA FROM THIS MAP IN AN AUTOCAD FORMAT SHOULD VERIFY ANY ELEMENTS REQUIRING PRECISE LOCATIONS PRIOR TO COMMENCEMENT OF ANY CRITICAL DESIGN OR CONSTRUCTION. CONTACT COMPASS LAND SURVEYORS FOR FURTHER INFORMATION. FURTHERMORE, COMPASS LAND SURVEYORS WILL NOT BE RESPONSIBLE NOR HELD LIABLE FOR ANY DESIGN OR CONSTRUCTION RELATED PROBLEMS THAT ARISE OUT OF THIRD PARTY USAGE OF THIS MAP (IN AUTOCAD OR OTHER FORMAT) FOR ANY PURPOSE OTHER THAN SPECIFICALLY STATED HEREIN. THIS STATEMENT IS AN OFFICIAL PART OF THIS MAP.
 - THIS DOES NOT CONSTITUTE A BOUNDARY SURVEY AND SHOULD NOT BE CONSTRUED AS SUCH. PROPERTY LINES ARE BASED ON RECORDED SURVEYS.

- DEMOLITION KEY NOTES**
- REMOVE EXISTING ASPHALT AND BASE ROCK. DISPOSE OF RUBBLE AND REFUSE OFF-SITE.
 - REMOVE EXISTING CONCRETE AND BASE ROCK TO NEAREST JOINT. DISPOSE OF RUBBLE AND REFUSE OFF-SITE.
 - REMOVE EXISTING BASKETBALL HOOP & POLE.
 - REMOVE EXISTING STORM PIPE TO LIMITS SHOWN AND DISPOSE OFF-SITE.
 - REMOVE EXISTING STORM SEWER STRUCTURE AND DISPOSE OFF-SITE.
 - SAWCUT EXISTING CURB AND REMOVE. DISPOSE OF RUBBLE AND REFUSE OFF-SITE. SEE C210 FOR ADDITIONAL INFORMATION.
 - REMOVE EXISTING BOLLARDS AND DISPOSE OFF-SITE.
 - REMOVE EXISTING CURB.
 - RELOCATE EXISTING IRRIGATION WATER VALVE & WATER VALVE BOX.
 - PROTECT EXISTING STORM STRUCTURE AND ASSOCIATED PIPING.
 - REMOVE OR RELOCATE EXISTING SIGN POST. COORDINATE LOCATION WITH SCHOOL DISTRICT.

CLIENT
West Linn-Wilsonville SD
22210 SW Stafford Rd., Tualatin, OR 97062

22210 SW Stafford Rd., Tualatin, OR 97062

COPYRIGHT
This drawing has been prepared by IBI Group, Inc. for the Client. No representation or warranty is made by IBI Group, Inc. for the use of this drawing for any purpose other than that intended. IBI Group, Inc. shall not be responsible for any errors or omissions in this drawing. IBI Group, Inc. shall not be responsible for any damage or injury resulting from the use of this drawing. IBI Group, Inc. shall not be responsible for any damage or injury resulting from the use of this drawing. IBI Group, Inc. shall not be responsible for any damage or injury resulting from the use of this drawing.

IBI GROUP ARCHITECTS, INC.
is a member of the IBI Group of companies

ISSUES	DESCRIPTION	DATE
No.		
A	100% DESIGN DEVELOPMENT	09/12/2020

KEYPLAN
NOT FOR CONSTRUCTION

CONSULTANTS
3 J CONSULTING
CIVIL ENGINEERING
WATER RESOURCES
COMMUNITY PLANNING
9600 SW ANIBUS AVE., SUITE 100, BEAVERTON, OR 97008

SEAL

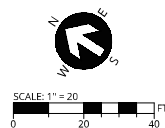
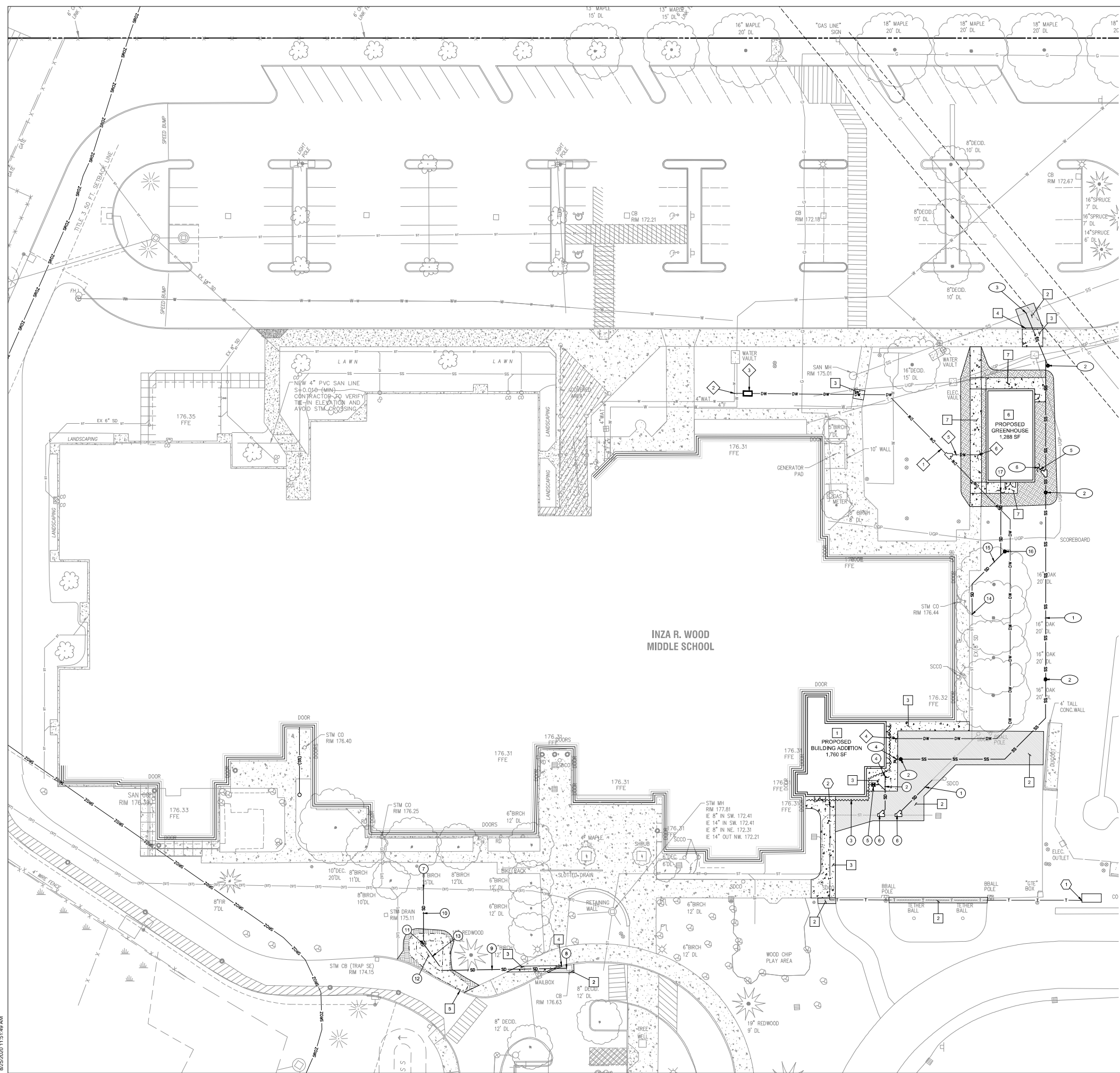
PRIME CONSULTANT
IBI GROUP
401 SW Harvey Milk Street
Portland, OR 97205, USA
503.228.6900 fax: 503.273.9192
ibi@ibi-group.com

PROJECT
Wood Middle School Remodel
11055 SW Wilsonville Road
Wilsonville, OR 97070

PROJECT NO: 124741	CHECKED BY: BKF
DRAWN BY: ARD	APPROVED BY: BKF
PROJECT MGR: BKF	

SHEET TITLE
**EXISTING
CONDITIONS &
DEMOLITION PLAN**

SHEET NUMBER C1100	ISSUE
------------------------------	-------



LEGEND

	PROPOSED ASPHALT
	PROPOSED CONCRETE
	PROPOSED CONCRETE SCORING
	PROPOSED STORM PIPE
	PROPOSED SANITARY PIPE
	PROPOSED WATER DOMESTIC SERVICE
	PROPOSED TELECOMMUNICATIONS LINE
	PROPOSED LAWN SEEDING
	SIGNIFICANT RESOURCE OVERLAY ZONE

- CONSTRUCTION KEY NOTES**
- PROPOSED BUILDING ADDITION. SEE ARCHITECTURAL PLANS FOR INFORMATION.
 - PROPOSED ASPHALT PAVING.
 - PROPOSED CONCRETE SIDEWALK.
 - PROPOSED CURB.
 - PROPOSED CURB CUT FOR DRAINAGE - 5 FT WIDE
 - ADD ALTERNATE: PROPOSED GREENHOUSE. SEE ARCHITECTURAL PLANS FOR INFORMATION.
 - ADD ALTERNATE: PROPOSED CONCRETE SIDEWALK.

- WATER SYSTEM KEY NOTES**
- PROPOSED 2 1/2" DOMESTIC SERVICE LINE - 360 LF
 - PROPOSED CONNECTION TO EXISTING 4" WATER LINE.
 - PROPOSED DOMESTIC SERVICE DOUBLE CHECK VAULT.
 - DOMESTIC WATER POINT OF CONNECTION. SEE PLUMBING PLANS FOR CONTINUATION.
 - ADD ALTERNATE: PROPOSED 1" DOMESTIC SERVICE LINE - 7 LF
 - ADD ALTERNATE: DOMESTIC WATER POINT OF CONNECTION. SEE PLUMBING PLANS FOR CONTINUATION.

- STORM DRAIN KEY NOTES**
- PROPOSED 6" STORM PIPE - 26 LF
 - PROPOSED 6" STORM PIPE - 22 LF
 - PROPOSED 4" PERFORATED FOUNDATION DRAIN PIPE.
 - ROOF DRAIN POINT OF CONNECTION. SEE PLUMBING PLANS FOR CONTINUATION.
 - PROPOSED SWING CHECK VALVE.
 - PROPOSED WYE CONNECTION TO EXISTING PIPE.
 - PROPOSED INSERTA-TEE CONNECTION TO EXISTING 15" PIPE.
 - PROPOSED CONNECTION TO EXISTING CATCH BASIN.
 - PROPOSED 6" STORM PIPE - 67 LF
 - PROPOSED 6" STORM PIPE - 29 LF
 - PROPOSED BEEHIVE OVERFLOW STRUCTURE WITH FLOW CONTROL ORIFICE.
 - PROPOSED RAIN GARDEN - 490 SF. PLANTINGS PER CITY OF WILSONVILLE STORMWATER & SURFACE WATER DESIGN & CONSTRUCTION STANDARDS. APPENDIX A: WATER CONSUMPTION: LOW WATER USAGE AREA (+/- 1" PER WEEK)
 - PROPOSED 6" PERFORATED STORM PIPE - 30 LF
 - ADD ALTERNATE: PROPOSED CONNECTION INTO EXISTING 8" STORM PIPE.
 - ADD ALTERNATE: PROPOSED 6" STORM PIPE - 72 LF
 - ADD ALTERNATE: PROPOSED 6" STORM CLEAN OUT.
 - ADD ALTERNATE: ROOF DRAIN POINT OF CONNECTION. SEE PLUMBING PLANS FOR CONTINUATION.

- SANITARY SEWER KEY NOTES**
- PROPOSED 6" SANITARY SEWER PIPE - 307 LF
 - PROPOSED 6" SANITARY CLEAN OUT.
 - PROPOSED CONNECTION TO EXISTING 8" SANITARY SEWER PIPE.
 - SANITARY SEWER POINT OF CONNECTION. SEE PLUMBING PLANS FOR CONTINUATION.
 - ADD ALTERNATE: PROPOSED 6" SANITARY SEWER PIPE - 4 LF
 - ADD ALTERNATE: SANITARY SEWER POINT OF CONNECTION. SEE PLUMBING PLANS FOR CONTINUATION.

- UTILITY KEY NOTES**
- TELECOMMUNICATIONS 4" CONDUIT POINT OF CONNECTION TO EXISTING VAULT. SEE TECHNOLOGY PLANS FOR CONTINUATION.
 - TELECOMMUNICATIONS 4" CONDUIT POINT OF CONNECTION TO BUILDING. SEE TECHNOLOGY PLANS FOR CONTINUATION.

- LANDSCAPING GENERAL NOTES**
- RESEED ALL LAWN AREAS DISTURBED BY FOUNDATION AND HARDSCAPE CONSTRUCTION. UTILITY TRENCHING AND ALL OTHER CONSTRUCTION ACTIVITIES. WATER CONSUMPTION: LOW WATER USAGE AREA (+/- 1" PER WEEK)

SITE INFORMATION

TOTAL SITE AREA	38.65 AC (1,683,694 SF)
EXISTING BUILDING AREA	86,613 SF
PROPOSED ADDITION AREA	1,760 SF
PROPOSED GREENHOUSE AREA	1,288 SF
TOTAL BUILDING AREA	89,661 SF

CLIENT
West Linn-Wilsonville SD
22210 SW Stafford Rd., Tualatin, OR 97062

COPYRIGHT
This drawing has been prepared by IBI Group, Inc. for the Client. It is the property of IBI Group, Inc. and shall not be used for any other project without the written consent of IBI Group, Inc. IBI Group, Inc. shall not be held responsible for any errors or omissions in this drawing. This drawing shall be used for the project and shall not be used for any other project without the written consent of IBI Group, Inc.

IBI GROUP ARCHITECTS, INC.
is a member of the IBI Group of companies

ISSUES	DESCRIPTION	DATE
No. 1		
A	100% DESIGN DEVELOPMENT	09/12/2020

KEYPLAN

CONSULTANTS
3J CONSULTING
CIVIL ENGINEERING
WATER RESOURCES
COMMUNITY PLANNING
9600 SW ANNEBURN AVE., SUITE 100 BEAVERTON, OR 97008

PRIME CONSULTANT
IBI GROUP
901 SW Harvey Milk Street
Portland, OR 97205, USA
503.525.2200 ext. 303 273 9192
ibi@ibi-group.com

PROJECT
Wood Middle School Remodel
11055 SW Wilsonville Road
Wilsonville, OR 97070

PROJECT NO:
124741

DRAWN BY: ARD	CHECKED BY: BKF
PROJECT MGR: BKF	APPROVED BY: BKF

SHEET TITLE
PRELIMINARY SITE & UTILITY PLAN

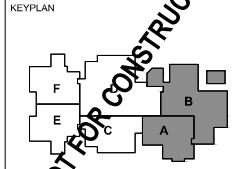
SHEET NUMBER C1210	ISSUE
------------------------------	-------



CLIENT
West Linn-Wilsonville SD
22210 SW Stafford Rd., Tualatin, OR 97062

COPYRIGHT
This drawing has been prepared by IBI Group, Inc. for the Client's use. No representation or warranty is made by IBI Group, Inc. for any other use. All rights reserved. IBI Group, Inc. is a member of the IBI Group of companies.

ISSUES	DESCRIPTION	DATE
A	100% DESIGN DEVELOPMENT	09/12/2020



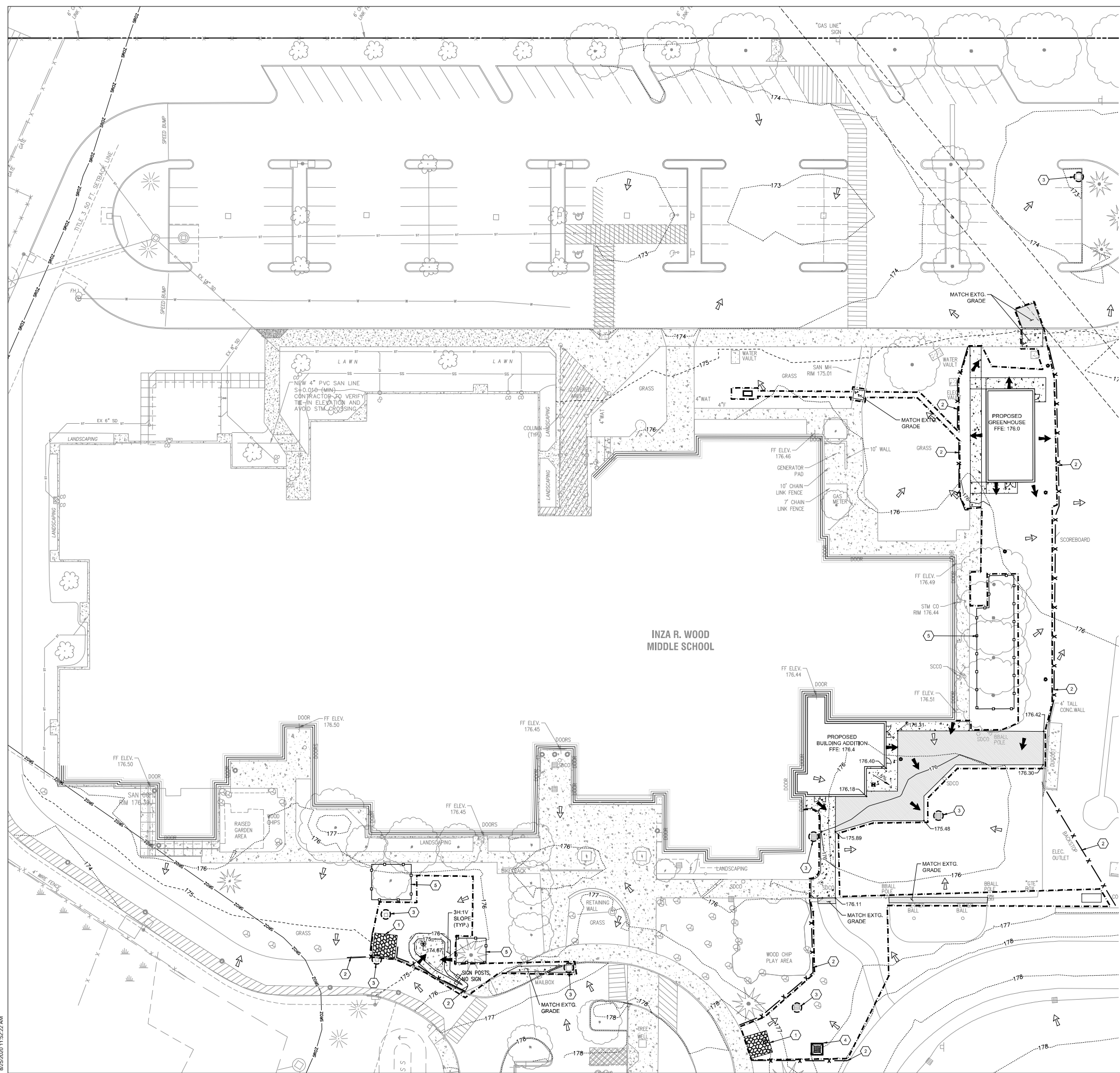
CONSULTANTS

3J CONSULTING
CIVIL ENGINEERING
WATER RESOURCES
COMMUNITY PLANNING
9600 SW ANNEBUS AVE., SUITE 100 BEAVERTON, OR 97008

- GRADING & EROSION CONTROL LEGEND**
- 100 - - - - - EXISTING MAJOR CONTOUR
 - 92 - - - - - EXISTING MINOR CONTOUR
 - 110 - - - - - PROPOSED MAJOR CONTOUR
 - 108 - - - - - PROPOSED MINOR CONTOUR
 - - - - - PROPOSED LIMITS OF DISTURBANCE
 - EXISTING SURFACE RUN-OFF FLOW ARROW
 - PROPOSED SURFACE RUN-OFF FLOW ARROW
 - 1.2% PROPOSED GRADE SLOPE ARROW
 - 175.50 PROPOSED SPOT GRADE
 - X SEDIMENT FENCING
 - TREE PROTECTION FENCING
 - SIGNIFICANT RESOURCE OVERLAY ZONE
 - CONSTRUCTION ENTRANCE
 - INLET PROTECTION
 - PROPOSED CONCRETE WASHOUT

- EROSION CONTROL KEYNOTES**
- 1 PROPOSED CONSTRUCTION ENTRANCE.
 - 2 PROPOSED SEDIMENT FENCING.
 - 3 PROPOSED INLET PROTECTION.
 - 4 PROPOSED CONCRETE WASHOUT.
 - 5 PROPOSED TREE PROTECTION FENCING.

- EROSION CONTROL GENERAL NOTES**
- PROVIDE CONSTRUCTION STAGING AND PARKING AREA FOR SITE ACCESS MANAGEMENT AND JOBSITE ADMINISTRATION.
 - PROVIDE AREA DESIGNATED FOR STOCKPILE, SOLID WASTE, HAZARDOUS WASTE, FUEL STORAGE, AND FUELING AREAS.



INZA R. WOOD
MIDDLE SCHOOL

8/25/2020 11:52:22 AM

SEAL

PRIME CONSULTANT
IBI GROUP
601 SW Harvey Milk Street
Portland, OR 97205, USA
503.520.2200 (toll free) 503.273.9192
ibi@ibi-group.com

PROJECT
Wood Middle School Remodel
11055 SW Wilsonville Road
Wilsonville, OR 97070

PROJECT NO:
124741
DRAWN BY:
ARD
PROJECT MGR:
BKF
CHECKED BY:
BKF
APPROVED BY:
BKF

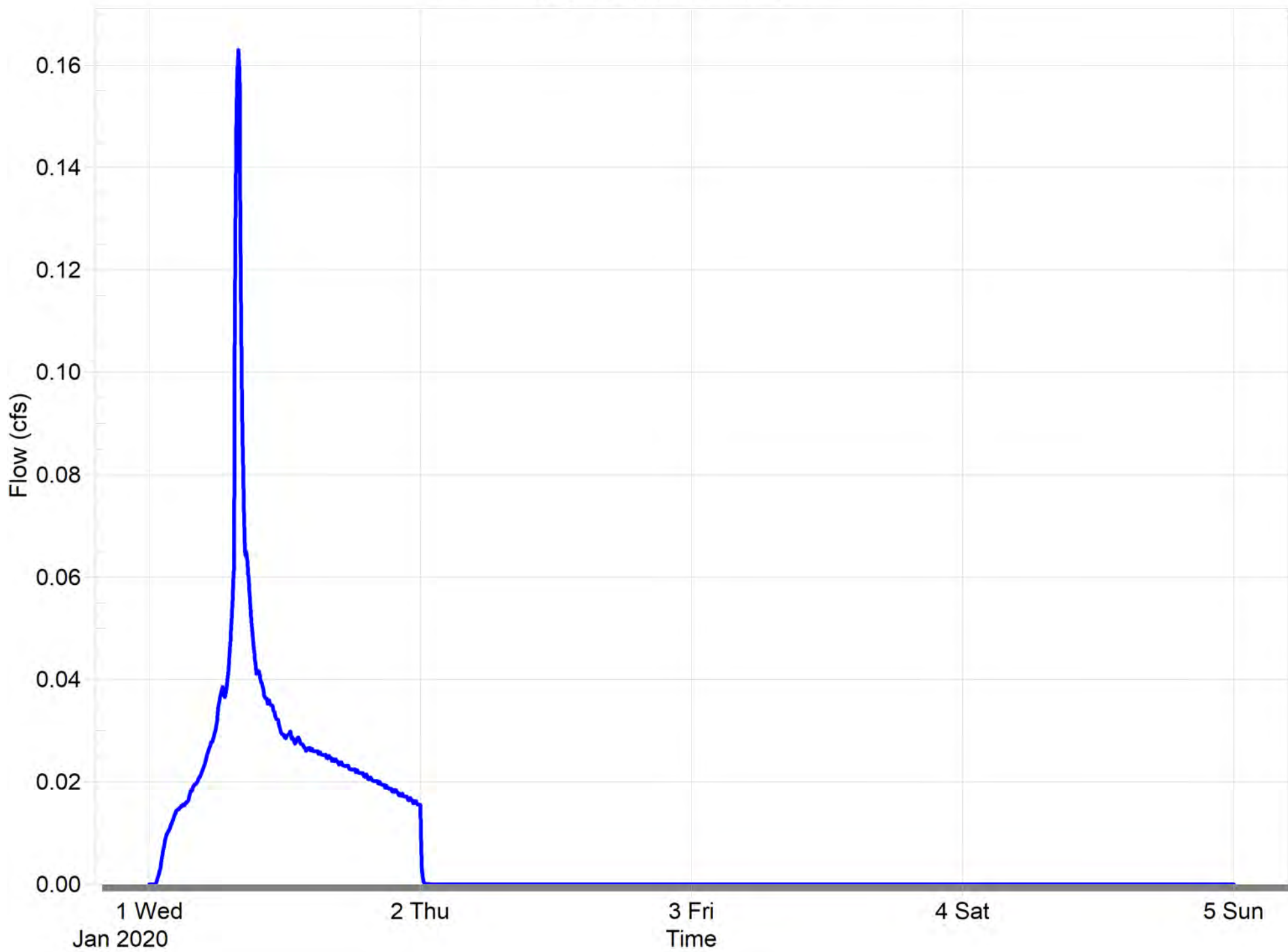
SHEET TITLE
GRADING & EROSION CONTROL PLAN

SHEET NUMBER
C1230
ISSUE

HYDROGRAPHS

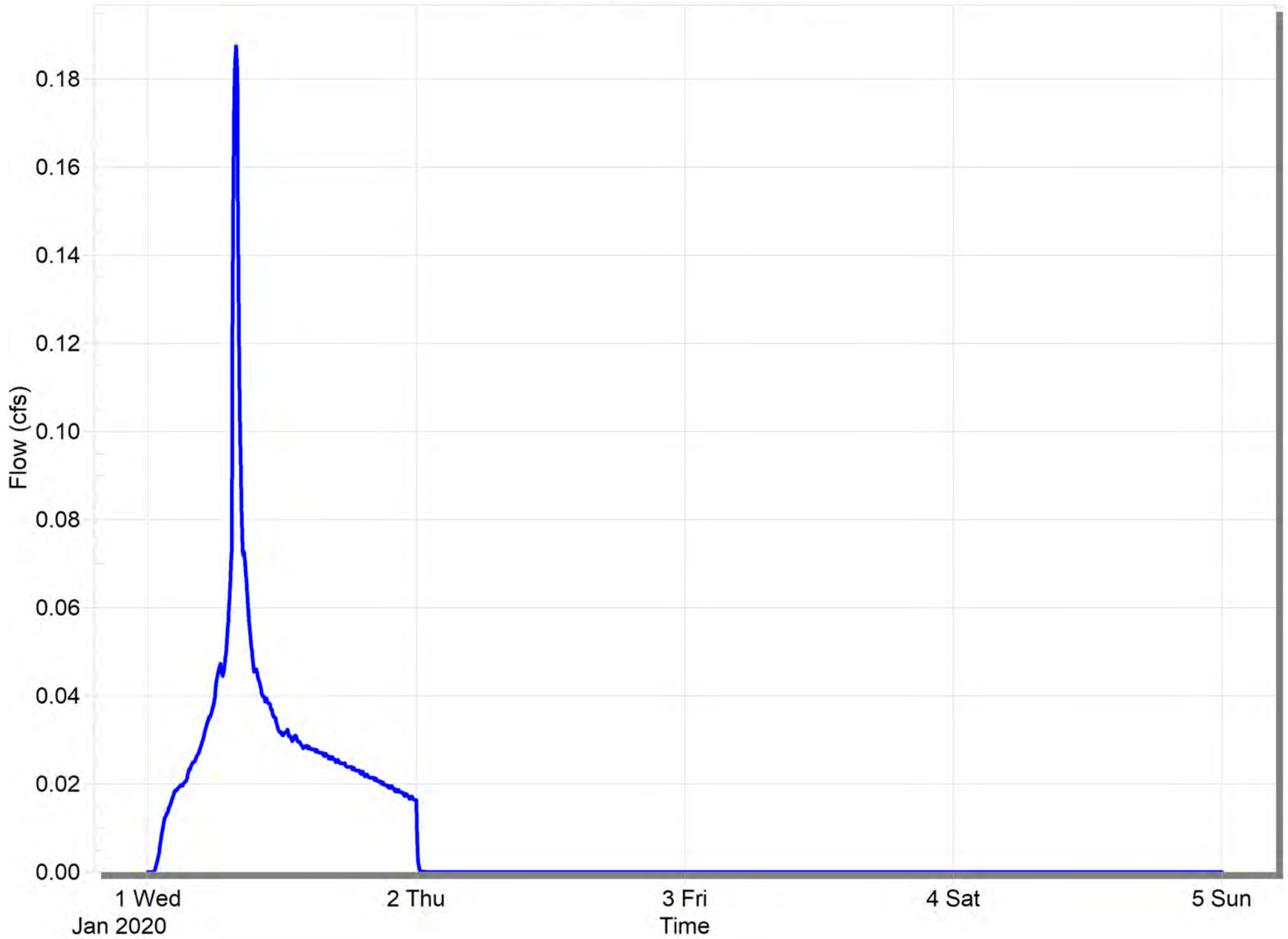
25-yr Runoff Rates - Existing Conditions

25-yr Peak Flow = 0.163 cfs



25-yr Runoff Rates - Developed Conditions

25-yr Peak Flow = 0.188 cfs



WES BMP SIZING REPORT

WES BMP Sizing Report

Project Information

Project Name	Inza Wood MS
Project Type	Addition
Location	11055 SW Wilsonville Rd, Wilsonville, OR 97070
Stormwater Management Area	0
Project Applicant	West Linn - Wilsonville School District (WLWV)
Jurisdiction	CCSD1NCSA

Drainage Management Area

Name	Area (sq-ft)	Pre-Project Cover	Post-Project Cover	DMA Soil Type	BMP
Pervious	1,582	Grass	LandscapeCsoil	C	Rain Garden
Impervious	8,133	Grass	ConventionalConcrete	C	Rain Garden

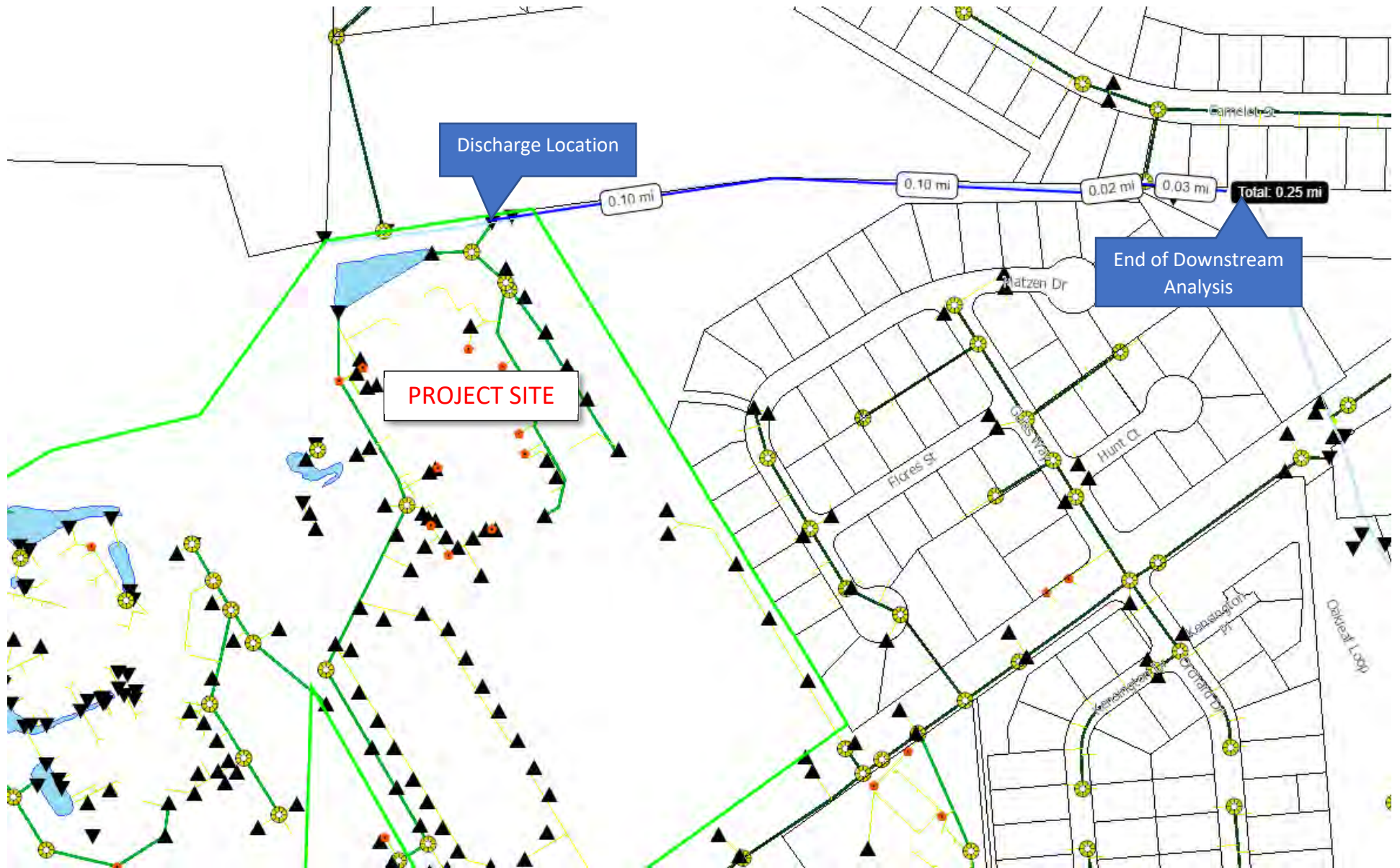
LID Facility Sizing Details

LID ID	Design Criteria	BMP Type	Facility Soil Type	Minimum Area (sq-ft)	Planned Areas (sq-ft)	Orifice Diameter (in)
Rain Garden	FlowControlAndTreatment	Rain Garden - Filtration	Lined	446.2	480.0	0.8

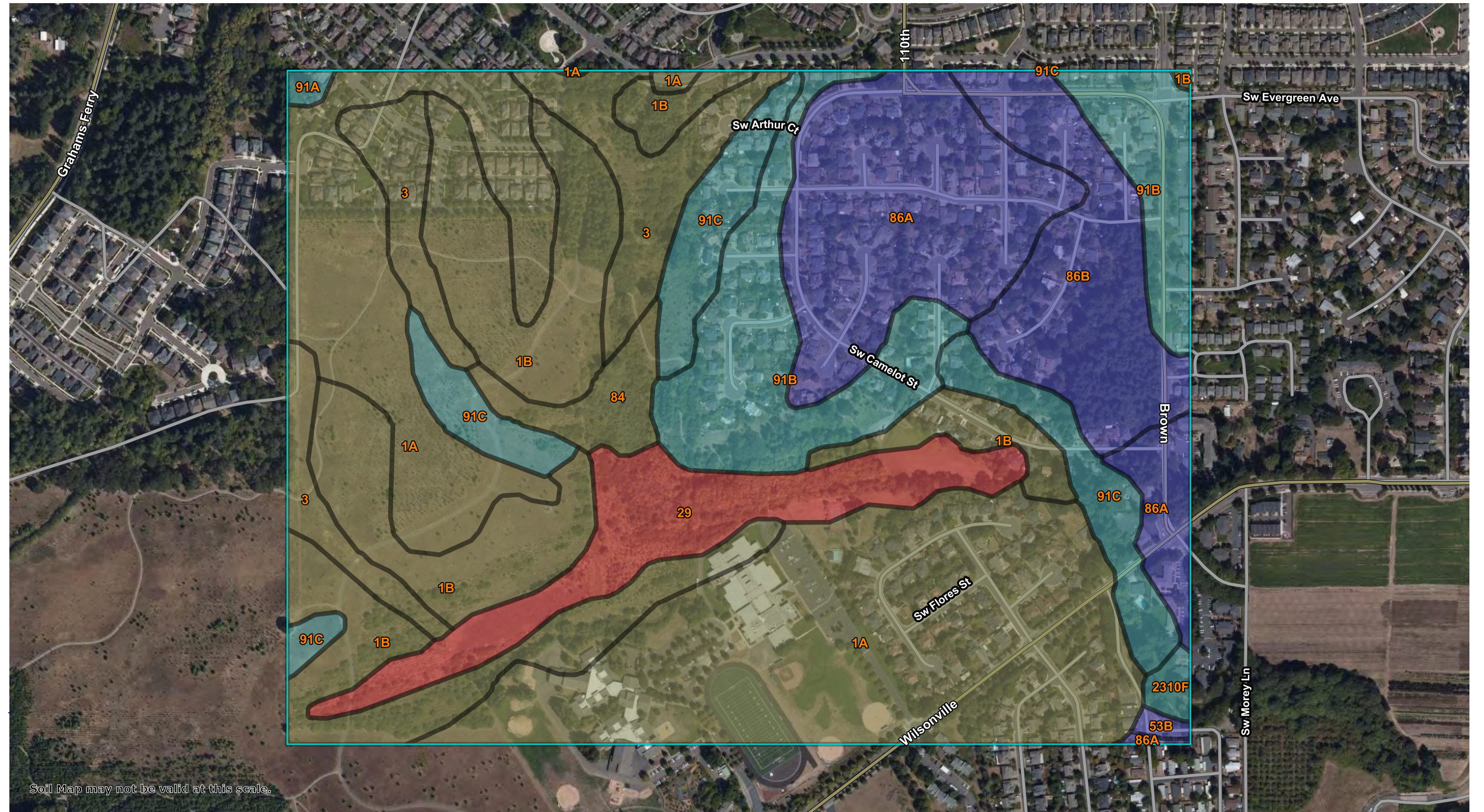
Pond Sizing Details

1. FCWQT = Flow control and water quality treatment, WQT = Water quality treatment only
2. Depth is measured from the bottom of the facility and includes the three feet of media (drain rock, separation layer and growing media).
3. Maximum volume of the facility. Includes the volume occupied by the media at the bottom of the facility.
4. Maximum water storage volume of the facility. Includes water storage in the three feet of soil media assuming a 40 percent porosity.

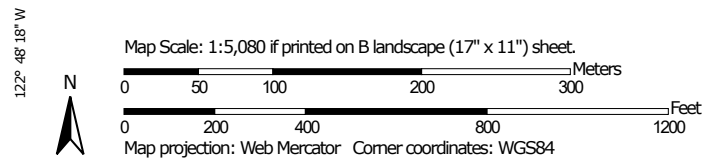
DOWNSTREAM ANALYSIS



Hydrologic Soil Group—Clackamas County Area, Oregon
(20617 - Wood MS - HSG - Downstream)



Soil Map may not be valid at this scale.



MAP LEGEND

Area of Interest (AOI)









Area of Interest (AOI)

Soils

Soil Rating Polygons





-  A
-  A/D
-  B
-  B/D
-  C
-  C/D
-  D
-  Not rated or not available

Soil Rating Lines


-  A
-  A/D
-  B
-  B/D
-  C
-  C/D
-  D
-  Not rated or not available

Soil Rating Points






-  A
-  A/D
-  B
-  B/D

-  C
-  C/D
-  D
-  Not rated or not available


Water Features

 Streams and Canals

Transportation

-  Rails
-  Interstate Highways
-  US Routes
-  Major Roads
-  Local Roads

Background

 Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:20,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Clackamas County Area, Oregon
Survey Area Data: Version 16, Jun 11, 2020

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Aug 1, 2019—Sep 12, 2019

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
1A	Aloha silt loam, 0 to 3 percent slopes	C/D	74.0	29.4%
1B	Aloha silt loam, 3 to 6 percent slopes	C/D	46.0	18.3%
3	Amity silt loam	C/D	18.2	7.3%
29	Dayton silt loam	D	16.9	6.7%
53B	Latourell loam, 3 to 8 percent slopes	B	0.5	0.2%
84	Wapato silty clay loam	C/D	4.6	1.8%
86A	Willamette silt loam, 0 to 3 percent slopes	B	29.4	11.7%
86B	Willamette silt loam, 3 to 8 percent slopes	B	18.1	7.2%
91A	Woodburn silt loam, 0 to 3 percent slopes	C	0.6	0.2%
91B	Woodburn silt loam, 3 to 8 percent slopes	C	24.7	9.8%
91C	Woodburn silt loam, 8 to 15 percent slopes	C	17.2	6.8%
2310F	Woodburn silt loam, 20 to 55 percent slopes	C	1.1	0.4%
Totals for Area of Interest			251.4	100.0%

Description

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

Table 2-2a Runoff curve numbers for urban areas ^{1/}

Cover description	Average percent impervious area ^{2/}	Curve numbers for hydrologic soil group			
		A	B	C	D
Fully developed urban areas (vegetation established)					
Open space (lawns, parks, golf courses, cemeteries, etc.) ^{3/} :					
Poor condition (grass cover < 50%)		68	79	86	89
Fair condition (grass cover 50% to 75%)		49	69	79	84
Good condition (grass cover > 75%)		39	61	74	80
Impervious areas:					
Paved parking lots, roofs, driveways, etc. (excluding right-of-way)		98	98	98	98
Streets and roads:					
Paved; curbs and storm sewers (excluding right-of-way)		98	98	98	98
Paved; open ditches (including right-of-way)		83	89	92	93
Gravel (including right-of-way)		76	85	89	91
Dirt (including right-of-way)		72	82	87	89
Western desert urban areas:					
Natural desert landscaping (pervious areas only) ^{4/}		63	77	85	88
Artificial desert landscaping (impervious weed barrier, desert shrub with 1- to 2-inch sand or gravel mulch and basin borders)		96	96	96	96
Urban districts:					
Commercial and business	85	89	92	94	95
Industrial	72	81	88	91	93
Residential districts by average lot size:					
1/8 acre or less (town houses)	65	77	85	90	92
1/4 acre	38	61	75	83	87
1/3 acre	30	57	72	81	86
1/2 acre	25	54	70	80	85
1 acre	20	51	68	79	84
2 acres	12	46	65	77	82
Developing urban areas					
Newly graded areas					
(pervious areas only, no vegetation) ^{5/}		77	86	91	94
Idle lands (CN's are determined using cover types similar to those in table 2-2c).					

¹ Average runoff condition, and $I_a = 0.2S$.² The average percent impervious area shown was used to develop the composite CN's. Other assumptions are as follows: impervious areas are directly connected to the drainage system, impervious areas have a CN of 98, and pervious areas are considered equivalent to open space in good hydrologic condition. CN's for other combinations of conditions may be computed using figure 2-3 or 2-4.³ CN's shown are equivalent to those of pasture. Composite CN's may be computed for other combinations of open space cover type.⁴ Composite CN's for natural desert landscaping should be computed using figures 2-3 or 2-4 based on the impervious area percentage (CN = 98) and the pervious area CN. The pervious area CN's are assumed equivalent to desert shrub in poor hydrologic condition.⁵ Composite CN's to use for the design of temporary measures during grading and construction should be computed using figure 2-3 or 2-4 based on the degree of development (impervious area percentage) and the CN's for the newly graded pervious areas.

Table 2-2c Runoff curve numbers for other agricultural lands ^{1/}

Cover description	Hydrologic condition	Curve numbers for hydrologic soil group			
		A	B	C	D
Pasture, grassland, or range—continuous forage for grazing. ^{2/}	Poor	68	79	86	89
	Fair	49	69	79	84
	Good	39	61	74	80
Meadow—continuous grass, protected from grazing and generally mowed for hay.	—	30	58	71	78
Brush—brush-weed-grass mixture with brush the major element. ^{3/}	Poor	48	67	77	83
	Fair	35	56	70	77
	Good	30 ^{4/}	48	65	73
Woods—grass combination (orchard or tree farm). ^{5/}	Poor	57	73	82	86
	Fair	43	65	76	82
	Good	32	58	72	79
Woods. ^{6/}	Poor	45	66	77	83
	Fair	36	60	73	79
	Good	30 ^{4/}	55	70	77
Farmsteads—buildings, lanes, driveways, and surrounding lots.	—	59	74	82	86

¹ Average runoff condition, and $I_a = 0.2S$.

² **Poor:** <50% ground cover or heavily grazed with no mulch.

Fair: 50 to 75% ground cover and not heavily grazed.

Good: > 75% ground cover and lightly or only occasionally grazed.

³ **Poor:** <50% ground cover.

Fair: 50 to 75% ground cover.

Good: >75% ground cover.

⁴ Actual curve number is less than 30; use CN = 30 for runoff computations.

⁵ CN's shown were computed for areas with 50% woods and 50% grass (pasture) cover. Other combinations of conditions may be computed from the CN's for woods and pasture.

⁶ **Poor:** Forest litter, small trees, and brush are destroyed by heavy grazing or regular burning.

Fair: Woods are grazed but not burned, and some forest litter covers the soil.

Good: Woods are protected from grazing, and litter and brush adequately cover the soil.

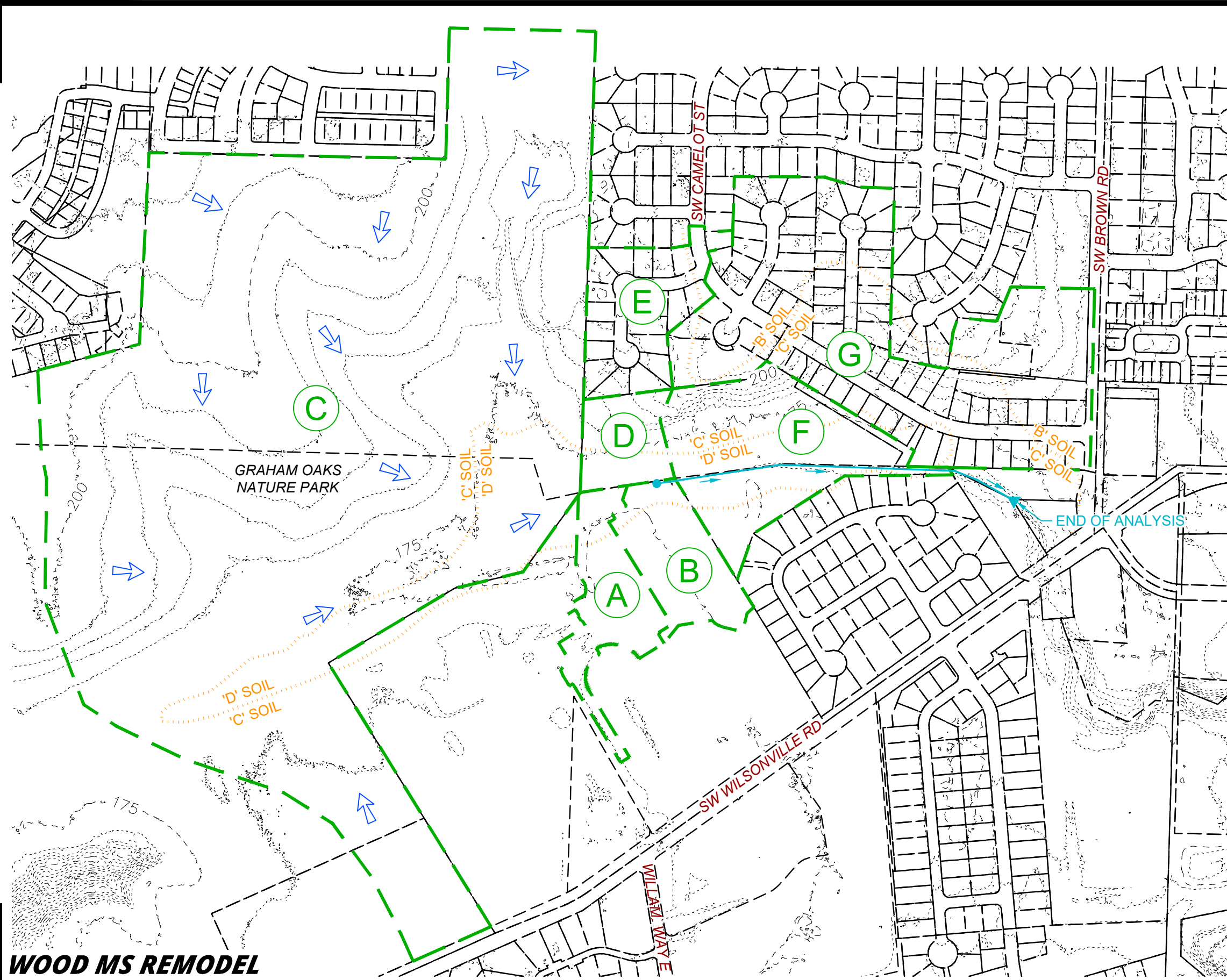


TIME OF CONCENTRATION (DOWNSTREAM ANALYSIS)

PROJECT NO.: 20617	BY: PJP	DATE: 7/8/2020
---------------------------	----------------	-----------------------

SHEET FLOW			
INPUT	Basin C	Basin D	Basin F
Surface Description	Type 7 Grass (Bermudagrass)	Type 9 Woods (Lt_Underbrush)	Type 9 Woods (Lt_Underbrush)
Manning's "n" Roughness Coefficient	0.41	0.40	0.40
Initial Area Flow Length, L	300 ft	300 ft	300 ft
2-Yr 24 Hour Rainfall, P ₂	2.5 in	2.5 in	2.5 in
Land Slope, s	0.035 ft/ft	0.075 ft/ft	0.090 ft/ft
OUTPUT	CALCULATED	CALCULATED	CALCULATED
Travel Time	0.80 hr	0.57 hr	0.53 hr
SHALLOW CONCENTRATED FLOW			
INPUT	VALUE	VALUE	VALUE
Surface Description	Unpaved	Unpaved	Unpaved
Flow Length, L	2360 ft	60 ft	980 ft
Watercourse Slope*, s	0.005 ft/ft	0.010 ft/ft	0.005 ft/ft
OUTPUT	CALCULATED	CALCULATED	CALCULATED
Average Velocity, V	1.14 ft/s	1.61 ft/s	1.14 ft/s
Travel Time	0.575 hr	0.010 hr	0.239 hr
CHANNEL FLOW			
INPUT	VALUE	VALUE	VALUE
Cross Sectional Flow Area, a	0 ft ²	0 ft ²	0 ft ²
Wetted Perimeter, P _w	0 ft	0 ft	0 ft
Channel Slope, s	0 ft/ft	0 ft/ft	0 ft/ft
Manning's "n"	0.24	0.24	0.24
Flow Length, L	0 ft	0 ft	0 ft
OUTPUT	CALCULATED	CALCULATED	CALCULATED
Average Velocity	0.00 ft/s	0.00 ft/s	0.00 ft/s
Hydraulic Radius, r = a / P _w	1.00 ft	1.00 ft	1.00 ft
Travel Time	0.00 hr	0.00 hr	0.00 hr
TIME OF CONCENTRATION			
<i>Watershed or Subarea, T_c =</i>	1.37 hr	0.59 hr	0.77 hr
	82 min	35 min	46 min





LEGEND

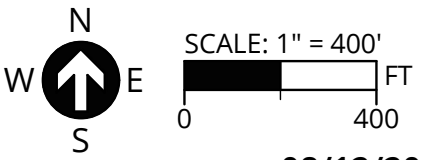
- BASIN BOUNDARY
- BASIN LABEL
- SOIL BOUNDARY (PER NRCS WEB SOIL SURVEY)
- MAIN LINE OF D/S ANALYSIS
- SURFACE FLOW DIRECTION

BASIN AREAS

Basin	A,tot ac	A,imp ac	A,per ac	CN,avg (pervious)	Tc min	D/S Node
A	4.18	3.08	1.10	79	5	Basin A
B	3.80	2.67	1.14	79	5	Basin B
C	102.7	0.00	102.7	73	82	Culv In
D	2.68	0.00	2.68	73	35	Culv In
E	5.44	3.53	1.90	78	5	Culv In
F	9.39	0.00	9.39	73	46	Culv Out
G	23.94	15.56	8.38	73	15	MH-160

ABBREVIATIONS

- A,tot TOTAL BASIN AREA
- A,imp IMPERVIOUS AREA
- A,per PERVIOUS AREA
- CN,avg SPATIALLY-AVERAGED PERVIOUS CURVE NUMBER
- Tc TIME OF CONCENTRATION
- D/S Node DOWNSTREAM NODE PER XPSTORM MODEL



08/12/20

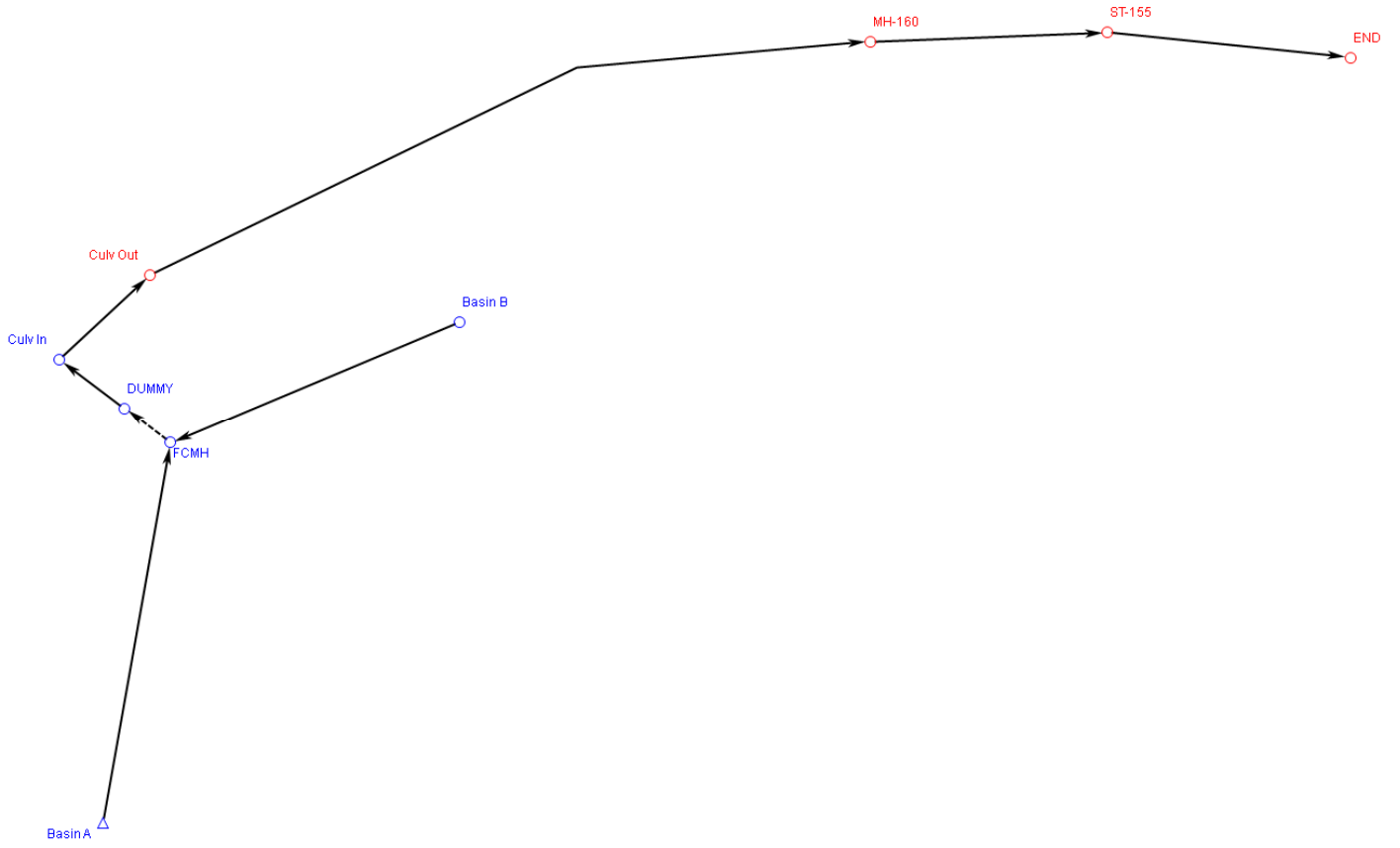
WOOD MS REMODEL

WLWV SCHOOL DISTRICT

DOWNSTREAM ANALYSIS - BASIN EXHIBIT

3J CONSULTING
CIVIL ENGINEERING . WATER RESOURCES . COMMUNITY PLANNING

Downstream Analysis - XPSTORM Hydraulic Layout



XPSTORM RUNOFF DATA - DOWNSTREAM ANALYSIS - 25-YR STORM EVENT**POST-DEVELOPED CONDITIONS - WOOD MS REMODEL**

Node Information					Runoff Information			
Node Name	Area	Impervious	Curve	Tc	Rainfall	Infiltration	Surface Runoff	
	acre	%	Number	min.			in	in
Basin A	3.08	100	98	5	4.00	2.04	1.96	3.39
	1.100	0	79	5				
Basin B	2.67	100	98	5	4.00	2.04	1.96	3.02
	1.14	0	79	5				
Culv In	102.7	0	73	82	4.00	0.98	3.02	15.69
	2.68	0	73	35				
	5.44	65	78	5				
Culv Out	9.39	0	73	46	4.00	2.47	1.53	1.60
MH-160	23.94	65	73	15	4.00	1.15	2.85	15.47

XPSTORM RUNOFF DATA - DOWNSTREAM ANALYSIS - 100-YR STORM EVENT**POST-DEVELOPED CONDITIONS - WOOD MS REMODEL**

Node Information					Runoff Information			
Node Name	Area	Impervious	Curve	Tc	Rainfall	Infiltration	Surface Runoff	
	acre	%	Number	min.			in	in
Basin A	3.08	100	98	5	4.80	2.17	2.63	4.18
	1.100	0	79	5				
Basin B	2.67	100	98	5	4.80	2.17	2.63	3.74
	1.14	0	79	5				
Culv In	102.7	0	73	82	4.80	1.01	3.79	23.73
	2.68	0	73	35				
	5.44	65	78	5				
Culv Out	9.39	0	73	46	4.80	2.68	2.12	2.46
MH-160	23.94	65	73	15	4.80	1.20	3.61	19.76

XPSTORM CONVEYANCE DATA - DOWNSTREAM ANALYSIS - 25-YEAR STORM EVENT																			
THE RESERVE AT FERN HILL - POST-DEVELOPED CONDITIONS - WEST BASIN																			
Link	Location Station		Conduit Properties			Conduit Results						Conduit Profile							
	From	To	Diameter	Length	Slope	Design Capacity	Qmax/Qdesign	Max Flow	Max Velocity	Max Flow Depth	y/d0	US Grnd Elev.	DS Grnd Elev.	US IE	DS IE	US Fb	DS Fb	US HGL	DS HGL
			ft	ft	%	cfs		cfs	ft/s	ft		ft	ft	ft	ft	ft	ft	ft	ft
Link63	Basin A	FCMH	1.25	70.00	0.3	3.54	0.68	2.40	2.10	1.20	0.96	173.00	173.50	169.50	165.29	2.44	3.01	170.56	170.49
Link61	Basin B	FCMH	1.25	120.00	0.3	3.54	0.85	3.01	2.88	1.20	0.96	173.25	173.50	169.65	165.29	2.56	3.01	170.69	170.49
Link74	Culv In	Culv Out	2.50	79.30	1.5	34.81	0.29	20.33	3.24	2.31	0.92	173.00	173.00	169.16	167.94	2.72	2.75	170.28	170.25
Link65	DUMMY	Culv In	1.50	62.00	0.1	2.67	1.76	4.70	3.72	1.15	0.76	173.50	173.00	165.29	169.16	3.06	2.72	170.44	170.28
Link75	Culv Out	MH-160	3.80	1130.00	0.3	79.07	0.27	20.96	0.92	2.79	0.74	173.00	168.95	167.94	164.10	2.75	2.06	170.25	166.89
Link76	MH-160	ST-155	2.25	60.00	1.2	24.33	1.32	32.05	7.94	2.79	1.24	168.95	169.64	164.10	163.39	2.06	3.90	166.89	165.74
Link77	ST-155	END	6.25	205.00	1.4	644.80	0.05	32.05	2.54	2.35	0.38	169.64	171.90	163.39	160.50	3.90	10.14	165.74	161.76

XPSTORM CONVEYANCE DATA - DOWNSTREAM ANALYSIS - 100-YEAR STORM EVENT																			
THE RESERVE AT FERN HILL - POST-DEVELOPED CONDITIONS - WEST BASIN																			
Link	Location Station		Conduit Properties			Conduit Results						Conduit Profile							
	From	To	Diameter	Length	Slope	Design Capacity	Qmax/Qdesign	Max Flow	Max Velocity	Max Flow Depth	y/d0	US Grnd Elev.	DS Grnd Elev.	US IE	DS IE	US Fb	DS Fb	US HGL	DS HGL
			ft	ft	%	cfs		cfs	ft/s	ft		ft	ft	ft	ft	ft	ft	ft	ft
Link63	Basin A	FCMH	1.25	70.00	0.3	3.54	0.66	2.34	1.83	1.53	1.22	173.00	173.50	169.50	165.29	2.10	2.68	170.90	170.82
Link61	Basin B	FCMH	1.25	120.00	0.3	3.54	1.05	3.73	3.04	1.53	1.22	173.25	173.50	169.65	165.29	2.15	2.68	171.10	170.82
Link74	Culv In	Culv Out	2.50	79.30	1.5	34.81	0.41	28.47	3.70	2.64	1.06	173.00	173.00	169.16	167.94	2.32	2.42	170.68	170.58
Link65	DUMMY	Culv In	1.50	62.00	0.1	2.67	1.80	4.81	3.18	1.49	0.99	173.50	173.00	165.29	169.16	2.72	2.32	170.78	170.68
Link75	Culv Out	MH-160	3.80	1130.00	0.3	79.07	0.38	29.95	0.94	3.75	0.99	173.00	168.95	167.94	164.10	2.42	1.10	170.58	167.85
Link76	MH-160	ST-155	2.25	60.00	1.2	24.33	1.68	40.78	10.02	3.75	1.67	168.95	169.64	164.10	163.39	1.10	3.69	167.85	165.95
Link77	ST-155	END	6.25	205.00	1.4	644.80	0.06	40.78	2.48	2.56	0.41	169.64	171.90	163.39	160.50	3.69	10.02	165.95	161.88

AS-BUILT DOCUMENTS



ARCHITECTURE • INTERIORS • PLANNING

DULL OLSON WEEKES
architects inc.

315 SW WASHINGTON ST. #200 - PORTLAND, OR 97204
P: 503 228 8881 F: 503 273 1162 www.dowaw.com

INZA R. WOOD MIDDLE SCHOOL Additions and Remodel

West Linn - Wilsonville S.D. 3J
22210 SW Starford Road, West Linn, OR 97068



CONSULTING ENGINEERS INC.
9000 REDWOOD LANE, SUITE 300
PORTLAND, OR 97224
PH: (503) 228-3001 FAX: (503) 228-3928



phase | Bid Set

date | August 9, 2004

revisions |

1 ADD July 12, 2004

2 ADD July 26, 2004

3 ADD July 26, 2004

project # | 03031

NORTH GRADING & EROSION CONTROL PLAN

C4.1

SOIL STOCKPILING

COMPLETELY COVER ANY STOCK PILED WITH 6 MIL BLACK PLASTIC AND PROVIDE RESTRAINTS TO HOLD PLASTIC IN PLACE. MONITOR PLASTIC COVER AS PART OF CONTINUOUS EROSION CONTROL PLAN. PLACE SILT FENCE COMPLETELY AROUND STOCKPILE. DO NOT STOCK PILE SOIL BEYOND 50' WETLAND SETBACK LINE.

GRADING NOTES

- 1 THE CONTRACTOR SHALL MAINTAIN POSITIVE DRAINAGE TOWARD ALL EXISTING STORMWATER FEATURES.
- 2 THE CONTRACTOR SHALL MAINTAIN POSITIVE DRAINAGE AWAY FROM BUILDING.
- 3 SEE LANDSCAPE PLANS FOR PEDESTRIAN SIDEWALK GRADES AROUND BUILDING.
- 4 STRIP TOPSOIL AND PROVIDE EXCAVATION OR STRUCTURAL BACKFILL AS NEEDED TO ESTABLISH PAVEMENT SUBGRADE.
- 5 STRIP TOPSOIL AND PROVIDE EXCAVATION OR STRUCTURAL BACKFILL AS NEEDED TO ACHIEVE SUBGRADE. PROVIDE STRUCTURAL FILL AS SPECIFIED UNDER BUILDING TO ACHIEVE FINISH FLOOR ELEVATIONS.

TEMPORARY CONSTRUCTION BENCHMARKS

TBM #1 EX STM MH RIM: 173.25	TBM #2 EX STM MH RIM: 181.81
------------------------------------	------------------------------------

MONUMENTATION NOTE

ALL SURVEY MONUMENTS ON THE SUBJECT SITE, OR THAT MAY BE SUBJECT TO DISTURBANCE WITHIN THE CONSTRUCTION AREA, OR THE CONSTRUCTION OF ANY OFF-SITE IMPROVEMENTS SHALL BE ADEQUATELY REFERENCED AND PROTECTED PRIOR TO COMMENCEMENT OF ANY CONSTRUCTION ACTIVITY. IF THE SURVEY MONUMENTS ARE DISTURBED, MOVED, RELOCATED, OR DESTROYED AS A RESULT OF ANY CONSTRUCTION, THE PROJECT SHALL, AT ITS COST, RETAIN THE SERVICES OF A REGISTERED PROFESSIONAL LAND SURVEYOR IN THE STATE OF OREGON TO RESTORE THE MONUMENT TO ITS ORIGINAL CONDITION AND FILE THE NECESSARY SURVEYS AS REQUIRED BY OREGON STATE LAW. A COPY OF ANY RECORDED SURVEY SHALL BE SUBMITTED TO STAFF.

EROSION CONTROL STABILIZATION SEEDING

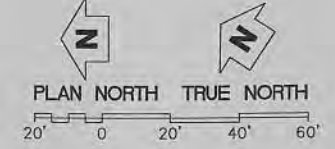
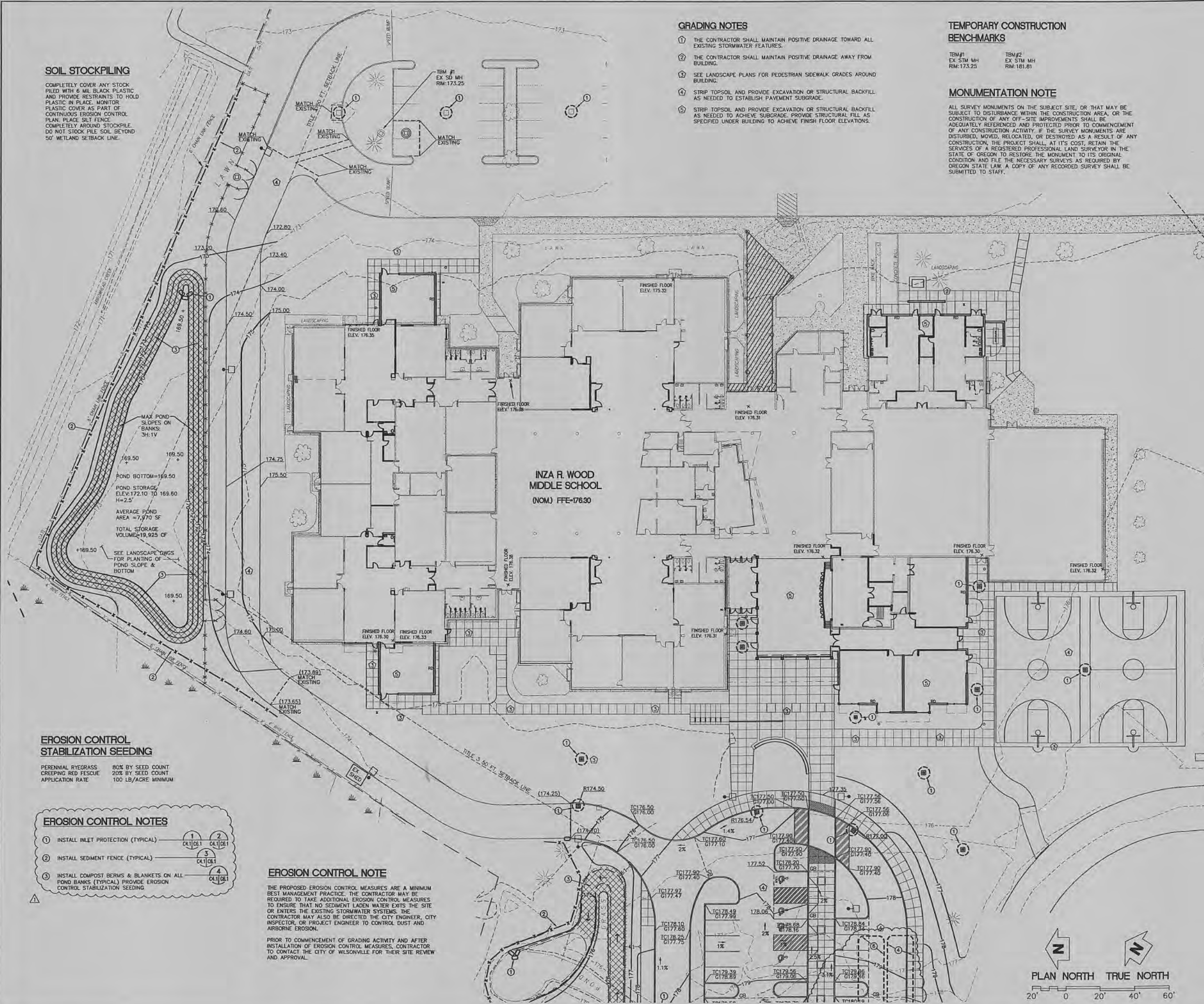
PERENNIAL RYEGRASS	80% BY SEED COUNT
CREeping RED FESCUE	20% BY SEED COUNT
APPLICATION RATE	100 LB/ACRE MINIMUM

EROSION CONTROL NOTES

- 1 INSTALL INLET PROTECTION (TYPICAL)
- 2 INSTALL SEDIMENT FENCE (TYPICAL)
- 3 INSTALL COMPOST BERMS & BLANKETS ON ALL POND BANKS (TYPICAL) PROVIDE EROSION CONTROL STABILIZATION SEEDING

EROSION CONTROL NOTE

THE PROPOSED EROSION CONTROL MEASURES ARE A MINIMUM BEST MANAGEMENT PRACTICE. THE CONTRACTOR MAY BE REQUIRED TO TAKE ADDITIONAL EROSION CONTROL MEASURES TO ENSURE THAT NO SEDIMENT LADEN WATER ENTERS THE SITE OR ENTERS THE EXISTING STORMWATER SYSTEMS. THE CONTRACTOR MAY ALSO BE DIRECTED BY THE CITY ENGINEER, CITY INSPECTOR, OR PROJECT ENGINEER TO CONTROL DUST AND AIRBORNE EROSION.
PRIOR TO COMMENCEMENT OF GRADING ACTIVITY AND AFTER INSTALLATION OF EROSION CONTROL MEASURES, CONTRACTOR TO CONTACT THE CITY OF WILSONVILLE FOR THEIR SITE REVIEW AND APPROVAL.





ARCHITECTURE • INTERIORS • PLANNING

DULL OLSON WEEKES
architects inc.

310 NW WASHINGTON ST. #600 PORTLAND, OR 97204
P: 503 228 8866 F: 503 273 8162 www.dow.com

INZA R. WOOD MIDDLE SCHOOL Additions and Remodel

West Linn - Wilsonville S.D. 3J
22210 SW Stafford Road, West Linn, OR 97068



CONSULTING ENGINEERS INC.
6000 REDWOOD LANE, SUITE 300
PORTLAND, OR 97228
PH: (503) 228-3841 FAX: (503) 229-3828



phase | Bid Set

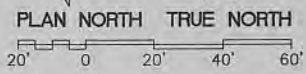
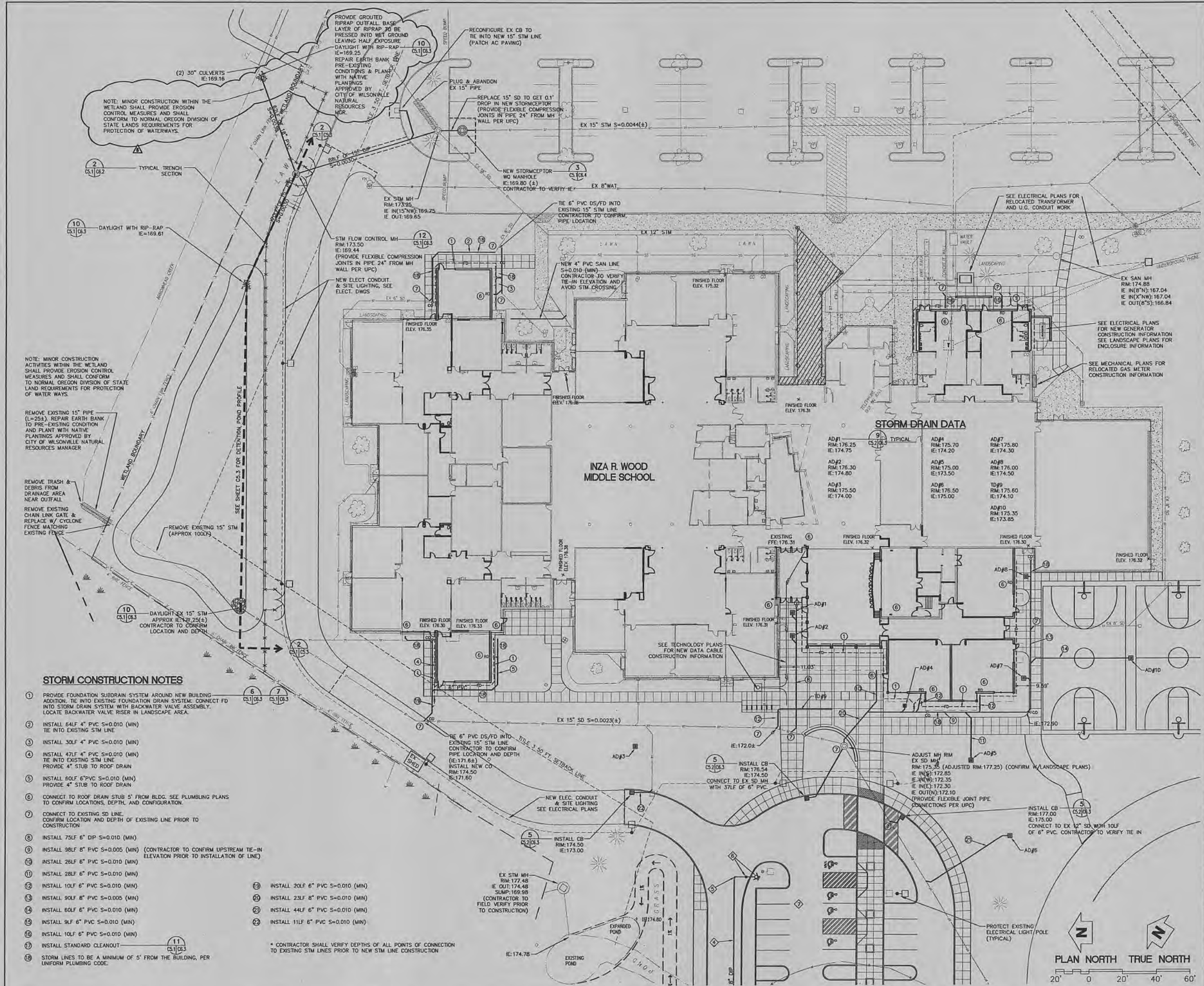
date | August 9, 2004

- revisions
- 1 ADD July 12, 2004
 - 2 ADD July 26, 2004
 - 3 ADD July 26, 2004
 - PR #2

project # | 03031

NORTH UTILITY PLAN

C5.1





ARCHITECTURE • INTERIORS • PLANNING

DULL OLSON WEEKES
architects inc.

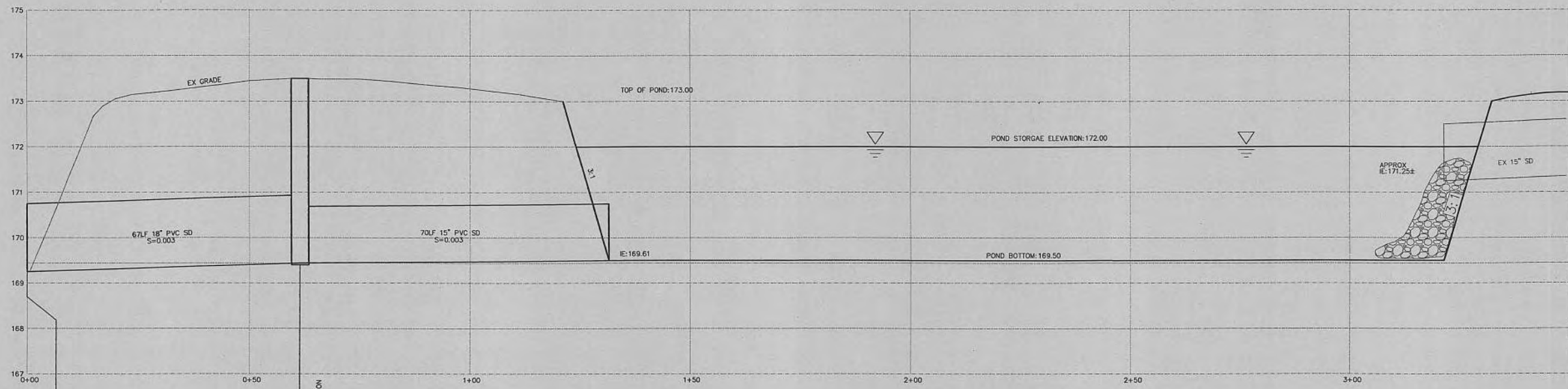
310 SW WASHINGTON ST. #205, PORTLAND, OR 97204
P: 503 226 8860 F: 503 273 0182 www.doww.com

INZA R. WOOD MIDDLE SCHOOL Additions and Remodel

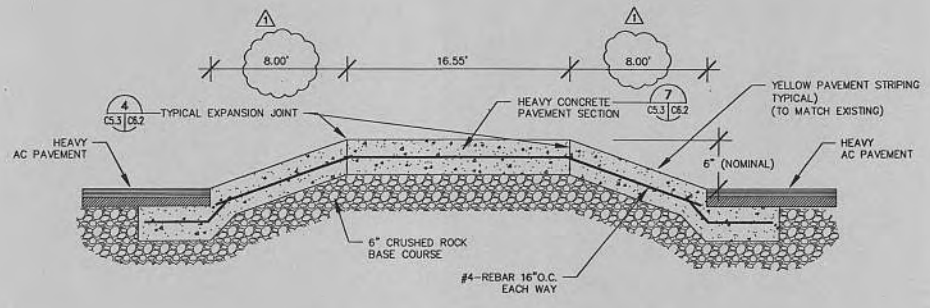
West Linn - Wilsonville S.D. 3J
22210 SW Stafford Road, West Linn, OR 97068



CONSULTING ENGINEERS INC.
6600 REDWOOD LAKE, SUITE 300
PORTLAND, OR 97224
PH: (503) 226-0821 FAX: (503) 226-3828



1 STORMWATER DETENTION POND PROFILE
SCALE: V: 1"=1' H: 1"=10'



2 RAISED CONCRETE PEDESTRIAN CROSSING
SCALE: NONE

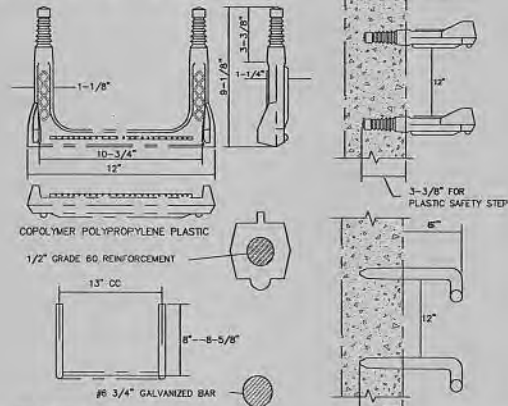
phase	Bid Set
date	August 9, 2004
revisions	
1	ADD July 12, 2004
2	ADD July 26, 2004
3	ADD July 26, 2004

project # | 03031

STORM POND PROFILE

C5.3

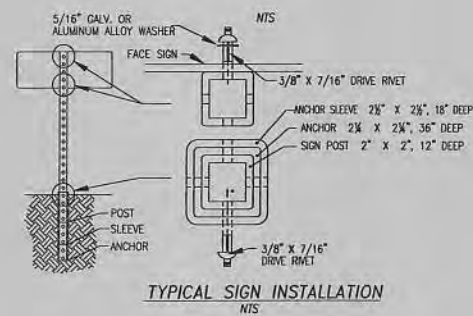
NOTE:
MANHOLE STEPS MUST BE TIGHT AND FIRMLY EMBEDDED. THEY MUST ALSO MEET THE ASTM TEST FOR WITHSTANDING PULLING OUT.



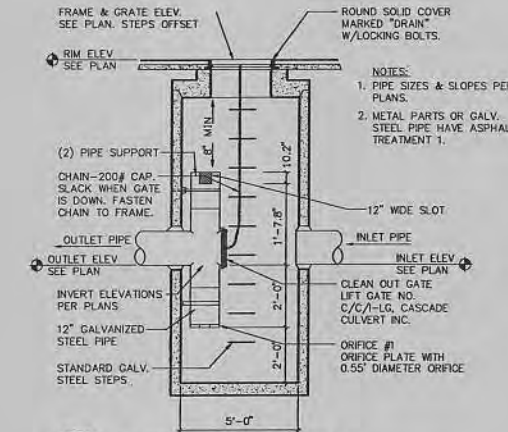
MATERIALS:
GALVANIZED:
#6 (3/4" DIA.) GALVANIZED DEFORMED REINFORCING BAR, REINFORCING BAR CONFORMING WITH ASTM A-615 GRADE 40.
GALVANIZED CONFORMING WITH ASTM A-123.

PLASTIC:
MUST CONFORM WITH ASTM C-478.
STEEL REINFORCING BAR MINIMUM 1/2" GRADE 60, MEETING REQUIREMENTS OF ASTM A615 ENCAPSULATED WITH INJECTION MOLDED COPOLYMER POLYPROPYLENE WITH SERRATED SURFACES.

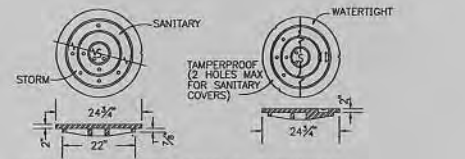
4 MANHOLE STEP DETAIL
C5.2/C6.3 SCALE: NONE



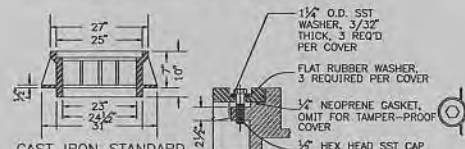
8 SIGN POST DETAIL
C6.2/C6.3 SCALE: NONE



12 FLOW CONTROL MANHOLE
C5.1/C6.3 SCALE: NONE



3 MANHOLE COVER & FRAME DETAIL
C5.2/C6.3 SCALE: NONE



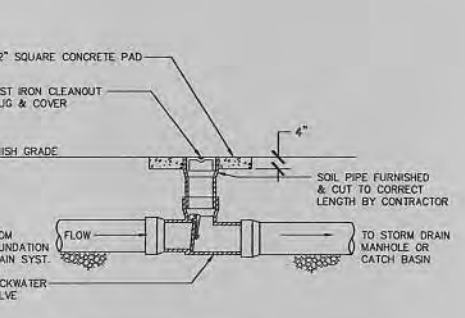
3 MANHOLE COVER & FRAME DETAIL
C5.2/C6.3 SCALE: NONE



3 MANHOLE COVER & FRAME DETAIL
C5.2/C6.3 SCALE: NONE



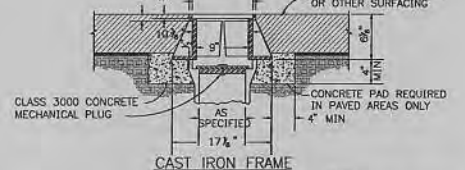
3 MANHOLE COVER & FRAME DETAIL
C5.2/C6.3 SCALE: NONE



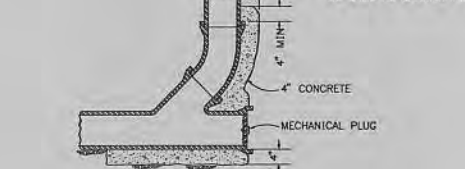
7 BACKWATER VALVE
C5.1/C6.3 SCALE: NONE



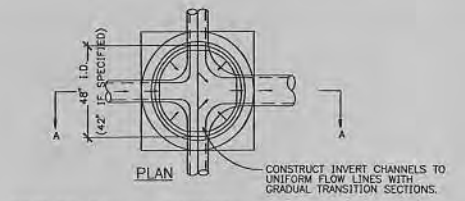
11 CLEANOUT
C5.1/C6.3 SCALE: NONE



11 CLEANOUT
C5.1/C6.3 SCALE: NONE



11 CLEANOUT
C5.1/C6.3 SCALE: NONE



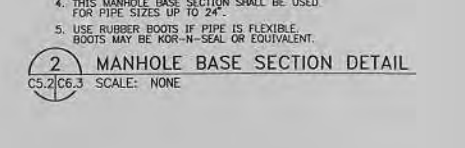
2 MANHOLE BASE SECTION DETAIL
C5.2/C6.3 SCALE: NONE



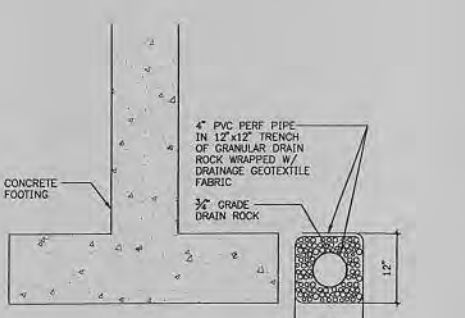
2 MANHOLE BASE SECTION DETAIL
C5.2/C6.3 SCALE: NONE



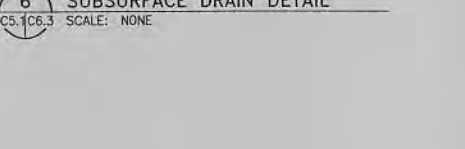
2 MANHOLE BASE SECTION DETAIL
C5.2/C6.3 SCALE: NONE



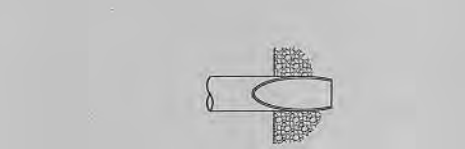
6 SUBSURFACE DRAIN DETAIL
C5.1/C6.3 SCALE: NONE



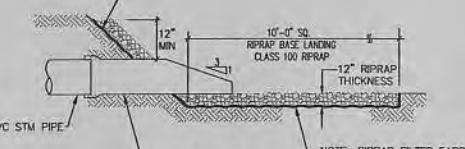
5 METAL CATCH BASIN
C5.2/C6.3 SCALE: NONE



10 CULVERT DAYLIGHT
C5.2/C6.3 SCALE: NONE



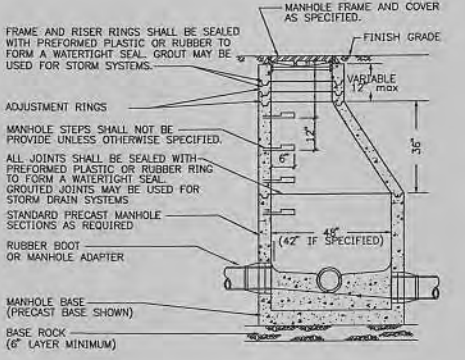
11 CLEANOUT
C5.1/C6.3 SCALE: NONE



9 METAL LANDSCAPE AREA DRAIN
C5.2/C6.3 SCALE: NONE



5 METAL CATCH BASIN
C5.2/C6.3 SCALE: NONE



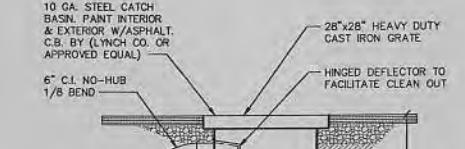
1 MANHOLE DETAIL
C5.2/C6.3 SCALE: NONE

NOTES:
1. STANDARD PRECAST MANHOLE SECTION DIAMETER SHALL BE 48". MAX PIPE SIZE SHALL BE 24".
2. ALL CONNECTING PIPES SHALL HAVE A FLEXIBLE JOINT BETWEEN 12" AND 36" FROM MANHOLE WALL PER UNIFORM PLUMBING CODE.
3. SEE MANHOLE BASE SECTION DRAWING FOR BASE DETAILS.
4. ALL PRECAST SECTIONS SHALL CONFORM TO REQUIREMENTS OF ASTM C-478M.

1 MANHOLE DETAIL
C5.2/C6.3 SCALE: NONE



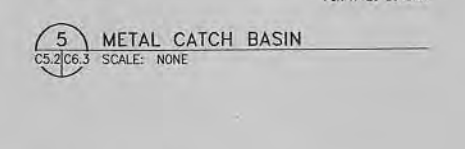
5 METAL CATCH BASIN
C5.2/C6.3 SCALE: NONE



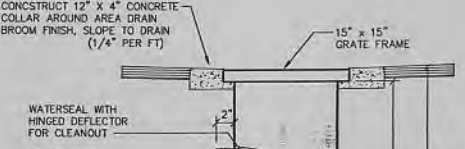
5 METAL CATCH BASIN
C5.2/C6.3 SCALE: NONE



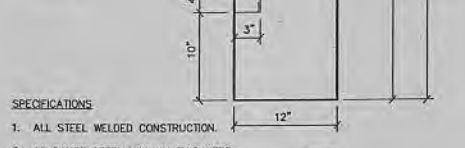
5 METAL CATCH BASIN
C5.2/C6.3 SCALE: NONE



5 METAL CATCH BASIN
C5.2/C6.3 SCALE: NONE



5 METAL CATCH BASIN
C5.2/C6.3 SCALE: NONE



5 METAL CATCH BASIN
C5.2/C6.3 SCALE: NONE



5 METAL CATCH BASIN
C5.2/C6.3 SCALE: NONE

phase	Bid Set
date	August 9, 2004
revisions	
ADD	July 12, 2004
ADD	July 26, 2004
ADD	July 26, 2004
project #	03031
CIVIL DETAILS	
C6.3	

04 06 002

**WOOD MIDDLE
SCHOOL
ADDITION**

**STORMWATER
MANAGEMENT
REPORT**

**City of Wilsonville
Engineering Department**

STORMWATER MANAGEMENT REPORT

for

Wood Middle School Additions & Remodel Project
Wilsonville Road
Wilsonville, Oregon



SJO



6650 SW Redwood Lane, Suite 360
Portland, Oregon 97224

June 15, 2004

WOOD MIDDLE SCHOOL PROJECT
WILSONVILLE ROAD, WEST LINN, OR
STORMWATER MANAGEMENT REPORT

Page 2

TABLE OF CONTENTS

- 1. Project Overview**
 - Existing Site Information
 - Proposed Development
 - Agency Stormwater Criteria
 - Proposed Stormwater Management

- 2. Stormwater Detention Summary**
 - Site Basin Areas
 - Design Storm 24-Hour Rainfall Amounts
 - Basin Curve Numbers (CN)
 - Basin Runoff Concentration Times (Tc)
 - Stormwater Discharge Peak Flows
 - Detention Summary
 - Orifice Control Structure

- 3. Water Quality Design**

WOOD MIDDLE SCHOOL PROJECT
WILSONVILLE ROAD, WEST LINN, OR
STORMWATER MANAGEMENT REPORT

Page 3

1. PROJECT OVERVIEW

Existing Site Information

Wood Middle School is an existing facility that was originally developed in the 1970's. Several additions have been added over the years. This project will provide four building additions at different locations around the existing building. In addition, extensive interior remodeling is also included as well as site parking and drainage improvements.

Proposed Development

The proposed improvements to the Middle School include a number of additions and renovations to the school and site. Additional impervious areas are tabulated below:

- A. New classroom addition at the northeast corner of the existing building.
- B. New classroom addition at the northwest corner of the existing building.
- C. New locker room addition at the southeast corner of the existing building.
- D. New music room and stage addition on the west side of the building.
- E. New exterior plaza outside the stage addition on the west side of the building.
- F. New asphalt play area on the south end of the building.
- G. New expanded parking area to the west of the building.

Existing Site Drainage

The site currently drains to an existing wetland channel to the north. There are no existing water quality or quantity control facilities on the site. The City of Wilsonville has indicated that detention facilities appropriately sized for the total site impervious area (both existing and proposed) will be required as part of the development. The impervious areas are tabulated below:

<u>Total Site Area</u>	=	11.34 Acres
<u>Existing Impervious Area</u>		
Parking	=	1.89 Acres
Existing Roof	=	1.77 Acres
Outside Plaza	=	0.27 Acres
Loop Road	=	0.27 Acres
Track	=	<u>0.55 Acres</u>
		4.75 Acres
<u>Proposed New Impervious Area</u>		
Classrooms	=	0.05 Acres
Commons/Music	=	0.38 Acres
Locker Rooms	=	0.04 Acres
Plaza (Additional)	=	0.11 Acres
Playground	=	0.19 Acres
Parking	=	<u>0.29 Acres</u>
		1.06 Acres

WOOD MIDDLE SCHOOL PROJECT
WILSONVILLE ROAD, WEST LINN, OR
STORMWATER MANAGEMENT REPORT

Page 4

Proposed Stormwater Management / Agency Stormwater Criteria

Quantity Control: The City of Wilsonville uses the Clean Water Services criteria. Onsite detention is required to provide quantity control for all impervious surface runoff. Detention will be provided to detain the 2-year storm, the 10-year storm, and the 25-year storm to pre-development levels. For this site, detention will be provided using a surface detention pond.

Quality Control: The City of Wilsonville uses the Clean Water Services criteria for quantity control. Onsite quality facilities shall be designed for a dry weather storm event totally 0.36 inches of precipitation falling in 4 hours with a 96 hour return interval. For this site, water quality will be provided using appropriately sized manufactured vender products like Stormceptor.

2. STORMWATER DETENTION SUMMARY

Site Basin Area

Basin	Impervious Area	Pervious Area	Total Acres
Pre-Development	0.00 acres	11.34 acres	11.34
Post-Development	5.83 acres	5.51 acres	11.34

Design 24-Hour Rainfall Amounts

Design Storm	24-Hour Rainfall	Source
2-Year	2.50"	Based on Clean Water Services Stormwater Management Manual Appendix A Hydrology & Hydraulics
10-Year	3.45"	
25-Year	3.90"	

Basin Curve Numbers (CN)

Basin	Surface	CN	Description
Wood MS Site	New Impervious	98	AC Paving
	New Pervious	80	Lawn
	Existing Greenfield	82	Undeveloped/Greenfield

Concentration Times (Tc)

Basin	Pre/Post	Tc	Description
Wood MS Site	Pre-Dev	40 min	
	Post-Dev	10 min	

WOOD MIDDLE SCHOOL PROJECT
WILSONVILLE ROAD, WEST LINN, OR
STORMWATER MANAGEMENT REPORT

Page 5

Stormwater Discharge Flows

Design Storm	PreDev Peak Q	PostDev Peak Q	Req. Det. Vol.
2 Year	1.43 cfs ✓	4.32 cfs ✓	10,159 cf ✓
10 Year	2.85 cfs ✓	6.70 cfs ✓	13,580 cf ✓
25-Year	3.59 cfs ✓	7.87 cfs ✓	15,544 cf ✓

Detention Summary

Basin	Req. Det. Vol.	Design Det. Vol
Wood MS Site	15,544 cf	Triangular Surface Detention Pond Average Area = (160' x 80') Working Depth = 2.5' Storage Volume = 16,000 cf

Orifice Control Structure

Basin	Orifice 1 Diameter	Orifice 1 Height	Orifice 2 Diameter	Orifice 2 Height	Overflow Height
Central	0.55' ✓	0.0' (= Pipe IE)	1.0' ✓	1.65' ✓	2.5'

OK WITH PIPE AND MIN. CAPACITY

Attached Calculations & Worksheets

Attached Calculations & Worksheets
Pre-Development Hydrographs Post-Development Hydrographs Routing & Orifice Calculations Charts & Tables Basin Diagrams

3. Water Quality Design

Provide Stormceptor for Existing Parking Lot Area

Parking Lot Area = 82,500 sf = 1.89 Acres

Rainfall = 0.36"

Time Period = 4 hours

$$\begin{array}{lcl} \text{Water Quality Volume} & = (82,500)(0.36) / 12 = & 2,475 \text{ cf} \\ \text{Water Quality Flow} & = 2,475 / 14,400 = & 0.172 \text{ cfs} = 77 \text{ gpm} \end{array}$$

Summary

Use CSR Stormceptor Unit STC 900.

Treatment Flow Capacity = 285 gpm.

See attached data sheets.

**Hydrographs
for
Wood MS
Site**

STORMWATER CALCULATION MATRIX - SANTA BARBARA HYDROGRAPGH METHOD

Date: **Nov-03**
 Given: **Project = WOOD MS**
Area = 11.34 acres
Pt = 2.5 inches 2-Year / 24 Hour Storm
dt = 10 min.
Tc = 40 min. (Pre-Developed Site Conditions)
PERVIOUS Parcel IMPERVIOUS Parcel
Area = 11.34 acres Area = 0 acres
CN = 82 CN = 98
S = 2.20 S = 0.20
0.2S = 0.44 0.2S = 0.04

Compute: Developed Conditions Runoff hydrograph

Column (3) = SCS Type IA Rainfall Distribution
 Column (4) = Col. (3) x Pt = 10 year - 24 Hour Hyetograph at this location.
 Column (5) = Accumulated Sum of Col. (4)
 Column (6) = [If P <= 0.2S] = 0; Note, use PERVIOUS Area "S" value.
 [If P > 0.2S] = (Col.(5) - 0.2S)^2/(Col.(5) + 0.8S); Using the PERVIOUS Area "S" value.
 Column (7) = Col.(6) of Present Time Step - Col.(6) of Previous Time Step
 Column (8) = Same method as for Col.(6), except use the IMPERVIOUS Area "S" value.
 Column (9) = Col.(8) of the present time step - Col.(8) of the previous time step.
 Column (10) = ((PERVIOUS area / Total area) x Col.(7)) + ((IMPERVIOUS area / Total area) x Col.(9))
 Column (11) = (60.5 x Col.(10) x Total Area) / 10 (dt = 10 minutes)
 Routing Constant, $w = dt / (2Tc + dt) = 0.1111$
 Column (12) = Col.(12) of Previous Time Step + (w x [Col.(11) of Previous Time Step + Col.(11) of Present Time Step - (2 x Col.(12) of Previous Time Step)])

(1) Time Increment	(2) Time min.	(3) Rainfall distrib- ution % of Pt	(4) Incre- mental Rainfall in.	(5) Accumu- lated Rainfall in.	Pervious Area (6) Accumu- lated Runoff in.	(7) Incre- mental Runoff in.	Impervious Area (8) Accumu- lated Runoff in.	(9) Incre- mental Runoff in.	(10) Total Runoff in.	(11) Instant hydro- graph cfs	(12) design hydro- graph cfs
1	10	0.0040	0.0100	0.0100	0.0000	0.0000	0.0000	0.0000	0.0000	0.0	0.000
2	20	0.0040	0.0100	0.0200	0.0000	0.0000	0.0000	0.0000	0.0000	0.0	0.000
3	30	0.0040	0.0100	0.0300	0.0000	0.0000	0.0000	0.0000	0.0000	0.0	0.000
4	40	0.0040	0.0100	0.0400	0.0000	0.0000	0.0000	0.0000	0.0000	0.0	0.000
5	50	0.0040	0.0100	0.0500	0.0000	0.0000	0.0004	0.0004	0.0000	0.0	0.000
6	60	0.0040	0.0100	0.0600	0.0000	0.0000	0.0016	0.0013	0.0000	0.0	0.000
7	70	0.0040	0.0100	0.0700	0.0000	0.0000	0.0037	0.0020	0.0000	0.0	0.000
8	80	0.0040	0.0100	0.0800	0.0000	0.0000	0.0063	0.0027	0.0000	0.0	0.000
9	90	0.0040	0.0100	0.0900	0.0000	0.0000	0.0096	0.0032	0.0000	0.0	0.000
10	100	0.0040	0.0100	0.1000	0.0000	0.0000	0.0133	0.0038	0.0000	0.0	0.000
11	110	0.0050	0.0125	0.1125	0.0000	0.0000	0.0186	0.0053	0.0000	0.0	0.000
12	120	0.0050	0.0125	0.1250	0.0000	0.0000	0.0246	0.0060	0.0000	0.0	0.000
13	130	0.0050	0.0125	0.1375	0.0000	0.0000	0.0311	0.0065	0.0000	0.0	0.000
14	140	0.0050	0.0125	0.1500	0.0000	0.0000	0.0381	0.0070	0.0000	0.0	0.000
15	150	0.0050	0.0125	0.1625	0.0000	0.0000	0.0455	0.0074	0.0000	0.0	0.000
16	160	0.0050	0.0125	0.1750	0.0000	0.0000	0.0532	0.0078	0.0000	0.0	0.000
17	170	0.0060	0.0150	0.1900	0.0000	0.0000	0.0630	0.0098	0.0000	0.0	0.000
18	180	0.0060	0.0150	0.2050	0.0000	0.0000	0.0732	0.0102	0.0000	0.0	0.000
19	190	0.0060	0.0150	0.2200	0.0000	0.0000	0.0838	0.0106	0.0000	0.0	0.000
20	200	0.0060	0.0150	0.2350	0.0000	0.0000	0.0947	0.0109	0.0000	0.0	0.000
21	210	0.0060	0.0150	0.2500	0.0000	0.0000	0.1059	0.0112	0.0000	0.0	0.000
22	220	0.0060	0.0150	0.2650	0.0000	0.0000	0.1174	0.0115	0.0000	0.0	0.000
23	230	0.0070	0.0175	0.2825	0.0000	0.0000	0.1310	0.0137	0.0000	0.0	0.000
24	240	0.0070	0.0175	0.3000	0.0000	0.0000	0.1450	0.0140	0.0000	0.0	0.000
25	250	0.0070	0.0175	0.3175	0.0000	0.0000	0.1592	0.0142	0.0000	0.0	0.000
26	260	0.0070	0.0175	0.3350	0.0000	0.0000	0.1737	0.0145	0.0000	0.0	0.000
27	270	0.0070	0.0175	0.3525	0.0000	0.0000	0.1884	0.0147	0.0000	0.0	0.000

(1) Time Increment	(2) Time min.	(3) Rainfall distrib- ution	(4) Incre- mental Rainfall in.	(5) Accumu- lated Rainfall in.	Pervious Area		Impervious Area		(10) Total Runoff in.	(11) Instant hydro- graph cfs	(12) design hydro- graph cfs
					(6) Accumu- lated Runoff in.	(7) Incre- mental Runoff in.	(8) Accumu- lated Runoff in.	(9) Incre- mental Runoff in.			
28	280	0.0070	0.0175	0.3700	0.0000	0.0000	0.2032	0.0148	0.0000	0.0	0.000
29	290	0.0082	0.0205	0.3905	0.0000	0.0000	0.2208	0.0176	0.0000	0.0	0.000
30	300	0.0082	0.0205	0.4110	0.0000	0.0000	0.2386	0.0178	0.0000	0.0	0.000
31	310	0.0082	0.0205	0.4315	0.0000	0.0000	0.2566	0.0180	0.0000	0.0	0.000
32	320	0.0082	0.0205	0.4520	0.0001	0.0001	0.2748	0.0182	0.0001	0.0	0.001
33	330	0.0082	0.0205	0.4725	0.0005	0.0004	0.2931	0.0183	0.0004	0.0	0.004
34	340	0.0082	0.0205	0.4930	0.0013	0.0008	0.3116	0.0185	0.0008	0.1	0.013
35	350	0.0095	0.0238	0.5168	0.0027	0.0014	0.3331	0.0215	0.0014	0.1	0.026
36	360	0.0095	0.0238	0.5405	0.0045	0.0018	0.3548	0.0217	0.0018	0.1	0.045
37	370	0.0095	0.0238	0.5643	0.0068	0.0023	0.3766	0.0218	0.0023	0.2	0.066
38	380	0.0095	0.0238	0.5880	0.0095	0.0027	0.3985	0.0219	0.0027	0.2	0.089
39	390	0.0095	0.0238	0.6118	0.0126	0.0031	0.4206	0.0221	0.0031	0.2	0.114
40	400	0.0095	0.0238	0.6355	0.0161	0.0035	0.4427	0.0222	0.0035	0.2	0.140
41	410	0.0134	0.0335	0.6690	0.0218	0.0057	0.4741	0.0314	0.0057	0.4	0.179
42	420	0.0134	0.0335	0.7025	0.0282	0.0064	0.5057	0.0316	0.0064	0.4	0.231
43	430	0.0134	0.0335	0.7360	0.0354	0.0072	0.5374	0.0317	0.0072	0.5	0.283
44	440	0.0180	0.0450	0.7810	0.0461	0.0107	0.5802	0.0428	0.0107	0.7	0.357
45	450	0.0180	0.0450	0.8260	0.0580	0.0119	0.6232	0.0430	0.0119	0.8	0.450
46	460	0.0340	0.0850	0.9110	0.0835	0.0255	0.7049	0.0817	0.0255	1.8	0.635
47	470	0.0540	0.1350	1.0460	0.1315	0.0480	0.8355	0.1307	0.0480	3.3	1.054
48	480	0.0270	0.0675	1.1135	0.1585	0.0271	0.9012	0.0657	0.0271	1.9	1.392
49	490	0.0180	0.0450	1.1585	0.1776	0.0191	0.9451	0.0439	0.0191	1.3	1.434
50	500	0.0134	0.0335	1.1920	0.1923	0.0147	0.9778	0.0327	0.0147	1.0	1.373
51	510	0.0134	0.0335	1.2255	0.2075	0.0151	1.0106	0.0328	0.0151	1.0	1.295
52	520	0.0134	0.0335	1.2590	0.2230	0.0155	1.0434	0.0328	0.0155	1.1	1.241
53	530	0.0088	0.0220	1.2810	0.2334	0.0104	1.0649	0.0216	0.0104	0.7	1.163
54	540	0.0088	0.0220	1.3030	0.2440	0.0106	1.0865	0.0216	0.0106	0.7	1.065
55	550	0.0088	0.0220	1.3250	0.2548	0.0108	1.1081	0.0216	0.0108	0.7	0.991
56	560	0.0088	0.0220	1.3470	0.2657	0.0109	1.1297	0.0216	0.0109	0.7	0.936
57	570	0.0088	0.0220	1.3690	0.2767	0.0111	1.1513	0.0216	0.0111	0.8	0.896
58	580	0.0088	0.0220	1.3910	0.2880	0.0112	1.1729	0.0216	0.0112	0.8	0.866
59	590	0.0088	0.0220	1.4130	0.2993	0.0114	1.1945	0.0216	0.0114	0.8	0.846
60	600	0.0088	0.0220	1.4350	0.3109	0.0115	1.2162	0.0216	0.0115	0.8	0.833
61	610	0.0088	0.0220	1.4570	0.3225	0.0117	1.2378	0.0216	0.0117	0.8	0.824
62	620	0.0088	0.0220	1.4790	0.3343	0.0118	1.2595	0.0217	0.0118	0.8	0.820
63	630	0.0088	0.0220	1.5010	0.3463	0.0119	1.2811	0.0217	0.0119	0.8	0.819
64	640	0.0088	0.0220	1.5230	0.3583	0.0121	1.3028	0.0217	0.0121	0.8	0.820
65	650	0.0072	0.0180	1.5410	0.3683	0.0100	1.3205	0.0177	0.0100	0.7	0.806
66	660	0.0072	0.0180	1.5590	0.3784	0.0101	1.3383	0.0177	0.0101	0.7	0.779
67	670	0.0072	0.0180	1.5770	0.3885	0.0102	1.3560	0.0177	0.0102	0.7	0.760
68	680	0.0072	0.0180	1.5950	0.3988	0.0102	1.3738	0.0178	0.0102	0.7	0.747
69	690	0.0072	0.0180	1.6130	0.4091	0.0103	1.3915	0.0178	0.0103	0.7	0.738
70	700	0.0072	0.0180	1.6310	0.4195	0.0104	1.4093	0.0178	0.0104	0.7	0.732
71	710	0.0072	0.0180	1.6490	0.4300	0.0105	1.4271	0.0178	0.0105	0.7	0.728
72	720	0.0072	0.0180	1.6670	0.4405	0.0106	1.4449	0.0178	0.0106	0.7	0.727
73	730	0.0072	0.0180	1.6850	0.4512	0.0106	1.4626	0.0178	0.0106	0.7	0.727
74	740	0.0072	0.0180	1.7030	0.4619	0.0107	1.4804	0.0178	0.0107	0.7	0.728
75	750	0.0072	0.0180	1.7210	0.4727	0.0108	1.4982	0.0178	0.0108	0.7	0.730
76	760	0.0072	0.0180	1.7390	0.4835	0.0109	1.5160	0.0178	0.0109	0.7	0.733
77	770	0.0057	0.0143	1.7533	0.4922	0.0087	1.5301	0.0141	0.0087	0.6	0.719
78	780	0.0057	0.0143	1.7675	0.5009	0.0087	1.5442	0.0141	0.0087	0.6	0.691
79	790	0.0057	0.0143	1.7818	0.5096	0.0087	1.5583	0.0141	0.0087	0.6	0.671
80	800	0.0057	0.0143	1.7960	0.5184	0.0088	1.5724	0.0141	0.0088	0.6	0.655
81	810	0.0057	0.0143	1.8103	0.5272	0.0088	1.5865	0.0141	0.0088	0.6	0.644

Peak
Pre-Des Q
= 1.43
cfs

(1) Time Increment	(2) Time min.	(3) Rainfall distrib- ution	(4) Incre- mental Rainfall in.	(5) Accumu- lated Rainfall in.	Pervious Area		Impervious Area		(10) Total Runoff in.	(11) Instant hydro- graph cfs	(12) design hydro- graph cfs
					(6) Accumu- lated Runoff in.	(7) Incre- mental Runoff in.	(8) Accumu- lated Runoff in.	(9) Incre- mental Runoff in.			
82	820	0.0057	0.0143	1.8245	0.5361	0.0089	1.6006	0.0141	0.0089	0.6	0.636
83	830	0.0057	0.0143	1.8388	0.5450	0.0089	1.6147	0.0141	0.0089	0.6	0.630
84	840	0.0057	0.0143	1.8530	0.5540	0.0090	1.6288	0.0141	0.0090	0.6	0.626
85	850	0.0057	0.0143	1.8673	0.5630	0.0090	1.6429	0.0141	0.0090	0.6	0.624
86	860	0.0057	0.0143	1.8815	0.5720	0.0090	1.6570	0.0141	0.0090	0.6	0.623
87	870	0.0057	0.0143	1.8958	0.5811	0.0091	1.6711	0.0141	0.0091	0.6	0.623
88	880	0.0057	0.0143	1.9100	0.5902	0.0091	1.6852	0.0141	0.0091	0.6	0.623
89	890	0.0050	0.0125	1.9225	0.5982	0.0080	1.6976	0.0124	0.0080	0.6	0.615
90	900	0.0050	0.0125	1.9350	0.6063	0.0081	1.7100	0.0124	0.0081	0.6	0.601
91	910	0.0050	0.0125	1.9475	0.6144	0.0081	1.7223	0.0124	0.0081	0.6	0.591
92	920	0.0050	0.0125	1.9600	0.6225	0.0081	1.7347	0.0124	0.0081	0.6	0.583
93	930	0.0050	0.0125	1.9725	0.6307	0.0082	1.7471	0.0124	0.0082	0.6	0.578
94	940	0.0050	0.0125	1.9850	0.6389	0.0082	1.7595	0.0124	0.0082	0.6	0.574
95	950	0.0050	0.0125	1.9975	0.6471	0.0082	1.7719	0.0124	0.0082	0.6	0.571
96	960	0.0050	0.0125	2.0100	0.6553	0.0082	1.7843	0.0124	0.0082	0.6	0.570
97	970	0.0050	0.0125	2.0225	0.6636	0.0083	1.7967	0.0124	0.0083	0.6	0.569
98	980	0.0050	0.0125	2.0350	0.6719	0.0083	1.8090	0.0124	0.0083	0.6	0.569
99	990	0.0050	0.0125	2.0475	0.6802	0.0083	1.8214	0.0124	0.0083	0.6	0.569
100	1000	0.0050	0.0125	2.0600	0.6885	0.0084	1.8338	0.0124	0.0084	0.6	0.570
101	1010	0.0040	0.0100	2.0700	0.6952	0.0067	1.8438	0.0099	0.0067	0.5	0.558
102	1020	0.0040	0.0100	2.0800	0.7020	0.0067	1.8537	0.0099	0.0067	0.5	0.536
103	1030	0.0040	0.0100	2.0900	0.7087	0.0067	1.8636	0.0099	0.0067	0.5	0.520
104	1040	0.0040	0.0100	2.1000	0.7154	0.0068	1.8735	0.0099	0.0068	0.5	0.507
105	1050	0.0040	0.0100	2.1100	0.7222	0.0068	1.8834	0.0099	0.0068	0.5	0.497
106	1060	0.0040	0.0100	2.1200	0.7290	0.0068	1.8933	0.0099	0.0068	0.5	0.490
107	1070	0.0040	0.0100	2.1300	0.7358	0.0068	1.9033	0.0099	0.0068	0.5	0.485
108	1080	0.0040	0.0100	2.1400	0.7426	0.0068	1.9132	0.0099	0.0068	0.5	0.481
109	1090	0.0040	0.0100	2.1500	0.7495	0.0068	1.9231	0.0099	0.0068	0.5	0.478
110	1100	0.0040	0.0100	2.1600	0.7563	0.0068	1.9330	0.0099	0.0068	0.5	0.476
111	1110	0.0040	0.0100	2.1700	0.7632	0.0069	1.9430	0.0099	0.0069	0.5	0.475
112	1120	0.0040	0.0100	2.1800	0.7701	0.0069	1.9529	0.0099	0.0069	0.5	0.474
113	1130	0.0040	0.0100	2.1900	0.7769	0.0069	1.9628	0.0099	0.0069	0.5	0.474
114	1140	0.0040	0.0100	2.2000	0.7839	0.0069	1.9727	0.0099	0.0069	0.5	0.474
115	1150	0.0040	0.0100	2.2100	0.7908	0.0069	1.9827	0.0099	0.0069	0.5	0.474
116	1160	0.0040	0.0100	2.2200	0.7977	0.0069	1.9926	0.0099	0.0069	0.5	0.474
117	1170	0.0040	0.0100	2.2300	0.8047	0.0070	2.0025	0.0099	0.0070	0.5	0.475
118	1180	0.0040	0.0100	2.2400	0.8117	0.0070	2.0124	0.0099	0.0070	0.5	0.476
119	1190	0.0040	0.0100	2.2500	0.8187	0.0070	2.0224	0.0099	0.0070	0.5	0.476
120	1200	0.0040	0.0100	2.2600	0.8257	0.0070	2.0323	0.0099	0.0070	0.5	0.477
121	1210	0.0040	0.0100	2.2700	0.8327	0.0070	2.0422	0.0099	0.0070	0.5	0.478
122	1220	0.0040	0.0100	2.2800	0.8397	0.0070	2.0521	0.0099	0.0070	0.5	0.479
123	1230	0.0040	0.0100	2.2900	0.8468	0.0070	2.0621	0.0099	0.0070	0.5	0.480
124	1240	0.0040	0.0100	2.3000	0.8538	0.0071	2.0720	0.0099	0.0071	0.5	0.481
125	1250	0.0040	0.0100	2.3100	0.8609	0.0071	2.0819	0.0099	0.0071	0.5	0.482
126	1260	0.0040	0.0100	2.3200	0.8680	0.0071	2.0919	0.0099	0.0071	0.5	0.483
127	1270	0.0040	0.0100	2.3300	0.8751	0.0071	2.1018	0.0099	0.0071	0.5	0.484
128	1280	0.0040	0.0100	2.3400	0.8822	0.0071	2.1117	0.0099	0.0071	0.5	0.485
129	1290	0.0040	0.0100	2.3500	0.8894	0.0071	2.1217	0.0099	0.0071	0.5	0.486
130	1300	0.0040	0.0100	2.3600	0.8965	0.0071	2.1316	0.0099	0.0071	0.5	0.487
131	1310	0.0040	0.0100	2.3700	0.9037	0.0072	2.1415	0.0099	0.0072	0.5	0.488
132	1320	0.0040	0.0100	2.3800	0.9109	0.0072	2.1515	0.0099	0.0072	0.5	0.489
133	1330	0.0040	0.0100	2.3900	0.9180	0.0072	2.1614	0.0099	0.0072	0.5	0.489
134	1340	0.0040	0.0100	2.4000	0.9252	0.0072	2.1714	0.0099	0.0072	0.5	0.490

(1) Time Increment	(2) Time min.	(3) Rainfall distrib- ution	(4) Incre- mental Rainfall in.	(5) Accumu- lated Rainfall in.	Pervious Area		Impervious Area		(10) Total Runoff in.	(11) Instant hydro- graph cfs	(12) design hydro- graph cfs
					(6) Accumu- lated Runoff in.	(7) Incre- mental Runoff in.	(8) Accumu- lated Runoff in.	(9) Incre- mental Runoff in.			
135	1350	0.0040	0.0100	2.4100	0.9325	0.0072	2.1813	0.0099	0.0072	0.5	0.491
136	1360	0.0040	0.0100	2.4200	0.9397	0.0072	2.1912	0.0099	0.0072	0.5	0.492
137	1370	0.0040	0.0100	2.4300	0.9469	0.0072	2.2012	0.0099	0.0072	0.5	0.493
138	1380	0.0040	0.0100	2.4400	0.9542	0.0073	2.2111	0.0099	0.0073	0.5	0.494
139	1390	0.0040	0.0100	2.4500	0.9615	0.0073	2.2210	0.0099	0.0073	0.5	0.495
140	1400	0.0040	0.0100	2.4600	0.9687	0.0073	2.2310	0.0099	0.0073	0.5	0.496
141	1410	0.0040	0.0100	2.4700	0.9760	0.0073	2.2409	0.0099	0.0073	0.5	0.497
142	1420	0.0040	0.0100	2.4800	0.9834	0.0073	2.2509	0.0099	0.0073	0.5	0.498
143	1430	0.0040	0.0100	2.4900	0.9907	0.0073	2.2608	0.0099	0.0073	0.5	0.499
144	1440	0.0040	0.0100	2.5000	0.9980	0.0073	2.2707	0.0099	0.0073	0.5	0.500
Total Volume of Runoff =										39882.111	cu. ft.
(Found by summing this column and multiplying by 600. 600 is the conversion required to convert SUM(Q) in cfs to total volume in cubic feet as follows: $V = \text{SUM}(Q) \times dt$ (cu.ft.) = (cu.ft/s) x (10 min.) x (60 s/min.)											

STORMWATER CALCULATION MATRIX - SANTA BARBARA HYDROGRAPGH METHOD

Date: **Nov-03**
 Given: **Project = WOOD MS**
Area = 11.34 acres
Pt = 2.5 inches 2-Year / 24 Hour Storm
dt = 10 min.
Tc = 10 min. (Post-Developed Site Conditions)
PERVIOUS Parcel IMPERVIOUS Parcel
Area = 5.51 acres Area = 5.83 acres
CN = 80 CN = 98
S = 2.50 S = 0.20
0.2S = 0.50 0.2S = 0.04

Compute: Developed Conditions Runoff hydrograph

Column (3) = SCS Type IA Rainfall Distribution
 Column (4) = Col. (3) x Pt = 10 year - 24 Hour Hyetograph at this location.
 Column (5) = Accumulated Sum of Col. (4)
 Column (6) = [If P <= 0.2S] = 0; Note, use PERVIOUS Area "S" value.
 [If P > 0.2S] = (Col.(5) - 0.2S)^2/(Col.(5) + 0.8S); Using the PERVIOUS Area "S" value.
 Column (7) = Col.(6) of Present Time Step - Col.(6) of Previous Time Step
 Column (8) = Same method as for Col.(6), except use the IMPERVIOUS Area "S" value.
 Column (9) = Col.(8) of the present time step - Col.(8) of the previous time step.
 Column (10) = ((PERVIOUS area / Total area) x Col.(7)) + ((IMPERVIOUS area / Total area) x Col.(9))
 Column (11) = (60.5 x Col.(10) x Total Area) / 10 (dt = 10 minutes)
 Routing Constant, w = dt / (2Tc + dt) = 0.3333
 Column (12) = Col.(12) of Previous Time Step + (w x [Col.(11) of Previous Time Step + Col.(11) of Present Time Step - (2 x Col.(12) of Previous Time Step)])

(1) Time Increment	(2) Time min.	(3) Rainfall distrib- ution % of Pt	(4) Incre- mental Rainfall in.	(5) Accumu- lated Rainfall in.	Pervious Area (6) Accumu- lated Runoff in.	(7) Incre- mental Runoff in.	Impervious Area (8) Accumu- lated Runoff in.	(9) Incre- mental Runoff in.	(10) Total Runoff in.	(11) Instant hydro- graph cfs	(12) design hydro- graph cfs
1	10	0.0040	0.0100	0.0100	0.0000	0.0000	0.0000	0.0000	0.0000	0.0	0.000
2	20	0.0040	0.0100	0.0200	0.0000	0.0000	0.0000	0.0000	0.0000	0.0	0.000
3	30	0.0040	0.0100	0.0300	0.0000	0.0000	0.0000	0.0000	0.0000	0.0	0.000
4	40	0.0040	0.0100	0.0400	0.0000	0.0000	0.0000	0.0000	0.0000	0.0	0.000
5	50	0.0040	0.0100	0.0500	0.0000	0.0000	0.0004	0.0004	0.0002	0.0	0.005
6	60	0.0040	0.0100	0.0600	0.0000	0.0000	0.0016	0.0013	0.0006	0.0	0.021
7	70	0.0040	0.0100	0.0700	0.0000	0.0000	0.0037	0.0020	0.0010	0.1	0.045
8	80	0.0040	0.0100	0.0800	0.0000	0.0000	0.0063	0.0027	0.0014	0.1	0.070
9	90	0.0040	0.0100	0.0900	0.0000	0.0000	0.0096	0.0032	0.0017	0.1	0.093
10	100	0.0040	0.0100	0.1000	0.0000	0.0000	0.0133	0.0038	0.0019	0.1	0.113
11	110	0.0050	0.0125	0.1125	0.0000	0.0000	0.0186	0.0053	0.0027	0.2	0.144
12	120	0.0050	0.0125	0.1250	0.0000	0.0000	0.0246	0.0060	0.0031	0.2	0.181
13	130	0.0050	0.0125	0.1375	0.0000	0.0000	0.0311	0.0065	0.0033	0.2	0.207
14	140	0.0050	0.0125	0.1500	0.0000	0.0000	0.0381	0.0070	0.0036	0.2	0.227
15	150	0.0050	0.0125	0.1625	0.0000	0.0000	0.0455	0.0074	0.0038	0.3	0.245
16	160	0.0050	0.0125	0.1750	0.0000	0.0000	0.0532	0.0078	0.0040	0.3	0.260
17	170	0.0060	0.0150	0.1900	0.0000	0.0000	0.0630	0.0098	0.0050	0.3	0.293
18	180	0.0060	0.0150	0.2050	0.0000	0.0000	0.0732	0.0102	0.0052	0.4	0.332
19	190	0.0060	0.0150	0.2200	0.0000	0.0000	0.0838	0.0106	0.0054	0.4	0.355
20	200	0.0060	0.0150	0.2350	0.0000	0.0000	0.0947	0.0109	0.0056	0.4	0.371
21	210	0.0060	0.0150	0.2500	0.0000	0.0000	0.1059	0.0112	0.0058	0.4	0.384
22	220	0.0060	0.0150	0.2650	0.0000	0.0000	0.1174	0.0115	0.0059	0.4	0.394
23	230	0.0070	0.0175	0.2825	0.0000	0.0000	0.1310	0.0137	0.0070	0.5	0.427
24	240	0.0070	0.0175	0.3000	0.0000	0.0000	0.1450	0.0140	0.0072	0.5	0.468
25	250	0.0070	0.0175	0.3175	0.0000	0.0000	0.1592	0.0142	0.0073	0.5	0.487
26	260	0.0070	0.0175	0.3350	0.0000	0.0000	0.1737	0.0145	0.0074	0.5	0.500
27	270	0.0070	0.0175	0.3525	0.0000	0.0000	0.1884	0.0147	0.0075	0.5	0.509

(1) Time Increment	(2) Time min.	(3) Rainfall distrib- ution	(4) Incre- mental Rainfall in.	(5) Accumu- lated Rainfall in.	Pervious Area		Impervious Area		(10) Total Runoff in.	(11) Instant hydro- graph cfs	(12) design hydro- graph cfs
					(6) Accumu- lated Runoff in.	(7) Incre- mental Runoff in.	(8) Accumu- lated Runoff in.	(9) Incre- mental Runoff in.			
28	280	0.0070	0.0175	0.3700	0.0000	0.0000	0.2032	0.0148	0.0076	0.5	0.517
29	290	0.0082	0.0205	0.3905	0.0000	0.0000	0.2208	0.0176	0.0091	0.6	0.554
30	300	0.0082	0.0205	0.4110	0.0000	0.0000	0.2386	0.0178	0.0092	0.6	0.601
31	310	0.0082	0.0205	0.4315	0.0000	0.0000	0.2566	0.0180	0.0093	0.6	0.621
32	320	0.0082	0.0205	0.4520	0.0000	0.0000	0.2748	0.0182	0.0093	0.6	0.632
33	330	0.0082	0.0205	0.4725	0.0000	0.0000	0.2931	0.0183	0.0094	0.6	0.640
34	340	0.0082	0.0205	0.4930	0.0000	0.0000	0.3116	0.0185	0.0095	0.7	0.646
35	350	0.0095	0.0238	0.5168	0.0001	0.0001	0.3331	0.0215	0.0111	0.8	0.687
36	360	0.0095	0.0238	0.5405	0.0006	0.0005	0.3548	0.0217	0.0114	0.8	0.744
37	370	0.0095	0.0238	0.5643	0.0016	0.0010	0.3766	0.0218	0.0117	0.8	0.776
38	380	0.0095	0.0238	0.5880	0.0030	0.0014	0.3985	0.0219	0.0120	0.8	0.799
39	390	0.0095	0.0238	0.6118	0.0048	0.0018	0.4206	0.0221	0.0122	0.8	0.819
40	400	0.0095	0.0238	0.6355	0.0070	0.0022	0.4427	0.0222	0.0125	0.9	0.837
41	410	0.0134	0.0335	0.6690	0.0107	0.0037	0.4741	0.0314	0.0180	1.2	0.974
42	420	0.0134	0.0335	0.7025	0.0152	0.0045	0.5057	0.0316	0.0184	1.3	1.156
43	430	0.0134	0.0335	0.7360	0.0204	0.0052	0.5374	0.0317	0.0188	1.3	1.237
44	440	0.0180	0.0450	0.7810	0.0284	0.0080	0.5802	0.0428	0.0259	1.8	1.435
45	450	0.0180	0.0450	0.8260	0.0376	0.0092	0.6232	0.0430	0.0266	1.8	1.679
46	460	0.0340	0.0850	0.9110	0.0580	0.0204	0.7049	0.0817	0.0519	3.6	2.355
47	470	0.0540	0.1350	1.0460	0.0979	0.0398	0.8355	0.1307	0.0865	5.9	3.951
48	480	0.0270	0.0675	1.1135	0.1209	0.0230	0.9012	0.0657	0.0449	3.1	3.324
49	490	0.0180	0.0450	1.1585	0.1373	0.0164	0.9451	0.0439	0.0305	2.1	3.168
50	500	0.0134	0.0335	1.1920	0.1500	0.0127	0.9778	0.0327	0.0230	1.6	2.280
51	510	0.0134	0.0335	1.2255	0.1632	0.0132	1.0106	0.0328	0.0232	1.6	1.818
52	520	0.0134	0.0335	1.2590	0.1768	0.0136	1.0434	0.0328	0.0235	1.6	1.674
53	530	0.0088	0.0220	1.2810	0.1859	0.0091	1.0649	0.0216	0.0155	1.1	1.449
54	540	0.0088	0.0220	1.3030	0.1952	0.0093	1.0865	0.0216	0.0156	1.1	1.195
55	550	0.0088	0.0220	1.3250	0.2047	0.0095	1.1081	0.0216	0.0157	1.1	1.114
56	560	0.0088	0.0220	1.3470	0.2143	0.0096	1.1297	0.0216	0.0158	1.1	1.092
57	570	0.0088	0.0220	1.3690	0.2241	0.0098	1.1513	0.0216	0.0159	1.1	1.088
58	580	0.0088	0.0220	1.3910	0.2341	0.0100	1.1729	0.0216	0.0160	1.1	1.090
59	590	0.0088	0.0220	1.4130	0.2442	0.0101	1.1945	0.0216	0.0160	1.1	1.095
60	600	0.0088	0.0220	1.4350	0.2545	0.0103	1.2162	0.0216	0.0161	1.1	1.100
61	610	0.0088	0.0220	1.4570	0.2649	0.0104	1.2378	0.0216	0.0162	1.1	1.106
62	620	0.0088	0.0220	1.4790	0.2755	0.0106	1.2595	0.0217	0.0163	1.1	1.111
63	630	0.0088	0.0220	1.5010	0.2862	0.0107	1.2811	0.0217	0.0163	1.1	1.116
64	640	0.0088	0.0220	1.5230	0.2971	0.0109	1.3028	0.0217	0.0164	1.1	1.121
65	650	0.0072	0.0180	1.5410	0.3060	0.0090	1.3205	0.0177	0.0135	0.9	1.057
66	660	0.0072	0.0180	1.5590	0.3151	0.0091	1.3383	0.0177	0.0135	0.9	0.970
67	670	0.0072	0.0180	1.5770	0.3243	0.0092	1.3560	0.0177	0.0136	0.9	0.943
68	680	0.0072	0.0180	1.5950	0.3335	0.0093	1.3738	0.0178	0.0136	0.9	0.937
69	690	0.0072	0.0180	1.6130	0.3429	0.0093	1.3915	0.0178	0.0137	0.9	0.936
70	700	0.0072	0.0180	1.6310	0.3523	0.0094	1.4093	0.0178	0.0137	0.9	0.938
71	710	0.0072	0.0180	1.6490	0.3618	0.0095	1.4271	0.0178	0.0138	0.9	0.941
72	720	0.0072	0.0180	1.6670	0.3714	0.0096	1.4449	0.0178	0.0138	0.9	0.944
73	730	0.0072	0.0180	1.6850	0.3811	0.0097	1.4626	0.0178	0.0138	0.9	0.947
74	740	0.0072	0.0180	1.7030	0.3908	0.0098	1.4804	0.0178	0.0139	1.0	0.950
75	750	0.0072	0.0180	1.7210	0.4007	0.0098	1.4982	0.0178	0.0139	1.0	0.952
76	760	0.0072	0.0180	1.7390	0.4106	0.0099	1.5160	0.0178	0.0140	1.0	0.955
77	770	0.0057	0.0143	1.7533	0.4185	0.0079	1.5301	0.0141	0.0111	0.8	0.891
78	780	0.0057	0.0143	1.7675	0.4264	0.0080	1.5442	0.0141	0.0111	0.8	0.805
79	790	0.0057	0.0143	1.7818	0.4344	0.0080	1.5583	0.0141	0.0111	0.8	0.777
80	800	0.0057	0.0143	1.7960	0.4425	0.0080	1.5724	0.0141	0.0112	0.8	0.769
81	810	0.0057	0.0143	1.8103	0.4506	0.0081	1.5865	0.0141	0.0112	0.8	0.767

PEAK
 POST-DEV
 $Q = 4.32$ CFS
 (RESTRICT
 TO 1.43
 CFS)

(1) Time Increment	(2) Time min.	(3) Rainfall distrib- ution	(4) Incre- mental Rainfall in.	(5) Accum- lated Rainfall in.	Pervious Area		Impervious Area		(10) Total Runoff in.	(11) Instant hydro- graph cfs	(12) design hydro- graph cfs
					(6) Accum- lated Runoff in.	(7) Incre- mental Runoff in.	(8) Accum- lated Runoff in.	(9) Incre- mental Runoff in.			
82	820	0.0057	0.0143	1.8245	0.4587	0.0081	1.6006	0.0141	0.0112	0.8	0.768
83	830	0.0057	0.0143	1.8388	0.4669	0.0082	1.6147	0.0141	0.0112	0.8	0.769
84	840	0.0057	0.0143	1.8530	0.4751	0.0082	1.6288	0.0141	0.0112	0.8	0.770
85	850	0.0057	0.0143	1.8673	0.4834	0.0083	1.6429	0.0141	0.0113	0.8	0.772
86	860	0.0057	0.0143	1.8815	0.4917	0.0083	1.6570	0.0141	0.0113	0.8	0.773
87	870	0.0057	0.0143	1.8958	0.5001	0.0084	1.6711	0.0141	0.0113	0.8	0.775
88	880	0.0057	0.0143	1.9100	0.5085	0.0084	1.6852	0.0141	0.0113	0.8	0.776
89	890	0.0050	0.0125	1.9225	0.5159	0.0074	1.6976	0.0124	0.0100	0.7	0.746
90	900	0.0050	0.0125	1.9350	0.5233	0.0074	1.7100	0.0124	0.0100	0.7	0.705
91	910	0.0050	0.0125	1.9475	0.5308	0.0075	1.7223	0.0124	0.0100	0.7	0.692
92	920	0.0050	0.0125	1.9600	0.5383	0.0075	1.7347	0.0124	0.0100	0.7	0.688
93	930	0.0050	0.0125	1.9725	0.5458	0.0075	1.7471	0.0124	0.0100	0.7	0.688
94	940	0.0050	0.0125	1.9850	0.5534	0.0076	1.7595	0.0124	0.0100	0.7	0.688
95	950	0.0050	0.0125	1.9975	0.5610	0.0076	1.7719	0.0124	0.0101	0.7	0.689
96	960	0.0050	0.0125	2.0100	0.5686	0.0076	1.7843	0.0124	0.0101	0.7	0.690
97	970	0.0050	0.0125	2.0225	0.5763	0.0077	1.7967	0.0124	0.0101	0.7	0.691
98	980	0.0050	0.0125	2.0350	0.5839	0.0077	1.8090	0.0124	0.0101	0.7	0.692
99	990	0.0050	0.0125	2.0475	0.5917	0.0077	1.8214	0.0124	0.0101	0.7	0.693
100	1000	0.0050	0.0125	2.0600	0.5994	0.0077	1.8338	0.0124	0.0101	0.7	0.694
101	1010	0.0040	0.0100	2.0700	0.6056	0.0062	1.8438	0.0099	0.0081	0.6	0.649
102	1020	0.0040	0.0100	2.0800	0.6119	0.0062	1.8537	0.0099	0.0081	0.6	0.588
103	1030	0.0040	0.0100	2.0900	0.6181	0.0063	1.8636	0.0099	0.0081	0.6	0.568
104	1040	0.0040	0.0100	2.1000	0.6244	0.0063	1.8735	0.0099	0.0081	0.6	0.562
105	1050	0.0040	0.0100	2.1100	0.6307	0.0063	1.8834	0.0099	0.0082	0.6	0.560
106	1060	0.0040	0.0100	2.1200	0.6370	0.0063	1.8933	0.0099	0.0082	0.6	0.560
107	1070	0.0040	0.0100	2.1300	0.6433	0.0063	1.9033	0.0099	0.0082	0.6	0.560
108	1080	0.0040	0.0100	2.1400	0.6497	0.0063	1.9132	0.0099	0.0082	0.6	0.561
109	1090	0.0040	0.0100	2.1500	0.6560	0.0064	1.9231	0.0099	0.0082	0.6	0.561
110	1100	0.0040	0.0100	2.1600	0.6624	0.0064	1.9330	0.0099	0.0082	0.6	0.562
111	1110	0.0040	0.0100	2.1700	0.6688	0.0064	1.9430	0.0099	0.0082	0.6	0.563
112	1120	0.0040	0.0100	2.1800	0.6752	0.0064	1.9529	0.0099	0.0082	0.6	0.563
113	1130	0.0040	0.0100	2.1900	0.6816	0.0064	1.9628	0.0099	0.0082	0.6	0.564
114	1140	0.0040	0.0100	2.2000	0.6881	0.0064	1.9727	0.0099	0.0082	0.6	0.564
115	1150	0.0040	0.0100	2.2100	0.6946	0.0065	1.9827	0.0099	0.0082	0.6	0.565
116	1160	0.0040	0.0100	2.2200	0.7010	0.0065	1.9926	0.0099	0.0083	0.6	0.566
117	1170	0.0040	0.0100	2.2300	0.7075	0.0065	2.0025	0.0099	0.0083	0.6	0.566
118	1180	0.0040	0.0100	2.2400	0.7141	0.0065	2.0124	0.0099	0.0083	0.6	0.567
119	1190	0.0040	0.0100	2.2500	0.7206	0.0065	2.0224	0.0099	0.0083	0.6	0.567
120	1200	0.0040	0.0100	2.2600	0.7271	0.0065	2.0323	0.0099	0.0083	0.6	0.568
121	1210	0.0040	0.0100	2.2700	0.7337	0.0066	2.0422	0.0099	0.0083	0.6	0.568
122	1220	0.0040	0.0100	2.2800	0.7403	0.0066	2.0521	0.0099	0.0083	0.6	0.569
123	1230	0.0040	0.0100	2.2900	0.7469	0.0066	2.0621	0.0099	0.0083	0.6	0.570
124	1240	0.0040	0.0100	2.3000	0.7535	0.0066	2.0720	0.0099	0.0083	0.6	0.570
125	1250	0.0040	0.0100	2.3100	0.7601	0.0066	2.0819	0.0099	0.0083	0.6	0.571
126	1260	0.0040	0.0100	2.3200	0.7668	0.0066	2.0919	0.0099	0.0083	0.6	0.571
127	1270	0.0040	0.0100	2.3300	0.7734	0.0067	2.1018	0.0099	0.0083	0.6	0.572
128	1280	0.0040	0.0100	2.3400	0.7801	0.0067	2.1117	0.0099	0.0083	0.6	0.572
129	1290	0.0040	0.0100	2.3500	0.7868	0.0067	2.1217	0.0099	0.0084	0.6	0.573
130	1300	0.0040	0.0100	2.3600	0.7935	0.0067	2.1316	0.0099	0.0084	0.6	0.573
131	1310	0.0040	0.0100	2.3700	0.8002	0.0067	2.1415	0.0099	0.0084	0.6	0.574
132	1320	0.0040	0.0100	2.3800	0.8069	0.0067	2.1515	0.0099	0.0084	0.6	0.574
133	1330	0.0040	0.0100	2.3900	0.8137	0.0067	2.1614	0.0099	0.0084	0.6	0.575
134	1340	0.0040	0.0100	2.4000	0.8205	0.0068	2.1714	0.0099	0.0084	0.6	0.575

(1) Time Increment	(2) Time min.	(3) Rainfall distri- bution	(4) Incre- mental Rainfall in.	(5) Accumu- lated Rainfall in.	Pervious Area		Impervious Area		(10) Total Runoff in.	(11) Instant hydro- graph cfs	(12) design hydro- graph cfs
					(6) Accumu- lated Runoff in.	(7) Incre- mental Runoff in.	(8) Accumu- lated Runoff in.	(9) Incre- mental Runoff in.			
135	1350	0.0040	0.0100	2.4100	0.8272	0.0068	2.1813	0.0099	0.0084	0.6	0.576
136	1360	0.0040	0.0100	2.4200	0.8340	0.0068	2.1912	0.0099	0.0084	0.6	0.576
137	1370	0.0040	0.0100	2.4300	0.8408	0.0068	2.2012	0.0099	0.0084	0.6	0.577
138	1380	0.0040	0.0100	2.4400	0.8477	0.0068	2.2111	0.0099	0.0084	0.6	0.577
139	1390	0.0040	0.0100	2.4500	0.8545	0.0068	2.2210	0.0099	0.0084	0.6	0.578
140	1400	0.0040	0.0100	2.4600	0.8613	0.0069	2.2310	0.0099	0.0084	0.6	0.578
141	1410	0.0040	0.0100	2.4700	0.8682	0.0069	2.2409	0.0099	0.0084	0.6	0.579
142	1420	0.0040	0.0100	2.4800	0.8751	0.0069	2.2509	0.0099	0.0085	0.6	0.579
143	1430	0.0040	0.0100	2.4900	0.8820	0.0069	2.2608	0.0099	0.0085	0.6	0.580
144	1440	0.0040	0.0100	2.5000	0.8889	0.0069	2.2707	0.0099	0.0085	0.6	0.580
Total Volume of Runoff =										65486.006	cu. ft.
<p>(Found by summing this column and multiplying by 600. 600 is the conversion required to convert SUM(Q) in cfs to total volume in cubic feet as follows: $V = \text{SUM}(Q) \times dt$ (cu.ft.) = (cu.ft/s) x (10 min.) x (60 s/min.)</p>											

STORMWATER CALCULATION MATRIX - SANTA BARBARA HYDROGRAPGH METHOD

Date: 37945.00 POND ROUTING
 Given: Project = WOOD MS - 2-YEAR
 Average Pond Length (ft) = 120.000 System: Pond 120' long x 50' wide
 Average Pond Width (ft) = 50.000
 Orifice Diameter (ft) = 0.550

Orifice Area = 0.238 SF
 Avg Pond Area = 6000.000 SF
 Column (3) = Col A:L * 600 = Incremental CFS into Pond
 Column (4) = Starting Pond Depth = Previous Remaining Pond Depth = Col (11)
 Column (5) =
 Column (6) = $2 * g * \text{Starting } h$
 Column (7) = Square Root of $2gh$
 Column (8) = Incremental Vol out = Col (7) * 0.60 * Orifice Area * 600
 Column (9) = Delta Vol = Incremental Vol in - Incremental Vol out = Col (3) - Col (8)
 Column (10) = Remaining Pond Vol = Previous Remaining Vol + Col (9)
 Column (11) = Pond Depth at End of Interval = Col (J) / Pond Area
 Column (12) = Pond CFS Discharge = Col(8) / 600

(1) Time Incr.	(2) Time min.	(3) Incr. Vol into Pond cf	(4) Starting Pond Depth ft.	(6)	(7)	(8) Incr. Vol out Pond cf	(9) Delta Vol cf	(10) Remain Total Vol in.	(11) Remain Pond Depth ft	(12) CFS Discharge
1	10	0.00	0.000	0.000	0.000	0.000	0.00	0.0	0.000	0.00
2	20	0.00	0.000	0.000	0.000	0.000	0.00	0.0	0.000	0.00
3	30	0.00	0.000	0.000	0.000	0.000	0.00	0.0	0.000	0.00
4	40	0.00	0.000	0.000	0.000	0.000	0.00	0.0	0.000	0.00
5	50	2.79	0.000	0.000	0.000	0.000	2.79	2.8	0.000	0.00
6	60	12.56	0.000	0.030	0.173	14.800	-2.24	0.5	0.000	0.02
7	70	27.15	0.000	0.006	0.077	6.555	20.60	21.1	0.004	0.01
8	80	41.95	0.004	0.227	0.476	40.746	1.20	22.3	0.004	0.07
9	90	55.60	0.004	0.240	0.490	41.886	13.72	36.1	0.006	0.07
10	100	67.87	0.006	0.387	0.622	53.212	14.66	50.7	0.008	0.09
11	110	86.69	0.008	0.544	0.738	63.106	23.59	74.3	0.012	0.11
12	120	108.47	0.012	0.798	0.893	76.383	32.09	106.4	0.018	0.13
13	130	123.95	0.018	1.142	1.069	91.398	32.56	138.9	0.023	0.15
14	140	136.34	0.023	1.491	1.221	104.450	31.89	170.8	0.028	0.17
15	150	146.84	0.028	1.834	1.354	115.817	31.02	201.9	0.034	0.19
16	160	155.99	0.034	2.167	1.472	125.893	30.09	231.9	0.039	0.21
17	170	175.78	0.039	2.490	1.578	134.952	40.83	272.8	0.045	0.22
18	180	199.47	0.045	2.928	1.711	146.348	53.12	325.9	0.054	0.24
19	190	213.02	0.054	3.498	1.870	159.964	53.05	378.9	0.063	0.27
20	200	222.54	0.063	4.067	2.017	172.494	50.04	429.0	0.071	0.29
21	210	230.16	0.071	4.604	2.146	183.531	46.63	475.6	0.079	0.31
22	220	236.67	0.079	5.105	2.259	193.248	43.42	519.0	0.087	0.32
23	230	256.32	0.087	5.571	2.360	201.877	54.44	573.5	0.096	0.34
24	240	280.51	0.096	6.155	2.481	212.201	68.31	641.8	0.107	0.35
25	250	292.42	0.107	6.889	2.625	224.484	67.94	709.7	0.118	0.37
26	260	299.82	0.118	7.618	2.760	236.066	63.76	773.5	0.129	0.39
27	270	305.37	0.129	8.302	2.881	246.442	58.93	832.4	0.139	0.41

(1) Time Incr.	(2) Time min.	(3) Incr. Vol into Pond cf	(4) Starting Pond Depth ft.	(6)	(7)	(8) Incr. Vol out Pond cf	(9) Delta Vol cf	(10) Remain Total Vol in.	(11) Remain Pond Depth ft	(12) CFS Discharge
28	280	309.99	0.139	8.935	2.989	255.657	54.33	886.8	0.148	0.43
29	290	332.30	0.148	9.518	3.085	263.869	68.43	955.2	0.159	0.44
30	300	360.66	0.159	10.252	3.202	273.861	86.80	1042.0	0.174	0.46
31	310	372.87	0.174	11.184	3.344	286.033	86.84	1128.8	0.188	0.48
32	320	379.42	0.188	12.116	3.481	297.714	81.71	1210.5	0.202	0.50
33	330	383.84	0.202	12.993	3.605	308.301	75.54	1286.1	0.214	0.51
34	340	387.34	0.214	13.804	3.715	317.775	69.57	1355.6	0.226	0.53
35	350	411.94	0.226	14.551	3.815	326.256	85.68	1441.3	0.240	0.54
36	360	446.48	0.240	15.470	3.933	336.408	110.07	1551.4	0.259	0.56
37	370	465.69	0.259	16.652	4.081	349.018	116.67	1668.1	0.278	0.58
38	380	479.56	0.278	17.904	4.231	361.903	117.65	1785.7	0.298	0.60
39	390	491.33	0.298	19.167	4.378	374.449	116.88	1902.6	0.317	0.62
40	400	502.09	0.317	20.421	4.519	386.509	115.59	2018.2	0.336	0.64
41	410	584.61	0.336	21.662	4.654	398.076	186.54	2204.7	0.367	0.66
42	420	693.76	0.367	23.664	4.865	416.066	277.69	2482.4	0.414	0.69
43	430	741.97	0.414	26.645	5.162	441.492	300.47	2782.9	0.464	0.74
44	440	861.01	0.464	29.870	5.465	467.448	393.56	3176.4	0.529	0.78
45	450	1007.17	0.529	34.094	5.839	499.409	507.76	3684.2	0.614	0.83
46	460	1412.71	0.614	39.544	6.288	537.846	874.87	4559.1	0.760	0.90
47	470	2370.61	0.760	48.934	6.995	598.307	1772.30	6331.4	1.055	1.00
48	480	2594.41	1.055	67.957	8.244	705.075	1889.33	8220.7	1.370	1.18
49	490	1900.52	1.370	88.236	9.393	803.416	1097.11	9317.8	1.553	1.34
50	500	1368.17	1.553	100.011	10.001	855.348	512.82	9830.6	1.638	1.43
51	510	1090.63	1.638	105.516	10.272	878.571	212.06	10042.7	1.674	1.46
52	520	1004.29	1.674	107.792	10.382	887.996	116.29	10159.8	1.693	1.48
53	530	869.64	1.693	109.040	10.442	893.123	-23.48	10135.5	1.689	1.49
54	540	717.10	1.689	108.788	10.430	892.090	-174.99	9960.5	1.660	1.49
55	550	668.70	1.660	106.910	10.340	884.356	-215.66	9744.9	1.624	1.47
56	560	654.96	1.624	104.595	10.227	874.730	-219.77	9525.1	1.588	1.46
57	570	652.72	1.588	102.236	10.111	864.810	-212.09	9313.0	1.552	1.44
58	580	654.26	1.552	99.959	9.998	855.127	-200.86	9112.1	1.519	1.43
59	590	657.02	1.519	97.804	9.890	845.855	-188.83	8923.3	1.487	1.41
60	600	660.14	1.487	95.777	9.787	837.045	-176.90	8746.4	1.458	1.40
61	610	663.33	1.458	93.878	9.689	828.706	-165.37	8581.0	1.430	1.38
62	620	666.51	1.430	92.103	9.597	820.835	-154.33	8426.7	1.404	1.37
63	630	669.63	1.404	90.447	9.510	813.420	-143.79	8282.9	1.380	1.36
64	640	672.69	1.380	88.903	9.429	806.450	-133.76	8149.1	1.358	1.34
65	650	634.49	1.358	87.467	9.352	799.912	-165.42	7983.7	1.331	1.33
66	660	582.19	1.331	85.692	9.257	791.752	-209.57	7774.2	1.296	1.32
67	670	566.03	1.296	83.443	9.135	781.291	-215.26	7558.9	1.260	1.30
68	680	561.91	1.260	81.132	9.007	770.399	-208.49	7350.4	1.225	1.28
69	690	561.78	1.225	78.894	8.882	759.700	-197.92	7152.5	1.192	1.27
70	700	562.96	1.192	76.770	8.762	749.402	-186.44	6966.0	1.161	1.25
71	710	564.55	1.161	74.769	8.647	739.570	-175.02	6791.0	1.132	1.23
72	720	566.27	1.132	72.890	8.538	730.221	-163.95	6627.1	1.105	1.22
73	730	568.01	1.105	71.131	8.434	721.352	-153.34	6473.7	1.079	1.20
74	740	569.74	1.079	69.485	8.336	712.958	-143.22	6330.5	1.055	1.19
75	750	571.44	1.055	67.948	8.243	705.027	-133.58	6196.9	1.033	1.18
76	760	573.13	1.033	66.514	8.156	697.549	-124.42	6072.5	1.012	1.16
77	770	534.71	1.012	65.178	8.073	690.511	-155.80	5916.7	0.986	1.15
78	780	482.71	0.986	63.506	7.969	681.595	-198.88	5717.8	0.953	1.14
79	790	466.05	0.953	61.371	7.834	670.042	-203.99	5513.8	0.919	1.12
80	800	461.16	0.919	59.182	7.693	657.981	-196.82	5317.0	0.886	1.10
81	810	460.18	0.886	57.069	7.554	646.130	-185.95	5131.1	0.855	1.08

RESIDUAL
TO
1.43
(CI)

(1) Time Incr.	(2) Time min.	(3) Incr. Vol into Pond cf	(4) Starting Pond Depth ft.	(6)	(7)	(8) Incr. Vol out Pond cf	(9) Delta Vol cf	(10) Remain Total Vol in.	(11) Remain Pond Depth ft	(12) CFS Discharge
82	820	460.50	0.000	57.069	7.554	646.130	-185.63	4945.4	0.824	1.08
83	830	461.25	0.824	53.081	7.286	623.144	-161.90	4783.5	0.797	1.04
84	840	462.13	0.797	51.343	7.165	612.860	-150.73	4632.8	0.772	1.02
85	850	463.05	0.772	49.726	7.052	603.127	-140.08	4492.7	0.749	1.01
86	860	463.97	0.749	48.222	6.944	593.938	-129.97	4362.8	0.727	0.99
87	870	464.89	0.727	46.827	6.843	585.284	-120.40	4242.4	0.707	0.98
88	880	465.80	0.707	45.535	6.748	577.152	-111.35	4131.0	0.689	0.96
89	890	447.54	0.689	44.340	6.659	569.527	-121.99	4009.0	0.668	0.95
90	900	422.82	0.668	43.030	6.560	561.055	-138.24	3870.8	0.645	0.94
91	910	415.03	0.645	41.546	6.446	551.297	-136.27	3734.5	0.622	0.92
92	920	412.88	0.622	40.084	6.331	541.506	-128.63	3605.9	0.601	0.90
93	930	412.60	0.601	38.703	6.221	532.099	-119.50	3486.4	0.581	0.89
94	940	412.94	0.581	37.421	6.117	523.208	-110.26	3376.1	0.563	0.87
95	950	413.49	0.563	36.237	6.020	514.868	-101.38	3274.8	0.546	0.86
96	960	414.10	0.546	35.149	5.929	507.079	-92.98	3181.8	0.530	0.85
97	970	414.73	0.530	34.151	5.844	499.828	-85.10	3096.7	0.516	0.83
98	980	415.36	0.516	33.238	5.765	493.099	-77.74	3018.9	0.503	0.82
99	990	415.98	0.503	32.403	5.692	486.870	-70.89	2948.0	0.491	0.81
100	1000	416.60	0.491	31.642	5.625	481.120	-64.52	2883.5	0.481	0.80
101	1010	389.35	0.481	30.950	5.563	475.826	-86.48	2797.1	0.466	0.79
102	1020	352.72	0.466	30.022	5.479	468.637	-115.92	2681.1	0.447	0.78
103	1030	340.77	0.447	28.778	5.364	458.823	-118.05	2563.1	0.427	0.76
104	1040	337.04	0.427	27.510	5.245	448.608	-111.57	2451.5	0.409	0.75
105	1050	336.05	0.409	26.313	5.130	438.736	-102.69	2348.8	0.391	0.73
106	1060	335.97	0.391	25.211	5.021	429.449	-93.48	2255.4	0.376	0.72
107	1070	336.19	0.376	24.207	4.920	420.817	-84.62	2170.7	0.362	0.70
108	1080	336.52	0.362	23.299	4.827	412.847	-76.33	2094.4	0.349	0.69
109	1090	336.87	0.349	22.480	4.741	405.523	-68.65	2025.7	0.338	0.68
110	1100	337.23	0.338	21.743	4.663	398.821	-61.59	1964.2	0.327	0.66
111	1110	337.59	0.327	21.082	4.592	392.711	-55.12	1909.0	0.318	0.65
112	1120	337.95	0.318	20.490	4.527	387.162	-49.21	1859.8	0.310	0.65
113	1130	338.31	0.310	19.962	4.468	382.139	-43.83	1816.0	0.303	0.64
114	1140	338.67	0.303	19.492	4.415	377.610	-38.94	1777.1	0.296	0.63
115	1150	339.02	0.296	19.074	4.367	373.539	-34.52	1742.5	0.290	0.62
116	1160	339.37	0.290	18.703	4.325	369.893	-30.52	1712.0	0.285	0.62
117	1170	339.72	0.285	18.376	4.287	366.640	-26.92	1685.1	0.281	0.61
118	1180	340.07	0.281	18.087	4.253	363.746	-23.68	1661.4	0.277	0.61
119	1190	340.41	0.277	17.832	4.223	361.181	-20.77	1640.6	0.273	0.60
120	1200	340.75	0.273	17.610	4.196	358.916	-18.17	1622.5	0.270	0.60
121	1210	341.09	0.270	17.415	4.173	356.923	-15.84	1606.6	0.268	0.59
122	1220	341.42	0.268	17.245	4.153	355.177	-13.75	1592.9	0.265	0.59
123	1230	341.76	0.265	17.097	4.135	353.653	-11.90	1581.0	0.263	0.59
124	1240	342.09	0.263	16.969	4.119	352.330	-10.24	1570.7	0.262	0.59
125	1250	342.42	0.262	16.859	4.106	351.187	-8.77	1562.0	0.260	0.59
126	1260	342.74	0.260	16.765	4.095	350.205	-7.46	1554.5	0.259	0.58
127	1270	343.07	0.259	16.685	4.085	349.368	-6.30	1548.2	0.258	0.58
128	1280	343.39	0.258	16.617	4.076	348.659	-5.27	1542.9	0.257	0.58
129	1290	343.71	0.257	16.561	4.070	348.065	-4.36	1538.6	0.256	0.58
130	1300	344.02	0.256	16.514	4.064	347.573	-3.55	1535.0	0.256	0.58
131	1310	344.34	0.256	16.476	4.059	347.172	-2.83	1532.2	0.255	0.58
132	1320	344.65	0.255	16.446	4.055	346.851	-2.20	1530.0	0.255	0.58
133	1330	344.96	0.255	16.422	4.052	346.602	-1.64	1528.4	0.255	0.58
134	1340	345.27	0.255	16.404	4.050	346.417	-1.15	1527.2	0.255	0.58

STORMWATER CALCULATION MATRIX - SANTA BARBARA HYDROGRAPGH METHOD

Date: Jun-04
 Given: Project = WOOD MS
 Area = 11.34 acres
 Pt = 3.45 inches 10-Year / 24 Hour Storm
 dt = 10 min.
 Tc = 40 min. (Pre-Developed Site Conditions)
 PERVIOUS Parcel IMPERVIOUS Parcel
 Area = 11.34 acres Area = 0 acres
 CN = 82 CN = 98
 S = 2.20 S = 0.20
 0.2S = 0.44 0.2S = 0.04

Compute: Developed Conditions Runoff hydrograph

Column (3) = SCS Type IA Rainfall Distribution
 Column (4) = Col. (3) x Pt = 10 year - 24 Hour Hyetograph at this location.
 Column (5) = Accumulated Sum of Col. (4)
 Column (6) = [If P <= 0.2S] = 0; Note, use PERVIOUS Area "S" value.
 [If P > 0.2S] = (Col.(5) - 0.2S)^2 / (Col.(5) + 0.8S); Using the PERVIOUS Area "S" value.
 Column (7) = Col.(6) of Present Time Step - Col.(6) of Previous Time Step
 Column (8) = Same method as for Col.(6), except use the IMPERVIOUS Area "S" value.
 Column (9) = Col.(8) of the present time step - Col.(8) of the previous time step.
 Column (10) = ((PERVIOUS area / Total area) x Col.(7)) + ((IMPERVIOUS area / Total area) x Col.(9))
 Column (11) = (60.5 x Col.(10) x Total Area) / 10 (dt = 10 minutes)
 Routing Constant, w = dt / (2Tc + dt) = 0.1111
 Column (12) = Col.(12) of Previous Time Step + (w x [Col.(11) of Previous Time Step + Col.(11) of Present Time Step - (2 x Col.(12) of Previous Time Step)])

(1) Time Increment	(2) Time min.	(3) Rainfall distrib- ution % of Pt	(4) Incre- mental Rainfall in.	(5) Accumu- lated Rainfall in.	Pervious Area (6) Accumu- lated Runoff in.	(7) Incre- mental Runoff in.	Impervious Area (8) Accumu- lated Runoff in.	(9) Incre- mental Runoff in.	(10) Total Runoff in.	(11) Instant hydro- graph cfs	(12) design hydro- graph cfs
1	10	0.0040	0.0138	0.0138	0.0000	0.0000	0.0000	0.0000	0.0000	0.0	0.000
2	20	0.0040	0.0138	0.0276	0.0000	0.0000	0.0000	0.0000	0.0000	0.0	0.000
3	30	0.0040	0.0138	0.0414	0.0000	0.0000	0.0000	0.0000	0.0000	0.0	0.000
4	40	0.0040	0.0138	0.0552	0.0000	0.0000	0.0009	0.0009	0.0000	0.0	0.000
5	50	0.0040	0.0138	0.0690	0.0000	0.0000	0.0034	0.0025	0.0000	0.0	0.000
6	60	0.0040	0.0138	0.0828	0.0000	0.0000	0.0072	0.0037	0.0000	0.0	0.000
7	70	0.0040	0.0138	0.0966	0.0000	0.0000	0.0120	0.0048	0.0000	0.0	0.000
8	80	0.0040	0.0138	0.1104	0.0000	0.0000	0.0177	0.0057	0.0000	0.0	0.000
9	90	0.0040	0.0138	0.1242	0.0000	0.0000	0.0242	0.0065	0.0000	0.0	0.000
10	100	0.0040	0.0138	0.1380	0.0000	0.0000	0.0313	0.0072	0.0000	0.0	0.000
11	110	0.0050	0.0173	0.1553	0.0000	0.0000	0.0411	0.0098	0.0000	0.0	0.000
12	120	0.0050	0.0173	0.1725	0.0000	0.0000	0.0516	0.0105	0.0000	0.0	0.000
13	130	0.0050	0.0173	0.1898	0.0000	0.0000	0.0628	0.0112	0.0000	0.0	0.000
14	140	0.0050	0.0173	0.2070	0.0000	0.0000	0.0746	0.0118	0.0000	0.0	0.000
15	150	0.0050	0.0173	0.2243	0.0000	0.0000	0.0868	0.0122	0.0000	0.0	0.000
16	160	0.0050	0.0173	0.2415	0.0000	0.0000	0.0995	0.0127	0.0000	0.0	0.000
17	170	0.0060	0.0207	0.2622	0.0000	0.0000	0.1152	0.0157	0.0000	0.0	0.000
18	180	0.0060	0.0207	0.2829	0.0000	0.0000	0.1314	0.0162	0.0000	0.0	0.000
19	190	0.0060	0.0207	0.3036	0.0000	0.0000	0.1479	0.0166	0.0000	0.0	0.000
20	200	0.0060	0.0207	0.3243	0.0000	0.0000	0.1648	0.0169	0.0000	0.0	0.000
21	210	0.0060	0.0207	0.3450	0.0000	0.0000	0.1820	0.0172	0.0000	0.0	0.000
22	220	0.0060	0.0207	0.3657	0.0000	0.0000	0.1995	0.0175	0.0000	0.0	0.000
23	230	0.0070	0.0242	0.3899	0.0000	0.0000	0.2203	0.0207	0.0000	0.0	0.000
24	240	0.0070	0.0242	0.4140	0.0000	0.0000	0.2413	0.0210	0.0000	0.0	0.000
25	250	0.0070	0.0242	0.4382	0.0000	0.0000	0.2625	0.0213	0.0000	0.0	0.000
26	260	0.0070	0.0242	0.4623	0.0002	0.0002	0.2840	0.0215	0.0002	0.0	0.002
27	270	0.0070	0.0242	0.4865	0.0010	0.0008	0.3057	0.0217	0.0008	0.1	0.009

(1) Time Increment	(2) Time min.	(3) Rainfall distrib- ution	(4) Incre- mental Rainfall in.	(5) Accumu- lated Rainfall in.	Pervious Area		Impervious Area		(10) Total Runoff in.	(11) Instant hydro- graph cfs	(12) design hydro- graph cfs
					(6) Accumu- lated Runoff in.	(7) Incre- mental Runoff in.	(8) Accumu- lated Runoff in.	(9) Incre- mental Runoff in.			
28	280	0.0070	0.0242	0.5106	0.0023	0.0013	0.3275	0.0219	0.0013	0.1	0.022
29	290	0.0082	0.0283	0.5389	0.0043	0.0021	0.3533	0.0258	0.0021	0.1	0.043
30	300	0.0082	0.0283	0.5672	0.0071	0.0027	0.3793	0.0260	0.0027	0.2	0.070
31	310	0.0082	0.0283	0.5955	0.0104	0.0033	0.4055	0.0262	0.0033	0.2	0.101
32	320	0.0082	0.0283	0.6238	0.0143	0.0039	0.4318	0.0263	0.0039	0.3	0.134
33	330	0.0082	0.0283	0.6521	0.0188	0.0045	0.4582	0.0265	0.0045	0.3	0.168
34	340	0.0082	0.0283	0.6803	0.0239	0.0051	0.4848	0.0266	0.0051	0.3	0.204
35	350	0.0095	0.0328	0.7131	0.0304	0.0065	0.5157	0.0309	0.0065	0.4	0.247
36	360	0.0095	0.0328	0.7459	0.0376	0.0072	0.5468	0.0311	0.0072	0.5	0.297
37	370	0.0095	0.0328	0.7787	0.0455	0.0079	0.5780	0.0312	0.0079	0.5	0.346
38	380	0.0095	0.0328	0.8114	0.0540	0.0085	0.6093	0.0313	0.0085	0.6	0.394
39	390	0.0095	0.0328	0.8442	0.0631	0.0091	0.6407	0.0314	0.0091	0.6	0.441
40	400	0.0095	0.0328	0.8770	0.0728	0.0097	0.6721	0.0315	0.0097	0.7	0.486
41	410	0.0134	0.0462	0.9232	0.0875	0.0147	0.7167	0.0445	0.0147	1.0	0.564
42	420	0.0134	0.0462	0.9695	0.1032	0.0157	0.7613	0.0447	0.0157	1.1	0.670
43	430	0.0134	0.0462	1.0157	0.1200	0.0167	0.8061	0.0448	0.0167	1.1	0.769
44	440	0.0180	0.0621	1.0778	0.1440	0.0240	0.8664	0.0603	0.0240	1.6	0.909
45	450	0.0180	0.0621	1.1399	0.1696	0.0256	0.9269	0.0605	0.0256	1.8	1.085
46	460	0.0340	0.1173	1.2572	0.2221	0.0525	1.0416	0.1147	0.0525	3.6	1.440
47	470	0.0540	0.1863	1.4435	0.3153	0.0932	1.2245	0.1829	0.0932	6.4	2.231
48	480	0.0270	0.0932	1.5366	0.3659	0.0505	1.3162	0.0917	0.0505	3.5	2.834
49	490	0.0180	0.0621	1.5987	0.4009	0.0350	1.3775	0.0612	0.0350	2.4	2.854
50	500	0.0134	0.0462	1.6450	0.4276	0.0267	1.4231	0.0456	0.0267	1.8	2.890
51	510	0.0134	0.0462	1.6912	0.4548	0.0272	1.4688	0.0457	0.0272	1.9	2.503
52	520	0.0134	0.0462	1.7374	0.4826	0.0277	1.5144	0.0457	0.0277	1.9	2.366
53	530	0.0088	0.0304	1.7678	0.5010	0.0185	1.5445	0.0300	0.0185	1.3	2.193
54	540	0.0088	0.0304	1.7981	0.5197	0.0187	1.5745	0.0300	0.0187	1.3	1.989
55	550	0.0088	0.0304	1.8285	0.5386	0.0189	1.6045	0.0300	0.0189	1.3	1.833
56	560	0.0088	0.0304	1.8589	0.5577	0.0191	1.6346	0.0300	0.0191	1.3	1.715
57	570	0.0088	0.0304	1.8892	0.5769	0.0193	1.6646	0.0301	0.0193	1.3	1.626
58	580	0.0088	0.0304	1.9196	0.5964	0.0194	1.6947	0.0301	0.0194	1.3	1.560
59	590	0.0088	0.0304	1.9499	0.6160	0.0196	1.7248	0.0301	0.0196	1.3	1.511
60	600	0.0088	0.0304	1.9803	0.6358	0.0198	1.7548	0.0301	0.0198	1.4	1.476
61	610	0.0088	0.0304	2.0107	0.6557	0.0200	1.7849	0.0301	0.0200	1.4	1.451
62	620	0.0088	0.0304	2.0410	0.6759	0.0201	1.8150	0.0301	0.0201	1.4	1.434
63	630	0.0088	0.0304	2.0714	0.6962	0.0203	1.8451	0.0301	0.0203	1.4	1.424
64	640	0.0088	0.0304	2.1017	0.7166	0.0205	1.8752	0.0301	0.0205	1.4	1.418
65	650	0.0072	0.0248	2.1266	0.7335	0.0168	1.8999	0.0240	0.0168	1.2	1.387
66	660	0.0072	0.0248	2.1514	0.7504	0.0170	1.9245	0.0246	0.0170	1.2	1.337
67	670	0.0072	0.0248	2.1763	0.7675	0.0171	1.9492	0.0246	0.0171	1.2	1.299
68	680	0.0072	0.0248	2.2011	0.7846	0.0171	1.9738	0.0247	0.0171	1.2	1.271
69	690	0.0072	0.0248	2.2259	0.8019	0.0172	1.9985	0.0247	0.0172	1.2	1.251
70	700	0.0072	0.0248	2.2508	0.8192	0.0173	2.0231	0.0247	0.0173	1.2	1.236
71	710	0.0072	0.0248	2.2756	0.8366	0.0174	2.0478	0.0247	0.0174	1.2	1.227
72	720	0.0072	0.0248	2.3005	0.8542	0.0175	2.0725	0.0247	0.0175	1.2	1.220
73	730	0.0072	0.0248	2.3253	0.8718	0.0176	2.0971	0.0247	0.0176	1.2	1.217
74	740	0.0072	0.0248	2.3501	0.8895	0.0177	2.1218	0.0247	0.0177	1.2	1.216
75	750	0.0072	0.0248	2.3750	0.9073	0.0178	2.1465	0.0247	0.0178	1.2	1.216
76	760	0.0072	0.0248	2.3998	0.9251	0.0179	2.1712	0.0247	0.0179	1.2	1.218
77	770	0.0057	0.0197	2.4195	0.9393	0.0142	2.1907	0.0195	0.0142	1.0	1.192
78	780	0.0057	0.0197	2.4392	0.9536	0.0143	2.2103	0.0195	0.0143	1.0	1.144
79	790	0.0057	0.0197	2.4588	0.9679	0.0143	2.2298	0.0195	0.0143	1.0	1.107
80	800	0.0057	0.0197	2.4785	0.9822	0.0144	2.2493	0.0195	0.0144	1.0	1.080
81	810	0.0057	0.0197	2.4981	0.9966	0.0144	2.2689	0.0195	0.0144	1.0	1.059

Peak
Pre-Dew.
(10-20)

(1) Time Increment	(2) Time min.	(3) Rainfall distrib- ution	(4) Incre- mental Rainfall in.	(5) Accumu- lated Rainfall in.	Pervious Area		Impervious Area		(10) Total Runoff in.	(11) Instant hydro- graph cfs	(12) design hydro- graph cfs
					(6) Accumu- lated Runoff in.	(7) Incre- mental Runoff in.	(8) Accumu- lated Runoff in.	(9) Incre- mental Runoff in.			
82	820	0.0057	0.0197	2.5178	1.0111	0.0145	2.2884	0.0196	0.0145	1.0	1.044
83	830	0.0057	0.0197	2.5375	1.0256	0.0145	2.3080	0.0196	0.0145	1.0	1.032
84	840	0.0057	0.0197	2.5571	1.0401	0.0145	2.3276	0.0196	0.0145	1.0	1.024
85	850	0.0057	0.0197	2.5768	1.0547	0.0146	2.3471	0.0196	0.0146	1.0	1.019
86	860	0.0057	0.0197	2.5965	1.0694	0.0146	2.3667	0.0196	0.0146	1.0	1.015
87	870	0.0057	0.0197	2.6161	1.0841	0.0147	2.3862	0.0196	0.0147	1.0	1.013
88	880	0.0057	0.0197	2.6358	1.0988	0.0147	2.4058	0.0196	0.0147	1.0	1.012
89	890	0.0050	0.0173	2.6531	1.1118	0.0130	2.4229	0.0172	0.0130	0.9	0.998
90	900	0.0050	0.0173	2.6703	1.1248	0.0130	2.4401	0.0172	0.0130	0.9	0.974
91	910	0.0050	0.0173	2.6876	1.1378	0.0130	2.4573	0.0172	0.0130	0.9	0.956
92	920	0.0050	0.0173	2.7048	1.1508	0.0131	2.4744	0.0172	0.0131	0.9	0.943
93	930	0.0050	0.0173	2.7221	1.1639	0.0131	2.4916	0.0172	0.0131	0.9	0.932
94	940	0.0050	0.0173	2.7393	1.1770	0.0131	2.5088	0.0172	0.0131	0.9	0.925
95	950	0.0050	0.0173	2.7566	1.1902	0.0132	2.5259	0.0172	0.0132	0.9	0.920
96	960	0.0050	0.0173	2.7738	1.2034	0.0132	2.5431	0.0172	0.0132	0.9	0.916
97	970	0.0050	0.0173	2.7911	1.2166	0.0132	2.5602	0.0172	0.0132	0.9	0.914
98	980	0.0050	0.0173	2.8083	1.2298	0.0132	2.5774	0.0172	0.0132	0.9	0.912
99	990	0.0050	0.0173	2.8256	1.2431	0.0133	2.5946	0.0172	0.0133	0.9	0.912
100	1000	0.0050	0.0173	2.8428	1.2564	0.0133	2.6118	0.0172	0.0133	0.9	0.912
101	1010	0.0040	0.0138	2.8566	1.2671	0.0107	2.6255	0.0137	0.0107	0.7	0.892
102	1020	0.0040	0.0138	2.8704	1.2778	0.0107	2.6392	0.0137	0.0107	0.7	0.856
103	1030	0.0040	0.0138	2.8842	1.2885	0.0107	2.6530	0.0137	0.0107	0.7	0.829
104	1040	0.0040	0.0138	2.8980	1.2992	0.0107	2.6667	0.0137	0.0107	0.7	0.808
105	1050	0.0040	0.0138	2.9118	1.3099	0.0107	2.6804	0.0137	0.0107	0.7	0.792
106	1060	0.0040	0.0138	2.9256	1.3207	0.0108	2.6942	0.0137	0.0108	0.7	0.780
107	1070	0.0040	0.0138	2.9394	1.3315	0.0108	2.7079	0.0137	0.0108	0.7	0.771
108	1080	0.0040	0.0138	2.9532	1.3423	0.0108	2.7217	0.0137	0.0108	0.7	0.764
109	1090	0.0040	0.0138	2.9670	1.3531	0.0108	2.7354	0.0137	0.0108	0.7	0.759
110	1100	0.0040	0.0138	2.9808	1.3639	0.0108	2.7491	0.0137	0.0108	0.7	0.755
111	1110	0.0040	0.0138	2.9946	1.3747	0.0108	2.7629	0.0137	0.0108	0.7	0.753
112	1120	0.0040	0.0138	3.0084	1.3856	0.0109	2.7766	0.0137	0.0109	0.7	0.751
113	1130	0.0040	0.0138	3.0222	1.3965	0.0109	2.7904	0.0137	0.0109	0.7	0.750
114	1140	0.0040	0.0138	3.0360	1.4074	0.0109	2.8041	0.0137	0.0109	0.7	0.749
115	1150	0.0040	0.0138	3.0498	1.4183	0.0109	2.8179	0.0137	0.0109	0.7	0.749
116	1160	0.0040	0.0138	3.0636	1.4292	0.0109	2.8316	0.0137	0.0109	0.7	0.749
117	1170	0.0040	0.0138	3.0774	1.4402	0.0109	2.8454	0.0137	0.0109	0.8	0.749
118	1180	0.0040	0.0138	3.0912	1.4511	0.0110	2.8591	0.0137	0.0110	0.8	0.750
119	1190	0.0040	0.0138	3.1050	1.4621	0.0110	2.8728	0.0137	0.0110	0.8	0.750
120	1200	0.0040	0.0138	3.1188	1.4731	0.0110	2.8866	0.0137	0.0110	0.8	0.751
121	1210	0.0040	0.0138	3.1326	1.4841	0.0110	2.9003	0.0137	0.0110	0.8	0.752
122	1220	0.0040	0.0138	3.1464	1.4951	0.0110	2.9141	0.0137	0.0110	0.8	0.753
123	1230	0.0040	0.0138	3.1602	1.5062	0.0110	2.9278	0.0137	0.0110	0.8	0.754
124	1240	0.0040	0.0138	3.1740	1.5172	0.0111	2.9416	0.0137	0.0111	0.8	0.755
125	1250	0.0040	0.0138	3.1878	1.5283	0.0111	2.9553	0.0137	0.0111	0.8	0.756
126	1260	0.0040	0.0138	3.2016	1.5394	0.0111	2.9691	0.0137	0.0111	0.8	0.757
127	1270	0.0040	0.0138	3.2154	1.5505	0.0111	2.9828	0.0137	0.0111	0.8	0.758
128	1280	0.0040	0.0138	3.2292	1.5616	0.0111	2.9966	0.0137	0.0111	0.8	0.759
129	1290	0.0040	0.0138	3.2430	1.5727	0.0111	3.0103	0.0138	0.0111	0.8	0.760
130	1300	0.0040	0.0138	3.2568	1.5839	0.0111	3.0241	0.0138	0.0111	0.8	0.761
131	1310	0.0040	0.0138	3.2706	1.5950	0.0112	3.0378	0.0138	0.0112	0.8	0.762
132	1320	0.0040	0.0138	3.2844	1.6062	0.0112	3.0516	0.0138	0.0112	0.8	0.763
133	1330	0.0040	0.0138	3.2982	1.6174	0.0112	3.0653	0.0138	0.0112	0.8	0.764
134	1340	0.0040	0.0138	3.3120	1.6286	0.0112	3.0791	0.0138	0.0112	0.8	0.765

(1) Time Increment	(2) Time min.	(3) Rainfall distrib- ution	(4) Incre- mental Rainfall in.	(5) Accumu- lated Rainfall in.	Pervious Area		Impervious Area		(10) Total Runoff in.	(11) Instant hydro- graph cfs	(12) design hydro- graph cfs
					(6) Accumu- lated Runoff in.	(7) Incre- mental Runoff in.	(8) Accumu- lated Runoff in.	(9) Incre- mental Runoff in.			
135	1350	0.0040	0.0138	3.3258	1.6398	0.0112	3.0928	0.0138	0.0112	0.8	0.766
136	1360	0.0040	0.0138	3.3396	1.6511	0.0112	3.1066	0.0138	0.0112	0.8	0.767
137	1370	0.0040	0.0138	3.3534	1.6623	0.0112	3.1203	0.0138	0.0112	0.8	0.768
138	1380	0.0040	0.0138	3.3672	1.6736	0.0113	3.1341	0.0138	0.0113	0.8	0.769
139	1390	0.0040	0.0138	3.3810	1.6848	0.0113	3.1479	0.0138	0.0113	0.8	0.770
140	1400	0.0040	0.0138	3.3948	1.6961	0.0113	3.1616	0.0138	0.0113	0.8	0.771
141	1410	0.0040	0.0138	3.4086	1.7074	0.0113	3.1754	0.0138	0.0113	0.8	0.772
142	1420	0.0040	0.0138	3.4224	1.7187	0.0113	3.1891	0.0138	0.0113	0.8	0.772
143	1430	0.0040	0.0138	3.4362	1.7301	0.0113	3.2029	0.0138	0.0113	0.8	0.773
144	1440	0.0040	0.0138	3.4500	1.7414	0.0113	3.2166	0.0138	0.0113	0.8	0.774
Total Volume of Runoff =										69824.489	
										cu. ft.	
(Found by summing this column and multiplying by 600. 600 is the conversion required to convert SUM(Q) in cfs to total volume in cubic feet as follows: $V = \text{SUM}(Q) \times dt$ (cu.ft.) = (cu.ft/s) x (10 min.) x (60 s/min.)											

STORMWATER CALCULATION MATRIX - SANTA BARBARA HYDROGRAPGH METHOD

Date: **Nov-03**
 Given: **Project = WOOD MS**
Area = 11.34 acres
Pt = 3.45 inches 10-Year / 24 Hour Storm
dt = 10 min.
Tc = 10 min. (Post-Developed Site Conditions)
PERVIOUS Parcel IMPERVIOUS Parcel
Area = 5.51 acres Area = 5.83 acres
CN = 80 CN = 98
S = 2.50 S = 0.20
0.2S = 0.50 0.2S = 0.04

Compute: Developed Conditions Runoff hydrograph

Column (3) = SCS Type IA Rainfall Distribution
 Column (4) = Col. (3) x Pt = 10 year - 24 Hour Hyetograph at this location.
 Column (5) = Accumulated Sum of Col. (4)
 Column (6) = [If P <= 0.2S] = 0; Note, use PERVIOUS Area "S" value.
 [If P > 0.2S] = (Col.(5) - 0.2S)^2/(Col.(5) + 0.8S); Using the PERVIOUS Area "S" value.
 Column (7) = Col.(6) of Present Time Step - Col.(6) of Previous Time Step
 Column (8) = Same method as for Col.(6), except use the IMPERVIOUS Area "S" value.
 Column (9) = Col.(8) of the present time step - Col.(8) of the previous time step.
 Column (10) = ((PERVIOUS area / Total area) x Col.(7)) + ((IMPERVIOUS area / Total area) x Col.(9))
 Column (11) = (60.5 x Col.(10) x Total Area) / 10 (dt = 10 minutes)
 Routing Constant, w = dt / (2Tc + dt) = 0.3333
 Column (12) = Col.(12) of Previous Time Step + (w x [Col.(11) of Previous Time Step + Col.(11) of Present Time Step - (2 x Col.(12) of Previous Time Step)])

(1) Time Increment	(2) Time min.	(3) Rainfall distrib- ution % of Pt	(4) Incre- mental Rainfall in.	(5) Accumu- lated Rainfall in.	Pervious Area (6) Accumu- lated Runoff in.	(7) Incre- mental Runoff in.	Impervious Area (8) Accumu- lated Runoff in.	(9) Incre- mental Runoff in.	(10) Total Runoff in.	(11) Instant hydro- graph cfs	(12) design hydro- graph cfs
1	10	0.0040	0.0138	0.0138	0.0000	0.0000	0.0000	0.0000	0.0000	0.0	0.000
2	20	0.0040	0.0138	0.0276	0.0000	0.0000	0.0000	0.0000	0.0000	0.0	0.000
3	30	0.0040	0.0138	0.0414	0.0000	0.0000	0.0000	0.0000	0.0000	0.0	0.000
4	40	0.0040	0.0138	0.0552	0.0000	0.0000	0.0009	0.0009	0.0005	0.0	0.011
5	50	0.0040	0.0138	0.0690	0.0000	0.0000	0.0034	0.0025	0.0013	0.1	0.044
6	60	0.0040	0.0138	0.0828	0.0000	0.0000	0.0072	0.0037	0.0019	0.1	0.088
7	70	0.0040	0.0138	0.0966	0.0000	0.0000	0.0120	0.0048	0.0025	0.2	0.130
8	80	0.0040	0.0138	0.1104	0.0000	0.0000	0.0177	0.0057	0.0029	0.2	0.167
9	90	0.0040	0.0138	0.1242	0.0000	0.0000	0.0242	0.0065	0.0033	0.2	0.199
10	100	0.0040	0.0138	0.1380	0.0000	0.0000	0.0313	0.0072	0.0037	0.3	0.227
11	110	0.0050	0.0173	0.1553	0.0000	0.0000	0.0411	0.0098	0.0050	0.3	0.275
12	120	0.0050	0.0173	0.1725	0.0000	0.0000	0.0516	0.0105	0.0054	0.4	0.330
13	130	0.0050	0.0173	0.1898	0.0000	0.0000	0.0628	0.0112	0.0058	0.4	0.365
14	140	0.0050	0.0173	0.2070	0.0000	0.0000	0.0746	0.0118	0.0060	0.4	0.392
15	150	0.0050	0.0173	0.2243	0.0000	0.0000	0.0868	0.0122	0.0063	0.4	0.413
16	160	0.0050	0.0173	0.2415	0.0000	0.0000	0.0995	0.0127	0.0065	0.4	0.430
17	170	0.0060	0.0207	0.2622	0.0000	0.0000	0.1152	0.0157	0.0081	0.6	0.477
18	180	0.0060	0.0207	0.2829	0.0000	0.0000	0.1314	0.0162	0.0083	0.6	0.533
19	190	0.0060	0.0207	0.3036	0.0000	0.0000	0.1479	0.0166	0.0085	0.6	0.563
20	200	0.0060	0.0207	0.3243	0.0000	0.0000	0.1648	0.0169	0.0087	0.6	0.581
21	210	0.0060	0.0207	0.3450	0.0000	0.0000	0.1820	0.0172	0.0089	0.6	0.595
22	220	0.0060	0.0207	0.3657	0.0000	0.0000	0.1995	0.0175	0.0090	0.6	0.606
23	230	0.0070	0.0242	0.3899	0.0000	0.0000	0.2203	0.0207	0.0106	0.7	0.651
24	240	0.0070	0.0242	0.4140	0.0000	0.0000	0.2413	0.0210	0.0108	0.7	0.708
25	250	0.0070	0.0242	0.4382	0.0000	0.0000	0.2625	0.0213	0.0109	0.7	0.733
26	260	0.0070	0.0242	0.4623	0.0000	0.0000	0.2840	0.0215	0.0110	0.8	0.747
27	270	0.0070	0.0242	0.4865	0.0000	0.0000	0.3057	0.0217	0.0111	0.8	0.756

(1) Time Increment	(2) Time min.	(3) Rainfall distrib- ution	(4) Incre- mental Rainfall in.	(5) Accumu- lated Rainfall in.	Pervious Area		Impervious Area		(10) Total Runoff in.	(11) Instant hydro- graph cfs	(12) design hydro- graph cfs
					(6) Accumu- lated Runoff in.	(7) Incre- mental Runoff in.	(8) Accumu- lated Runoff in.	(9) Incre- mental Runoff in.			
28	280	0.0070	0.0242	0.5106	0.0000	0.0000	0.3275	0.0219	0.0113	0.8	0.764
29	290	0.0082	0.0283	0.5389	0.0006	0.0006	0.3533	0.0258	0.0135	0.9	0.822
30	300	0.0082	0.0283	0.5672	0.0018	0.0012	0.3793	0.0260	0.0139	1.0	0.902
31	310	0.0082	0.0283	0.5955	0.0035	0.0018	0.4055	0.0262	0.0143	1.0	0.946
32	320	0.0082	0.0283	0.6238	0.0058	0.0023	0.4318	0.0263	0.0147	1.0	0.978
33	330	0.0082	0.0283	0.6521	0.0087	0.0029	0.4582	0.0265	0.0150	1.0	1.004
34	340	0.0082	0.0283	0.6803	0.0121	0.0034	0.4848	0.0266	0.0153	1.1	1.028
35	350	0.0095	0.0328	0.7131	0.0167	0.0046	0.5157	0.0309	0.0181	1.2	1.108
36	360	0.0095	0.0328	0.7459	0.0220	0.0053	0.5468	0.0311	0.0185	1.3	1.208
37	370	0.0095	0.0328	0.7787	0.0279	0.0059	0.5780	0.0312	0.0189	1.3	1.259
38	380	0.0095	0.0328	0.8114	0.0345	0.0066	0.6093	0.0313	0.0193	1.3	1.293
39	390	0.0095	0.0328	0.8442	0.0417	0.0072	0.6407	0.0314	0.0196	1.3	1.320
40	400	0.0095	0.0328	0.8770	0.0494	0.0077	0.6721	0.0315	0.0199	1.4	1.345
41	410	0.0134	0.0462	0.9232	0.0613	0.0119	0.7167	0.0445	0.0287	2.0	1.560
42	420	0.0134	0.0462	0.9695	0.0742	0.0129	0.7613	0.0447	0.0293	2.0	1.844
43	430	0.0134	0.0462	1.0157	0.0882	0.0140	0.8061	0.0448	0.0298	2.0	1.965
44	440	0.0180	0.0621	1.0778	0.1085	0.0203	0.8664	0.0603	0.0409	2.8	2.272
45	450	0.0180	0.0621	1.1399	0.1304	0.0219	0.9269	0.0605	0.0418	2.9	2.647
46	460	0.0340	0.1173	1.2572	0.1760	0.0456	1.0416	0.1147	0.0811	5.6	3.692
47	470	0.0540	0.1863	1.4435	0.2585	0.0825	1.2245	0.1829	0.1341	9.2	6.153
48	480	0.0270	0.0932	1.5366	0.3038	0.0453	1.3162	0.0917	0.0692	4.7	6.700 Q peak
49	490	0.0180	0.0621	1.5987	0.3355	0.0316	1.3775	0.0612	0.0468	3.2	4.887
50	500	0.0134	0.0462	1.6450	0.3597	0.0242	1.4231	0.0456	0.0352	2.4	3.505
51	510	0.0134	0.0462	1.6912	0.3844	0.0248	1.4688	0.0457	0.0355	2.4	2.786
52	520	0.0134	0.0462	1.7374	0.4097	0.0253	1.5144	0.0457	0.0358	2.5	2.559
53	530	0.0088	0.0304	1.7678	0.4266	0.0169	1.5445	0.0300	0.0236	1.6	2.211
54	540	0.0088	0.0304	1.7981	0.4437	0.0171	1.5745	0.0300	0.0237	1.6	1.821
55	550	0.0088	0.0304	1.8285	0.4610	0.0173	1.6045	0.0300	0.0239	1.6	1.695
56	560	0.0088	0.0304	1.8589	0.4785	0.0175	1.6346	0.0300	0.0240	1.6	1.659
57	570	0.0088	0.0304	1.8892	0.4962	0.0177	1.6646	0.0301	0.0241	1.7	1.651
58	580	0.0088	0.0304	1.9196	0.5141	0.0179	1.6947	0.0301	0.0242	1.7	1.653
59	590	0.0088	0.0304	1.9499	0.5322	0.0181	1.7248	0.0301	0.0243	1.7	1.658
60	600	0.0088	0.0304	1.9803	0.5505	0.0183	1.7548	0.0301	0.0244	1.7	1.664
61	610	0.0088	0.0304	2.0107	0.5690	0.0185	1.7849	0.0301	0.0244	1.7	1.671
62	620	0.0088	0.0304	2.0410	0.5877	0.0187	1.8150	0.0301	0.0245	1.7	1.677
63	630	0.0088	0.0304	2.0714	0.6065	0.0188	1.8451	0.0301	0.0246	1.7	1.683
64	640	0.0088	0.0304	2.1017	0.6255	0.0190	1.8752	0.0301	0.0247	1.7	1.689
65	650	0.0072	0.0248	2.1266	0.6412	0.0157	1.8999	0.0246	0.0203	1.4	1.592
66	660	0.0072	0.0248	2.1514	0.6569	0.0158	1.9245	0.0246	0.0203	1.4	1.460
67	670	0.0072	0.0248	2.1763	0.6728	0.0159	1.9492	0.0246	0.0204	1.4	1.418
68	680	0.0072	0.0248	2.2011	0.6888	0.0160	1.9738	0.0247	0.0204	1.4	1.406
69	690	0.0072	0.0248	2.2259	0.7049	0.0161	1.9985	0.0247	0.0205	1.4	1.405
70	700	0.0072	0.0248	2.2508	0.7211	0.0162	2.0231	0.0247	0.0205	1.4	1.407
71	710	0.0072	0.0248	2.2756	0.7374	0.0163	2.0478	0.0247	0.0206	1.4	1.410
72	720	0.0072	0.0248	2.3005	0.7538	0.0164	2.0725	0.0247	0.0206	1.4	1.413
73	730	0.0072	0.0248	2.3253	0.7703	0.0165	2.0971	0.0247	0.0207	1.4	1.417
74	740	0.0072	0.0248	2.3501	0.7869	0.0166	2.1218	0.0247	0.0207	1.4	1.420
75	750	0.0072	0.0248	2.3750	0.8036	0.0167	2.1465	0.0247	0.0208	1.4	1.423
76	760	0.0072	0.0248	2.3998	0.8203	0.0168	2.1712	0.0247	0.0208	1.4	1.427
77	770	0.0057	0.0197	2.4195	0.8337	0.0133	2.1907	0.0195	0.0165	1.1	1.330
78	780	0.0057	0.0197	2.4392	0.8471	0.0134	2.2103	0.0195	0.0166	1.1	1.200
79	790	0.0057	0.0197	2.4588	0.8605	0.0135	2.2298	0.0195	0.0166	1.1	1.158
80	800	0.0057	0.0197	2.4785	0.8740	0.0135	2.2493	0.0195	0.0166	1.1	1.145
81	810	0.0057	0.0197	2.4981	0.8876	0.0136	2.2689	0.0195	0.0166	1.1	1.142

10-12
POST-DEN
PENTIC Q
(RESTRICT
TO 2.9)

(1) Time Increment	(2) Time min.	(3) Rainfall distrib- ution	(4) Incre- mental Rainfall in.	(5) Accumu- lated Rainfall in.	Pervious Area		Impervious Area		(10) Total Runoff in.	(11) Instant hydro- graph cfs	(12) design hydro- graph cfs
					(6) Accumu- lated Runoff in.	(7) Incre- mental Runoff in.	(8) Accumu- lated Runoff in.	(9) Incre- mental Runoff in.			
82	820	0.0057	0.0197	2.5178	0.9012	0.0136	2.2884	0.0196	0.0167	1.1	1.142
83	830	0.0057	0.0197	2.5375	0.9149	0.0137	2.3080	0.0196	0.0167	1.1	1.144
84	840	0.0057	0.0197	2.5571	0.9286	0.0137	2.3276	0.0196	0.0167	1.1	1.145
85	850	0.0057	0.0197	2.5768	0.9424	0.0138	2.3471	0.0196	0.0167	1.1	1.147
86	860	0.0057	0.0197	2.5965	0.9562	0.0138	2.3667	0.0196	0.0168	1.2	1.149
87	870	0.0057	0.0197	2.6161	0.9701	0.0139	2.3862	0.0196	0.0168	1.2	1.151
88	880	0.0057	0.0197	2.6358	0.9840	0.0139	2.4058	0.0196	0.0168	1.2	1.152
89	890	0.0050	0.0173	2.6531	0.9963	0.0123	2.4229	0.0172	0.0148	1.0	1.107
90	900	0.0050	0.0173	2.6703	1.0085	0.0123	2.4401	0.0172	0.0148	1.0	1.045
91	910	0.0050	0.0173	2.6876	1.0209	0.0123	2.4573	0.0172	0.0148	1.0	1.025
92	920	0.0050	0.0173	2.7048	1.0332	0.0124	2.4744	0.0172	0.0148	1.0	1.020
93	930	0.0050	0.0173	2.7221	1.0456	0.0124	2.4916	0.0172	0.0148	1.0	1.019
94	940	0.0050	0.0173	2.7393	1.0581	0.0124	2.5088	0.0172	0.0149	1.0	1.019
95	950	0.0050	0.0173	2.7566	1.0705	0.0125	2.5259	0.0172	0.0149	1.0	1.020
96	960	0.0050	0.0173	2.7738	1.0830	0.0125	2.5431	0.0172	0.0149	1.0	1.021
97	970	0.0050	0.0173	2.7911	1.0956	0.0125	2.5602	0.0172	0.0149	1.0	1.022
98	980	0.0050	0.0173	2.8083	1.1081	0.0126	2.5774	0.0172	0.0149	1.0	1.023
99	990	0.0050	0.0173	2.8256	1.1207	0.0126	2.5946	0.0172	0.0150	1.0	1.025
100	1000	0.0050	0.0173	2.8428	1.1334	0.0126	2.6118	0.0172	0.0150	1.0	1.026
101	1010	0.0040	0.0138	2.8566	1.1435	0.0101	2.6255	0.0137	0.0120	0.8	0.958
102	1020	0.0040	0.0138	2.8704	1.1537	0.0102	2.6392	0.0137	0.0120	0.8	0.868
103	1030	0.0040	0.0138	2.8842	1.1638	0.0102	2.6530	0.0137	0.0120	0.8	0.838
104	1040	0.0040	0.0138	2.8980	1.1740	0.0102	2.6667	0.0137	0.0120	0.8	0.829
105	1050	0.0040	0.0138	2.9118	1.1842	0.0102	2.6804	0.0137	0.0120	0.8	0.826
106	1060	0.0040	0.0138	2.9256	1.1945	0.0102	2.6942	0.0137	0.0120	0.8	0.826
107	1070	0.0040	0.0138	2.9394	1.2047	0.0103	2.7079	0.0137	0.0120	0.8	0.826
108	1080	0.0040	0.0138	2.9532	1.2150	0.0103	2.7217	0.0137	0.0121	0.8	0.827
109	1090	0.0040	0.0138	2.9670	1.2253	0.0103	2.7354	0.0137	0.0121	0.8	0.827
110	1100	0.0040	0.0138	2.9808	1.2356	0.0103	2.7491	0.0137	0.0121	0.8	0.828
111	1110	0.0040	0.0138	2.9946	1.2460	0.0103	2.7629	0.0137	0.0121	0.8	0.828
112	1120	0.0040	0.0138	3.0084	1.2563	0.0104	2.7766	0.0137	0.0121	0.8	0.829
113	1130	0.0040	0.0138	3.0222	1.2667	0.0104	2.7904	0.0137	0.0121	0.8	0.830
114	1140	0.0040	0.0138	3.0360	1.2771	0.0104	2.8041	0.0137	0.0121	0.8	0.830
115	1150	0.0040	0.0138	3.0498	1.2875	0.0104	2.8179	0.0137	0.0121	0.8	0.831
116	1160	0.0040	0.0138	3.0636	1.2979	0.0104	2.8316	0.0137	0.0121	0.8	0.832
117	1170	0.0040	0.0138	3.0774	1.3083	0.0104	2.8454	0.0137	0.0121	0.8	0.832
118	1180	0.0040	0.0138	3.0912	1.3188	0.0105	2.8591	0.0137	0.0122	0.8	0.833
119	1190	0.0040	0.0138	3.1050	1.3293	0.0105	2.8728	0.0137	0.0122	0.8	0.834
120	1200	0.0040	0.0138	3.1188	1.3398	0.0105	2.8866	0.0137	0.0122	0.8	0.834
121	1210	0.0040	0.0138	3.1326	1.3503	0.0105	2.9003	0.0137	0.0122	0.8	0.835
122	1220	0.0040	0.0138	3.1464	1.3608	0.0105	2.9141	0.0137	0.0122	0.8	0.835
123	1230	0.0040	0.0138	3.1602	1.3714	0.0106	2.9278	0.0137	0.0122	0.8	0.836
124	1240	0.0040	0.0138	3.1740	1.3820	0.0106	2.9416	0.0137	0.0122	0.8	0.837
125	1250	0.0040	0.0138	3.1878	1.3925	0.0106	2.9553	0.0137	0.0122	0.8	0.837
126	1260	0.0040	0.0138	3.2016	1.4032	0.0106	2.9691	0.0137	0.0122	0.8	0.838
127	1270	0.0040	0.0138	3.2154	1.4138	0.0106	2.9828	0.0137	0.0122	0.8	0.838
128	1280	0.0040	0.0138	3.2292	1.4244	0.0106	2.9966	0.0137	0.0122	0.8	0.839
129	1290	0.0040	0.0138	3.2430	1.4351	0.0107	3.0103	0.0138	0.0122	0.8	0.840
130	1300	0.0040	0.0138	3.2568	1.4457	0.0107	3.0241	0.0138	0.0123	0.8	0.840
131	1310	0.0040	0.0138	3.2706	1.4564	0.0107	3.0378	0.0138	0.0123	0.8	0.841
132	1320	0.0040	0.0138	3.2844	1.4671	0.0107	3.0516	0.0138	0.0123	0.8	0.841
133	1330	0.0040	0.0138	3.2982	1.4778	0.0107	3.0653	0.0138	0.0123	0.8	0.842
134	1340	0.0040	0.0138	3.3120	1.4886	0.0107	3.0791	0.0138	0.0123	0.8	0.842

(1) Time Increment	(2) Time min.	(3) Rainfall distrib- ution	(4) Incre- mental Rainfall in.	(5) Accumu- lated Rainfall in.	Pervious Area		Impervious Area		(10) Total Runoff in.	(11) Instant hydro- graph cfs	(12) design hydro- graph cfs
					(6) Accumu- lated Runoff in.	(7) Incre- mental Runoff in.	(8) Accumu- lated Runoff in.	(9) Incre- mental Runoff in.			
135	1350	0.0040	0.0138	3.3258	1.4993	0.0108	3.0928	0.0138	0.0123	0.8	0.843
136	1360	0.0040	0.0138	3.3396	1.5101	0.0108	3.1066	0.0138	0.0123	0.8	0.843
137	1370	0.0040	0.0138	3.3534	1.5209	0.0108	3.1203	0.0138	0.0123	0.8	0.844
138	1380	0.0040	0.0138	3.3672	1.5317	0.0108	3.1341	0.0138	0.0123	0.8	0.845
139	1390	0.0040	0.0138	3.3810	1.5425	0.0108	3.1479	0.0138	0.0123	0.8	0.845
140	1400	0.0040	0.0138	3.3948	1.5533	0.0108	3.1616	0.0138	0.0123	0.8	0.846
141	1410	0.0040	0.0138	3.4086	1.5642	0.0108	3.1754	0.0138	0.0123	0.8	0.846
142	1420	0.0040	0.0138	3.4224	1.5750	0.0109	3.1891	0.0138	0.0123	0.8	0.847
143	1430	0.0040	0.0138	3.4362	1.5859	0.0109	3.2029	0.0138	0.0124	0.8	0.847
144	1440	0.0040	0.0138	3.4500	1.5968	0.0109	3.2166	0.0138	0.0124	0.8	0.848
Total Volume of Runoff =										99502.298	cu. ft.
<p>(Found by summing this column and multiplying by 600. 600 is the conversion required to convert SUM(Q) in cfs to total volume in cubic feet as follows: $V = \text{SUM}(Q) \times dt$ (cu.ft.) = (cu.ft/s) x (10 min.) x (60 s/min.)</p>											

STORMWATER CALCULATION MATRIX - SANTA BARBARA HYDROGRAPGH METHOD

Date: 37945.00 POND ROUTING
 Given: Project = WOOD MS - 10-YEAR
 Average Pond Length (ft) = 120.000 System: Pond 120' long x 50' wide
 Average Pond Width (ft) = 50.000
 Orifice 1 Diameter (ft) = 0.550
 Orifice 2 Diameter (ft) = 1.000
 Height to Orifice 2 = 1.650

Orifice 2 Area 0.785 SF
 Orifice 1 Area = 0.238 SF
 Avg Pond Area = 6000.000 SF
 Column (3) = Col A:L * 600 = Incremental CFS into Pond
 Column (4) = Starting Pond Depth = Previous Remaining Pond Depth = Col (11)
 Column (5) =
 Column (6) = $2 * g * \text{Starting } h$

 Column (7) = Square Root of $2gh$
 Column (8) = Incremental Vol out = Col (7) * 0.60 * Orifice Area * 600
 Column (9) = Delta Vol = Incremental Vol in - Incremental Vol out = Col (3) - Col (8)
 Column (10) = Remaining Pond Vol = Previous Remaining Vol + Col (9)
 Column (11) = Pond Depth at End of Interval = Col (J) / Pond Area
 Column (12) = Pond CFS Discharge = Col(8) / 600

(1) Time Incr.	(2) Time min.	(3) Incr. Vol into Pond cf	(4) Starting Pond Depth ft.	(6)	(7)	(8) Incr. Vol 1 out Pond cf	(6a)	(9) Delta Vol cf
1	10	0.00	0.000	0.000	0.000	0.000	-106.26	0.000
2	20	0.00	0.000	0.000	0.000	0.000	-106.26	0.000
3	30	0.01	0.000	0.000	0.000	0.000	-106.26	0.000
4	40	6.68	0.000	0.000	0.011	0.960	-106.26	0.000
5	50	26.34	0.001	0.062	0.248	21.222	-106.20	0.000
6	60	52.63	0.002	0.117	0.341	29.195	-106.14	0.000
7	70	77.89	0.006	0.368	0.607	51.890	-105.89	0.000
8	80	100.24	0.010	0.647	0.804	68.806	-105.61	0.000
9	90	119.56	0.015	0.985	0.992	84.868	-105.28	0.000
10	100	136.20	0.021	1.357	1.165	99.632	-104.90	0.000
11	110	164.80	0.027	1.749	1.323	113.126	-104.51	0.000
12	120	198.10	0.036	2.304	1.518	129.827	-103.96	0.000
13	130	219.26	0.047	3.037	1.743	149.049	-103.22	0.000
14	140	234.93	0.059	3.790	1.947	166.519	-102.47	0.000
15	150	247.59	0.070	4.525	2.127	181.933	-101.74	0.000
16	160	258.27	0.081	5.229	2.287	195.588	-101.03	0.000
17	170	286.17	0.092	5.902	2.429	207.789	-100.36	0.000
18	180	320.09	0.105	6.743	2.597	222.105	-99.52	0.000
19	190	337.51	0.121	7.795	2.792	238.797	-98.46	0.000
20	200	348.63	0.137	8.855	2.976	254.509	-97.41	0.000
21	210	357.00	0.153	9.865	3.141	268.636	-96.40	0.000
22	220	363.88	0.168	10.813	3.288	281.253	-95.45	0.000
23	230	390.81	0.182	11.700	3.421	292.560	-94.56	0.000
24	240	424.52	0.198	12.755	3.571	305.460	-93.51	0.000
25	250	439.57	0.218	14.033	3.746	320.397	-92.23	0.000
26	260	447.95	0.238	15.312	3.913	334.681	-90.95	0.000
27	270	453.72	0.257	16.527	4.065	347.714	-89.73	0.000

(1) Time Incr.	(2) Time min.	(3) Incr. Vol into Pond cf	(4) Starting Pond Depth ft.	(6)	(7)	(8) Incr. Vol out Pond cf			(9) Delta Vol cf	
28	280	458.60	0.274	17.665	4.203	359.484	-88.59	0.000	0.000	99.11
29	290	492.99	0.291	18.729	4.328	370.150	-87.53	0.000	0.000	122.84
30	300	541.11	0.311	20.048	4.477	382.957	-86.21	0.000	0.000	158.16
31	310	567.74	0.338	21.745	4.663	398.841	-84.51	0.000	0.000	168.90
32	320	586.66	0.366	23.558	4.854	415.134	-82.70	0.000	0.000	171.53
33	330	602.52	0.394	25.399	5.040	431.050	-80.86	0.000	0.000	171.47
34	340	616.91	0.423	27.240	5.219	446.394	-79.02	0.000	0.000	170.52
35	350	664.79	0.451	29.070	5.392	461.147	-77.19	0.000	0.000	203.64
36	360	724.80	0.485	31.255	5.591	478.170	-75.00	0.000	0.000	246.63
37	370	755.39	0.526	33.903	5.823	498.007	-72.36	0.000	0.000	257.39
38	380	775.69	0.569	36.665	6.055	517.900	-69.59	0.000	0.000	257.79
39	390	792.09	0.612	39.432	6.280	537.086	-66.83	0.000	0.000	255.01
40	400	806.78	0.655	42.169	6.494	555.414	-64.09	0.000	0.000	251.37
41	410	935.82	0.697	44.867	6.698	572.906	-61.39	0.000	0.000	362.92
42	420	1106.59	0.757	48.763	6.983	597.258	-57.50	0.000	0.000	509.33
43	430	1179.29	0.842	54.229	7.364	629.848	-52.03	0.000	0.000	549.44
44	440	1362.98	0.934	60.127	7.754	663.212	-46.13	0.000	0.000	699.77
45	450	1588.21	1.050	67.638	8.224	703.417	-38.62	0.000	0.000	884.79
46	460	2215.43	1.198	77.134	8.783	751.178	-29.13	0.000	0.000	1464.25
47	470	3691.63	1.442	92.851	9.636	824.159	-13.41	0.000	0.000	2867.47
48	480	4020.13	1.920	123.628	11.119	950.993	17.37	4.168	1178.340	1890.80
49	490	2932.14	2.235	143.923	11.997	*****	37.66	6.137	1735.199	170.86
50	500	2103.29	2.263	145.757	12.073	*****	39.50	6.285	1776.942	-706.25
51	510	1671.43	2.146	138.176	11.755	*****	31.92	5.649	1597.345	-931.31
52	520	1535.10	1.990	128.180	11.322	968.343	21.92	4.682	1323.776	-757.02
53	530	1326.86	1.864	120.055	10.957	937.149	13.79	3.714	1050.148	-660.43
54	540	1092.43	1.754	112.966	10.629	909.061	6.71	2.590	732.198	-548.83
55	550	1017.26	1.663	107.075	10.348	885.041	0.82	0.903	255.300	-123.08
56	560	995.12	1.642	105.754	10.284	879.565	-0.51	0.000	0.000	115.56
57	570	990.58	1.661	106.995	10.344	884.708	0.73	0.857	242.337	-136.46
58	580	991.84	1.639	105.530	10.273	878.631	-0.73	0.000	0.000	113.21
59	590	994.96	1.658	106.745	10.332	883.675	0.49	0.696	196.910	-85.62
60	600	998.64	1.643	105.826	10.287	879.863	-0.43	0.000	0.000	118.78
61	610	1002.45	1.663	107.101	10.349	885.147	0.84	0.917	259.279	-141.98
62	620	1006.23	1.639	105.577	10.275	878.827	-0.68	0.000	0.000	127.41
63	630	1009.95	1.661	106.944	10.341	884.500	0.68	0.827	233.924	-108.47
64	640	1013.59	1.643	105.780	10.285	879.672	-0.48	0.000	0.000	133.92
65	650	955.21	1.665	107.218	10.355	885.629	0.96	0.979	276.689	-207.11
66	660	875.73	1.630	104.995	10.247	876.400	-1.27	0.000	0.000	-0.67
67	670	850.74	1.630	104.987	10.246	876.370	-1.27	0.000	0.000	-25.63
68	680	843.90	1.626	104.712	10.233	875.221	-1.55	0.000	0.000	-31.33
69	690	843.07	1.621	104.376	10.216	873.815	-1.88	0.000	0.000	-30.75
70	700	844.22	1.616	104.046	10.200	872.432	-2.21	0.000	0.000	-28.21
71	710	846.01	1.611	103.743	10.185	871.162	-2.52	0.000	0.000	-25.15
72	720	847.98	1.607	103.473	10.172	870.028	-2.79	0.000	0.000	-22.04
73	730	850.00	1.603	103.237	10.161	869.033	-3.02	0.000	0.000	-19.04
74	740	852.00	1.600	103.032	10.150	868.172	-3.23	0.000	0.000	-16.18
75	750	853.97	1.597	102.859	10.142	867.440	-3.40	0.000	0.000	-13.47
76	760	855.91	1.595	102.714	10.135	866.830	-3.55	0.000	0.000	-10.92
77	770	798.07	1.593	102.597	10.129	866.336	-3.66	0.000	0.000	-68.27
78	780	720.04	1.582	101.864	10.093	863.237	-4.40	0.000	0.000	-143.19
79	790	694.80	1.558	100.327	10.016	856.700	-5.93	0.000	0.000	-161.90
80	800	687.15	1.531	98.590	9.929	849.248	-7.67	0.000	0.000	-162.10
81	810	685.34	1.504	96.850	9.841	841.721	-9.41	0.000	0.000	-156.38

(1) Time Incr.	(2) Time min.	(3) Incr. Vol into Pond cf	(4) Starting Pond Depth ft.	(6)	(7)	(8) Incr. Vol out Pond cf	(9) Delta Vol cf
82	820	685.48	1.478	96.850	9.841	841.721	-11.09
83	830	686.25	1.452	93.494	9.669	827.012	-12.77
84	840	687.23	1.428	91.984	9.591	820.302	-14.28
85	850	688.26	1.406	90.555	9.516	813.909	-15.70
86	860	689.30	1.385	89.207	9.445	807.825	-17.05
87	870	690.34	1.365	87.935	9.377	802.045	-18.33
88	880	691.37	1.347	86.736	9.313	796.558	-19.52
89	890	663.98	1.329	85.607	9.252	791.357	-20.65
90	900	627.04	1.308	84.239	9.178	785.012	-22.02
91	910	615.23	1.282	82.544	9.085	777.072	-23.72
92	920	611.79	1.255	80.807	8.989	768.851	-25.45
93	930	611.14	1.229	79.121	8.895	760.789	-27.14
94	940	611.41	1.204	77.515	8.804	753.027	-28.75
95	950	611.98	1.180	75.995	8.717	745.607	-30.27
96	960	612.65	1.158	74.560	8.635	738.538	-31.70
97	970	613.35	1.137	73.209	8.556	731.816	-33.05
98	980	614.05	1.117	71.938	8.482	725.432	-34.32
99	990	614.74	1.098	70.742	8.411	719.379	-35.52
100	1000	615.43	1.081	69.619	8.344	713.646	-36.64
101	1010	574.97	1.065	68.565	8.280	708.222	-37.70
102	1020	520.72	1.042	67.135	8.194	700.797	-39.13
103	1030	502.92	1.012	65.202	8.075	690.635	-41.06
104	1040	497.27	0.981	63.187	7.949	679.881	-43.07
105	1050	495.66	0.951	61.227	7.825	669.253	-45.03
106	1060	495.40	0.922	59.364	7.705	658.991	-46.90
107	1070	495.59	0.895	57.608	7.590	649.172	-48.65
108	1080	495.93	0.869	55.959	7.481	639.817	-50.30
109	1090	496.31	0.845	54.415	7.377	630.926	-51.84
110	1100	496.70	0.823	52.970	7.278	622.493	-53.29
111	1110	497.10	0.802	51.620	7.185	614.508	-54.64
112	1120	497.49	0.782	50.360	7.096	606.961	-55.90
113	1130	497.89	0.764	49.185	7.013	599.839	-57.08
114	1140	498.28	0.747	48.091	6.935	593.128	-58.17
115	1150	498.66	0.731	47.072	6.861	586.817	-59.19
116	1160	499.05	0.716	46.126	6.792	580.889	-60.13
117	1170	499.43	0.703	45.248	6.727	575.331	-61.01
118	1180	499.80	0.690	44.433	6.666	570.128	-61.83
119	1190	500.18	0.678	43.678	6.609	565.264	-62.58
120	1200	500.55	0.667	42.980	6.556	560.726	-63.28
121	1210	500.91	0.657	42.334	6.506	556.496	-63.93
122	1220	501.28	0.648	41.737	6.460	552.561	-64.52
123	1230	501.64	0.640	41.187	6.418	548.905	-65.07
124	1240	502.00	0.632	40.679	6.378	545.514	-65.58
125	1250	502.35	0.624	40.212	6.341	542.374	-66.05
126	1260	502.71	0.618	39.783	6.307	539.469	-66.48
127	1270	503.06	0.612	39.388	6.276	536.787	-66.87
128	1280	503.40	0.606	39.026	6.247	534.314	-67.23
129	1290	503.75	0.601	38.694	6.220	532.038	-67.57
130	1300	504.09	0.596	38.391	6.196	529.947	-67.87
131	1310	504.43	0.592	38.113	6.174	528.028	-68.15
132	1320	504.77	0.588	37.860	6.153	526.270	-68.40
133	1330	505.10	0.584	37.629	6.134	524.664	-68.63
134	1340	505.43	0.581	37.419	6.117	523.197	-68.84

(10) Remain Total Vol in.	(11) Remain Pond Depth ft	(12) CFS Discharge
0.0	0.000	0.00
0.0	0.000	0.00
0.0	0.000	0.00
5.7	0.001	0.00
10.9	0.002	0.04
34.3	0.006	0.05
60.3	0.010	0.09
91.7	0.015	0.11
126.4	0.021	0.14
163.0	0.027	0.17
214.7	0.036	0.19
282.9	0.047	0.22
353.1	0.059	0.25
421.6	0.070	0.28
487.2	0.081	0.30
549.9	0.092	0.33
628.3	0.105	0.35
726.2	0.121	0.37
825.0	0.137	0.40
919.1	0.153	0.42
1007.4	0.168	0.45
1090.1	0.182	0.47
1188.3	0.198	0.49
1307.4	0.218	0.51
1426.6	0.238	0.53
1539.8	0.257	0.56
1645.8	0.274	0.58

(10) Remain Total Vol in.	(11) Remain Pond Depth ft	(12) CFS Discharge
1744.9	0.291	0.60
1867.8	0.311	0.62
2025.9	0.338	0.64
2194.8	0.366	0.66
2366.4	0.394	0.69
2537.8	0.423	0.72
2708.4	0.451	0.74
2912.0	0.485	0.77
3158.6	0.526	0.80
3416.0	0.569	0.83
3673.8	0.612	0.86
3928.8	0.655	0.90
4180.2	0.697	0.93
4543.1	0.757	0.95
5052.4	0.842	1.00
5601.9	0.934	1.05
6301.6	1.050	1.11
7186.4	1.198	1.17
8650.7	1.442	1.25
11518.2	1.920	1.37
13499.0	2.235	1.58
13579.8	2.263	1.71
12873.6	2.146	1.72
11942.2	1.990	1.68
11185.2	1.864	1.61
10524.8	1.754	1.56
9976.0	1.663	1.52
9852.9	1.642	1.48
9968.4	1.661	1.47
9832.0	1.639	1.47
9945.2	1.658	1.46
9859.6	1.643	1.47
9978.3	1.663	1.47
9836.4	1.639	1.48
9963.8	1.661	1.46
9855.3	1.643	1.47
9989.2	1.665	1.47
9782.1	1.630	1.48
9781.4	1.630	1.46
9755.8	1.626	1.46
9724.5	1.621	1.46
9693.7	1.616	1.46
9665.5	1.611	1.45
9640.4	1.607	1.45
9618.3	1.603	1.45
9599.3	1.600	1.45
9583.1	1.597	1.45
9569.7	1.595	1.45
9558.7	1.593	1.44
9490.5	1.582	1.44
9347.3	1.558	1.44
9185.4	1.531	1.43
9023.3	1.504	1.42
8866.9	1.478	1.40

*Restricted
below 2.9*

(10) Remain Total Vol in.	(11) Remain Pond Depth ft	(12) CFS Discharge
8710.7	1.452	1.40
8569.9	1.428	1.38
8436.8	1.406	1.37
8311.2	1.385	1.36
8192.7	1.365	1.35
8081.0	1.347	1.34
7975.8	1.329	1.33
7848.4	1.308	1.32
7690.4	1.282	1.31
7528.6	1.255	1.30
7371.5	1.229	1.28
7221.9	1.204	1.27
7080.2	1.180	1.26
6946.6	1.158	1.24
6820.7	1.137	1.23
6702.3	1.117	1.22
6590.9	1.098	1.21
6486.2	1.081	1.20
6388.0	1.065	1.19
6254.8	1.042	1.18
6074.7	1.012	1.17
5887.0	0.981	1.15
5704.4	0.951	1.13
5530.8	0.922	1.12
5367.2	0.895	1.10
5213.6	0.869	1.08
5069.7	0.845	1.07
4935.1	0.823	1.05
4809.3	0.802	1.04
4691.9	0.782	1.02
4582.4	0.764	1.01
4480.5	0.747	1.00
4385.6	0.731	0.99
4297.5	0.716	0.98
4215.6	0.703	0.97
4139.7	0.690	0.96
4069.4	0.678	0.95
4004.3	0.667	0.94
3944.1	0.657	0.93
3888.6	0.648	0.93
3837.3	0.640	0.92
3790.0	0.632	0.91
3746.5	0.624	0.91
3706.5	0.618	0.90
3669.7	0.612	0.90
3636.0	0.606	0.89
3605.1	0.601	0.89
3576.8	0.596	0.89
3550.9	0.592	0.88
3527.3	0.588	0.88
3505.8	0.584	0.88
3486.3	0.581	0.87
3468.5	0.578	0.87

(10) Remain Total Vol in.	(11) Remain Pond Depth ft	(12) CFS Discharge
3452.4	0.575	0.87
3437.8	0.573	0.87
3424.7	0.571	0.87
3412.8	0.569	0.86
3402.2	0.567	0.86
3392.7	0.565	0.86
3384.3	0.564	0.86
3376.8	0.563	0.86
3370.1	0.562	0.86
3364.3	0.561	0.86

STORMWATER CALCULATION MATRIX - SANTA BARBARA HYDROGRAPGH METHOD

Date: Jun-04
 Given: Project = WOOD MS
 Area = 11.34 acres
 Pt = 3.9 inches 25-Year / 24 Hour Storm
 dt = 10 min.
 Tc = 40 min. (Pre-Developed Site Conditions)
PERVIOUS Parcel **IMPERVIOUS Parcel**
 Area = 11.34 acres Area = 0 acres
 CN = 82 CN = 98
 S = 2.20 S = 0.20
 0.2S = 0.44 0.2S = 0.04

Compute: Developed Conditions Runoff hydrograph

Column (3) = SCS Type IA Rainfall Distribution
 Column (4) = Col. (3) x Pt = 10 year - 24 Hour Hyetograph at this location.
 Column (5) = Accumulated Sum of Col. (4)
 Column (6) = [If P <= 0.2S] = 0; Note, use PERVIOUS Area "S" value.
 [If P > 0.2S] = (Col.(5) - 0.2S)^2 / (Col.(5) + 0.8S); Using the PERVIOUS Area "S" value.
 Column (7) = Col.(6) of Present Time Step - Col.(6) of Previous Time Step
 Column (8) = Same method as for Col.(6), except use the IMPERVIOUS Area "S" value.
 Column (9) = Col.(8) of the present time step - Col.(8) of the previous time step.
 Column (10) = ((PERVIOUS area / Total area) x Col.(7)) + ((IMPERVIOUS area / Total area) x Col.(9))
 Column (11) = (60.5 x Col.(10) x Total Area) / 10 (dt = 10 minutes)
 Routing Constant, w = dt / (2Tc + dt) = 0.1111
 Column (12) = Col.(12) of Previous Time Step + (w x [Col.(11) of Previous Time Step
 + Col.(11) of Present Time Step - (2 x Col.(12) of Previous Time Step)])

(1) Time Increment	(2) Time min.	(3) Rainfall distrib- ution % of Pt	(4) Incre- mental Rainfall in.	(5) Accumu- lated Rainfall in.	(6) Accumu- lated Runoff in.	(7) Incre- mental Runoff in.	(8) Accumu- lated Runoff in.	(9) Incre- mental Runoff in.	(10) Total Runoff in.	(11) Instant hydro- graph cfs	(12) design hydro- graph cfs
1	10	0.0040	0.0156	0.0156	0.0000	0.0000	0.0000	0.0000	0.0000	0.0	0.000
2	20	0.0040	0.0156	0.0312	0.0000	0.0000	0.0000	0.0000	0.0000	0.0	0.000
3	30	0.0040	0.0156	0.0468	0.0000	0.0000	0.0002	0.0002	0.0000	0.0	0.000
4	40	0.0040	0.0156	0.0624	0.0000	0.0000	0.0021	0.0019	0.0000	0.0	0.000
5	50	0.0040	0.0156	0.0780	0.0000	0.0000	0.0057	0.0037	0.0000	0.0	0.000
6	60	0.0040	0.0156	0.0936	0.0000	0.0000	0.0108	0.0051	0.0000	0.0	0.000
7	70	0.0040	0.0156	0.1092	0.0000	0.0000	0.0172	0.0063	0.0000	0.0	0.000
8	80	0.0040	0.0156	0.1248	0.0000	0.0000	0.0245	0.0073	0.0000	0.0	0.000
9	90	0.0040	0.0156	0.1404	0.0000	0.0000	0.0327	0.0082	0.0000	0.0	0.000
10	100	0.0040	0.0156	0.1560	0.0000	0.0000	0.0416	0.0089	0.0000	0.0	0.000
11	110	0.0050	0.0195	0.1755	0.0000	0.0000	0.0535	0.0120	0.0000	0.0	0.000
12	120	0.0050	0.0195	0.1950	0.0000	0.0000	0.0664	0.0128	0.0000	0.0	0.000
13	130	0.0050	0.0195	0.2145	0.0000	0.0000	0.0799	0.0135	0.0000	0.0	0.000
14	140	0.0050	0.0195	0.2340	0.0000	0.0000	0.0939	0.0141	0.0000	0.0	0.000
15	150	0.0050	0.0195	0.2535	0.0000	0.0000	0.1085	0.0146	0.0000	0.0	0.000
16	160	0.0050	0.0195	0.2730	0.0000	0.0000	0.1236	0.0150	0.0000	0.0	0.000
17	170	0.0060	0.0234	0.2964	0.0000	0.0000	0.1421	0.0185	0.0000	0.0	0.000
18	180	0.0060	0.0234	0.3198	0.0000	0.0000	0.1611	0.0190	0.0000	0.0	0.000
19	190	0.0060	0.0234	0.3432	0.0000	0.0000	0.1805	0.0194	0.0000	0.0	0.000
20	200	0.0060	0.0234	0.3666	0.0000	0.0000	0.2003	0.0198	0.0000	0.0	0.000
21	210	0.0060	0.0234	0.3900	0.0000	0.0000	0.2204	0.0201	0.0000	0.0	0.000
22	220	0.0060	0.0234	0.4134	0.0000	0.0000	0.2407	0.0203	0.0000	0.0	0.000
23	230	0.0070	0.0273	0.4407	0.0000	0.0000	0.2648	0.0240	0.0000	0.0	0.000
24	240	0.0070	0.0273	0.4680	0.0004	0.0004	0.2891	0.0243	0.0004	0.0	0.003
25	250	0.0070	0.0273	0.4953	0.0014	0.0010	0.3136	0.0246	0.0010	0.1	0.013
26	260	0.0070	0.0273	0.5226	0.0031	0.0017	0.3384	0.0248	0.0017	0.1	0.031
27	270	0.0070	0.0273	0.5499	0.0053	0.0023	0.3634	0.0250	0.0023	0.2	0.054

(1) Time Increment	(2) Time min.	(3) Rainfall distri- bution	(4) Incre- mental Rainfall in.	(5) Accumu- lated Rainfall in.	Pervious Area		Impervious Area		(10) Total Runoff in.	(11) Instant hydro- graph cfs	(12) design hydro- graph cfs
					(6) Accumu- lated Runoff in.	(7) Incre- mental Runoff in.	(8) Accumu- lated Runoff in.	(9) Incre- mental Runoff in.			
28	280	0.0070	0.0273	0.5772	0.0082	0.0029	0.3885	0.0251	0.0029	0.2	0.081
29	290	0.0082	0.0320	0.6092	0.0122	0.0041	0.4182	0.0297	0.0041	0.3	0.115
30	300	0.0082	0.0320	0.6412	0.0170	0.0048	0.4480	0.0298	0.0048	0.3	0.157
31	310	0.0082	0.0320	0.6731	0.0226	0.0055	0.4780	0.0300	0.0055	0.4	0.201
32	320	0.0082	0.0320	0.7051	0.0288	0.0062	0.5082	0.0301	0.0062	0.4	0.246
33	330	0.0082	0.0320	0.7371	0.0356	0.0069	0.5385	0.0303	0.0069	0.5	0.291
34	340	0.0082	0.0320	0.7691	0.0431	0.0075	0.5689	0.0304	0.0075	0.5	0.336
35	350	0.0095	0.0371	0.8061	0.0526	0.0095	0.6042	0.0353	0.0095	0.6	0.390
36	360	0.0095	0.0371	0.8432	0.0628	0.0102	0.6397	0.0355	0.0102	0.7	0.454
37	370	0.0095	0.0371	0.8802	0.0738	0.0110	0.6752	0.0356	0.0110	0.8	0.515
38	380	0.0095	0.0371	0.9173	0.0856	0.0117	0.7109	0.0357	0.0117	0.8	0.574
39	390	0.0095	0.0371	0.9543	0.0980	0.0124	0.7467	0.0358	0.0124	0.9	0.630
40	400	0.0095	0.0371	0.9914	0.1110	0.0131	0.7826	0.0359	0.0131	0.9	0.684
41	410	0.0134	0.0523	1.0436	0.1306	0.0195	0.8333	0.0507	0.0195	1.3	0.781
42	420	0.0134	0.0523	1.0959	0.1513	0.0207	0.8841	0.0508	0.0207	1.4	0.914
43	430	0.0134	0.0523	1.1482	0.1732	0.0219	0.9350	0.0509	0.0219	1.5	1.036
44	440	0.0180	0.0702	1.2184	0.2042	0.0310	1.0036	0.0686	0.0310	2.1	1.209
45	450	0.0180	0.0702	1.2886	0.2370	0.0328	1.0723	0.0687	0.0328	2.3	1.427
46	460	0.0340	0.1326	1.4212	0.3036	0.0666	1.2025	0.1302	0.0666	4.6	1.868
47	470	0.0540	0.2106	1.6318	0.4199	0.1163	1.4101	0.2075	0.1163	8.0	2.847
48	480	0.0270	0.1053	1.7371	0.4823	0.0624	1.5141	0.1040	0.0624	4.3	3.572
49	490	0.0180	0.0702	1.8073	0.5254	0.0430	1.5835	0.0694	0.0430	3.0	3.586
50	500	0.0134	0.0523	1.8595	0.5581	0.0327	1.6352	0.0517	0.0327	2.2	3.566
51	510	0.0134	0.0523	1.9118	0.5914	0.0333	1.6870	0.0517	0.0333	2.3	3.121
52	520	0.0134	0.0523	1.9640	0.6252	0.0338	1.7387	0.0518	0.0338	2.3	2.939
53	530	0.0088	0.0343	1.9984	0.6476	0.0225	1.7727	0.0340	0.0225	1.5	2.715
54	540	0.0088	0.0343	2.0327	0.6703	0.0227	1.8067	0.0340	0.0227	1.6	2.456
55	550	0.0088	0.0343	2.0670	0.6932	0.0229	1.8408	0.0340	0.0229	1.6	2.258
56	560	0.0088	0.0343	2.1013	0.7163	0.0231	1.8748	0.0340	0.0231	1.6	2.107
57	570	0.0088	0.0343	2.1356	0.7396	0.0233	1.9089	0.0340	0.0233	1.6	1.992
58	580	0.0088	0.0343	2.1700	0.7631	0.0235	1.9429	0.0341	0.0235	1.6	1.906
59	590	0.0088	0.0343	2.2043	0.7868	0.0237	1.9770	0.0341	0.0237	1.6	1.842
60	600	0.0088	0.0343	2.2386	0.8107	0.0239	2.0110	0.0341	0.0239	1.6	1.795
61	610	0.0088	0.0343	2.2729	0.8347	0.0240	2.0451	0.0341	0.0240	1.6	1.762
62	620	0.0088	0.0343	2.3072	0.8590	0.0242	2.0792	0.0341	0.0242	1.7	1.738
63	630	0.0088	0.0343	2.3416	0.8833	0.0244	2.1133	0.0341	0.0244	1.7	1.722
64	640	0.0088	0.0343	2.3759	0.9079	0.0246	2.1474	0.0341	0.0246	1.7	1.713
65	650	0.0072	0.0281	2.4040	0.9281	0.0202	2.1753	0.0279	0.0202	1.4	1.673
66	660	0.0072	0.0281	2.4320	0.9484	0.0203	2.2032	0.0279	0.0203	1.4	1.610
67	670	0.0072	0.0281	2.4601	0.9688	0.0204	2.2311	0.0279	0.0204	1.4	1.563
68	680	0.0072	0.0281	2.4882	0.9894	0.0205	2.2590	0.0279	0.0205	1.4	1.528
69	690	0.0072	0.0281	2.5163	1.0100	0.0206	2.2869	0.0279	0.0206	1.4	1.502
70	700	0.0072	0.0281	2.5444	1.0307	0.0207	2.3148	0.0279	0.0207	1.4	1.483
71	710	0.0072	0.0281	2.5724	1.0515	0.0208	2.3428	0.0279	0.0208	1.4	1.470
72	720	0.0072	0.0281	2.6005	1.0724	0.0209	2.3707	0.0279	0.0209	1.4	1.461
73	730	0.0072	0.0281	2.6286	1.0934	0.0210	2.3986	0.0279	0.0210	1.4	1.456
74	740	0.0072	0.0281	2.6567	1.1145	0.0211	2.4266	0.0279	0.0211	1.4	1.453
75	750	0.0072	0.0281	2.6848	1.1357	0.0212	2.4545	0.0279	0.0212	1.5	1.453
76	760	0.0072	0.0281	2.7128	1.1569	0.0213	2.4824	0.0279	0.0213	1.5	1.453
77	770	0.0057	0.0222	2.7351	1.1738	0.0169	2.5045	0.0221	0.0169	1.2	1.421
78	780	0.0057	0.0222	2.7573	1.1908	0.0169	2.5267	0.0221	0.0169	1.2	1.363
79	790	0.0057	0.0222	2.7795	1.2078	0.0170	2.5488	0.0221	0.0170	1.2	1.319
80	800	0.0057	0.0222	2.8018	1.2248	0.0170	2.5709	0.0221	0.0170	1.2	1.285
81	810	0.0057	0.0222	2.8240	1.2419	0.0171	2.5930	0.0221	0.0171	1.2	1.260

Q peak
Peak
Pre-Dew
(25-11)

(1) Time Increment	(2) Time min.	(3) Rainfall distrib- ution	(4) Incre- mental Rainfall in.	(5) Accumu- lated Rainfall in.	Pervious Area		Impervious Area		(10) Total Runoff in.	(11) Instant hydro- graph cfs	(12) design hydro- graph cfs
					(6) Accumu- lated Runoff in.	(7) Incre- mental Runoff in.	(8) Accumu- lated Runoff in.	(9) Incre- mental Runoff in.			
82	820	0.0057	0.0222	2.8462	1.2591	0.0171	2.6152	0.0221	0.0171	1.2	1.241
83	830	0.0057	0.0222	2.8685	1.2763	0.0172	2.6373	0.0221	0.0172	1.2	1.227
84	840	0.0057	0.0222	2.8907	1.2935	0.0172	2.6594	0.0221	0.0172	1.2	1.217
85	850	0.0057	0.0222	2.9129	1.3108	0.0173	2.6816	0.0221	0.0173	1.2	1.210
86	860	0.0057	0.0222	2.9351	1.3281	0.0173	2.7037	0.0221	0.0173	1.2	1.205
87	870	0.0057	0.0222	2.9574	1.3455	0.0174	2.7258	0.0221	0.0174	1.2	1.202
88	880	0.0057	0.0222	2.9796	1.3630	0.0174	2.7480	0.0221	0.0174	1.2	1.200
89	890	0.0050	0.0195	2.9991	1.3783	0.0153	2.7674	0.0194	0.0153	1.1	1.183
90	900	0.0050	0.0195	3.0186	1.3936	0.0154	2.7868	0.0194	0.0154	1.1	1.154
91	910	0.0050	0.0195	3.0381	1.4090	0.0154	2.8062	0.0194	0.0154	1.1	1.132
92	920	0.0050	0.0195	3.0576	1.4245	0.0154	2.8256	0.0194	0.0154	1.1	1.116
93	930	0.0050	0.0195	3.0771	1.4399	0.0155	2.8451	0.0194	0.0155	1.1	1.103
94	940	0.0050	0.0195	3.0966	1.4554	0.0155	2.8645	0.0194	0.0155	1.1	1.094
95	950	0.0050	0.0195	3.1161	1.4709	0.0155	2.8839	0.0194	0.0155	1.1	1.087
96	960	0.0050	0.0195	3.1356	1.4865	0.0156	2.9033	0.0194	0.0156	1.1	1.083
97	970	0.0050	0.0195	3.1551	1.5021	0.0156	2.9228	0.0194	0.0156	1.1	1.079
98	980	0.0050	0.0195	3.1746	1.5177	0.0156	2.9422	0.0194	0.0156	1.1	1.078
99	990	0.0050	0.0195	3.1941	1.5334	0.0157	2.9616	0.0194	0.0157	1.1	1.076
100	1000	0.0050	0.0195	3.2136	1.5490	0.0157	2.9810	0.0194	0.0157	1.1	1.076
101	1010	0.0040	0.0156	3.2292	1.5616	0.0126	2.9966	0.0155	0.0126	0.9	1.052
102	1020	0.0040	0.0156	3.2448	1.5742	0.0126	3.0121	0.0155	0.0126	0.9	1.010
103	1030	0.0040	0.0156	3.2604	1.5868	0.0126	3.0277	0.0155	0.0126	0.9	0.978
104	1040	0.0040	0.0156	3.2760	1.5994	0.0126	3.0432	0.0155	0.0126	0.9	0.953
105	1050	0.0040	0.0156	3.2916	1.6121	0.0126	3.0588	0.0155	0.0126	0.9	0.934
106	1060	0.0040	0.0156	3.3072	1.6247	0.0127	3.0743	0.0155	0.0127	0.9	0.919
107	1070	0.0040	0.0156	3.3228	1.6374	0.0127	3.0898	0.0155	0.0127	0.9	0.908
108	1080	0.0040	0.0156	3.3384	1.6501	0.0127	3.1054	0.0155	0.0127	0.9	0.900
109	1090	0.0040	0.0156	3.3540	1.6628	0.0127	3.1209	0.0155	0.0127	0.9	0.893
110	1100	0.0040	0.0156	3.3696	1.6755	0.0127	3.1365	0.0155	0.0127	0.9	0.889
111	1110	0.0040	0.0156	3.3852	1.6883	0.0127	3.1520	0.0155	0.0127	0.9	0.885
112	1120	0.0040	0.0156	3.4008	1.7010	0.0128	3.1676	0.0155	0.0128	0.9	0.883
113	1130	0.0040	0.0156	3.4164	1.7138	0.0128	3.1831	0.0155	0.0128	0.9	0.882
114	1140	0.0040	0.0156	3.4320	1.7266	0.0128	3.1987	0.0155	0.0128	0.9	0.881
115	1150	0.0040	0.0156	3.4476	1.7394	0.0128	3.2142	0.0155	0.0128	0.9	0.880
116	1160	0.0040	0.0156	3.4632	1.7523	0.0128	3.2298	0.0156	0.0128	0.9	0.880
117	1170	0.0040	0.0156	3.4788	1.7651	0.0128	3.2453	0.0156	0.0128	0.9	0.880
118	1180	0.0040	0.0156	3.4944	1.7780	0.0129	3.2609	0.0156	0.0129	0.9	0.881
119	1190	0.0040	0.0156	3.5100	1.7909	0.0129	3.2764	0.0156	0.0129	0.9	0.881
120	1200	0.0040	0.0156	3.5256	1.8038	0.0129	3.2920	0.0156	0.0129	0.9	0.882
121	1210	0.0040	0.0156	3.5412	1.8167	0.0129	3.3075	0.0156	0.0129	0.9	0.883
122	1220	0.0040	0.0156	3.5568	1.8296	0.0129	3.3231	0.0156	0.0129	0.9	0.884
123	1230	0.0040	0.0156	3.5724	1.8426	0.0129	3.3387	0.0156	0.0129	0.9	0.884
124	1240	0.0040	0.0156	3.5880	1.8555	0.0130	3.3542	0.0156	0.0130	0.9	0.885
125	1250	0.0040	0.0156	3.6036	1.8685	0.0130	3.3698	0.0156	0.0130	0.9	0.886
126	1260	0.0040	0.0156	3.6192	1.8815	0.0130	3.3853	0.0156	0.0130	0.9	0.887
127	1270	0.0040	0.0156	3.6348	1.8945	0.0130	3.4009	0.0156	0.0130	0.9	0.888
128	1280	0.0040	0.0156	3.6504	1.9075	0.0130	3.4164	0.0156	0.0130	0.9	0.889
129	1290	0.0040	0.0156	3.6660	1.9205	0.0130	3.4320	0.0156	0.0130	0.9	0.890
130	1300	0.0040	0.0156	3.6816	1.9336	0.0131	3.4475	0.0156	0.0131	0.9	0.891
131	1310	0.0040	0.0156	3.6972	1.9467	0.0131	3.4631	0.0156	0.0131	0.9	0.892
132	1320	0.0040	0.0156	3.7128	1.9597	0.0131	3.4786	0.0156	0.0131	0.9	0.893
133	1330	0.0040	0.0156	3.7284	1.9728	0.0131	3.4942	0.0156	0.0131	0.9	0.894
134	1340	0.0040	0.0156	3.7440	1.9859	0.0131	3.5098	0.0156	0.0131	0.9	0.895

(1) Time Increment	(2) Time min.	(3) Rainfall distri- bution	(4) Incre- mental Rainfall in.	(5) Accumu- lated Rainfall in.	Pervious Area		Impervious Area		(10) Total Runoff in.	(11) Instant hydro- graph cfs	(12) design hydro- graph cfs
					(6) Accumu- lated Runoff in.	(7) Incre- mental Runoff in.	(8) Accumu- lated Runoff in.	(9) Incre- mental Runoff in.			
135	1350	0.0040	0.0156	3.7596	1.9991	0.0131	3.5253	0.0156	0.0131	0.9	0.896
136	1360	0.0040	0.0156	3.7752	2.0122	0.0131	3.5409	0.0156	0.0131	0.9	0.897
137	1370	0.0040	0.0156	3.7908	2.0253	0.0132	3.5564	0.0156	0.0132	0.9	0.898
138	1380	0.0040	0.0156	3.8064	2.0385	0.0132	3.5720	0.0156	0.0132	0.9	0.899
139	1390	0.0040	0.0156	3.8220	2.0517	0.0132	3.5876	0.0156	0.0132	0.9	0.900
140	1400	0.0040	0.0156	3.8376	2.0649	0.0132	3.6031	0.0156	0.0132	0.9	0.901
141	1410	0.0040	0.0156	3.8532	2.0781	0.0132	3.6187	0.0156	0.0132	0.9	0.902
142	1420	0.0040	0.0156	3.8688	2.0913	0.0132	3.6342	0.0156	0.0132	0.9	0.903
143	1430	0.0040	0.0156	3.8844	2.1045	0.0132	3.6498	0.0156	0.0132	0.9	0.904
144	1440	0.0040	0.0156	3.9000	2.1178	0.0132	3.6654	0.0156	0.0132	0.9	0.905
Total Volume of Runoff =										85003.654	cu. ft.
<p>(Found by summing this column and multiplying by 600. 600 is the conversion required to convert SUM(Q) in cfs to total volume in cubic feet as follows: $V = \text{SUM}(Q) \times dt$ $(\text{cu.ft.}) = (\text{cu.ft./s}) \times (10 \text{ min.}) \times (60 \text{ s/min.})$)</p>											

STORMWATER CALCULATION MATRIX - SANTA BARBARA HYDROGRAPGH METHOD

Date: **Nov-03**
 Given: **Project = WOOD MS**
Area = 11.34 acres
Pt = 3.9 inches 25-Year / 24 Hour Storm
dt = 10 min.
Tc = 10 min. (Post-Developed Site Conditions)
PERVIOUS Parcel IMPERVIOUS Parcel
Area = 5.51 acres Area = 5.83 acres
CN = 80 CN = 98
S = 2.50 S = 0.20
0.2S = 0.50 0.2S = 0.04

Compute: Developed Conditions Runoff hydrograph

Column (3) = SCS Type IA Rainfall Distribution
 Column (4) = Col. (3) x Pt = 10 year - 24 Hour Hyetograph at this location.
 Column (5) = Accumulated Sum of Col. (4)
 Column (6) = [If P <= 0.2S] = 0; Note, use PERVIOUS Area "S" value.
 [If P > 0.2S] = (Col.(5) - 0.2S)^2 / (Col.(5) + 0.8S); Using the PERVIOUS Area "S" value.
 Column (7) = Col.(6) of Present Time Step - Col.(6) of Previous Time Step
 Column (8) = Same method as for Col.(6), except use the IMPERVIOUS Area "S" value.
 Column (9) = Col.(8) of the present time step - Col.(8) of the previous time step.
 Column (10) = ((PERVIOUS area / Total area) x Col.(7)) + ((IMPERVIOUS area / Total area) x Col.(9))
 Column (11) = (60.5 x Col.(10) x Total Area) / 10 (dt = 10 minutes)
 Routing Constant, w = dt / (2Tc + dt) = 0.3333
 Column (12) = Col.(12) of Previous Time Step + (w x [Col.(11) of Previous Time Step + Col.(11) of Present Time Step - (2 x Col.(12) of Previous Time Step)])

(1) Time Increment	(2) Time min.	(3) Rainfall distrib- ution % of Pt	(4) Incre- mental Rainfall in.	(5) Accumu- lated Rainfall in.	Pervious Area		Impervious Area		(10) Total Runoff in.	(11) Instant hydro- graph cfs	(12) design hydro- graph cfs
					(6) Accumu- lated Runoff in.	(7) Incre- mental Runoff in.	(8) Accumu- lated Runoff in.	(9) Incre- mental Runoff in.			
1	10	0.0040	0.0156	0.0156	0.0000	0.0000	0.0000	0.0000	0.0000	0.0	0.000
2	20	0.0040	0.0156	0.0312	0.0000	0.0000	0.0000	0.0000	0.0000	0.0	0.000
3	30	0.0040	0.0156	0.0468	0.0000	0.0000	0.0002	0.0002	0.0001	0.0	0.002
4	40	0.0040	0.0156	0.0624	0.0000	0.0000	0.0021	0.0019	0.0010	0.1	0.025
5	50	0.0040	0.0156	0.0780	0.0000	0.0000	0.0057	0.0037	0.0019	0.1	0.074
6	60	0.0040	0.0156	0.0936	0.0000	0.0000	0.0108	0.0051	0.0026	0.2	0.128
7	70	0.0040	0.0156	0.1092	0.0000	0.0000	0.0172	0.0063	0.0032	0.2	0.177
8	80	0.0040	0.0156	0.1248	0.0000	0.0000	0.0245	0.0073	0.0038	0.3	0.219
9	90	0.0040	0.0156	0.1404	0.0000	0.0000	0.0327	0.0082	0.0042	0.3	0.255
10	100	0.0040	0.0156	0.1560	0.0000	0.0000	0.0416	0.0089	0.0046	0.3	0.286
11	110	0.0050	0.0195	0.1755	0.0000	0.0000	0.0535	0.0120	0.0062	0.4	0.341
12	120	0.0050	0.0195	0.1950	0.0000	0.0000	0.0664	0.0128	0.0066	0.5	0.405
13	130	0.0050	0.0195	0.2145	0.0000	0.0000	0.0799	0.0135	0.0069	0.5	0.444
14	140	0.0050	0.0195	0.2340	0.0000	0.0000	0.0939	0.0141	0.0072	0.5	0.472
15	150	0.0050	0.0195	0.2535	0.0000	0.0000	0.1085	0.0146	0.0075	0.5	0.495
16	160	0.0050	0.0195	0.2730	0.0000	0.0000	0.1236	0.0150	0.0077	0.5	0.513
17	170	0.0060	0.0234	0.2964	0.0000	0.0000	0.1421	0.0185	0.0095	0.7	0.566
18	180	0.0060	0.0234	0.3198	0.0000	0.0000	0.1611	0.0190	0.0098	0.7	0.630
19	190	0.0060	0.0234	0.3432	0.0000	0.0000	0.1805	0.0194	0.0100	0.7	0.662
20	200	0.0060	0.0234	0.3666	0.0000	0.0000	0.2003	0.0198	0.0102	0.7	0.681
21	210	0.0060	0.0234	0.3900	0.0000	0.0000	0.2204	0.0201	0.0103	0.7	0.696
22	220	0.0060	0.0234	0.4134	0.0000	0.0000	0.2407	0.0203	0.0105	0.7	0.707
23	230	0.0070	0.0273	0.4407	0.0000	0.0000	0.2648	0.0240	0.0124	0.8	0.757
24	240	0.0070	0.0273	0.4680	0.0000	0.0000	0.2891	0.0243	0.0125	0.9	0.821
25	250	0.0070	0.0273	0.4953	0.0000	0.0000	0.3136	0.0246	0.0126	0.9	0.848
26	260	0.0070	0.0273	0.5226	0.0002	0.0002	0.3384	0.0248	0.0128	0.9	0.865
27	270	0.0070	0.0273	0.5499	0.0010	0.0008	0.3634	0.0250	0.0132	0.9	0.884

(1) Time Increment	(2) Time min.	(3) Rainfall distrib- ution	(4) Incre- mental Rainfall in.	(5) Accum- lated Rainfall in.	Pervious Area		Impervious Area		(10) Total Runoff in.	(11) Instant hydro- graph cfs	(12) design hydro- graph cfs
					(6) Accumu- lated Runoff in.	(7) Incre- mental Runoff in.	(8) Accumu- lated Runoff in.	(9) Incre- mental Runoff in.			
28	280	0.0070	0.0273	0.5772	0.0023	0.0013	0.3885	0.0251	0.0136	0.9	0.908
29	290	0.0082	0.0320	0.6092	0.0046	0.0023	0.4182	0.0297	0.0163	1.1	0.987
30	300	0.0082	0.0320	0.6412	0.0075	0.0030	0.4480	0.0298	0.0168	1.2	1.086
31	310	0.0082	0.0320	0.6731	0.0112	0.0037	0.4780	0.0300	0.0172	1.2	1.140
32	320	0.0082	0.0320	0.7051	0.0156	0.0043	0.5082	0.0301	0.0176	1.2	1.176
33	330	0.0082	0.0320	0.7371	0.0205	0.0050	0.5385	0.0303	0.0180	1.2	1.206
34	340	0.0082	0.0320	0.7691	0.0261	0.0056	0.5689	0.0304	0.0184	1.3	1.233
35	350	0.0095	0.0371	0.8061	0.0334	0.0072	0.6042	0.0353	0.0217	1.5	1.327
36	360	0.0095	0.0371	0.8432	0.0414	0.0080	0.6397	0.0355	0.0221	1.5	1.445
37	370	0.0095	0.0371	0.8802	0.0502	0.0088	0.6752	0.0356	0.0226	1.5	1.504
38	380	0.0095	0.0371	0.9173	0.0597	0.0095	0.7109	0.0357	0.0230	1.6	1.542
39	390	0.0095	0.0371	0.9543	0.0699	0.0102	0.7467	0.0358	0.0233	1.6	1.573
40	400	0.0095	0.0371	0.9914	0.0807	0.0108	0.7826	0.0359	0.0237	1.6	1.600
41	410	0.0134	0.0523	1.0436	0.0971	0.0164	0.8333	0.0507	0.0340	2.3	1.854
42	420	0.0134	0.0523	1.0959	0.1147	0.0176	0.8841	0.0508	0.0347	2.4	2.189
43	430	0.0134	0.0523	1.1482	0.1334	0.0187	0.9350	0.0509	0.0353	2.4	2.330
44	440	0.0180	0.0702	1.2184	0.1603	0.0269	1.0036	0.0686	0.0483	3.3	2.689
45	450	0.0180	0.0702	1.2886	0.1891	0.0287	1.0723	0.0687	0.0493	3.4	3.129
46	460	0.0340	0.1326	1.4212	0.2480	0.0589	1.2025	0.1302	0.0956	6.6	4.356
47	470	0.0540	0.2106	1.6318	0.3527	0.1047	1.4101	0.2075	0.1575	10.8	7.241
48	480	0.0270	0.1053	1.7371	0.4095	0.0568	1.5141	0.1040	0.0811	5.6	7.870
49	490	0.0180	0.0702	1.8073	0.4489	0.0394	1.5835	0.0694	0.0548	3.8	5.731
50	500	0.0134	0.0523	1.8595	0.4789	0.0300	1.6352	0.0517	0.0412	2.8	4.106
51	510	0.0134	0.0523	1.9118	0.5095	0.0306	1.6870	0.0517	0.0415	2.8	3.259
52	520	0.0134	0.0523	1.9640	0.5407	0.0312	1.7387	0.0518	0.0418	2.9	2.990
53	530	0.0088	0.0343	1.9984	0.5615	0.0208	1.7727	0.0340	0.0276	1.9	2.583
54	540	0.0088	0.0343	2.0327	0.5825	0.0210	1.8067	0.0340	0.0277	1.9	2.125
55	550	0.0088	0.0343	2.0670	0.6038	0.0212	1.8408	0.0340	0.0278	1.9	1.978
56	560	0.0088	0.0343	2.1013	0.6252	0.0215	1.8748	0.0340	0.0279	1.9	1.934
57	570	0.0088	0.0343	2.1356	0.6469	0.0217	1.9089	0.0340	0.0280	1.9	1.924
58	580	0.0088	0.0343	2.1700	0.6688	0.0219	1.9429	0.0341	0.0281	1.9	1.926
59	590	0.0088	0.0343	2.2043	0.6909	0.0221	1.9770	0.0341	0.0282	1.9	1.931
60	600	0.0088	0.0343	2.2386	0.7131	0.0223	2.0110	0.0341	0.0283	1.9	1.938
61	610	0.0088	0.0343	2.2729	0.7356	0.0225	2.0451	0.0341	0.0284	2.0	1.944
62	620	0.0088	0.0343	2.3072	0.7583	0.0227	2.0792	0.0341	0.0285	2.0	1.951
63	630	0.0088	0.0343	2.3416	0.7811	0.0228	2.1133	0.0341	0.0286	2.0	1.958
64	640	0.0088	0.0343	2.3759	0.8042	0.0230	2.1474	0.0341	0.0287	2.0	1.964
65	650	0.0072	0.0281	2.4040	0.8231	0.0190	2.1753	0.0279	0.0236	1.6	1.850
66	660	0.0072	0.0281	2.4320	0.8422	0.0191	2.2032	0.0279	0.0236	1.6	1.696
67	670	0.0072	0.0281	2.4601	0.8614	0.0192	2.2311	0.0279	0.0237	1.6	1.647
68	680	0.0072	0.0281	2.4882	0.8807	0.0193	2.2590	0.0279	0.0237	1.6	1.633
69	690	0.0072	0.0281	2.5163	0.9002	0.0194	2.2869	0.0279	0.0238	1.6	1.631
70	700	0.0072	0.0281	2.5444	0.9197	0.0195	2.3148	0.0279	0.0238	1.6	1.633
71	710	0.0072	0.0281	2.5724	0.9393	0.0196	2.3428	0.0279	0.0239	1.6	1.636
72	720	0.0072	0.0281	2.6005	0.9591	0.0197	2.3707	0.0279	0.0239	1.6	1.639
73	730	0.0072	0.0281	2.6286	0.9789	0.0198	2.3986	0.0279	0.0240	1.6	1.643
74	740	0.0072	0.0281	2.6567	0.9988	0.0199	2.4266	0.0279	0.0240	1.6	1.646
75	750	0.0072	0.0281	2.6848	1.0189	0.0200	2.4545	0.0279	0.0241	1.7	1.650
76	760	0.0072	0.0281	2.7128	1.0390	0.0201	2.4824	0.0279	0.0241	1.7	1.653
77	770	0.0057	0.0222	2.7351	1.0550	0.0160	2.5045	0.0221	0.0191	1.3	1.541
78	780	0.0057	0.0222	2.7573	1.0711	0.0161	2.5267	0.0221	0.0192	1.3	1.390
79	790	0.0057	0.0222	2.7795	1.0872	0.0161	2.5488	0.0221	0.0192	1.3	1.341
80	800	0.0057	0.0222	2.8018	1.1034	0.0162	2.5709	0.0221	0.0192	1.3	1.326
81	810	0.0057	0.0222	2.8240	1.1196	0.0162	2.5930	0.0221	0.0193	1.3	1.322

Q peak

(1) Time Increment	(2) Time min.	(3) Rainfall distrib- ution	(4) Incre- mental Rainfall in.	(5) Accumu- lated Rainfall in.	Pervious Area		Impervious Area		(10) Total Runoff in.	(11) Instant hydro- graph cfs	(12) design hydro- graph cfs
					(6) Accumu- lated Runoff in.	(7) Incre- mental Runoff in.	(8) Accumu- lated Runoff in.	(9) Incre- mental Runoff in.			
82	820	0.0057	0.0222	2.8462	1.1359	0.0163	2.6152	0.0221	0.0193	1.3	1.322
83	830	0.0057	0.0222	2.8685	1.1522	0.0163	2.6373	0.0221	0.0193	1.3	1.324
84	840	0.0057	0.0222	2.8907	1.1686	0.0164	2.6594	0.0221	0.0193	1.3	1.325
85	850	0.0057	0.0222	2.9129	1.1851	0.0164	2.6816	0.0221	0.0194	1.3	1.327
86	860	0.0057	0.0222	2.9351	1.2016	0.0165	2.7037	0.0221	0.0194	1.3	1.329
87	870	0.0057	0.0222	2.9574	1.2181	0.0166	2.7258	0.0221	0.0194	1.3	1.331
88	880	0.0057	0.0222	2.9796	1.2347	0.0166	2.7480	0.0221	0.0194	1.3	1.332
89	890	0.0050	0.0195	2.9991	1.2493	0.0146	2.7674	0.0194	0.0171	1.2	1.279
90	900	0.0050	0.0195	3.0186	1.2640	0.0146	2.7868	0.0194	0.0171	1.2	1.208
91	910	0.0050	0.0195	3.0381	1.2786	0.0147	2.8062	0.0194	0.0171	1.2	1.185
92	920	0.0050	0.0195	3.0576	1.2934	0.0147	2.8256	0.0194	0.0171	1.2	1.178
93	930	0.0050	0.0195	3.0771	1.3081	0.0148	2.8451	0.0194	0.0172	1.2	1.177
94	940	0.0050	0.0195	3.0966	1.3229	0.0148	2.8645	0.0194	0.0172	1.2	1.177
95	950	0.0050	0.0195	3.1161	1.3377	0.0148	2.8839	0.0194	0.0172	1.2	1.178
96	960	0.0050	0.0195	3.1356	1.3526	0.0149	2.9033	0.0194	0.0172	1.2	1.179
97	970	0.0050	0.0195	3.1551	1.3675	0.0149	2.9228	0.0194	0.0172	1.2	1.181
98	980	0.0050	0.0195	3.1746	1.3824	0.0149	2.9422	0.0194	0.0172	1.2	1.182
99	990	0.0050	0.0195	3.1941	1.3974	0.0150	2.9616	0.0194	0.0173	1.2	1.183
100	1000	0.0050	0.0195	3.2136	1.4124	0.0150	2.9810	0.0194	0.0173	1.2	1.184
101	1010	0.0040	0.0156	3.2292	1.4244	0.0120	2.9966	0.0155	0.0138	0.9	1.106
102	1020	0.0040	0.0156	3.2448	1.4365	0.0120	3.0121	0.0155	0.0138	0.9	1.002
103	1030	0.0040	0.0156	3.2604	1.4485	0.0121	3.0277	0.0155	0.0139	1.0	0.967
104	1040	0.0040	0.0156	3.2760	1.4606	0.0121	3.0432	0.0155	0.0139	1.0	0.956
105	1050	0.0040	0.0156	3.2916	1.4727	0.0121	3.0588	0.0155	0.0139	1.0	0.953
106	1060	0.0040	0.0156	3.3072	1.4848	0.0121	3.0743	0.0155	0.0139	1.0	0.953
107	1070	0.0040	0.0156	3.3228	1.4970	0.0121	3.0898	0.0155	0.0139	1.0	0.953
108	1080	0.0040	0.0156	3.3384	1.5092	0.0122	3.1054	0.0155	0.0139	1.0	0.953
109	1090	0.0040	0.0156	3.3540	1.5214	0.0122	3.1209	0.0155	0.0139	1.0	0.954
110	1100	0.0040	0.0156	3.3696	1.5336	0.0122	3.1365	0.0155	0.0139	1.0	0.955
111	1110	0.0040	0.0156	3.3852	1.5458	0.0122	3.1520	0.0155	0.0139	1.0	0.955
112	1120	0.0040	0.0156	3.4008	1.5580	0.0122	3.1676	0.0155	0.0139	1.0	0.956
113	1130	0.0040	0.0156	3.4164	1.5703	0.0123	3.1831	0.0155	0.0140	1.0	0.957
114	1140	0.0040	0.0156	3.4320	1.5826	0.0123	3.1987	0.0155	0.0140	1.0	0.957
115	1150	0.0040	0.0156	3.4476	1.5949	0.0123	3.2142	0.0155	0.0140	1.0	0.958
116	1160	0.0040	0.0156	3.4632	1.6072	0.0123	3.2298	0.0156	0.0140	1.0	0.959
117	1170	0.0040	0.0156	3.4788	1.6196	0.0123	3.2453	0.0156	0.0140	1.0	0.959
118	1180	0.0040	0.0156	3.4944	1.6319	0.0124	3.2609	0.0156	0.0140	1.0	0.960
119	1190	0.0040	0.0156	3.5100	1.6443	0.0124	3.2764	0.0156	0.0140	1.0	0.961
120	1200	0.0040	0.0156	3.5256	1.6567	0.0124	3.2920	0.0156	0.0140	1.0	0.961
121	1210	0.0040	0.0156	3.5412	1.6691	0.0124	3.3075	0.0156	0.0140	1.0	0.962
122	1220	0.0040	0.0156	3.5568	1.6815	0.0124	3.3231	0.0156	0.0140	1.0	0.962
123	1230	0.0040	0.0156	3.5724	1.6940	0.0125	3.3387	0.0156	0.0140	1.0	0.963
124	1240	0.0040	0.0156	3.5880	1.7065	0.0125	3.3542	0.0156	0.0141	1.0	0.964
125	1250	0.0040	0.0156	3.6036	1.7190	0.0125	3.3698	0.0156	0.0141	1.0	0.964
126	1260	0.0040	0.0156	3.6192	1.7315	0.0125	3.3853	0.0156	0.0141	1.0	0.965
127	1270	0.0040	0.0156	3.6348	1.7440	0.0125	3.4009	0.0156	0.0141	1.0	0.965
128	1280	0.0040	0.0156	3.6504	1.7565	0.0125	3.4164	0.0156	0.0141	1.0	0.966
129	1290	0.0040	0.0156	3.6660	1.7691	0.0126	3.4320	0.0156	0.0141	1.0	0.967
130	1300	0.0040	0.0156	3.6816	1.7816	0.0126	3.4475	0.0156	0.0141	1.0	0.967
131	1310	0.0040	0.0156	3.6972	1.7942	0.0126	3.4631	0.0156	0.0141	1.0	0.968
132	1320	0.0040	0.0156	3.7128	1.8068	0.0126	3.4786	0.0156	0.0141	1.0	0.968
133	1330	0.0040	0.0156	3.7284	1.8195	0.0126	3.4942	0.0156	0.0141	1.0	0.969
134	1340	0.0040	0.0156	3.7440	1.8321	0.0126	3.5098	0.0156	0.0141	1.0	0.969

(1) Time Increment	(2) Time min.	(3) Rainfall distri- bution	(4) Incre- mental Rainfall in.	(5) Accumu- lated Rainfall in.	Pervious Area		Impervious Area		(10) Total Runoff in.	(11) Instant hydro- graph cfs	(12) design hydro- graph cfs
					(6) Accumu- lated Runoff in.	(7) Incre- mental Runoff in.	(8) Accumu- lated Runoff in.	(9) Incre- mental Runoff in.			
135	1350	0.0040	0.0156	3.7596	1.8447	0.0127	3.5253	0.0156	0.0141	1.0	0.970
136	1360	0.0040	0.0156	3.7752	1.8574	0.0127	3.5409	0.0156	0.0142	1.0	0.971
137	1370	0.0040	0.0156	3.7908	1.8701	0.0127	3.5564	0.0156	0.0142	1.0	0.971
138	1380	0.0040	0.0156	3.8064	1.8828	0.0127	3.5720	0.0156	0.0142	1.0	0.972
139	1390	0.0040	0.0156	3.8220	1.8955	0.0127	3.5876	0.0156	0.0142	1.0	0.972
140	1400	0.0040	0.0156	3.8376	1.9082	0.0127	3.6031	0.0156	0.0142	1.0	0.973
141	1410	0.0040	0.0156	3.8532	1.9210	0.0127	3.6187	0.0156	0.0142	1.0	0.973
142	1420	0.0040	0.0156	3.8688	1.9338	0.0128	3.6342	0.0156	0.0142	1.0	0.974
143	1430	0.0040	0.0156	3.8844	1.9465	0.0128	3.6498	0.0156	0.0142	1.0	0.974
144	1440	0.0040	0.0156	3.9000	1.9593	0.0128	3.6654	0.0156	0.0142	1.0	0.975
Total Volume of Runoff =										116173.469	
											cu. ft.
(Found by summing this column and multiplying by 600. 600 is the conversion required to convert SUM(Q) in cfs to total volume in cubic feet as follows:											
$V = \text{SUM}(Q) \times dt$											
(cu.ft.) = (cu.ft/s) x (10 min.) x (60 s/min.)											

STORMWATER CALCULATION MATRIX - SANTA BARBARA HYDROGRAPGH METHOD

Date: 37948.00 POND ROUTING
 Given: Project = WOOD MS - 25-YEAR System: Pond 120' long x 50' wide
 Average Pond Length (ft) = 120.000
 Average Pond Width (ft) = 50.000
 Orifice 1 Diameter (ft) = 0.550
 Orifice 2 Diameter (ft) = 1.000
 Height to Orifice 2 = 1.650

Orifice 2 Area 0.785 SF
 Orifice 1 Area = 0.238 SF
 Avg Pond Area = 6000.000 SF
 Column (3) = Col A:L * 600 = Incremental CFS into Pond
 Column (4) = Starting Pond Depth = Previous Remaining Pond Depth = Col (11)
 Column (5) =
 Column (6) = $2 * g * \text{Starting } h$
 Column (7) = Square Root of $2gh$
 Column (8) = Incremental Vol out = Col (7) * 0.60 * Orifice Area * 600
 Column (9) = Delta Vol = Incremental Vol in - Incremental Vol out = Col (3) - Col (8)
 Column (10) = Remaining Pond Vol = Previous Remaining Vol + Col (9)
 Column (11) = Pond Depth at End of Interval = Col (J) / Pond Area
 Column (12) = Pond CFS Discharge = Col(8) / 600

(1) Time Incr.	(2) Time min.	(3) Incr. Vol into Pond cf	(4) Starting Pond Depth ft.	(6)	(7)	(8) Incr. Vol 1 out Pond cf	(6a)	(9) Delta Vol cf
1	10	0.00	0.000	0.000	0.000	0.000	-106.26	0.000
2	20	0.00	0.000	0.000	0.000	0.000	-106.26	0.000
3	30	1.20	0.000	0.000	0.000	0.000	-106.26	0.000
4	40	14.96	0.000	0.013	0.114	9.716	-106.25	0.000
5	50	44.21	0.001	0.069	0.263	22.503	-106.19	0.000
6	60	76.69	0.005	0.302	0.550	47.020	-105.96	0.000
7	70	106.21	0.010	0.621	0.788	67.383	-105.64	0.000
8	80	131.61	0.016	1.037	1.019	87.116	-105.22	0.000
9	90	153.17	0.024	1.515	1.231	105.276	-104.74	0.000
10	100	171.48	0.032	2.029	1.424	121.835	-104.23	0.000
11	110	204.52	0.040	2.562	1.601	136.901	-103.70	0.000
12	120	243.11	0.051	3.288	1.813	155.084	-102.97	0.000
13	130	266.62	0.066	4.233	2.057	175.963	-102.03	0.000
14	140	283.48	0.081	5.206	2.282	195.144	-101.05	0.000
15	150	296.83	0.096	6.154	2.481	212.173	-100.11	0.000
16	160	307.95	0.110	7.062	2.658	227.298	-99.20	0.000
17	170	339.48	0.123	7.928	2.816	240.826	-98.33	0.000
18	180	378.06	0.140	8.987	2.998	256.405	-97.27	0.000
19	190	397.10	0.160	10.293	3.208	274.400	-95.97	0.000
20	200	408.79	0.180	11.610	3.407	291.427	-94.65	0.000
21	210	417.33	0.200	12.869	3.587	306.830	-93.39	0.000
22	220	424.25	0.218	14.055	3.749	320.657	-92.20	0.000
23	230	454.49	0.236	15.167	3.895	333.099	-91.09	0.000
24	240	492.59	0.256	16.470	4.058	347.112	-89.79	0.000
25	250	509.03	0.280	18.032	4.246	363.194	-88.23	0.000
26	260	519.14	0.304	19.597	4.427	378.630	-86.66	0.000
27	270	530.57	0.328	21.105	4.594	392.929	-85.15	0.000

(1) Time Incr.	(2) Time min.	(3) Incr. Vol into Pond cf	(4) Starting Pond Depth ft.	(6)	(7)	(8) Incr. Vol out Pond cf			(9) Delta Vol cf	
28	280	544.50	0.351	22.583	4.752	406.449	-83.68	0.000	0.000	138.05
29	290	592.01	0.374	24.064	4.906	419.571	-82.20	0.000	0.000	172.44
30	300	651.86	0.402	25.915	5.091	435.408	-80.34	0.000	0.000	216.46
31	310	683.70	0.438	28.238	5.314	454.506	-78.02	0.000	0.000	229.20
32	320	705.59	0.477	30.699	5.541	473.890	-75.56	0.000	0.000	231.70
33	330	723.60	0.515	33.185	5.761	492.711	-73.07	0.000	0.000	230.89
34	340	739.81	0.554	35.664	5.972	510.778	-70.60	0.000	0.000	229.94
35	350	796.05	0.592	38.122	6.174	528.088	-68.14	0.000	0.000	267.96
36	360	866.72	0.637	40.998	6.403	547.647	-65.26	0.000	0.000	319.07
37	370	902.11	0.690	44.423	6.665	570.062	-61.84	0.000	0.000	332.04
38	380	925.17	0.745	47.987	6.927	592.488	-58.27	0.000	0.000	332.69
39	390	943.61	0.801	51.558	7.180	614.137	-54.70	0.000	0.000	329.47
40	400	960.02	0.855	55.094	7.423	634.849	-51.17	0.000	0.000	325.17
41	410	1112.14	0.910	58.584	7.654	654.649	-47.68	0.000	0.000	457.49
42	420	1313.47	0.986	63.495	7.968	681.533	-42.77	0.000	0.000	631.94
43	430	1398.05	1.091	70.277	8.383	717.012	-35.98	0.000	0.000	681.04
44	440	1613.52	1.205	77.587	8.808	753.379	-28.67	0.000	0.000	860.14
45	450	1877.56	1.348	86.819	9.318	796.942	-19.44	0.000	0.000	1080.62
46	460	2613.84	1.528	98.418	9.921	848.508	-7.84	0.000	0.000	1765.33
47	470	4344.37	1.822	117.366	10.834	926.594	11.11	3.333	942.254	2475.52
48	480	4722.30	2.235	143.936	11.997	*****	37.68	6.138	1735.512	1960.65
49	490	3438.74	2.562	164.981	12.844	*****	58.72	7.663	2166.651	173.50
50	500	2463.42	2.591	166.843	12.917	*****	60.58	7.784	2200.738	-842.09
51	510	1955.35	2.450	157.804	12.562	*****	51.54	7.179	2029.945	-1149.02
52	520	1794.14	2.259	145.472	12.061	*****	39.21	6.262	1770.519	-1007.97
53	530	1549.71	2.091	134.653	11.604	992.490	28.39	5.328	1506.595	-949.38
54	540	1275.17	1.933	124.463	11.156	954.198	18.20	4.266	1206.317	-885.35
55	550	1186.82	1.785	114.960	10.722	917.048	8.70	2.950	833.975	-564.20
56	560	1160.46	1.691	108.904	10.436	892.568	2.64	1.626	459.773	-191.88
57	570	1154.67	1.659	106.845	10.337	884.087	0.58	0.765	216.197	54.39
58	580	1155.67	1.668	107.428	10.365	886.499	1.17	1.081	305.629	-36.46
59	590	1158.86	1.662	107.037	10.346	884.883	0.78	0.882	249.252	24.72
60	600	1162.70	1.666	107.302	10.359	885.979	1.04	1.021	288.687	-11.96
61	610	1166.69	1.664	107.174	10.352	885.449	0.91	0.956	270.321	10.92
62	620	1170.67	1.666	107.291	10.358	885.933	1.03	1.016	287.137	-2.40
63	630	1174.58	1.666	107.266	10.357	885.827	1.01	1.003	283.530	5.22
64	640	1178.40	1.666	107.322	10.360	886.058	1.06	1.030	291.322	1.02
65	650	1110.17	1.667	107.333	10.360	886.103	1.07	1.036	292.816	-68.75
66	660	1017.48	1.655	106.595	10.324	883.052	0.33	0.578	163.558	-29.13
67	670	988.17	1.650	106.282	10.309	881.756	0.02	0.148	41.941	64.47
68	680	979.94	1.661	106.974	10.343	884.622	0.71	0.845	238.910	-143.59
69	690	978.72	1.637	105.433	10.268	878.227	-0.83	0.000	0.000	100.49
70	700	979.80	1.654	106.511	10.320	882.707	0.25	0.501	141.758	-44.67
71	710	981.62	1.646	106.032	10.297	880.719	-0.23	0.000	0.000	100.90
72	720	983.66	1.663	107.115	10.350	885.205	0.85	0.925	261.436	-162.98
73	730	985.75	1.636	105.366	10.265	877.947	-0.89	0.000	0.000	107.80
74	740	987.82	1.654	106.523	10.321	882.754	0.26	0.513	144.920	-39.85
75	750	989.87	1.647	106.095	10.300	880.980	-0.17	0.000	0.000	108.89
76	760	991.89	1.666	107.264	10.357	885.820	1.00	1.002	283.275	-177.21
77	770	924.66	1.636	105.362	10.265	877.931	-0.90	0.000	0.000	46.73
78	780	834.09	1.644	105.863	10.289	880.018	-0.40	0.000	0.000	-45.93
79	790	804.69	1.636	105.370	10.265	877.966	-0.89	0.000	0.000	-73.28
80	800	795.67	1.624	104.584	10.227	874.683	-1.68	0.000	0.000	-79.01
81	810	793.44	1.611	103.736	10.185	871.130	-2.52	0.000	0.000	-77.69

(1) Time Incr.	(2) Time min.	(3) Incr. Vol into Pond cf	(4) Starting Pond Depth ft.	(6)	(7)	(8) Incr. Vol out Pond cf			(9) Delta Vol cf	
82	820	793.46	1.598	103.736	10.185	871.130	-3.36	0.000	0.000	-77.67
83	830	794.21	1.585	102.068	10.103	864.100	-4.19	0.000	0.000	-69.89
84	840	795.20	1.573	101.318	10.066	860.919	-4.94	0.000	0.000	-65.71
85	850	796.26	1.562	100.613	10.031	857.917	-5.65	0.000	0.000	-61.65
86	860	797.34	1.552	99.951	9.998	855.091	-6.31	0.000	0.000	-57.75
87	870	798.40	1.542	99.331	9.966	852.435	-6.93	0.000	0.000	-54.03
88	880	799.46	1.533	98.751	9.937	849.943	-7.51	0.000	0.000	-50.48
89	890	767.67	1.525	98.209	9.910	847.608	-8.05	0.000	0.000	-79.93
90	900	724.85	1.512	97.351	9.867	843.898	-8.91	0.000	0.000	-119.05
91	910	711.10	1.492	96.074	9.802	838.341	-10.19	0.000	0.000	-127.25
92	920	707.02	1.471	94.708	9.732	832.361	-11.55	0.000	0.000	-125.34
93	930	706.17	1.450	93.363	9.662	826.428	-12.90	0.000	0.000	-120.26
94	940	706.39	1.430	92.072	9.595	820.695	-14.19	0.000	0.000	-114.31
95	950	706.95	1.411	90.845	9.531	815.209	-15.42	0.000	0.000	-108.25
96	960	707.63	1.393	89.683	9.470	809.979	-16.58	0.000	0.000	-102.35
97	970	708.34	1.376	88.584	9.412	805.003	-17.68	0.000	0.000	-96.66
98	980	709.06	1.359	87.547	9.357	800.275	-18.71	0.000	0.000	-91.22
99	990	709.77	1.344	86.568	9.304	795.787	-19.69	0.000	0.000	-86.02
100	1000	710.47	1.330	85.645	9.254	791.532	-20.62	0.000	0.000	-81.06
101	1010	663.69	1.316	84.774	9.207	787.501	-21.49	0.000	0.000	-123.81
102	1020	601.00	1.296	83.446	9.135	781.304	-22.81	0.000	0.000	-180.31
103	1030	580.39	1.266	81.510	9.028	772.191	-24.75	0.000	0.000	-191.80
104	1040	573.81	1.234	79.452	8.914	762.377	-26.81	0.000	0.000	-188.57
105	1050	571.90	1.202	77.428	8.799	752.604	-28.83	0.000	0.000	-180.71
106	1060	571.54	1.172	75.488	8.688	743.118	-30.77	0.000	0.000	-171.58
107	1070	571.70	1.144	73.646	8.582	733.997	-32.61	0.000	0.000	-162.29
108	1080	572.03	1.117	71.904	8.480	725.265	-34.36	0.000	0.000	-153.23
109	1090	572.42	1.091	70.260	8.382	716.922	-36.00	0.000	0.000	-144.50
110	1100	572.82	1.067	68.709	8.289	708.965	-37.55	0.000	0.000	-136.15
111	1110	573.22	1.044	67.247	8.200	701.385	-39.01	0.000	0.000	-128.16
112	1120	573.62	1.023	65.872	8.116	694.174	-40.39	0.000	0.000	-120.55
113	1130	574.02	1.003	64.578	8.036	687.323	-41.68	0.000	0.000	-113.30
114	1140	574.42	0.984	63.362	7.960	680.820	-42.90	0.000	0.000	-106.40
115	1150	574.81	0.966	62.220	7.888	674.657	-44.04	0.000	0.000	-99.85
116	1160	575.20	0.950	61.148	7.820	668.821	-45.11	0.000	0.000	-93.62
117	1170	575.58	0.934	60.143	7.755	663.303	-46.12	0.000	0.000	-87.72
118	1180	575.97	0.919	59.202	7.694	658.090	-47.06	0.000	0.000	-82.12
119	1190	576.35	0.906	58.320	7.637	653.173	-47.94	0.000	0.000	-76.83
120	1200	576.72	0.893	57.496	7.583	648.539	-48.76	0.000	0.000	-71.82
121	1210	577.09	0.881	56.725	7.532	644.177	-49.54	0.000	0.000	-67.08
122	1220	577.46	0.870	56.005	7.484	640.075	-50.26	0.000	0.000	-62.61
123	1230	577.83	0.859	55.333	7.439	636.223	-50.93	0.000	0.000	-58.39
124	1240	578.19	0.849	54.706	7.396	632.610	-51.55	0.000	0.000	-54.42
125	1250	578.55	0.840	54.122	7.357	629.223	-52.14	0.000	0.000	-50.67
126	1260	578.91	0.832	53.578	7.320	626.054	-52.68	0.000	0.000	-47.15
127	1270	579.26	0.824	53.072	7.285	623.090	-53.19	0.000	0.000	-43.83
128	1280	579.61	0.817	52.601	7.253	620.323	-53.66	0.000	0.000	-40.71
129	1290	579.96	0.810	52.164	7.222	617.741	-54.10	0.000	0.000	-37.78
130	1300	580.31	0.804	51.759	7.194	615.335	-54.50	0.000	0.000	-35.03
131	1310	580.65	0.798	51.383	7.168	613.096	-54.88	0.000	0.000	-32.45
132	1320	580.99	0.792	51.035	7.144	611.015	-55.23	0.000	0.000	-30.03
133	1330	581.32	0.787	50.712	7.121	609.082	-55.55	0.000	0.000	-27.76
134	1340	581.66	0.783	50.415	7.100	607.291	-55.85	0.000	0.000	-25.63

(10) Remain Total Vol in.	(11) Remain Pond Depth ft	(12) CFS Discharge
0.0	0.000	0.00
0.0	0.000	0.00
1.2	0.000	0.00
6.4	0.001	0.02
28.2	0.005	0.04
57.8	0.010	0.08
96.7	0.016	0.11
141.2	0.024	0.15
189.0	0.032	0.18
238.7	0.040	0.20
306.3	0.051	0.23
394.3	0.066	0.26
485.0	0.081	0.29
573.3	0.096	0.33
658.0	0.110	0.35
738.6	0.123	0.38
837.3	0.140	0.40
959.0	0.160	0.43
1081.6	0.180	0.46
1199.0	0.200	0.49
1309.5	0.218	0.51
1413.1	0.236	0.53
1534.5	0.256	0.56
1680.0	0.280	0.58
1825.8	0.304	0.61
1966.3	0.328	0.63
2104.0	0.351	0.65

(10) Remain Total Vol in.	(11) Remain Pond Depth ft	(12) CFS Discharge
2242.0	0.374	0.68
2414.5	0.402	0.70
2630.9	0.438	0.73
2860.1	0.477	0.76
3091.8	0.515	0.79
3322.7	0.554	0.82
3551.7	0.592	0.85
3819.7	0.637	0.88
4138.8	0.690	0.91
4470.8	0.745	0.95
4803.5	0.801	0.99
5133.0	0.855	1.02
5458.1	0.910	1.06
5915.6	0.986	1.09
6547.6	1.091	1.14
7228.6	1.205	1.20
8088.7	1.348	1.26
9169.4	1.528	1.33
10934.7	1.822	1.41
13410.2	2.235	1.54
15370.9	2.562	1.71
15544.4	2.591	1.83
14702.3	2.450	1.84
13553.3	2.259	1.79
12545.3	2.091	1.72
11595.9	1.933	1.65
10710.6	1.785	1.59
10146.4	1.691	1.53
9954.5	1.659	1.49
10008.9	1.668	1.47
9972.4	1.662	1.48
9997.1	1.666	1.47
9985.2	1.664	1.48
9996.1	1.666	1.48
9993.7	1.666	1.48
9998.9	1.666	1.48
9999.9	1.667	1.48
9931.2	1.655	1.48
9902.0	1.650	1.47
9966.5	1.661	1.47
9822.9	1.637	1.47
9923.4	1.654	1.46
9878.8	1.646	1.47
9979.7	1.663	1.47
9816.7	1.636	1.48
9924.5	1.654	1.46
9884.6	1.647	1.47
9993.5	1.666	1.47
9816.3	1.636	1.48
9863.0	1.644	1.46
9817.1	1.636	1.47
9743.8	1.624	1.46
9664.8	1.611	1.46
9587.1	1.598	1.45

(10) Remain Total Vol in.	(11) Remain Pond Depth ft	(12) CFS Discharge
9509.5	1.585	1.45
9439.6	1.573	1.44
9373.9	1.562	1.43
9312.2	1.552	1.43
9254.4	1.542	1.43
9200.4	1.533	1.42
9149.9	1.525	1.42
9070.0	1.512	1.41
8951.0	1.492	1.41
8823.7	1.471	1.40
8698.4	1.450	1.39
8578.1	1.430	1.38
8463.8	1.411	1.37
8355.6	1.393	1.36
8253.2	1.376	1.35
8156.5	1.359	1.34
8065.3	1.344	1.33
7979.3	1.330	1.33
7898.2	1.316	1.32
7774.4	1.296	1.31
7594.1	1.266	1.30
7402.3	1.234	1.29
7213.7	1.202	1.27
7033.0	1.172	1.25
6861.5	1.144	1.24
6699.2	1.117	1.22
6545.9	1.091	1.21
6401.4	1.067	1.19
6265.3	1.044	1.18
6137.1	1.023	1.17
6016.6	1.003	1.16
5903.3	0.984	1.15
5796.9	0.966	1.13
5697.0	0.950	1.12
5603.4	0.934	1.11
5515.7	0.919	1.11
5433.6	0.906	1.10
5356.7	0.893	1.09
5284.9	0.881	1.08
5217.8	0.870	1.07
5155.2	0.859	1.07
5096.8	0.849	1.06
5042.4	0.840	1.05
4991.7	0.832	1.05
4944.6	0.824	1.04
4900.8	0.817	1.04
4860.0	0.810	1.03
4822.3	0.804	1.03
4787.2	0.798	1.03
4754.8	0.792	1.02
4724.8	0.787	1.02
4697.0	0.783	1.02
4671.4	0.779	1.01

(10) Remain Total Vol in.	(11) Remain Pond Depth ft	(12) CFS Discharge
4647.7	0.775	1.01
4625.9	0.771	1.01
4605.9	0.768	1.00
4587.5	0.765	1.00
4570.6	0.762	1.00
4555.2	0.759	1.00
4541.0	0.757	1.00
4528.1	0.755	1.00
4516.4	0.753	0.99
4505.7	0.751	0.99

Water Quality

CSR



2.3 Technical Specifications

The Stormceptor dimensions vary with the size of unit that is specified. Dimensions of the fiberglass and concrete Stormceptor units that are being manufactured are provided in Table 2.

Model	Treatment Bowl Diameter	Pipe Invert to Bottom of Concrete Stormceptor **
450i	4'	68"
900	6'	74"
1200	6'	86"
1800	6'	122"
2400	8'	122"
3600	8'	158"
4800	10'	146"
6000	10'	170"
7200	12'	158"

* Depths are approximate

** Inlet invert to bottom of base slab

Storage capacities and maximum treatment flowrate for Stormceptor are provided in Table 3. These flow rates indicate the threshold when bypassing begins to occur. At flow rates greater than the maximum treatment flow rate, treatment is still provided in the unit at 80% to 90% of the maximum treatment flow rate (NWRI, 1993). The treatment rate decreases once the unit begins to bypass since the overflow regulates the head differential between the inlet and outlet from the lower chamber (Figure 2).

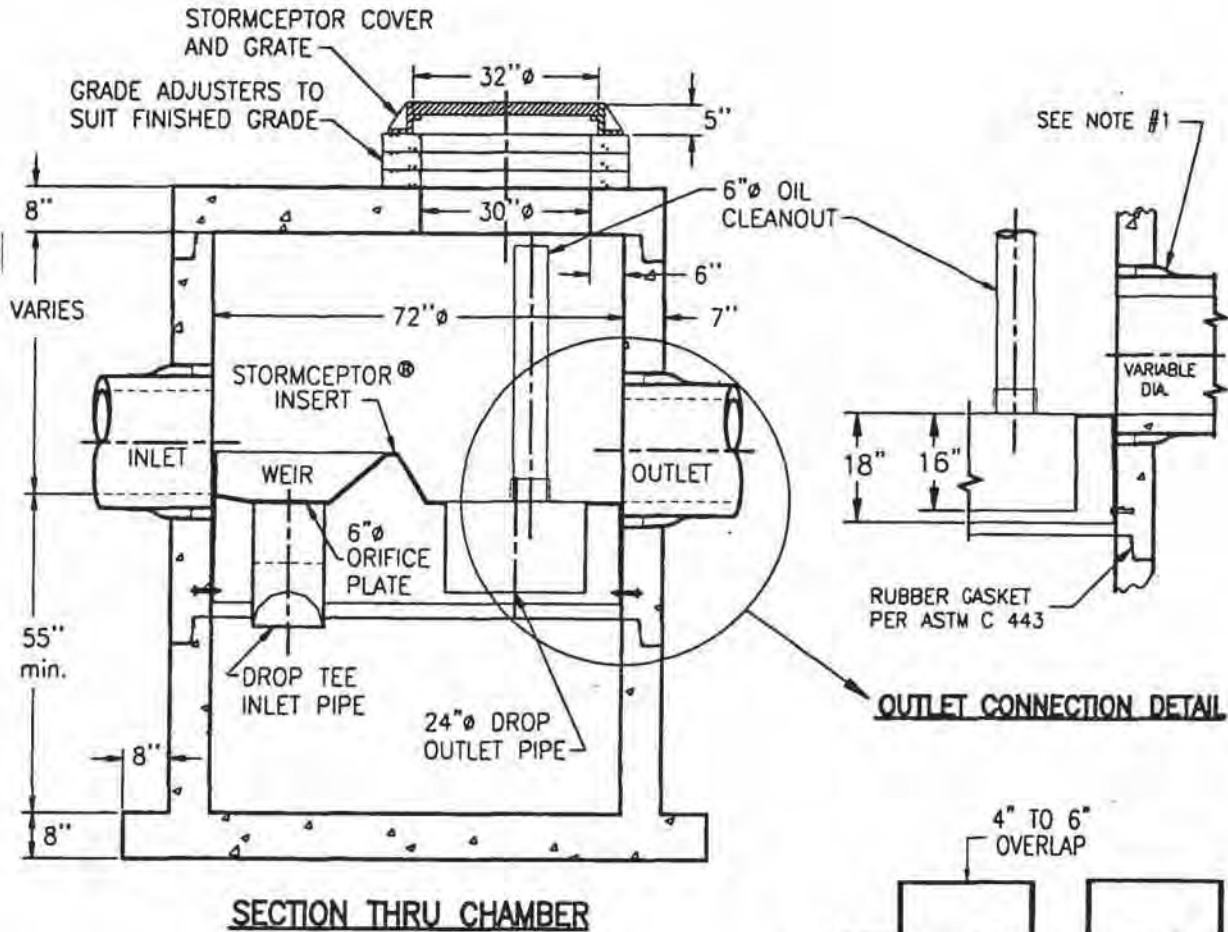
Model	Maximum Treatment* Flow Rate gpm (l/s)	Down Pipe Diameter/ Orifice	Sediment Capacity (ft ³)	Oil Capacity (USG)	Total Holding Capacity (USG)	RES. TIME (MIN)
450i	79 (5)	12**	45	85	470	
900	285 (18)	6	84	242	1143	
1200	285 (18)	6	115	242	1354	4.8
1800	285 (18)	6	200	242	1988	
2400	476 (30)	8	217	778	2886	6.96
3600	476 (30)	8	368	778	4014	
4800	793 (50)	10	497	922	5331	4.7
6000	793 (50)	10	654	922	6508	
7200	1110 (70)	12	828	1096	8245	7.4

* approximate flow rate without by-passing

** standard 4" diameter riser outlet pipe

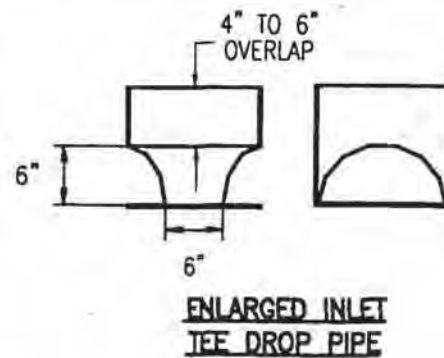
Appendix A

STC 900 Precast Concrete Stormceptor®
(900 US Gallon Capacity)



NOTE :

1. THE USE OF FLEXIBLE CONNECTIONS IS RECOMMENDED AT THE INLET AND OUTLET WHERE APPLICABLE.
2. THE COVER SHOULD BE POSITIONED OVER THE OUTLET DROP PIPE AND THE OIL CLEANOUT PIPE.
3. THE STORMCEPTOR SYSTEM IS PROTECTED BY ONE OR MORE OF THE FOLLOWING U.S. PATENTS: #4985148, #5498331, #5725760, #5753115, #5849181.





Hydro Conduit

Hydro Conduit Division
800 N.E. Tenney Road, Suite 413
Vancouver, WA 98685
Telephone (503) 572-9894
Facsimile (503) 296-2023
pvantilburg@rinker.com

April 28, 2004

Matt Johnson
SJO Consulting Engineers
1500 S.E. 12th
Portland, OR 97201
mjohnson@sjoeng.com

Re: Stormceptor Removal Rates

Dear Matt:

Stormceptor has conducted several field studies to evaluate the removal rates of various pollutants. When our units have been sized based on 80% annual TSS removal, field monitoring has shown that we have been able to achieve removal rates in the ranges indicated below.

90-99%	Total Petroleum Hydrocarbons (TPH)
10-30%	Total Phosphorus (TP)
40-60%	Total Kjeldahl Nitrogen (TKN)
40-50%	Lead (Pb)
35-40%	Zinc (Zn)
15-25%	Biochemical Oxygen Demand (BOD)

This letter should not be taken as a guarantee of performance, but as an indication to what level our units have been proven to be able to perform. If you have any questions, please call me at 1-800-909-7763. Thank you.

Sincerely,

Peter Van Tilburg (via email)

Hydro Conduit, Area Manager



ATTACHMENT A

Comparison Table Of Field Studies and Lab Studies

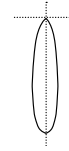
3J Note: Not Included & Not Relevant to this Project

OPERATIONS & MAINTENANCE (O&M) PLAN

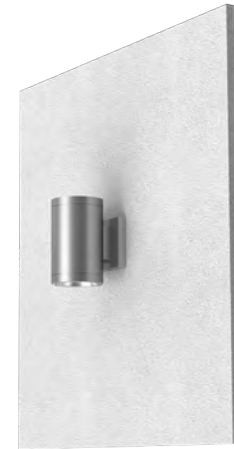
(Will be included with Final Storm Drainage Report)



ATTACHMENT B
Light Fixture Specifications



High Center Beam Wall Mount Cylinder 2"

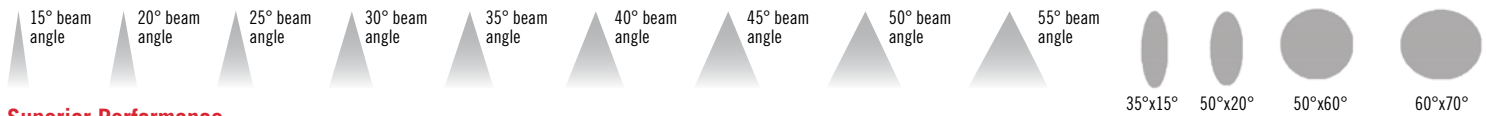


OVERVIEW

Feature Set

- Thirteen optimized distribution patterns allow designers to achieve tailored objectives
- Bounding Ray™ optical design
- 50° Cutoff to source and source image
- Field interchangeable optic
- Driver and LED light engine fully serviceable from below ceiling
- 70% lumen maintenance at 60,000 hours
- 2.5 SDCM; 85 CRI typical, 90+ CRI optional
- Fixtures are wet location, covered ceiling (WL option)
- ENERGY STAR® Certified product
- 20 standard colors in textured and gloss finish; custom or RAL colors also available

Distribution



Superior Performance

Nominal lumens	250	500	750	1000	1500	2000
Delivered	263	560	859	1177	1764	2227
Wattage	3.1	5.6	8.7	12.0	19.8	28.6
Efficacy	85	100	99	98	89	78

*Based on 3500K 80CRI 15D AR LSS

COMPLIMENTARY PRODUCTS

Coordinated Apertures | Multiple Layers of Light



General Illumination Layer | EVO



High Center Beam Layer | Incito



EVO + Incito — Multiple Layers of Light

Core	Downlight	Adjustable	Open Wallwash	Lensed Wallwash	Cylinder	Pinhole	Bevel	Hyperbolic
Healthcare	MRI	Surgical Suite	Patient Room					
Special Applications	Dynamic	Food Service	Vandal/Tamper	Clean Room	Shower	Steam Room		

ORDERING INFORMATION

A+ Capable options indicated by this color background.



Design2Ship Quick Ship Program: Options in green text qualify for Design2Ship — 5 business days from order entry to ship. Refer to Design2Ship Brochure for complete program details. **Maximum Order Quantity: 50 units.**

Luminaire Type:

Catalog Number:

EXAMPLE: IC02WC 35/10 AR LSS 20D MVOLT UGZ RGH DWHG

Series	Color Temperature	Lumens	Reflector Color	Reflector Finish	Beam
IC02WC Incito 2in Round Wall Mount Cylinder Open Downlight	27/ 2700 K	02 250 lumens	AR Clear	LSS Semi-specular	15D 15° beam angle
	30/ 3000 K	05 500 lumens	PR Pewter	LD Matte diffuse	20D 20° beam angle
	35/ 3500 K	07 750 lumens	WTR Wheat		25D 25° beam angle
	40/ 4000 K	10 1000 lumens	GR Gold		30D 30° beam angle
	50/1 5000 K	15 1500 lumens	WR ² White painted		35D 35° beam angle
		20 2000 lumens	BR ² Black		40D 40° beam angle
			BZR ² Dark Bronze painted		45D 45° beam angle
					50D 50° beam angle
					55D 55° beam angle
					3515D Elliptical 35° x 15° beam angle
				5020D Elliptical 50° x 20° beam angle	
				5060D Elliptical 50° x 60° beam angle	
				6070D Elliptical 60° x 70° beam angle	

Voltage	Driver	Mounting	Control Interface ⁵
MVOLT 120V - 277V 120 120V 277 277V	UGZ ³ Universal dimming to 1% (0-10V, 120V TRIAC or ELV)	RGH ⁴ Recessed Gear Housing SGB Surface Gear Box	(blank) NLT nLight® dimming pack. NLTER ⁶ nLight® dimming pack for fixtures on emergency circuit NLTAIR2 nLight® AIR dimming pack. NLTAIRER2 ⁶ nLight® AIR dimming pack for fixtures on emergency circuit NLTAIREM2 nLight® AIR dimming pack for fixtures on emergency circuit

Options	Architectural Colors - Powder Paint ⁹																				
90CRI ¹ High CRI (90+) N80 ⁷ nLight Lumen Compensation WL ⁸ Wet Location	<table border="0"> <tr> <td>DDB Gloss Dark Bronze</td> <td>DBBT Textured Dark Bronze</td> </tr> <tr> <td>DBL Gloss Black</td> <td>DBLB Matte Black</td> </tr> <tr> <td>DWH Gloss White</td> <td>DWHG Textured White</td> </tr> <tr> <td>DMB Gloss Medium Bronze</td> <td>DBNH Textured Bronze</td> </tr> <tr> <td>DNA Gloss Natural Aluminum</td> <td>DNAT Textured Natural Aluminum</td> </tr> <tr> <td>DSS Gloss Sandstone</td> <td>DSST Textured Sandstone</td> </tr> <tr> <td>DGC Gloss Charcoal Grey</td> <td>DSPD Textured Dark Grey</td> </tr> <tr> <td>DTG Gloss Tennis Green</td> <td>DSPE Textured Green</td> </tr> <tr> <td>DBR Gloss Bright Red</td> <td>DSPH Textured Light Red</td> </tr> <tr> <td>DSB Gloss Steel Blue</td> <td>DWHAMF Gloss White with Anti-microbial finish</td> </tr> </table>	DDB Gloss Dark Bronze	DBBT Textured Dark Bronze	DBL Gloss Black	DBLB Matte Black	DWH Gloss White	DWHG Textured White	DMB Gloss Medium Bronze	DBNH Textured Bronze	DNA Gloss Natural Aluminum	DNAT Textured Natural Aluminum	DSS Gloss Sandstone	DSST Textured Sandstone	DGC Gloss Charcoal Grey	DSPD Textured Dark Grey	DTG Gloss Tennis Green	DSPE Textured Green	DBR Gloss Bright Red	DSPH Textured Light Red	DSB Gloss Steel Blue	DWHAMF Gloss White with Anti-microbial finish
DDB Gloss Dark Bronze	DBBT Textured Dark Bronze																				
DBL Gloss Black	DBLB Matte Black																				
DWH Gloss White	DWHG Textured White																				
DMB Gloss Medium Bronze	DBNH Textured Bronze																				
DNA Gloss Natural Aluminum	DNAT Textured Natural Aluminum																				
DSS Gloss Sandstone	DSST Textured Sandstone																				
DGC Gloss Charcoal Grey	DSPD Textured Dark Grey																				
DTG Gloss Tennis Green	DSPE Textured Green																				
DBR Gloss Bright Red	DSPH Textured Light Red																				
DSB Gloss Steel Blue	DWHAMF Gloss White with Anti-microbial finish																				

ACCESSORIES — order as separate catalog numbers (shipped separately)

IC02OPTC XXD	Additional optics for field installation. Replace "XX" with beam angle.
IC02OPTC KIT	Kit including a field interchangeable optic for each of the 13 preset beam distribution patterns
HS234FL	Hole saw for RGH option
SDT 347/120 75VA	347V/120V, 75VA step down transformer. Must be remote mounted.

ORDERING NOTES

- 5000K CCT not available with 90CRI.
- Not available with Reflector Finish.
- Refer to [Tech 240](#) for compatible dimmers.
- RGH with 2000LM option requires 120 or 277 (non-IC).
- Field installed. Access required to location of remote mounted device.
- ER for use with generator supply power. Will require an emergency hot feed and normal hot feed.
- Requires NLT or NLTER.
- Must be mounted in down orientation in wet location applications.
- For details on RAL and Custom colors please see [Architectural colors](#).

ATTACHMENT C
Reader Board Sign Specifications

GALAXY® GS6 15.85 MM PRODUCT SPECIFICATIONS

The GS6 is the best full-feature, high-quality Galaxy series yet. This product provides users a display that runs outstanding graphics and animations using the best contrast in the industry. The 15.85 mm pixel pitch is the highest resolution 16 mm LED display in the industry.

15.85 MM TECHNICAL SPECIFICATIONS

Character Height:

4.4" (7 pixel font)

Line Spacing:

15.85 mm (0.62")

Pixel Configuration:

Monochrome: 1 red or 1 amber

RGB: 1 red, 1 green, 1 blue

Maximum Brightness:

Monochrome red: 4,500 nits

Monochrome amber: 6,000 nits

RGB: 12,000 nits

Monochrome Color Capability:

4,096 shades of red or amber

Full Color Capability:

RGB: 281 trillion colors

Optimal Viewing Angle:

140 degrees horizontal x 70 degrees vertical

Readability Angle:

160 degrees horizontal x 90 degrees vertical

Min Viewing Distance:

37'

PRODUCT FEATURES

- All sealed components
- Quick connects
- Mounting clips
- High-contrast louvers
- Redundant module signal
- Large sections for fast installation
- Front ventilation on displays less than seven feet tall
- No spreader beam required for displays greater than seven feet tall
- Same module size and cabinet size for all pixel pitches
- Single-step module removal
- Shallow cabinet depth
- Narrow cabinet borders

MODEL NUMBER GUIDE

GS6	-	100	x	250	-	15.85	-	RGB	-	SF
Series		Lines High		Columns Wide		Line Spacing		LED Color Red, Amber, or RGB		Single Face or Two View



GS6 SERIES SPECIFICATIONS

Estimated LED Lifetime:

100,000+ hours

Contrast Enhancement:

Non-reflective black louvers and module face grooves disperse light

Message Capability:

Text, graphics, logos, basic animation, video clips, multiple font styles, and sizes

Control Software:

Venus® Control Suite

Power:

120, 120/240 VAC Single Phase

Display Dimming:

64 levels (Automatic, scheduled or manual control)

Communication Options:

Ethernet Fiber Optic, Ethernet Bridge Radio, Remote Cellular, Ethernet CAT5

Operating Temperature:

-40°F to 120°F with 99% RH non-condensing

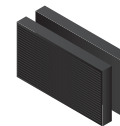
Compliance Information:

UL and cUL Listed, UL-Energy Verified, FCC compliance

DISPLAY CONFIGURATIONS



Single-face (SF)
Available in all sizes



Two-view (2V)
Available in all sizes

GALAXY® GS6 15.85 MM PRODUCT SPECIFICATIONS

Lines x Columns	Sections/Ventilated	Cabinet Dimensions Feet-Inches H x W x D	Cabinet Dimensions Meters H x W x D	Cabinet Square Feet (Square Meters)	Active Area Square Feet (Square Meters)	Cabinet Weight Pounds (kilograms)	Lines/Characters per line	Character Height	Maximum Watts		
									Amber	Red	RGB
20x100	Sing/Ft	1'7" x 5'6" x 5"	0.47 x 1.67 x 0.13	8.4 (0.8)	5.5 (0.6)	65 (30)	2/20	4"-12"	230	230	305
20x125	Sing/Ft	1'7" x 6'9" x 5"	0.47 x 2.06 x 0.13	10.4 (1.0)	6.8 (0.8)	75 (35)	2/25	4"-12"	275	275	370
20x150	Sing/Ft	1'7" x 8'1" x 5"	0.47 x 2.46 x 0.13	12.4 (1.2)	8.2 (1.0)	90 (41)	2/30	4"-12"	320	320	345
20x175	Sing/Ft	1'7" x 9'5" x 5"	0.47 x 2.85 x 0.13	14.4 (1.3)	9.5 (1.1)	105 (48)	2/35	4"-12"	365	365	500
20x200	Sing/Ft	1'7" x 10'8" x 5"	0.47 x 3.25 x 0.13	16.4 (1.5)	10.9 (1.3)	120 (55)	2/40	4"-12"	405	405	565
20x225	Sing/Ft	1'7" x 12'0" x 5"	0.47 x 3.65 x 0.13	18.4 (1.7)	12.2 (1.4)	135 (62)	2/45	4"-12"	450	450	630
20x250	Sing/Ft	1'7" x 13'3" x 5"	0.47 x 4.04 x 0.13	20.4 (1.9)	13.6 (1.6)	150 (69)	2/50	4"-12"	495	495	695
20x275	Sing/Ft	1'7" x 14'7" x 5"	0.47 x 4.44 x 0.13	22.4 (2.1)	14.9 (1.8)	165 (75)	2/55	4"-12"	540	540	755
20x300	Sing/Ft	1'7" x 15'11" x 5"	0.47 x 4.84 x 0.13	24.4 (2.3)	16.3 (1.9)	180 (82)	2/60	4"-12"	585	585	820
20x325	Sing/Ft	1'7" x 17'2" x 5"	0.47 x 5.23 x 0.13	26.4 (2.5)	17.6 (2.1)	195 (89)	2/65	4"-12"	630	630	885
20x350	Sing/Ft	1'7" x 18'6" x 5"	0.47 x 5.63 x 0.13	28.4 (2.6)	19.0 (2.2)	205 (93)	2/70	4"-12"	675	675	950
20x375	Sing/Ft	1'7" x 19'9" x 5"	0.47 x 6.02 x 0.13	30.4 (2.8)	20.3 (2.4)	220 (100)	2/75	4"-12"	720	720	1015
20x400	Sing/Ft	1'7" x 21'1" x 5"	0.47 x 6.42 x 0.13	32.4 (3.0)	21.7 (2.6)	235 (107)	2/80	4"-12"	765	765	1080
20x425	Sing/Ft	1'7" x 22'5" x 5"	0.47 x 6.82 x 0.13	34.4 (3.2)	23.0 (2.7)	250 (114)	2/85	4"-12"	810	810	1145
20x450	Sing/Ft	1'7" x 23'8" x 5"	0.47 x 7.21 x 0.13	36.4 (3.4)	24.4 (2.9)	265 (121)	2/90	4"-12"	855	855	1205
20x475	Sing/Ft	1'7" x 25'0" x 5"	0.47 x 7.61 x 0.13	38.4 (3.6)	25.7 (3.0)	280 (128)	2/95	4"-12"	900	900	1270
20x500	Sing/Ft	1'7" x 26'3" x 5"	0.47 x 8.01 x 0.13	40.4 (3.8)	27.1 (3.2)	295 (134)	2/100	4"-12"	955	955	1335
40x75	Sing/Ft	2'7" x 4'2" x 5"	0.79 x 1.27 x 0.13	10.7 (1.0)	8.2 (0.8)	80 (37)	5/15	4"-24"	255	255	360
40x100	Sing/Ft	2'7" x 5'6" x 5"	0.79 x 1.67 x 0.13	14.1 (1.3)	10.9 (1.1)	105 (48)	5/20	4"-24"	305	305	465
40x125	Sing/Ft	2'7" x 6'9" x 5"	0.79 x 2.06 x 0.13	17.4 (1.6)	13.6 (1.4)	130 (59)	5/25	4"-24"	370	370	570
40x150	Sing/Ft	2'7" x 8'1" x 5"	0.79 x 2.46 x 0.13	20.8 (1.9)	16.3 (1.7)	150 (69)	5/30	4"-24"	435	435	670
40x175	Sing/Ft	2'7" x 9'5" x 5"	0.79 x 2.85 x 0.13	24.1 (2.3)	19.0 (2.0)	175 (80)	5/35	4"-24"	500	500	775
40x200	Sing/Ft	2'7" x 10'8" x 5"	0.79 x 3.25 x 0.13	27.5 (2.6)	21.7 (2.2)	200 (91)	5/40	4"-24"	565	565	880
40x225	Sing/Ft	2'7" x 12'0" x 5"	0.79 x 3.65 x 0.13	30.8 (2.9)	24.4 (2.5)	225 (103)	5/45	4"-24"	630	630	980
40x250	Sing/Ft	2'7" x 13'3" x 5"	0.79 x 4.04 x 0.13	34.2 (3.2)	27.1 (2.8)	250 (114)	5/50	4"-24"	695	695	1085
40x275	Sing/Ft	2'7" x 14'7" x 5"	0.79 x 4.44 x 0.13	37.5 (3.5)	29.8 (3.1)	275 (125)	5/55	4"-24"	755	755	1190
40x300	Sing/Ft	2'7" x 15'11" x 5"	0.79 x 4.84 x 0.13	40.9 (3.8)	32.5 (3.4)	295 (134)	5/60	4"-24"	820	820	1295
40x325	Sing/Ft	2'7" x 17'2" x 5"	0.79 x 5.23 x 0.13	44.2 (4.1)	35.2 (3.6)	320 (146)	5/65	4"-24"	885	885	1395
40x350	Sing/Ft	2'7" x 18'6" x 5"	0.79 x 5.63 x 0.13	47.6 (4.4)	37.9 (3.9)	345 (157)	5/70	4"-24"	950	950	1500
40x375	Sing/Ft	2'7" x 19'9" x 5"	0.79 x 6.02 x 0.13	51.0 (4.8)	40.6 (4.2)	370 (168)	5/75	4"-24"	1015	1015	1605
40x400	Sing/Ft	2'7" x 21'1" x 5"	0.79 x 6.42 x 0.13	54.3 (5.1)	43.3 (4.5)	395 (180)	5/80	4"-24"	1080	1080	1705
40x425	Sing/Ft	2'7" x 22'5" x 5"	0.79 x 6.82 x 0.13	57.7 (5.4)	46.0 (4.8)	420 (191)	5/85	4"-24"	1145	1145	1810
40x450	Sing/Ft	2'7" x 23'8" x 5"	0.79 x 7.21 x 0.13	61.0 (5.7)	48.7 (5.0)	440 (200)	5/90	4"-24"	1205	1205	1915
40x475	Sing/Ft	2'7" x 25'0" x 5"	0.79 x 7.61 x 0.13	64.4 (6.0)	51.4 (5.3)	465 (211)	5/95	4"-24"	1270	1270	2020
40x500	Sing/Ft	2'7" x 26'3" x 5"	0.79 x 8.01 x 0.13	67.7 (6.3)	54.1 (5.6)	490 (223)	5/100	4"-24"	1335	1335	2120
60x75	Sing/Ft	3'8" x 4'2" x 5"	1.11 x 1.27 x 0.13	15.0 (1.4)	12.2 (1.2)	110 (50)	7/15	4"-37"	300	300	480
60x100	Sing/Ft	3'8" x 5'6" x 5"	1.11 x 1.67 x 0.13	19.7 (1.9)	16.3 (1.6)	145 (66)	7/20	4"-37"	385	385	620
60x125	Sing/Ft	3'8" x 6'9" x 5"	1.11 x 2.06 x 0.13	24.4 (2.3)	20.3 (2.0)	180 (82)	7/25	4"-37"	470	470	765
60x150	Sing/Ft	3'8" x 8'1" x 5"	1.11 x 2.46 x 0.13	29.1 (2.7)	24.4 (2.4)	210 (96)	7/30	4"-37"	555	555	905
60x175	Sing/Ft	3'8" x 9'5" x 5"	1.11 x 2.85 x 0.13	33.8 (3.2)	28.4 (2.8)	245 (112)	7/35	4"-37"	640	640	1050
60x200	Sing/Ft	3'8" x 10'8" x 5"	1.11 x 3.25 x 0.13	38.6 (3.6)	32.5 (3.2)	280 (128)	7/40	4"-37"	720	720	1195
60x225	Sing/Ft	3'8" x 12'0" x 5"	1.11 x 3.65 x 0.13	43.3 (4.1)	36.6 (3.6)	315 (143)	7/45	4"-37"	805	805	1335
60x250	Sing/Ft	3'8" x 13'3" x 5"	1.11 x 4.04 x 0.13	48.0 (4.5)	40.6 (4.0)	350 (159)	7/50	4"-37"	890	890	1480
60x275	Sing/Ft	3'8" x 14'7" x 5"	1.11 x 4.44 x 0.13	52.7 (4.9)	44.7 (4.4)	380 (173)	7/55	4"-37"	975	975	1620
60x300	Sing/Ft	3'8" x 15'11" x 5"	1.11 x 4.84 x 0.13	57.4 (5.4)	48.7 (4.8)	415 (189)	7/60	4"-37"	1055	1055	1765
60x325	Sing/Ft	3'8" x 17'2" x 5"	1.11 x 5.23 x 0.13	62.1 (5.8)	52.8 (5.2)	450 (205)	7/65	4"-37"	1140	1140	1905
60x350	Sing/Ft	3'8" x 18'6" x 5"	1.11 x 5.63 x 0.13	66.8 (6.2)	56.8 (5.6)	485 (220)	7/70	4"-37"	1225	1225	2050
60x375	Sing/Ft	3'8" x 19'9" x 5"	1.11 x 6.02 x 0.13	71.5 (6.7)	60.9 (6.0)	515 (234)	7/75	4"-37"	1310	1310	2195
60x400	Sing/Ft	3'8" x 21'1" x 5"	1.11 x 6.42 x 0.13	76.2 (7.1)	64.9 (6.4)	550 (250)	7/80	4"-37"	1395	1395	2335
60x425	Sing/Ft	3'8" x 22'5" x 5"	1.11 x 6.82 x 0.13	80.9 (7.6)	69.0 (6.8)	585 (266)	7/85	4"-37"	1475	1475	2480
60x450	Sing/Ft	3'8" x 23'8" x 5"	1.11 x 7.21 x 0.13	85.6 (8.0)	73.1 (7.2)	620 (282)	7/90	4"-37"	1560	1560	2620
60x475	Sing/Ft	3'8" x 25'0" x 5"	1.11 x 7.61 x 0.13	90.3 (8.4)	77.1 (7.6)	655 (298)	7/95	4"-37"	1645	1645	2765
60x500	Sing/Ft	3'8" x 26'3" x 5"	1.11 x 8.01 x 0.13	95.0 (8.9)	81.2 (8.0)	685 (311)	7/100	4"-37"	1730	1730	2905
80x75	Sing/Ft	4'8" x 4'2" x 5"	1.43 x 1.27 x 0.13	19.3 (1.8)	16.3 (1.6)	140 (64)	10/15	4"-49"	360	360	595
80x100	Sing/Ft	4'8" x 5'6" x 5"	1.43 x 1.67 x 0.13	25.4 (2.4)	21.7 (2.1)	185 (84)	10/20	4"-49"	465	465	780
80x125	Sing/Ft	4'8" x 6'9" x 5"	1.43 x 2.06 x 0.13	31.5 (2.9)	27.1 (2.6)	230 (105)	10/25	4"-49"	570	570	960
80x150	Sing/Ft	4'8" x 8'1" x 5"	1.43 x 2.46 x 0.13	37.5 (3.5)	32.5 (3.1)	275 (125)	10/30	4"-49"	670	670	1145
80x175	Sing/Ft	4'8" x 9'5" x 5"	1.43 x 2.85 x 0.13	43.6 (4.1)	37.9 (3.6)	315 (143)	10/35	4"-49"	775	775	1325
80x200	Sing/Ft	4'8" x 10'8" x 5"	1.43 x 3.25 x 0.13	49.6 (4.6)	43.3 (4.2)	360 (164)	10/40	4"-49"	880	880	1505
80x225	Sing/Ft	4'8" x 12'0" x 5"	1.43 x 3.65 x 0.13	55.7 (5.2)	48.7 (4.7)	405 (184)	10/45	4"-49"	980	980	1690
80x250	Sing/Ft	4'8" x 13'3" x 5"	1.43 x 4.04 x 0.13	61.7 (5.8)	54.1 (5.2)	445 (202)	10/50	4"-49"	1085	1085	1870
80x275	Sing/Ft	4'8" x 14'7" x 5"	1.43 x 4.44 x 0.13	67.8 (6.3)	59.5 (5.7)	490 (223)	10/55	4"-49"	1190	1190	2055
80x300	Sing/Ft	4'8" x 15'11" x 5"	1.43 x 4.84 x 0.13	73.9 (6.9)	64.9 (6.2)	535 (243)	10/60	4"-49"	1295	1295	2235
80x325	Sing/Ft	4'8" x 17'2" x 5"	1.43 x 5.23 x 0.13	79.9 (7.5)	70.4 (6.8)	580 (264)	10/65	4"-49"	1395	1395	2420
80x350	Sing/Ft	4'8" x 18'6" x 5"	1.43 x 5.63 x 0.13	86.0 (8.1)	75.8 (7.3)	620 (282)	10/70	4"-49"	1500	1500	2600
80x375	Sing/Ft	4'8" x 19'9" x 5"	1.43 x 6.02 x 0.13	92.0 (8.6)	81.2 (7.8)	665 (302)	10/75	4"-49"	1605	1605	2780
80x400	Sing/Ft	4'8" x 21'1" x 5"	1.43 x 6.42 x 0.13	98.1 (9.2)	86.6 (8.3)	710 (323)	10/80	4"-49"	1705	1705	2965

GALAXY® GS6 15.85 MM PRODUCT SPECIFICATIONS

Lines x Columns	Sections/Ventilated	Cabinet Dimensions Feet-Inches H x W x D	Cabinet Dimensions Meters H x W x D	Cabinet Square Feet (Square Meters)	Active Area Square Feet (Square Meters)	Cabinet Weight Pounds (kilograms)	Lines/Characters per line	Character Height	Maximum Watts		
									Amber	Red	RGB
80x425	Sing/Ft	4'8" x 22'5" x 5"	1.43 x 6.82 x 0.13	104.2 (9.8)	92.0 (8.8)	750 (341)	10/85	4"-49"	1810	1810	3145
80x450	Sing/Ft	4'8" x 23'8" x 5"	1.43 x 7.21 x 0.13	110.2 (10.3)	97.4 (9.4)	795 (361)	10/90	4"-49"	1915	1915	3330
80x475	Sing/Ft	4'8" x 25'0" x 5"	1.43 x 7.61 x 0.13	116.3 (10.9)	102.8 (9.9)	840 (382)	10/95	4"-49"	2020	2020	3510
80x500	Sing/Ft	4'8" x 26'3" x 5"	1.43 x 8.01 x 0.13	122.3 (11.5)	108.2 (10.4)	885 (402)	10/100	4"-49"	2120	2120	3695
100x75	Sing/Ft	5'9" x 4'2" x 5"	1.74 x 1.27 x 0.13	23.7 (2.2)	20.3 (1.9)	175 (80)	12/15	4"-62"	420	420	790
100x100	Sing/Ft	5'9" x 5'6" x 5"	1.74 x 1.67 x 0.13	31.1 (2.9)	27.1 (2.6)	225 (103)	12/20	4"-62"	545	545	1035
100x125	Sing/Ft	5'9" x 6'9" x 5"	1.74 x 2.06 x 0.13	38.5 (3.6)	33.8 (3.2)	280 (128)	12/25	4"-62"	665	665	1280
100x150	Sing/Ft	5'9" x 8'1" x 5"	1.74 x 2.46 x 0.13	45.9 (4.3)	40.6 (3.8)	335 (152)	12/30	4"-62"	790	790	1530
100x175	Sing/Ft	5'9" x 9'5" x 5"	1.74 x 2.85 x 0.13	53.3 (5.0)	47.4 (4.5)	385 (175)	12/35	4"-62"	915	915	1775
100x200	Sing/Ft	5'9" x 10'8" x 5"	1.74 x 3.25 x 0.13	60.7 (5.7)	54.1 (5.1)	440 (200)	12/40	4"-62"	1035	1035	2020
100x225	Sing/Ft	5'9" x 12'0" x 5"	1.74 x 3.65 x 0.13	68.1 (6.4)	60.9 (5.8)	495 (225)	12/45	4"-62"	1160	1160	2270
100x250	Sing/Ft	5'9" x 13'3" x 5"	1.74 x 4.04 x 0.13	75.5 (7.0)	67.6 (6.4)	545 (248)	12/50	4"-62"	1280	1280	2515
100x275	Sing/Ft	5'9" x 14'7" x 5"	1.74 x 4.44 x 0.13	82.9 (7.7)	74.4 (7.0)	600 (273)	12/55	4"-62"	1405	1405	2760
100x300	Sing/Ft	5'9" x 15'11" x 5"	1.74 x 4.84 x 0.13	90.3 (8.4)	81.2 (7.7)	655 (298)	12/60	4"-62"	1530	1530	3005
100x325	Sing/Ft	5'9" x 17'2" x 5"	1.74 x 5.23 x 0.13	97.8 (9.1)	87.9 (8.3)	705 (320)	12/65	4"-62"	1650	1650	3255
100x350	Sing/Ft	5'9" x 18'6" x 5"	1.74 x 5.63 x 0.13	105.2 (9.8)	94.7 (9.0)	760 (345)	12/70	4"-62"	1775	1775	3500
100x375	Sing/Ft	5'9" x 19'9" x 5"	1.74 x 6.02 x 0.13	112.6 (10.5)	101.4 (9.6)	815 (370)	12/75	4"-62"	1900	1900	3745
100x400	Sing/Ft	5'9" x 21'1" x 5"	1.74 x 6.42 x 0.13	120.0 (11.2)	108.2 (10.2)	865 (393)	12/80	4"-62"	2020	2020	3995
100x425	Sing/Ft	5'9" x 22'5" x 5"	1.74 x 6.82 x 0.13	127.4 (11.9)	115.0 (10.9)	920 (418)	12/85	4"-62"	2145	2145	4240
100x450	Sing/Ft	5'9" x 23'8" x 5"	1.74 x 7.21 x 0.13	134.8 (12.5)	121.7 (11.5)	975 (443)	12/90	4"-62"	2270	2270	4485
100x475	Sing/Ft	5'9" x 25'0" x 5"	1.74 x 7.61 x 0.13	142.2 (13.2)	128.5 (12.2)	1025 (465)	12/95	4"-62"	2390	2390	4730
100x500	Sing/Ft	5'9" x 26'3" x 5"	1.74 x 8.01 x 0.13	149.6 (13.9)	135.2 (12.8)	1080 (490)	12/100	4"-62"	2515	2515	4980
120x75	Sing/Ft	6'9" x 4'2" x 5"	2.06 x 1.27 x 0.13	28.0 (2.6)	24.4 (2.4)	205 (93)	15/15	4"-74"	480	480	905
120x100	Sing/Ft	6'9" x 5'6" x 5"	2.06 x 1.67 x 0.13	36.7 (3.4)	32.5 (3.2)	265 (121)	15/20	4"-74"	620	620	1195
120x125	Sing/Ft	6'9" x 6'9" x 5"	2.06 x 2.06 x 0.13	45.5 (4.2)	40.6 (4.0)	330 (150)	15/25	4"-74"	765	765	1480
120x150	Sing/Ft	6'9" x 8'1" x 5"	2.06 x 2.46 x 0.13	54.3 (5.1)	48.7 (4.8)	395 (180)	15/30	4"-74"	905	905	1765
120x175	Sing/Ft	6'9" x 9'5" x 5"	2.06 x 2.85 x 0.13	63.0 (5.9)	56.8 (5.6)	455 (207)	15/35	4"-74"	1050	1050	2050
120x200	Sing/Ft	6'9" x 10'8" x 5"	2.06 x 3.25 x 0.13	71.8 (6.7)	64.9 (6.4)	520 (236)	15/40	4"-74"	1195	1195	2335
120x225	Sing/Ft	6'9" x 12'0" x 5"	2.06 x 3.65 x 0.13	80.5 (7.5)	73.1 (7.2)	580 (264)	15/45	4"-74"	1335	1335	2620
120x250	Sing/Ft	6'9" x 13'3" x 5"	2.06 x 4.04 x 0.13	89.3 (8.3)	81.2 (8.0)	645 (293)	15/50	4"-74"	1480	1480	2905
120x275	Sing/Ft	6'9" x 14'7" x 5"	2.06 x 4.44 x 0.13	98.1 (9.1)	89.3 (8.8)	710 (323)	15/55	4"-74"	1620	1620	3195
120x300	Sing/Ft	6'9" x 15'11" x 5"	2.06 x 4.84 x 0.13	106.8 (10.0)	97.4 (9.6)	770 (350)	15/60	4"-74"	1765	1765	3480
120x325	Sing/Ft	6'9" x 17'2" x 5"	2.06 x 5.23 x 0.13	115.6 (10.8)	105.5 (10.4)	835 (379)	15/65	4"-74"	1905	1905	3765
120x350	Sing/Ft	6'9" x 18'6" x 5"	2.06 x 5.63 x 0.13	124.4 (11.6)	113.6 (11.2)	900 (409)	15/70	4"-74"	2050	2050	4050
120x375	Sing/Ft	6'9" x 19'9" x 5"	2.06 x 6.02 x 0.13	133.1 (12.4)	121.7 (12.0)	960 (436)	15/75	4"-74"	2195	2195	4335
120x400	Sing/Ft	6'9" x 21'1" x 5"	2.06 x 6.42 x 0.13	141.9 (13.2)	129.8 (12.8)	1025 (465)	15/80	4"-74"	2335	2335	4620
120x425	Sing/Ft	6'9" x 22'5" x 5"	2.06 x 6.82 x 0.13	150.6 (14.0)	138.0 (13.6)	1085 (493)	15/85	4"-74"	2480	2480	4905
120x450	Sing/Ft	6'9" x 23'8" x 5"	2.06 x 7.21 x 0.13	159.4 (14.9)	146.1 (14.4)	1150 (522)	15/90	4"-74"	2620	2620	5195
120x475	Sing/Ft	6'9" x 25'0" x 5"	2.06 x 7.61 x 0.13	168.2 (15.7)	154.2 (15.2)	1215 (552)	15/95	4"-74"	2765	2765	5480
120x500	Sing/Ft	6'9" x 26'3" x 5"	2.06 x 8.01 x 0.13	176.9 (16.5)	162.3 (16.0)	1275 (579)	15/100	4"-74"	2905	2905	5765
140x100	Sing/Bk	7'10" x 5'9" x 11"	2.38 x 1.74 x 0.28	44.3 (4.1)	37.9 (3.7)	495 (225)	17/20	4"-87"	755	755	1355
140x125	Sing/Bk	7'10" x 7'0" x 11"	2.38 x 2.14 x 0.28	54.5 (5.1)	47.4 (4.6)	605 (275)	17/25	4"-87"	950	950	1700
140x150	Sing/Bk	7'10" x 8'4" x 11"	2.38 x 2.53 x 0.28	64.6 (6.0)	56.8 (5.5)	720 (327)	17/30	4"-87"	1150	1150	2050
140x175	Sing/Bk	7'10" x 9'8" x 11"	2.38 x 2.93 x 0.28	74.7 (7.0)	66.3 (6.4)	830 (377)	17/35	4"-87"	1300	1300	2350
140x200	Sing/Bk	7'10" x 10'11" x 11"	2.38 x 3.33 x 0.28	84.8 (7.9)	75.8 (7.4)	945 (429)	17/40	4"-87"	1500	1500	2700
140x225	Sing/Bk	7'10" x 12'3" x 11"	2.38 x 3.72 x 0.28	94.9 (8.9)	85.2 (8.3)	1055 (479)	17/45	4"-87"	1695	1695	3045
140x250	Sing/Bk	7'10" x 13'6" x 11"	2.38 x 4.12 x 0.28	105.0 (9.8)	94.7 (9.2)	1170 (531)	17/50	4"-87"	1845	1845	3345
140x275	Sing/Bk	7'10" x 14'10" x 11"	2.38 x 4.52 x 0.28	115.1 (10.8)	104.2 (10.1)	1280 (581)	17/55	4"-87"	2045	2045	3695
140x300	Sing/Bk	7'10" x 16'2" x 11"	2.38 x 4.91 x 0.28	125.3 (11.7)	113.6 (11.0)	1395 (633)	17/60	4"-87"	2240	2240	4040
140x325	Sing/Bk	7'10" x 17'5" x 11"	2.38 x 5.31 x 0.28	135.4 (12.6)	123.1 (12.0)	1505 (683)	17/65	4"-87"	2390	2390	4340
140x350	Sing/Bk	7'10" x 18'9" x 11"	2.38 x 5.7 x 0.28	145.5 (13.6)	132.5 (12.9)	1615 (733)	17/70	4"-87"	2590	2590	4690
140x375	Sing/Bk	7'10" x 20'0" x 11"	2.38 x 6.1 x 0.28	155.6 (14.5)	142.0 (13.8)	1730 (785)	17/75	4"-87"	2790	2790	5040
140x400	Sing/Bk	7'10" x 21'4" x 11"	2.38 x 6.5 x 0.28	165.7 (15.5)	151.5 (14.7)	1840 (835)	17/80	4"-87"	2940	2940	5340
140x425	Sing/Bk	7'10" x 22'8" x 11"	2.38 x 6.89 x 0.28	175.8 (16.4)	160.9 (15.6)	1955 (887)	17/85	4"-87"	3135	3135	5685
140x450	Sing/Bk	7'10" x 23'11" x 11"	2.38 x 7.29 x 0.28	185.9 (17.4)	170.4 (16.6)	2065 (937)	17/90	4"-87"	3335	3335	6035
140x475	Sing/Bk	7'10" x 25'3" x 11"	2.38 x 7.69 x 0.28	196.1 (18.3)	179.9 (17.5)	2180 (989)	17/95	4"-87"	3485	3485	6335
140x500	Sing/Bk	7'10" x 26'6" x 11"	2.38 x 8.08 x 0.28	206.2 (19.2)	189.3 (18.4)	2290 (1039)	17/100	4"-87"	3680	3680	6680
140x525	Sing/Bk	7'10" x 27'10" x 11"	2.38 x 8.48 x 0.28	216.3 (20.2)	198.8 (19.3)	2405 (1091)	17/105	4"-87"	3880	3880	7030
140x550	Sing/Bk	7'10" x 29'2" x 11"	2.38 x 8.87 x 0.28	226.4 (21.1)	208.3 (20.2)	2515 (1141)	17/110	4"-87"	4030	4030	7330
140x575	Sing/Bk	7'10" x 30'5" x 11"	2.38 x 9.27 x 0.28	236.5 (22.1)	217.7 (21.2)	2630 (1193)	17/115	4"-87"	4235	4235	7685
140x600	Sing/Bk	7'10" x 31'9" x 11"	2.38 x 9.67 x 0.28	246.6 (23.0)	227.2 (22.1)	2740 (1243)	17/120	4"-87"	4435	4435	8035
140x625	Sing/Bk	7'10" x 33'0" x 11"	2.38 x 10.06 x 0.28	256.7 (23.9)	236.6 (23.0)	2850 (1293)	17/125	4"-87"	4585	4585	8335
140x650	Sing/Bk	7'10" x 34'4" x 11"	2.38 x 10.46 x 0.28	266.9 (24.9)	246.1 (23.9)	2965 (1345)	17/130	4"-87"	4785	4785	8685
140x675	Sing/Bk	7'10" x 35'8" x 11"	2.38 x 10.86 x 0.28	277.0 (25.8)	255.6 (24.6)	3075 (1395)	17/135	4"-87"	4980	4980	9030
140x700	Sing/Bk	7'10" x 36'11" x 11"	2.38 x 11.25 x 0.28	287.1 (26.8)	265.0 (25.5)	3190 (1447)	17/140	4"-87"	5130	5130	9330
140x725	Sing/Bk	7'10" x 38'3" x 11"	2.38 x 11.65 x 0.28	297.2 (27.7)	274.5 (26.5)	3300 (1497)	17/145	4"-87"	5330	5330	9680
140x750	Sing/Bk	7'10" x 39'6" x 11"	2.38 x 12.04 x 0.28	307.3 (28.7)	284.0 (27.4)	3415 (1550)	17/150	4"-87"	5525	5525	10025

GALAXY® GS6 15.85 MM PRODUCT SPECIFICATIONS

Lines x Columns	Sections/Ventilated	Cabinet Dimensions Feet-Inches H x W x D	Cabinet Dimensions Meters H x W x D	Cabinet Square Feet (Square Meters)	Active Area Square Feet (Square Meters)	Cabinet Weight Pounds (kilograms)	Lines/Characters per line	Character Height	Maximum Watts		
									Amber	Red	RGB
140x775	Sing/Bk	7'10" x 40'10" x 11"	2.38 x 12.44 x 0.28	317.4 (29.6)	293.4 (28.3)	3525 (1599)	17/155	4"-87"	5675	5675	10325
140x800	Sing/Bk	7'10" x 42'2" x 11"	2.38 x 12.84 x 0.28	327.5 (30.6)	302.9 (29.2)	3640 (1652)	17/160	4"-87"	5875	5875	10675
140x825	Sing/Bk	7'10" x 43'5" x 11"	2.38 x 13.23 x 0.28	337.7 (31.5)	312.4 (30.1)	3750 (1701)	17/165	4"-87"	6075	6075	11025
160x100	Sing/Bk	8'10" x 5'9" x 11"	2.69 x 1.74 x 0.28	50.3 (4.7)	43.3 (4.2)	560 (255)	20/20	4"-99"	840	840	1525
160x125	Sing/Bk	8'10" x 7'0" x 11"	2.69 x 2.14 x 0.28	61.7 (5.8)	54.1 (5.2)	690 (313)	20/25	4"-99"	1060	1060	1915
160x150	Sing/Bk	8'10" x 8'4" x 11"	2.69 x 2.53 x 0.28	73.2 (6.8)	64.9 (6.2)	815 (370)	20/30	4"-99"	1280	1280	2310
160x175	Sing/Bk	8'10" x 9'8" x 11"	2.69 x 2.93 x 0.28	84.7 (7.9)	75.8 (7.3)	940 (427)	20/35	4"-99"	1450	1450	2650
160x200	Sing/Bk	8'10" x 10'11" x 11"	2.69 x 3.33 x 0.28	96.1 (9.0)	86.6 (8.3)	1070 (486)	20/40	4"-99"	1670	1670	3040
160x225	Sing/Bk	8'10" x 12'3" x 11"	2.69 x 3.72 x 0.28	107.6 (10.0)	97.4 (9.4)	1195 (543)	20/45	4"-99"	1890	1890	3430
160x250	Sing/Bk	8'10" x 13'6" x 11"	2.69 x 4.12 x 0.28	119.1 (11.1)	108.2 (10.4)	1325 (602)	20/50	4"-99"	2060	2060	3775
160x275	Sing/Bk	8'10" x 14'10" x 11"	2.69 x 4.52 x 0.28	130.5 (12.2)	119.0 (11.4)	1450 (658)	20/55	4"-99"	2280	2280	4165
160x300	Sing/Bk	8'10" x 16'2" x 11"	2.69 x 4.91 x 0.28	142.0 (13.2)	129.8 (12.5)	1580 (717)	20/60	4"-99"	2500	2500	4555
160x325	Sing/Bk	8'10" x 17'5" x 11"	2.69 x 5.31 x 0.28	153.5 (14.3)	140.7 (13.5)	1705 (774)	20/65	4"-99"	2670	2670	4900
160x350	Sing/Bk	8'10" x 18'9" x 11"	2.69 x 5.7 x 0.28	164.9 (15.3)	151.5 (14.6)	1835 (833)	20/70	4"-99"	2890	2890	5290
160x375	Sing/Bk	8'10" x 20'0" x 11"	2.69 x 6.1 x 0.28	176.4 (16.4)	162.3 (15.6)	1960 (890)	20/75	4"-99"	3110	3110	5680
160x400	Sing/Bk	8'10" x 21'4" x 11"	2.69 x 6.5 x 0.28	187.9 (17.5)	173.1 (16.6)	2090 (949)	20/80	4"-99"	3280	3280	6025
160x425	Sing/Bk	8'10" x 22'8" x 11"	2.69 x 6.89 x 0.28	199.3 (18.5)	183.9 (17.7)	2215 (1005)	20/85	4"-99"	3500	3500	6415
160x450	Sing/Bk	8'10" x 23'11" x 11"	2.69 x 7.29 x 0.28	210.8 (19.6)	194.7 (18.7)	2340 (1062)	20/90	4"-99"	3720	3720	6805
160x475	Sing/Bk	8'10" x 25'3" x 11"	2.69 x 7.69 x 0.28	222.3 (20.7)	205.6 (19.8)	2470 (1121)	20/95	4"-99"	3890	3890	7150
160x500	Sing/Bk	8'10" x 26'6" x 11"	2.69 x 8.08 x 0.28	233.7 (21.7)	216.4 (20.8)	2595 (1178)	20/100	4"-99"	4110	4110	7540
160x525	Sing/Bk	8'10" x 27'10" x 11"	2.69 x 8.48 x 0.28	245.2 (22.8)	227.2 (21.8)	2725 (1237)	20/105	4"-99"	4330	4330	7930
160x550	Sing/Bk	8'10" x 29'2" x 11"	2.69 x 8.87 x 0.28	256.7 (23.9)	238.0 (22.9)	2850 (1293)	20/110	4"-99"	4500	4500	8275
160x575	Sing/Bk	8'10" x 30'5" x 11"	2.69 x 9.27 x 0.28	268.1 (24.9)	248.8 (23.9)	2980 (1352)	20/115	4"-99"	4730	4730	8670
160x600	Sing/Bk	8'10" x 31'9" x 11"	2.69 x 9.67 x 0.28	279.6 (26.0)	259.6 (25.0)	3105 (1409)	20/120	4"-99"	4950	4950	9065
160x625	Sing/Bk	8'10" x 33'0" x 11"	2.69 x 10.06 x 0.28	291.1 (27.1)	270.4 (26.0)	3235 (1468)	20/125	4"-99"	5120	5120	9405
160x650	Sing/Bk	8'10" x 34'4" x 11"	2.69 x 10.46 x 0.28	302.5 (28.1)	281.3 (27.0)	3360 (1525)	20/130	4"-99"	5340	5340	9795
160x675	Sing/Bk	8'10" x 35'8" x 11"	2.69 x 10.86 x 0.28	314.0 (29.2)	292.1 (27.8)	3490 (1584)	20/135	4"-99"	5560	5560	10190
160x700	Sing/Bk	8'10" x 36'11" x 11"	2.69 x 11.25 x 0.28	325.5 (30.3)	302.9 (28.9)	3615 (1640)	20/140	4"-99"	5730	5730	10530
160x725	Sing/Bk	8'10" x 38'3" x 11"	2.69 x 11.65 x 0.28	336.9 (31.3)	313.7 (29.9)	3740 (1697)	20/145	4"-99"	5950	5950	10920
160x750	Sing/Bk	8'10" x 39'6" x 11"	2.69 x 12.04 x 0.28	348.4 (32.4)	324.5 (30.9)	3870 (1756)	20/150	4"-99"	6170	6170	11310
160x775	Sing/Bk	8'10" x 40'10" x 11"	2.69 x 12.44 x 0.28	359.9 (33.5)	335.3 (32.0)	3995 (1813)	20/155	4"-99"	6340	6340	11655
160x800	Sing/Bk	8'10" x 42'2" x 11"	2.69 x 12.84 x 0.28	371.3 (34.5)	346.2 (33.0)	4125 (1872)	20/160	4"-99"	6560	6560	12045
160x825	Sing/Bk	8'10" x 43'5" x 11"	2.69 x 13.23 x 0.28	382.8 (35.6)	357.0 (34.1)	4250 (1928)	20/165	4"-99"	6780	6780	12435
180x100	Sing/Bk	9'11" x 5'9" x 11"	3.01 x 1.74 x 0.28	56.2 (5.2)	48.7 (4.6)	625 (284)	22/20	4"-112"	925	925	1695
180x125	Sing/Bk	9'11" x 7'0" x 11"	3.01 x 2.14 x 0.28	69.0 (6.4)	60.9 (5.8)	770 (350)	22/25	4"-112"	1165	1165	2130
180x150	Sing/Bk	9'11" x 8'4" x 11"	3.01 x 2.53 x 0.28	81.8 (7.6)	73.1 (7.0)	910 (413)	22/30	4"-112"	1410	1410	2565
180x175	Sing/Bk	9'11" x 9'8" x 11"	3.01 x 2.93 x 0.28	94.7 (8.8)	85.2 (8.1)	1055 (479)	22/35	4"-112"	1600	1600	2950
180x200	Sing/Bk	9'11" x 10'11" x 11"	3.01 x 3.33 x 0.28	107.5 (10.0)	97.4 (9.3)	1195 (543)	22/40	4"-112"	1840	1840	3385
180x225	Sing/Bk	9'11" x 12'3" x 11"	3.01 x 3.72 x 0.28	120.3 (11.2)	109.6 (10.4)	1340 (608)	22/45	4"-112"	2080	2080	3820
180x250	Sing/Bk	9'11" x 13'6" x 11"	3.01 x 4.12 x 0.28	133.1 (12.4)	121.7 (11.6)	1480 (672)	22/50	4"-112"	2275	2275	4205
180x275	Sing/Bk	9'11" x 14'10" x 11"	3.01 x 4.52 x 0.28	145.9 (13.6)	133.9 (12.8)	1620 (735)	22/55	4"-112"	2515	2515	4635
180x300	Sing/Bk	9'11" x 16'2" x 11"	3.01 x 4.91 x 0.28	158.7 (14.8)	146.1 (13.9)	1765 (801)	22/60	4"-112"	2755	2755	5070
180x325	Sing/Bk	9'11" x 17'5" x 11"	3.01 x 5.31 x 0.28	171.6 (16.0)	158.2 (15.1)	1905 (865)	22/65	4"-112"	2950	2950	5455
180x350	Sing/Bk	9'11" x 18'9" x 11"	3.01 x 5.7 x 0.28	184.4 (17.2)	170.4 (16.2)	2050 (930)	22/70	4"-112"	3190	3190	5890
180x375	Sing/Bk	9'11" x 20'0" x 11"	3.01 x 6.1 x 0.28	197.2 (18.4)	182.6 (17.4)	2190 (994)	22/75	4"-112"	3430	3430	6325
180x400	Sing/Bk	9'11" x 21'4" x 11"	3.01 x 6.5 x 0.28	210.0 (19.6)	194.7 (18.6)	2335 (1060)	22/80	4"-112"	3625	3625	6710
180x425	Sing/Bk	9'11" x 22'8" x 11"	3.01 x 6.89 x 0.28	222.8 (20.7)	206.9 (19.7)	2475 (1123)	22/85	4"-112"	3865	3865	7145
180x450	Sing/Bk	9'11" x 23'11" x 11"	3.01 x 7.29 x 0.28	235.7 (21.9)	219.1 (20.9)	2620 (1189)	22/90	4"-112"	4105	4105	7575
180x475	Sing/Bk	9'11" x 25'3" x 11"	3.01 x 7.69 x 0.28	248.5 (23.1)	231.2 (22.0)	2760 (1252)	22/95	4"-112"	4300	4300	7965
180x500	Sing/Bk	9'11" x 26'6" x 11"	3.01 x 8.08 x 0.28	261.3 (24.3)	243.4 (23.2)	2905 (1318)	22/100	4"-112"	4540	4540	8395
180x525	Sing/Bk	9'11" x 27'10" x 11"	3.01 x 8.48 x 0.28	274.1 (25.5)	255.6 (24.4)	3045 (1382)	22/105	4"-112"	4780	4780	8830
180x550	Sing/Bk	9'11" x 29'2" x 11"	3.01 x 8.87 x 0.28	286.9 (26.7)	267.7 (25.5)	3185 (1445)	22/110	4"-112"	4975	4975	9215
180x575	Sing/Bk	9'11" x 30'5" x 11"	3.01 x 9.27 x 0.28	299.7 (27.9)	279.9 (26.7)	3330 (1511)	22/115	4"-112"	5220	5220	9660
180x600	Sing/Bk	9'11" x 31'9" x 11"	3.01 x 9.67 x 0.28	312.6 (29.1)	292.1 (27.8)	3470 (1574)	22/120	4"-112"	5465	5465	10090
180x625	Sing/Bk	9'11" x 33'0" x 11"	3.01 x 10.06 x 0.28	325.4 (30.3)	304.2 (29.0)	3615 (1640)	22/125	4"-112"	5655	5655	10480
180x650	Sing/Bk	9'11" x 34'4" x 11"	3.01 x 10.46 x 0.28	338.2 (31.5)	316.4 (30.2)	3755 (1704)	22/130	4"-112"	5895	5895	10910
180x675	Sing/Bk	9'11" x 35'8" x 11"	3.01 x 10.86 x 0.28	351.0 (32.7)	328.6 (31.0)	3900 (1770)	22/135	4"-112"	6140	6140	11345
180x700	Sing/Bk	9'11" x 36'11" x 11"	3.01 x 11.25 x 0.28	363.8 (33.9)	340.8 (32.2)	4040 (1833)	22/140	4"-112"	6330	6330	11730
180x725	Sing/Bk	9'11" x 38'3" x 11"	3.01 x 11.65 x 0.28	376.7 (35.1)	352.9 (33.4)	4185 (1899)	22/145	4"-112"	6570	6570	12165
180x750	Sing/Bk	9'11" x 39'6" x 11"	3.01 x 12.04 x 0.28	389.5 (36.2)	365.1 (34.5)	4325 (1962)	22/150	4"-112"	6810	6810	12600
180x775	Sing/Bk	9'11" x 40'10" x 11"	3.01 x 12.44 x 0.28	402.3 (37.4)	377.3 (35.7)	4470 (2028)	22/155	4"-112"	7005	7005	12985
180x800	Sing/Bk	9'11" x 42'2" x 11"	3.01 x 12.84 x 0.28	415.1 (38.6)	389.4 (36.8)	4610 (2092)	22/160	4"-112"	7245	7245	13420
180x825	Sing/Bk	9'11" x 43'5" x 11"	3.01 x 13.23 x 0.28	427.9 (39.8)	401.6 (38.0)	4750 (2155)	22/165	4"-112"	7485	7485	13850
200x100	Multi/Bk	10'11" x 5'9" x 11"	3.33 x 1.74 x 0.28	62.1 (5.8)	54.1 (5.1)	690 (313)	25/20	4"-124"	1165	1165	2020
200x125	Multi/Bk	10'11" x 7'0" x 11"	3.33 x 2.14 x 0.28	76.3 (7.1)	67.6 (6.4)	850 (386)	25/25	4"-124"	1475	1475	2545
200x150	Multi/Bk	10'11" x 8'4" x 11"	3.33 x 2.53 x 0.28	90.5 (8.4)	81.2 (7.7)	1005 (456)	25/30	4"-124"	1785	1785	3070
200x175	Multi/Bk	10'11" x 9'8" x 11"	3.33 x 2.93 x 0.28	104.6 (9.8)	94.7 (9.0)	1165 (529)	25/35	4"-124"	2000	2000	3500

GALAXY® GS6 15.85 MM PRODUCT SPECIFICATIONS

Lines x Columns	Sections/Ventilated	Cabinet Dimensions Feet-Inches H x W x D	Cabinet Dimensions Meters H x W x D	Cabinet Square Feet (Square Meters)	Active Area Square Feet (Square Meters)	Cabinet Weight Pounds (kilograms)	Lines/Characters per line	Character Height	Maximum Watts		
									Amber	Red	RGB
200x200	Multi/Bk	10'11" x 10'11" x 11"	3.33 x 3.33 x 0.28	118.8 (11.1)	108.2 (10.2)	1320 (599)	25/40	4"-124"	2310	2310	4025
200x225	Multi/Bk	10'11" x 12'3" x 11"	3.33 x 3.72 x 0.28	133.0 (12.4)	121.7 (11.5)	1480 (672)	25/45	4"-124"	2620	2620	4550
200x250	Multi/Bk	10'11" x 13'6" x 11"	3.33 x 4.12 x 0.28	147.2 (13.7)	135.2 (12.8)	1635 (742)	25/50	4"-124"	2835	2835	4975
200x275	Multi/Bk	10'11" x 14'10" x 11"	3.33 x 4.52 x 0.28	161.3 (15.1)	148.8 (14.1)	1795 (815)	25/55	4"-124"	3145	3145	5500
200x300	Multi/Bk	10'11" x 16'2" x 11"	3.33 x 4.91 x 0.28	175.5 (16.4)	162.3 (15.4)	1950 (885)	25/60	4"-124"	3455	3455	6025
200x325	Multi/Bk	10'11" x 17'5" x 11"	3.33 x 5.31 x 0.28	189.7 (17.7)	175.8 (16.6)	2110 (958)	25/65	4"-124"	3670	3670	6455
200x350	Multi/Bk	10'11" x 18'9" x 11"	3.33 x 5.7 x 0.28	203.8 (19.0)	189.3 (17.9)	2265 (1028)	25/70	4"-124"	3980	3980	6980
200x375	Multi/Bk	10'11" x 20'0" x 11"	3.33 x 6.1 x 0.28	218.0 (20.3)	202.8 (19.2)	2420 (1098)	25/75	4"-124"	4290	4290	7505
200x400	Multi/Bk	10'11" x 21'4" x 11"	3.33 x 6.5 x 0.28	232.2 (21.6)	216.4 (20.5)	2580 (1171)	25/80	4"-124"	4505	4505	7930
200x425	Multi/Bk	10'11" x 22'8" x 11"	3.33 x 6.89 x 0.28	246.3 (22.9)	229.9 (21.8)	2735 (1241)	25/85	4"-124"	4815	4815	8455
200x450	Multi/Bk	10'11" x 23'11" x 11"	3.33 x 7.29 x 0.28	260.5 (24.3)	243.4 (23.0)	2895 (1314)	25/90	4"-124"	5125	5125	8980
200x475	Multi/Bk	10'11" x 25'3" x 11"	3.33 x 7.69 x 0.28	274.7 (25.6)	256.9 (24.3)	3050 (1384)	25/95	4"-124"	5340	5340	9410
200x500	Multi/Bk	10'11" x 26'6" x 11"	3.33 x 8.08 x 0.28	288.9 (26.9)	270.4 (25.6)	3210 (1457)	25/100	4"-124"	5650	5650	9935
200x525	Multi/Bk	10'11" x 27'10" x 11"	3.33 x 8.48 x 0.28	303.0 (28.2)	284.0 (26.9)	3365 (1527)	25/105	4"-124"	5960	5960	10460
200x550	Multi/Bk	10'11" x 29'2" x 11"	3.33 x 8.87 x 0.28	317.2 (29.5)	297.5 (28.2)	3525 (1599)	25/110	4"-124"	6175	6175	10890
200x575	Multi/Bk	10'11" x 30'5" x 11"	3.33 x 9.27 x 0.28	331.4 (30.9)	311.0 (29.4)	3680 (1670)	25/115	4"-124"	6500	6500	11430
200x600	Multi/Bk	10'11" x 31'9" x 11"	3.33 x 9.67 x 0.28	345.5 (32.2)	324.5 (30.7)	3840 (1742)	25/120	4"-124"	6810	6810	11955
200x625	Multi/Bk	10'11" x 33'0" x 11"	3.33 x 10.06 x 0.28	359.7 (33.5)	338.0 (32.0)	3995 (1813)	25/125	4"-124"	7025	7025	12380
200x650	Multi/Bk	10'11" x 34'4" x 11"	3.33 x 10.46 x 0.28	373.9 (34.8)	351.6 (33.3)	4150 (1883)	25/130	4"-124"	7335	7335	12905
200x675	Multi/Bk	10'11" x 35'8" x 11"	3.33 x 10.86 x 0.28	388.0 (36.2)	365.1 (34.2)	4310 (1955)	25/135	4"-124"	7645	7645	13430
200x700	Multi/Bk	10'11" x 36'11" x 11"	3.33 x 11.25 x 0.28	402.2 (37.5)	378.6 (35.5)	4465 (2026)	25/140	4"-124"	7860	7860	13860
200x725	Multi/Bk	10'11" x 38'3" x 11"	3.33 x 11.65 x 0.28	416.4 (38.8)	392.1 (36.8)	4625 (2098)	25/145	4"-124"	8170	8170	14385
200x750	Multi/Bk	10'11" x 39'6" x 11"	3.33 x 12.04 x 0.28	430.6 (40.1)	405.6 (38.1)	4780 (2169)	25/150	4"-124"	8480	8480	14910
200x775	Multi/Bk	10'11" x 40'10" x 11"	3.33 x 12.44 x 0.28	444.7 (41.4)	419.2 (39.4)	4940 (2241)	25/155	4"-124"	8695	8695	15340
200x800	Multi/Bk	10'11" x 42'2" x 11"	3.33 x 12.84 x 0.28	458.9 (42.8)	432.7 (40.6)	5095 (2312)	25/160	4"-124"	9005	9005	15860
200x825	Multi/Bk	10'11" x 43'5" x 11"	3.33 x 13.23 x 0.28	473.1 (44.1)	446.2 (41.9)	5255 (2384)	25/165	4"-124"	9315	9315	16385
220x100	Multi/Bk	12'0" x 5'9" x 11"	3.64 x 1.74 x 0.28	68.1 (6.3)	59.5 (5.6)	760 (345)	27/20	4"-137"	1250	1250	2195
220x125	Multi/Bk	12'0" x 7'0" x 11"	3.64 x 2.14 x 0.28	83.6 (7.8)	74.4 (7.0)	930 (422)	27/25	4"-137"	1585	1585	2760
220x150	Multi/Bk	12'0" x 8'4" x 11"	3.64 x 2.53 x 0.28	99.1 (9.2)	89.3 (8.4)	1100 (499)	27/30	4"-137"	1915	1915	3325
220x175	Multi/Bk	12'0" x 9'8" x 11"	3.64 x 2.93 x 0.28	114.6 (10.7)	104.2 (9.8)	1275 (579)	27/35	4"-137"	2150	2150	3800
220x200	Multi/Bk	12'0" x 10'11" x 11"	3.64 x 3.33 x 0.28	130.1 (12.1)	119.0 (11.2)	1445 (656)	27/40	4"-137"	2480	2480	4365
220x225	Multi/Bk	12'0" x 12'3" x 11"	3.64 x 3.72 x 0.28	145.7 (13.5)	133.9 (12.6)	1620 (735)	27/45	4"-137"	2815	2815	4925
220x250	Multi/Bk	12'0" x 13'6" x 11"	3.64 x 4.12 x 0.28	161.2 (15.0)	148.8 (14.0)	1790 (812)	27/50	4"-137"	3050	3050	5405
220x275	Multi/Bk	12'0" x 14'10" x 11"	3.64 x 4.52 x 0.28	176.7 (16.5)	163.6 (15.4)	1965 (892)	27/55	4"-137"	3380	3380	5975
220x300	Multi/Bk	12'0" x 16'2" x 11"	3.64 x 4.91 x 0.28	192.2 (17.9)	178.5 (16.8)	2135 (969)	27/60	4"-137"	3710	3710	6540
220x325	Multi/Bk	12'0" x 17'5" x 11"	3.64 x 5.31 x 0.28	207.8 (19.3)	193.4 (18.2)	2310 (1048)	27/65	4"-137"	3945	3945	7010
220x350	Multi/Bk	12'0" x 18'9" x 11"	3.64 x 5.7 x 0.28	223.3 (20.7)	208.3 (19.6)	2480 (1125)	27/70	4"-137"	4280	4280	7580
220x375	Multi/Bk	12'0" x 20'0" x 11"	3.64 x 6.1 x 0.28	238.8 (22.2)	223.1 (21.0)	2655 (1205)	27/75	4"-137"	4610	4610	8145
220x400	Multi/Bk	12'0" x 21'4" x 11"	3.64 x 6.5 x 0.28	254.3 (23.7)	238.0 (22.4)	2825 (1282)	27/80	4"-137"	4845	4845	8620
220x425	Multi/Bk	12'0" x 22'8" x 11"	3.64 x 6.89 x 0.28	269.8 (25.1)	252.9 (23.8)	3000 (1361)	27/85	4"-137"	5180	5180	9185
220x450	Multi/Bk	12'0" x 23'11" x 11"	3.64 x 7.29 x 0.28	285.4 (26.5)	267.7 (25.2)	3170 (1438)	27/90	4"-137"	5510	5510	9755
220x475	Multi/Bk	12'0" x 25'3" x 11"	3.64 x 7.69 x 0.28	300.9 (28.0)	282.6 (26.6)	3340 (1515)	27/95	4"-137"	5745	5745	10225
220x500	Multi/Bk	12'0" x 26'6" x 11"	3.64 x 8.08 x 0.28	316.4 (29.4)	297.5 (28.0)	3515 (1595)	27/100	4"-137"	6075	6075	10790
220x525	Multi/Bk	12'0" x 27'10" x 11"	3.64 x 8.48 x 0.28	331.9 (30.9)	312.4 (29.4)	3685 (1672)	27/105	4"-137"	6410	6410	11360
220x550	Multi/Bk	12'0" x 29'2" x 11"	3.64 x 8.87 x 0.28	347.5 (32.3)	327.2 (30.8)	3860 (1751)	27/110	4"-137"	6645	6645	11830
220x575	Multi/Bk	12'0" x 30'5" x 11"	3.64 x 9.27 x 0.28	363.0 (33.7)	342.1 (32.2)	4030 (1828)	27/115	4"-137"	6995	6995	12415
220x600	Multi/Bk	12'0" x 31'9" x 11"	3.64 x 9.67 x 0.28	378.5 (35.2)	357.0 (33.6)	4205 (1908)	27/120	4"-137"	7325	7325	12980
220x625	Multi/Bk	12'0" x 33'0" x 11"	3.64 x 10.06 x 0.28	394.0 (36.6)	371.8 (35.0)	4375 (1985)	27/125	4"-137"	7560	7560	13455
220x650	Multi/Bk	12'0" x 34'4" x 11"	3.64 x 10.46 x 0.28	409.5 (38.1)	386.7 (36.4)	4550 (2064)	27/130	4"-137"	7890	7890	14020
220x675	Multi/Bk	12'0" x 35'8" x 11"	3.64 x 10.86 x 0.28	425.1 (39.5)	401.6 (37.5)	4720 (2141)	27/135	4"-137"	8225	8225	14590
220x700	Multi/Bk	12'0" x 36'11" x 11"	3.64 x 11.25 x 0.28	440.6 (41.0)	416.5 (38.9)	4895 (2221)	27/140	4"-137"	8460	8460	15060
220x725	Multi/Bk	12'0" x 38'3" x 11"	3.64 x 11.65 x 0.28	456.1 (42.4)	431.3 (40.3)	5065 (2298)	27/145	4"-137"	8790	8790	15625
220x750	Multi/Bk	12'0" x 39'6" x 11"	3.64 x 12.04 x 0.28	471.6 (43.8)	446.2 (41.7)	5240 (2377)	27/150	4"-137"	9125	9125	16195
220x775	Multi/Bk	12'0" x 40'10" x 11"	3.64 x 12.44 x 0.28	487.2 (45.3)	461.1 (43.1)	5410 (2454)	27/155	4"-137"	9360	9360	16665
220x800	Multi/Bk	12'0" x 42'2" x 11"	3.64 x 12.84 x 0.28	502.7 (46.7)	476.0 (44.5)	5580 (2532)	27/160	4"-137"	9690	9690	17235
220x825	Multi/Bk	12'0" x 43'5" x 11"	3.64 x 13.23 x 0.28	518.2 (48.2)	490.8 (45.9)	5755 (2611)	27/165	4"-137"	10020	10020	17800
240x100	Multi/Bk	13'0" x 5'9" x 11"	3.96 x 1.74 x 0.28	74.0 (6.9)	64.9 (6.2)	825 (375)	30/20	4"-149"	1335	1335	2365
240x125	Multi/Bk	13'0" x 7'0" x 11"	3.96 x 2.14 x 0.28	90.9 (8.5)	81.2 (7.8)	1010 (459)	30/25	4"-149"	1695	1695	2975
240x150	Multi/Bk	13'0" x 8'4" x 11"	3.96 x 2.53 x 0.28	107.7 (10.0)	97.4 (9.4)	1200 (545)	30/30	4"-149"	2040	2040	3585
240x175	Multi/Bk	13'0" x 9'8" x 11"	3.96 x 2.93 x 0.28	124.6 (11.6)	113.6 (10.9)	1385 (629)	30/35	4"-149"	2300	2300	4100
240x200	Multi/Bk	13'0" x 10'11" x 11"	3.96 x 3.33 x 0.28	141.5 (13.2)	129.8 (12.5)	1575 (715)	30/40	4"-149"	2650	2650	4710
240x225	Multi/Bk	13'0" x 12'3" x 11"	3.96 x 3.72 x 0.28	158.4 (14.7)	146.1 (14.0)	1760 (799)	30/45	4"-149"	3005	3005	5300
240x250	Multi/Bk	13'0" x 13'6" x 11"	3.96 x 4.12 x 0.28	175.2 (16.3)	162.3 (15.6)	1950 (885)	30/50	4"-149"	3260	3260	5835
240x275	Multi/Bk	13'0" x 14'10" x 11"	3.96 x 4.52 x 0.28	192.1 (17.9)	178.5 (17.2)	2135 (969)	30/55	4"-149"	3615	3615	6445
240x300	Multi/Bk	13'0" x 16'2" x 11"	3.96 x 4.91 x 0.28	209.0 (19.4)	194.7 (18.7)	2320 (1053)	30/60	4"-149"	3970	3970	7055
240x325	Multi/Bk	13'0" x 17'5" x 11"	3.96 x 5.31 x 0.28	225.9 (21.0)	211.0 (20.3)	2510 (1139)	30/65	4"-149"	4225	4225	7570
240x350	Multi/Bk	13'0" x 18'9" x 11"	3.96 x 5.7 x 0.28	242.7 (22.6)	227.2 (21.8)	2695 (1223)	30/70	4"-149"	4580	4580	8180

GALAXY® GS6 15.85 MM PRODUCT SPECIFICATIONS

Lines x Columns	Sections/Ventilated	Cabinet Dimensions Feet-Inches H x W x D	Cabinet Dimensions Meters H x W x D	Cabinet Square Feet (Square Meters)	Active Area Square Feet (Square Meters)	Cabinet Weight Pounds (kilograms)	Lines/Characters per line	Character Height	Maximum Watts		
									Amber	Red	RGB
240x375	Multi/Bk	13'0" x 20'0" x 11"	3.96 x 6.1 x 0.28	259.6 (24.2)	243.4 (23.4)	2885 (1309)	30/75	4"-149"	4930	4930	8790
240x400	Multi/Bk	13'0" x 21'4" x 11"	3.96 x 6.5 x 0.28	276.5 (25.7)	259.6 (25.0)	3070 (1393)	30/80	4"-149"	5190	5190	9305
240x425	Multi/Bk	13'0" x 22'8" x 11"	3.96 x 6.89 x 0.28	293.3 (27.3)	275.9 (26.5)	3260 (1479)	30/85	4"-149"	5540	5540	9915
240x450	Multi/Bk	13'0" x 23'11" x 11"	3.96 x 7.29 x 0.28	310.2 (28.9)	292.1 (28.1)	3445 (1563)	30/90	4"-149"	5895	5895	10525
240x475	Multi/Bk	13'0" x 25'3" x 11"	3.96 x 7.69 x 0.28	327.1 (30.5)	308.3 (29.6)	3635 (1649)	30/95	4"-149"	6150	6150	11040
240x500	Multi/Bk	13'0" x 26'6" x 11"	3.96 x 8.08 x 0.28	344.0 (32.0)	324.5 (31.2)	3820 (1733)	30/100	4"-149"	6505	6505	11650
240x525	Multi/Bk	13'0" x 27'10" x 11"	3.96 x 8.48 x 0.28	360.8 (33.6)	340.8 (32.8)	4010 (1819)	30/105	4"-149"	6860	6860	12260
240x550	Multi/Bk	13'0" x 29'2" x 11"	3.96 x 8.87 x 0.28	377.7 (35.1)	357.0 (34.3)	4195 (1903)	30/110	4"-149"	7115	7115	12775
240x575	Multi/Bk	13'0" x 30'5" x 11"	3.96 x 9.27 x 0.28	394.6 (36.7)	373.2 (35.9)	4380 (1987)	30/115	4"-149"	7485	7485	13400
240x600	Multi/Bk	13'0" x 31'9" x 11"	3.96 x 9.67 x 0.28	411.5 (38.3)	389.4 (37.4)	4570 (2073)	30/120	4"-149"	7840	7840	14010
240x625	Multi/Bk	13'0" x 33'0" x 11"	3.96 x 10.06 x 0.28	428.3 (39.8)	405.6 (39.0)	4755 (2157)	30/125	4"-149"	8095	8095	14525
240x650	Multi/Bk	13'0" x 34'4" x 11"	3.96 x 10.46 x 0.28	445.2 (41.4)	421.9 (40.6)	4945 (2244)	30/130	4"-149"	8450	8450	15135
240x675	Multi/Bk	13'0" x 35'8" x 11"	3.96 x 10.86 x 0.28	462.1 (43.0)	438.1 (41.7)	5130 (2327)	30/135	4"-149"	8800	8800	15745
240x700	Multi/Bk	13'0" x 36'11" x 11"	3.96 x 11.25 x 0.28	479.0 (44.6)	454.3 (43.3)	5320 (2414)	30/140	4"-149"	9060	9060	16260
240x725	Multi/Bk	13'0" x 38'3" x 11"	3.96 x 11.65 x 0.28	495.8 (46.1)	470.5 (44.9)	5505 (2498)	30/145	4"-149"	9410	9410	16870
240x750	Multi/Bk	13'0" x 39'6" x 11"	3.96 x 12.04 x 0.28	512.7 (47.7)	486.8 (46.4)	5695 (2584)	30/150	4"-149"	9765	9765	17480
240x775	Multi/Bk	13'0" x 40'10" x 11"	3.96 x 12.44 x 0.28	529.6 (49.3)	503.0 (48.0)	5880 (2668)	30/155	4"-149"	10020	10020	17995
240x800	Multi/Bk	13'0" x 42'2" x 11"	3.96 x 12.84 x 0.28	546.5 (50.8)	519.2 (49.5)	6070 (2754)	30/160	4"-149"	10375	10375	18605
240x825	Multi/Bk	13'0" x 43'5" x 11"	3.96 x 13.23 x 0.28	563.3 (52.4)	535.4 (51.1)	6255 (2838)	30/165	4"-149"	10730	10730	19215
260x100	Multi/Bk	14'1" x 5'9" x 11"	4.28 x 1.74 x 0.28	79.9 (7.4)	70.4 (6.7)	890 (404)	32/20	4"-162"	1420	1420	2535
260x125	Multi/Bk	14'1" x 7'0" x 11"	4.28 x 2.14 x 0.28	98.1 (9.2)	87.9 (8.4)	1090 (495)	32/25	4"-162"	1800	1800	3190
260x150	Multi/Bk	14'1" x 8'4" x 11"	4.28 x 2.53 x 0.28	116.4 (10.8)	105.5 (10.1)	1295 (588)	32/30	4"-162"	2170	2170	3840
260x175	Multi/Bk	14'1" x 9'8" x 11"	4.28 x 2.93 x 0.28	134.6 (12.5)	123.1 (11.8)	1495 (679)	32/35	4"-162"	2450	2450	4400
260x200	Multi/Bk	14'1" x 10'11" x 11"	4.28 x 3.33 x 0.28	152.8 (14.3)	140.7 (13.4)	1700 (772)	32/40	4"-162"	2825	2825	5050
260x225	Multi/Bk	14'1" x 12'3" x 11"	4.28 x 3.72 x 0.28	171.0 (15.9)	158.2 (15.1)	1900 (862)	32/45	4"-162"	3200	3200	5695
260x250	Multi/Bk	14'1" x 13'6" x 11"	4.28 x 4.12 x 0.28	189.3 (17.6)	175.8 (16.8)	2105 (955)	32/50	4"-162"	3475	3475	6260
260x275	Multi/Bk	14'1" x 14'10" x 11"	4.28 x 4.52 x 0.28	207.5 (19.3)	193.4 (18.5)	2305 (1046)	32/55	4"-162"	3850	3850	6915
260x300	Multi/Bk	14'1" x 16'2" x 11"	4.28 x 4.91 x 0.28	225.7 (21.0)	211.0 (20.2)	2510 (1139)	32/60	4"-162"	4225	4225	7570
260x325	Multi/Bk	14'1" x 17'5" x 11"	4.28 x 5.31 x 0.28	243.9 (22.7)	228.5 (21.8)	2710 (1230)	32/65	4"-162"	4505	4505	8125
260x350	Multi/Bk	14'1" x 18'9" x 11"	4.28 x 5.7 x 0.28	262.2 (24.4)	246.1 (23.5)	2915 (1323)	32/70	4"-162"	4880	4880	8780
260x375	Multi/Bk	14'1" x 20'0" x 11"	4.28 x 6.1 x 0.28	280.4 (26.1)	263.7 (25.2)	3115 (1413)	32/75	4"-162"	5255	5255	9430
260x400	Multi/Bk	14'1" x 21'4" x 11"	4.28 x 6.5 x 0.28	298.6 (27.8)	281.3 (26.9)	3315 (1504)	32/80	4"-162"	5530	5530	9990
260x425	Multi/Bk	14'1" x 22'8" x 11"	4.28 x 6.89 x 0.28	316.9 (29.5)	298.8 (28.6)	3520 (1597)	32/85	4"-162"	5905	5905	10640
260x450	Multi/Bk	14'1" x 23'11" x 11"	4.28 x 7.29 x 0.28	335.1 (31.2)	316.4 (30.2)	3720 (1688)	32/90	4"-162"	6280	6280	11295
260x475	Multi/Bk	14'1" x 25'3" x 11"	4.28 x 7.69 x 0.28	353.3 (32.9)	334.0 (31.9)	3925 (1781)	32/95	4"-162"	6560	6560	11850
260x500	Multi/Bk	14'1" x 26'6" x 11"	4.28 x 8.08 x 0.28	371.5 (34.6)	351.6 (33.6)	4125 (1872)	32/100	4"-162"	6935	6935	12505
260x525	Multi/Bk	14'1" x 27'10" x 11"	4.28 x 8.48 x 0.28	389.8 (36.3)	369.1 (35.3)	4330 (1965)	32/105	4"-162"	7310	7310	13160
260x550	Multi/Bk	14'1" x 29'2" x 11"	4.28 x 8.87 x 0.28	408.0 (38.0)	386.7 (37.0)	4530 (2055)	32/110	4"-162"	7585	7585	13715
260x575	Multi/Bk	14'1" x 30'5" x 11"	4.28 x 9.27 x 0.28	426.2 (39.7)	404.3 (38.6)	4735 (2148)	32/115	4"-162"	7980	7980	14385
260x600	Multi/Bk	14'1" x 31'9" x 11"	4.28 x 9.67 x 0.28	444.4 (41.4)	421.9 (40.3)	4935 (2239)	32/120	4"-162"	8355	8355	15040
260x625	Multi/Bk	14'1" x 33'0" x 11"	4.28 x 10.06 x 0.28	462.7 (43.1)	439.4 (42.0)	5140 (2332)	32/125	4"-162"	8630	8630	15595
260x650	Multi/Bk	14'1" x 34'4" x 11"	4.28 x 10.46 x 0.28	480.9 (44.8)	457.0 (43.7)	5340 (2423)	32/130	4"-162"	9005	9005	16250
260x675	Multi/Bk	14'1" x 35'8" x 11"	4.28 x 10.86 x 0.28	499.1 (46.5)	474.6 (44.9)	5545 (2516)	32/135	4"-162"	9380	9380	16905
260x700	Multi/Bk	14'1" x 36'11" x 11"	4.28 x 11.25 x 0.28	517.3 (48.2)	492.2 (46.6)	5745 (2606)	32/140	4"-162"	9660	9660	17460
260x725	Multi/Bk	14'1" x 38'3" x 11"	4.28 x 11.65 x 0.28	535.6 (49.9)	509.8 (48.3)	5945 (2697)	32/145	4"-162"	10035	10035	18115
260x750	Multi/Bk	14'1" x 39'6" x 11"	4.28 x 12.04 x 0.28	553.8 (51.5)	527.3 (50.0)	6150 (2790)	32/150	4"-162"	10410	10410	18765
260x775	Multi/Bk	14'1" x 40'10" x 11"	4.28 x 12.44 x 0.28	572.0 (53.2)	544.9 (51.7)	6350 (2881)	32/155	4"-162"	10685	10685	19325
260x800	Multi/Bk	14'1" x 42'2" x 11"	4.28 x 12.84 x 0.28	590.2 (55.0)	562.5 (53.3)	6555 (2974)	32/160	4"-162"	11060	11060	19975
260x825	Multi/Bk	14'1" x 43'5" x 11"	4.28 x 13.23 x 0.28	608.5 (56.6)	580.1 (55.0)	6755 (3065)	32/165	4"-162"	11435	11435	20630
280x100	Multi/Bk	15'1" x 5'9" x 11"	4.6 x 1.74 x 0.28	85.8 (8.0)	75.8 (7.2)	955 (434)	35/20	4"-174"	1505	1505	2705
280x125	Multi/Bk	15'1" x 7'0" x 11"	4.6 x 2.14 x 0.28	105.4 (9.8)	94.7 (9.0)	1175 (533)	35/25	4"-174"	1900	1900	3400
280x150	Multi/Bk	15'1" x 8'4" x 11"	4.6 x 2.53 x 0.28	125.0 (11.6)	113.6 (10.8)	1390 (631)	35/30	4"-174"	2300	2300	4100
280x175	Multi/Bk	15'1" x 9'8" x 11"	4.6 x 2.93 x 0.28	144.6 (13.5)	132.5 (12.6)	1605 (729)	35/35	4"-174"	2600	2600	4700
280x200	Multi/Bk	15'1" x 10'11" x 11"	4.6 x 3.33 x 0.28	164.2 (15.3)	151.5 (14.4)	1825 (828)	35/40	4"-174"	2995	2995	5395
280x225	Multi/Bk	15'1" x 12'3" x 11"	4.6 x 3.72 x 0.28	183.7 (17.1)	170.4 (16.2)	2040 (926)	35/45	4"-174"	3390	3390	6090
280x250	Multi/Bk	15'1" x 13'6" x 11"	4.6 x 4.12 x 0.28	203.3 (19.0)	189.3 (18.0)	2260 (1026)	35/50	4"-174"	3690	3690	6690
280x275	Multi/Bk	15'1" x 14'10" x 11"	4.6 x 4.52 x 0.28	222.9 (20.8)	208.3 (19.8)	2475 (1123)	35/55	4"-174"	4085	4085	7385
280x300	Multi/Bk	15'1" x 16'2" x 11"	4.6 x 4.91 x 0.28	242.5 (22.6)	227.2 (21.6)	2695 (1223)	35/60	4"-174"	4480	4480	8080
280x325	Multi/Bk	15'1" x 17'5" x 11"	4.6 x 5.31 x 0.28	262.0 (24.4)	246.1 (23.4)	2910 (1320)	35/65	4"-174"	4780	4780	8680
280x350	Multi/Bk	15'1" x 18'9" x 11"	4.6 x 5.7 x 0.28	281.6 (26.2)	265.0 (25.2)	3130 (1420)	35/70	4"-174"	5180	5180	9380
280x375	Multi/Bk	15'1" x 20'0" x 11"	4.6 x 6.1 x 0.28	301.2 (28.1)	284.0 (27.0)	3345 (1518)	35/75	4"-174"	5575	5575	10075
280x400	Multi/Bk	15'1" x 21'4" x 11"	4.6 x 6.5 x 0.28	320.8 (29.9)	302.9 (28.8)	3565 (1618)	35/80	4"-174"	5875	5875	10675
280x425	Multi/Bk	15'1" x 22'8" x 11"	4.6 x 6.89 x 0.28	340.4 (31.7)	321.8 (30.6)	3780 (1715)	35/85	4"-174"	6270	6270	11370
280x450	Multi/Bk	15'1" x 23'11" x 11"	4.6 x 7.29 x 0.28	359.9 (33.5)	340.8 (32.4)	4000 (1815)	35/90	4"-174"	6665	6665	12065
280x475	Multi/Bk	15'1" x 25'3" x 11"	4.6 x 7.69 x 0.28	379.5 (35.4)	359.7 (34.2)	4215 (1912)	35/95	4"-174"	6965	6965	12665
280x500	Multi/Bk	15'1" x 26'6" x 11"	4.6 x 8.08 x 0.28	399.1 (37.2)	378.6 (36.0)	4430 (2010)	35/100	4"-174"	7360	7360	13360
280x525	Multi/Bk	15'1" x 27'10" x 11"	4.6 x 8.48 x 0.28	418.7 (39.0)	397.5 (37.8)	4650 (2110)	35/105	4"-174"	7760	7760	14060

GALAXY® GS6 15.85 MM PRODUCT SPECIFICATIONS

Lines x Columns	Sections/Ventilated	Cabinet Dimensions Feet-Inches H x W x D	Cabinet Dimensions Meters H x W x D	Cabinet Square Feet (Square Meters)	Active Area Square Feet (Square Meters)	Cabinet Weight Pounds (kilograms)	Lines/Characters per line	Character Height	Maximum Watts		
									Amber	Red	RGB
280x550	Multi/Bk	15"1" x 29"2" x 11"	4.6 x 8.87 x 0.28	438.2 (40.8)	416.5 (39.6)	4865 (2207)	35/110	4"-174"	8060	8060	14660
280x575	Multi/Bk	15"1" x 30"5" x 11"	4.6 x 9.27 x 0.28	457.8 (42.6)	435.4 (41.4)	5085 (2307)	35/115	4"-174"	8470	8470	15370
280x600	Multi/Bk	15"1" x 31"9" x 11"	4.6 x 9.67 x 0.28	477.4 (44.5)	454.3 (43.2)	5300 (2405)	35/120	4"-174"	8870	8870	16070
280x625	Multi/Bk	15"1" x 33"0" x 11"	4.6 x 10.06 x 0.28	497.0 (46.3)	473.2 (45.0)	5520 (2504)	35/125	4"-174"	9170	9170	16670
280x650	Multi/Bk	15"1" x 34"4" x 11"	4.6 x 10.46 x 0.28	516.6 (48.1)	492.2 (46.8)	5735 (2602)	35/130	4"-174"	9565	9565	17365
280x675	Multi/Bk	15"1" x 35"8" x 11"	4.6 x 10.86 x 0.28	536.1 (50.0)	511.1 (48.2)	5955 (2702)	35/135	4"-174"	9960	9960	18060
280x700	Multi/Bk	15"1" x 36"11" x 11"	4.6 x 11.25 x 0.28	555.7 (51.8)	530.0 (50.0)	6170 (2799)	35/140	4"-174"	10260	10260	18660
280x725	Multi/Bk	15"1" x 38"3" x 11"	4.6 x 11.65 x 0.28	575.3 (53.6)	549.0 (51.8)	6390 (2899)	35/145	4"-174"	10655	10655	19355
280x750	Multi/Bk	15"1" x 39"6" x 11"	4.6 x 12.04 x 0.28	594.9 (55.4)	567.9 (53.6)	6605 (2996)	35/150	4"-174"	11050	11050	20050
280x775	Multi/Bk	15"1" x 40"10" x 11"	4.6 x 12.44 x 0.28	614.4 (57.2)	586.8 (55.4)	6825 (3096)	35/155	4"-174"	11350	11350	20650
280x800	Multi/Bk	15"1" x 42"2" x 11"	4.6 x 12.84 x 0.28	634.0 (59.1)	605.7 (57.2)	7040 (3194)	35/160	4"-174"	11750	11750	21350
280x825	Multi/Bk	15"1" x 43"5" x 11"	4.6 x 13.23 x 0.28	653.6 (60.9)	624.7 (59.0)	7255 (3291)	35/165	4"-174"	12145	12145	22045
300x100	Multi/Bk	16"2" x 5"9" x 11"	4.91 x 1.74 x 0.28	91.8 (8.5)	81.2 (7.7)	1020 (463)	37/20	4"-187"	1590	1590	2880
300x125	Multi/Bk	16"2" x 7"0" x 11"	4.91 x 2.14 x 0.28	112.7 (10.5)	101.4 (9.6)	1255 (570)	37/25	4"-187"	2010	2010	3615
300x150	Multi/Bk	16"2" x 8"4" x 11"	4.91 x 2.53 x 0.28	133.6 (12.4)	121.7 (11.5)	1485 (674)	37/30	4"-187"	2425	2425	4355
300x175	Multi/Bk	16"2" x 9"8" x 11"	4.91 x 2.93 x 0.28	154.6 (14.4)	142.0 (13.4)	1720 (781)	37/35	4"-187"	2750	2750	5000
300x200	Multi/Bk	16"2" x 10"11" x 11"	4.91 x 3.33 x 0.28	175.5 (16.4)	162.3 (15.4)	1950 (885)	37/40	4"-187"	3165	3165	5735
300x225	Multi/Bk	16"2" x 12"3" x 11"	4.91 x 3.72 x 0.28	196.4 (18.3)	182.6 (17.3)	2185 (992)	37/45	4"-187"	3585	3585	6475
300x250	Multi/Bk	16"2" x 13"6" x 11"	4.91 x 4.12 x 0.28	217.4 (20.2)	202.8 (19.2)	2415 (1096)	37/50	4"-187"	3905	3905	7120
300x275	Multi/Bk	16"2" x 14"10" x 11"	4.91 x 4.52 x 0.28	238.3 (22.2)	223.1 (21.1)	2645 (1200)	37/55	4"-187"	4320	4320	7860
300x300	Multi/Bk	16"2" x 16"2" x 11"	4.91 x 4.91 x 0.28	259.2 (24.1)	243.4 (23.0)	2880 (1307)	37/60	4"-187"	4740	4740	8595
300x325	Multi/Bk	16"2" x 17"5" x 11"	4.91 x 5.31 x 0.28	280.1 (26.1)	263.7 (25.0)	3110 (1411)	37/65	4"-187"	5060	5060	9240
300x350	Multi/Bk	16"2" x 18"9" x 11"	4.91 x 5.7 x 0.28	301.1 (28.0)	284.0 (26.9)	3345 (1518)	37/70	4"-187"	5480	5480	9980
300x375	Multi/Bk	16"2" x 20"0" x 11"	4.91 x 6.1 x 0.28	322.0 (30.0)	304.2 (28.8)	3575 (1622)	37/75	4"-187"	5895	5895	10715
300x400	Multi/Bk	16"2" x 21"4" x 11"	4.91 x 6.5 x 0.28	342.9 (31.9)	324.5 (30.7)	3810 (1729)	37/80	4"-187"	6215	6215	11360
300x425	Multi/Bk	16"2" x 22"8" x 11"	4.91 x 6.89 x 0.28	363.9 (33.8)	344.8 (32.6)	4040 (1833)	37/85	4"-187"	6635	6635	12100
300x450	Multi/Bk	16"2" x 23"11" x 11"	4.91 x 7.29 x 0.28	384.8 (35.8)	365.1 (34.6)	4275 (1940)	37/90	4"-187"	7050	7050	12840
300x475	Multi/Bk	16"2" x 25"3" x 11"	4.91 x 7.69 x 0.28	405.7 (37.8)	385.4 (36.5)	4505 (2044)	37/95	4"-187"	7375	7375	13480
300x500	Multi/Bk	16"2" x 26"6" x 11"	4.91 x 8.08 x 0.28	426.7 (39.7)	405.6 (38.4)	4740 (2151)	37/100	4"-187"	7790	7790	14220
300x525	Multi/Bk	16"2" x 27"10" x 11"	4.91 x 8.48 x 0.28	447.6 (41.6)	425.9 (40.3)	4970 (2255)	37/105	4"-187"	8210	8210	14960
300x550	Multi/Bk	16"2" x 29"2" x 11"	4.91 x 8.87 x 0.28	468.5 (43.6)	446.2 (42.2)	5205 (2361)	37/110	4"-187"	8530	8530	15600
300x575	Multi/Bk	16"2" x 30"5" x 11"	4.91 x 9.27 x 0.28	489.4 (45.5)	466.5 (44.2)	5435 (2466)	37/115	4"-187"	8965	8965	16355
300x600	Multi/Bk	16"2" x 31"9" x 11"	4.91 x 9.67 x 0.28	510.4 (47.5)	486.8 (46.1)	5670 (2572)	37/120	4"-187"	9380	9380	17095
300x625	Multi/Bk	16"2" x 33"0" x 11"	4.91 x 10.06 x 0.28	531.3 (49.4)	507.0 (48.0)	5900 (2677)	37/125	4"-187"	9705	9705	17740
300x650	Multi/Bk	16"2" x 34"4" x 11"	4.91 x 10.46 x 0.28	552.2 (51.4)	527.3 (49.9)	6130 (2781)	37/130	4"-187"	10120	10120	18480
300x675	Multi/Bk	16"2" x 35"8" x 11"	4.91 x 10.86 x 0.28	573.2 (53.3)	547.6 (51.4)	6365 (2888)	37/135	4"-187"	10540	10540	19215
300x700	Multi/Bk	16"2" x 36"11" x 11"	4.91 x 11.25 x 0.28	594.1 (55.2)	567.9 (53.3)	6595 (2992)	37/140	4"-187"	10860	10860	19860
300x725	Multi/Bk	16"2" x 38"3" x 11"	4.91 x 11.65 x 0.28	615.0 (57.2)	588.2 (55.2)	6830 (3099)	37/145	4"-187"	11275	11275	20600
300x750	Multi/Bk	16"2" x 39"6" x 11"	4.91 x 12.04 x 0.28	636.0 (59.1)	608.4 (57.1)	7060 (3203)	37/150	4"-187"	11695	11695	21335
300x775	Multi/Bk	16"2" x 40"10" x 11"	4.91 x 12.44 x 0.28	656.9 (61.1)	628.7 (59.0)	7295 (3309)	37/155	4"-187"	12015	12015	21980
300x800	Multi/Bk	16"2" x 42"2" x 11"	4.91 x 12.84 x 0.28	677.8 (63.0)	649.0 (61.0)	7525 (3414)	37/160	4"-187"	12435	12435	22720
300x825	Multi/Bk	16"2" x 43"5" x 11"	4.91 x 13.23 x 0.28	698.7 (65.0)	669.3 (62.9)	7760 (3520)	37/165	4"-187"	12850	12850	23460
320x100	Multi/Bk	17"2" x 5"9" x 11"	5.23 x 1.74 x 0.28	97.7 (9.1)	86.6 (8.2)	1085 (493)	40/20	4"-199"	1680	1680	3050
320x125	Multi/Bk	17"2" x 7"0" x 11"	5.23 x 2.14 x 0.28	120.0 (11.2)	108.2 (10.2)	1335 (606)	40/25	4"-199"	2120	2120	3830
320x150	Multi/Bk	17"2" x 8"4" x 11"	5.23 x 2.53 x 0.28	142.3 (13.2)	129.8 (12.2)	1580 (717)	40/30	4"-199"	2555	2555	4615
320x175	Multi/Bk	17"2" x 9"8" x 11"	5.23 x 2.93 x 0.28	164.5 (15.3)	151.5 (14.3)	1830 (831)	40/35	4"-199"	2900	2900	5300
320x200	Multi/Bk	17"2" x 10"11" x 11"	5.23 x 3.33 x 0.28	186.8 (17.4)	173.1 (16.3)	2075 (942)	40/40	4"-199"	3340	3340	6080
320x225	Multi/Bk	17"2" x 12"3" x 11"	5.23 x 3.72 x 0.28	209.1 (19.5)	194.7 (18.4)	2325 (1055)	40/45	4"-199"	3775	3775	6860
320x250	Multi/Bk	17"2" x 13"6" x 11"	5.23 x 4.12 x 0.28	231.4 (21.5)	216.4 (20.4)	2570 (1166)	40/50	4"-199"	4120	4120	7550
320x275	Multi/Bk	17"2" x 14"10" x 11"	5.23 x 4.52 x 0.28	253.7 (23.6)	238.0 (22.4)	2820 (1280)	40/55	4"-199"	4560	4560	8330
320x300	Multi/Bk	17"2" x 16"2" x 11"	5.23 x 4.91 x 0.28	276.0 (25.7)	259.6 (24.5)	3065 (1391)	40/60	4"-199"	5000	5000	9110
320x325	Multi/Bk	17"2" x 17"5" x 11"	5.23 x 5.31 x 0.28	298.2 (27.8)	281.3 (26.5)	3315 (1504)	40/65	4"-199"	5340	5340	9800
320x350	Multi/Bk	17"2" x 18"9" x 11"	5.23 x 5.7 x 0.28	320.5 (29.8)	302.9 (28.6)	3560 (1615)	40/70	4"-199"	5780	5780	10580
320x375	Multi/Bk	17"2" x 20"0" x 11"	5.23 x 6.1 x 0.28	342.8 (31.9)	324.5 (30.6)	3810 (1729)	40/75	4"-199"	6220	6220	11360
320x400	Multi/Bk	17"2" x 21"4" x 11"	5.23 x 6.5 x 0.28	365.1 (34.0)	346.2 (32.6)	4055 (1840)	40/80	4"-199"	6560	6560	12045
320x425	Multi/Bk	17"2" x 22"8" x 11"	5.23 x 6.89 x 0.28	387.4 (36.0)	367.8 (34.7)	4300 (1951)	40/85	4"-199"	7000	7000	12830
320x450	Multi/Bk	17"2" x 23"11" x 11"	5.23 x 7.29 x 0.28	409.6 (38.1)	389.4 (36.7)	4550 (2064)	40/90	4"-199"	7440	7440	13610
320x475	Multi/Bk	17"2" x 25"3" x 11"	5.23 x 7.69 x 0.28	431.9 (40.2)	411.1 (38.8)	4795 (2175)	40/95	4"-199"	7780	7780	14295
320x500	Multi/Bk	17"2" x 26"6" x 11"	5.23 x 8.08 x 0.28	454.2 (42.3)	432.7 (40.8)	5045 (2289)	40/100	4"-199"	8220	8220	15080
320x525	Multi/Bk	17"2" x 27"10" x 11"	5.23 x 8.48 x 0.28	476.5 (44.4)	454.3 (42.8)	5290 (2400)	40/105	4"-199"	8660	8660	15860
320x550	Multi/Bk	17"2" x 29"2" x 11"	5.23 x 8.87 x 0.28	498.8 (46.4)	476.0 (44.9)	5540 (2513)	40/110	4"-199"	9000	9000	16545
320x575	Multi/Bk	17"2" x 30"5" x 11"	5.23 x 9.27 x 0.28	521.1 (48.5)	497.6 (46.9)	5785 (2625)	40/115	4"-199"	9460	9460	17340
320x600	Multi/Bk	17"2" x 31"9" x 11"	5.23 x 9.67 x 0.28	543.3 (50.6)	519.2 (49.0)	6035 (2738)	40/120	4"-199"	9895	9895	18125
320x625	Multi/Bk	17"2" x 33"0" x 11"	5.23 x 10.06 x 0.28	565.6 (52.6)	540.8 (51.0)	6280 (2849)	40/125	4"-199"	10240	10240	18810
320x650	Multi/Bk	17"2" x 34"4" x 11"	5.23 x 10.46 x 0.28	587.9 (54.7)	562.5 (53.0)	6530 (2962)	40/130	4"-199"	10680	10680	19590
320x675	Multi/Bk	17"2" x 35"8" x 11"	5.23 x 10.86 x 0.28	610.2 (56.8)	584.1 (54.6)	6775 (3074)	40/135	4"-199"	11115	11115	20375
320x700	Multi/Bk	17"2" x 36"11" x 11"	5.23 x 11.25 x 0.28	632.5 (58.8)	605.7 (56.6)	7025 (3187)	40/140	4"-199"	11460	11460	21060

GALAXY® GS6 15.85 MM PRODUCT SPECIFICATIONS

Lines x Columns	Sections/Ventilated	Cabinet Dimensions		Cabinet Square Feet (Square Meters)	Active Area Square Feet (Square Meters)	Cabinet Weight Pounds (kilograms)	Lines/Characters per line	Character Height	Maximum Watts		
		Feet-Inches H x W x D	Meters H x W x D						Amber	Red	RGB
320x725	Multi/Bk	17'2" x 38'3" x 11"	5.23 x 11.65 x 0.28	654.7 (60.9)	627.4 (58.7)	7270 (3298)	40/145	4"-199"	11900	11900	21840
320x750	Multi/Bk	17'2" x 39'6" x 11"	5.23 x 12.04 x 0.28	677.0 (63.0)	649.0 (60.7)	7515 (3409)	40/150	4"-199"	12340	12340	22620
320x775	Multi/Bk	17'2" x 40'10" x 11"	5.23 x 12.44 x 0.28	699.3 (65.1)	670.6 (62.7)	7765 (3523)	40/155	4"-199"	12680	12680	23310
320x800	Multi/Bk	17'2" x 42'2" x 11"	5.23 x 12.84 x 0.28	721.6 (67.2)	692.3 (64.8)	8010 (3634)	40/160	4"-199"	13120	13120	24090
320x825	Multi/Bk	17'2" x 43'5" x 11"	5.23 x 13.23 x 0.28	743.9 (69.2)	713.9 (66.8)	8260 (3747)	40/165	4"-199"	13560	13560	24870
340x100	Multi/Bk	18'3" x 5'9" x 11"	5.55 x 1.74 x 0.28	103.6 (9.7)	92.0 (8.6)	1155 (524)	42/20	4"-212"	1765	1765	3220
340x125	Multi/Bk	18'3" x 7'0" x 11"	5.55 x 2.14 x 0.28	127.3 (11.9)	115.0 (10.8)	1415 (642)	42/25	4"-212"	2225	2225	4045
340x150	Multi/Bk	18'3" x 8'4" x 11"	5.55 x 2.53 x 0.28	150.9 (14.0)	138.0 (13.0)	1675 (760)	42/30	4"-212"	2685	2685	4870
340x175	Multi/Bk	18'3" x 9'8" x 11"	5.55 x 2.93 x 0.28	174.5 (16.3)	160.9 (15.1)	1940 (880)	42/35	4"-212"	3050	3050	5600
340x200	Multi/Bk	18'3" x 10'11" x 11"	5.55 x 3.33 x 0.28	198.2 (18.5)	183.9 (17.3)	2200 (998)	42/40	4"-212"	3510	3510	6425
340x225	Multi/Bk	18'3" x 12'3" x 11"	5.55 x 3.72 x 0.28	221.8 (20.6)	206.9 (19.4)	2465 (1119)	42/45	4"-212"	3970	3970	7250
340x250	Multi/Bk	18'3" x 13'6" x 11"	5.55 x 4.12 x 0.28	245.4 (22.9)	229.9 (21.6)	2725 (1237)	42/50	4"-212"	4335	4335	7975
340x275	Multi/Bk	18'3" x 14'10" x 11"	5.55 x 4.52 x 0.28	269.1 (25.1)	252.9 (23.8)	2990 (1357)	42/55	4"-212"	4795	4795	8800
340x300	Multi/Bk	18'3" x 16'2" x 11"	5.55 x 4.91 x 0.28	292.7 (27.3)	275.9 (25.9)	3250 (1475)	42/60	4"-212"	5255	5255	9625
340x325	Multi/Bk	18'3" x 17'5" x 11"	5.55 x 5.31 x 0.28	316.3 (29.5)	298.8 (28.1)	3515 (1595)	42/65	4"-212"	5620	5620	10355
340x350	Multi/Bk	18'3" x 18'9" x 11"	5.55 x 5.7 x 0.28	340.0 (31.6)	321.8 (30.2)	3775 (1713)	42/70	4"-212"	6080	6080	11180
340x375	Multi/Bk	18'3" x 20'0" x 11"	5.55 x 6.1 x 0.28	363.6 (33.9)	344.8 (32.4)	4040 (1833)	42/75	4"-212"	6540	6540	12005
340x400	Multi/Bk	18'3" x 21'4" x 11"	5.55 x 6.5 x 0.28	387.2 (36.1)	367.8 (34.6)	4300 (1951)	42/80	4"-212"	6905	6905	12730
340x425	Multi/Bk	18'3" x 22'8" x 11"	5.55 x 6.89 x 0.28	410.9 (38.2)	390.8 (36.7)	4565 (2071)	42/85	4"-212"	7365	7365	13555
340x450	Multi/Bk	18'3" x 23'11" x 11"	5.55 x 7.29 x 0.28	434.5 (40.5)	413.8 (38.9)	4825 (2189)	42/90	4"-212"	7825	7825	14380
340x475	Multi/Bk	18'3" x 25'3" x 11"	5.55 x 7.69 x 0.28	458.1 (42.7)	436.7 (41.0)	5090 (2309)	42/95	4"-212"	8190	8190	15110
340x500	Multi/Bk	18'3" x 26'6" x 11"	5.55 x 8.08 x 0.28	481.8 (44.8)	459.7 (43.2)	5350 (2427)	42/100	4"-212"	8650	8650	15935
340x525	Multi/Bk	18'3" x 27'10" x 11"	5.55 x 8.48 x 0.28	505.4 (47.1)	482.7 (45.4)	5610 (2545)	42/105	4"-212"	9110	9110	16760
340x550	Multi/Bk	18'3" x 29'2" x 11"	5.55 x 8.87 x 0.28	529.0 (49.2)	505.7 (47.5)	5875 (2665)	42/110	4"-212"	9475	9475	17485
340x575	Multi/Bk	18'3" x 30'5" x 11"	5.55 x 9.27 x 0.28	552.7 (51.4)	528.7 (49.7)	6135 (2783)	42/115	4"-212"	9950	9950	18330
340x600	Multi/Bk	18'3" x 31'9" x 11"	5.55 x 9.67 x 0.28	576.3 (53.7)	551.7 (51.8)	6400 (2903)	42/120	4"-212"	10410	10410	19155
340x625	Multi/Bk	18'3" x 33'0" x 11"	5.55 x 10.06 x 0.28	599.9 (55.8)	574.6 (54.0)	6660 (3021)	42/125	4"-212"	10775	10775	19880
340x650	Multi/Bk	18'3" x 34'4" x 11"	5.55 x 10.46 x 0.28	623.6 (58.1)	597.6 (56.2)	6925 (3142)	42/130	4"-212"	11235	11235	20705
340x675	Multi/Bk	18'3" x 35'8" x 11"	5.55 x 10.86 x 0.28	647.2 (60.3)	620.6 (57.8)	7185 (3260)	42/135	4"-212"	11695	11695	21530
340x700	Multi/Bk	18'3" x 36'11" x 11"	5.55 x 11.25 x 0.28	670.8 (62.4)	643.6 (59.9)	7450 (3380)	42/140	4"-212"	12060	12060	22260
340x725	Multi/Bk	18'3" x 38'3" x 11"	5.55 x 11.65 x 0.28	694.5 (64.7)	666.6 (62.1)	7710 (3498)	42/145	4"-212"	12520	12520	23085
340x750	Multi/Bk	18'3" x 39'6" x 11"	5.55 x 12.04 x 0.28	718.1 (66.8)	689.6 (64.3)	7975 (3618)	42/150	4"-212"	12980	12980	23910
340x775	Multi/Bk	18'3" x 40'10" x 11"	5.55 x 12.44 x 0.28	741.7 (69.0)	712.6 (66.4)	8235 (3736)	42/155	4"-212"	13345	13345	24635
340x800	Multi/Bk	18'3" x 42'2" x 11"	5.55 x 12.84 x 0.28	765.4 (71.3)	735.5 (68.6)	8500 (3856)	42/160	4"-212"	13805	13805	25460
340x825	Multi/Bk	18'3" x 43'5" x 11"	5.55 x 13.23 x 0.28	789.0 (73.4)	758.5 (70.7)	8760 (3974)	42/165	4"-212"	14265	14265	26285
360x100	Multi/Bk	19'3" x 5'9" x 11"	5.86 x 1.74 x 0.28	109.6 (10.2)	97.4 (9.3)	1220 (554)	45/20	4"-224"	1850	1850	3390
360x125	Multi/Bk	19'3" x 7'0" x 11"	5.86 x 2.14 x 0.28	134.5 (12.5)	121.7 (11.6)	1495 (679)	45/25	4"-224"	2330	2330	4260
360x150	Multi/Bk	19'3" x 8'4" x 11"	5.86 x 2.53 x 0.28	159.5 (14.8)	146.1 (13.9)	1775 (806)	45/30	4"-224"	2815	2815	5130
360x175	Multi/Bk	19'3" x 9'8" x 11"	5.86 x 2.93 x 0.28	184.5 (17.2)	170.4 (16.2)	2050 (930)	45/35	4"-224"	3200	3200	5900
360x200	Multi/Bk	19'3" x 10'11" x 11"	5.86 x 3.33 x 0.28	209.5 (19.5)	194.7 (18.6)	2330 (1057)	45/40	4"-224"	3680	3680	6765
360x225	Multi/Bk	19'3" x 12'3" x 11"	5.86 x 3.72 x 0.28	234.5 (21.8)	219.1 (20.9)	2605 (1182)	45/45	4"-224"	4160	4160	7635
360x250	Multi/Bk	19'3" x 13'6" x 11"	5.86 x 4.12 x 0.28	259.5 (24.1)	243.4 (23.2)	2885 (1309)	45/50	4"-224"	4550	4550	8405
360x275	Multi/Bk	19'3" x 14'10" x 11"	5.86 x 4.52 x 0.28	284.5 (26.5)	267.7 (25.5)	3160 (1434)	45/55	4"-224"	5030	5030	9270
360x300	Multi/Bk	19'3" x 16'2" x 11"	5.86 x 4.91 x 0.28	309.4 (28.8)	292.1 (27.8)	3435 (1559)	45/60	4"-224"	5510	5510	10140
360x325	Multi/Bk	19'3" x 17'5" x 11"	5.86 x 5.31 x 0.28	334.4 (31.1)	316.4 (30.2)	3715 (1686)	45/65	4"-224"	5900	5900	10910
360x350	Multi/Bk	19'3" x 18'9" x 11"	5.86 x 5.7 x 0.28	359.4 (33.4)	340.8 (32.5)	3990 (1810)	45/70	4"-224"	6380	6380	11780
360x375	Multi/Bk	19'3" x 20'0" x 11"	5.86 x 6.1 x 0.28	384.4 (35.7)	365.1 (34.8)	4270 (1937)	45/75	4"-224"	6860	6860	12645
360x400	Multi/Bk	19'3" x 21'4" x 11"	5.86 x 6.5 x 0.28	409.4 (38.1)	389.4 (37.1)	4545 (2062)	45/80	4"-224"	7245	7245	13420
360x425	Multi/Bk	19'3" x 22'8" x 11"	5.86 x 6.89 x 0.28	434.4 (40.4)	413.8 (39.4)	4825 (2189)	45/85	4"-224"	7730	7730	14285
360x450	Multi/Bk	19'3" x 23'11" x 11"	5.86 x 7.29 x 0.28	459.4 (42.7)	438.1 (41.8)	5100 (2314)	45/90	4"-224"	8210	8210	15150
360x475	Multi/Bk	19'3" x 25'3" x 11"	5.86 x 7.69 x 0.28	484.3 (45.1)	462.4 (44.1)	5380 (2441)	45/95	4"-224"	8595	8595	15925
360x500	Multi/Bk	19'3" x 26'6" x 11"	5.86 x 8.08 x 0.28	509.3 (47.3)	486.8 (46.4)	5655 (2566)	45/100	4"-224"	9080	9080	16790
360x525	Multi/Bk	19'3" x 27'10" x 11"	5.86 x 8.48 x 0.28	534.3 (49.7)	511.1 (48.7)	5935 (2693)	45/105	4"-224"	9560	9560	17660
360x550	Multi/Bk	19'3" x 29'2" x 11"	5.86 x 8.87 x 0.28	559.3 (52.0)	535.4 (51.0)	6210 (2817)	45/110	4"-224"	9945	9945	18430
360x575	Multi/Bk	19'3" x 30'5" x 11"	5.86 x 9.27 x 0.28	584.3 (54.3)	559.8 (53.4)	6490 (2944)	45/115	4"-224"	10440	10440	19315
360x600	Multi/Bk	19'3" x 31'9" x 11"	5.86 x 9.67 x 0.28	609.3 (56.7)	584.1 (55.7)	6765 (3069)	45/120	4"-224"	10925	10925	20180
360x625	Multi/Bk	19'3" x 33'0" x 11"	5.86 x 10.06 x 0.28	634.3 (59.0)	608.4 (58.0)	7045 (3196)	45/125	4"-224"	11310	11310	20955
360x650	Multi/Bk	19'3" x 34'4" x 11"	5.86 x 10.46 x 0.28	659.2 (61.3)	632.8 (60.3)	7320 (3321)	45/130	4"-224"	11790	11790	21820
360x675	Multi/Bk	19'3" x 35'8" x 11"	5.86 x 10.86 x 0.28	684.2 (63.6)	657.1 (62.1)	7595 (3446)	45/135	4"-224"	12275	12275	22690
360x700	Multi/Bk	19'3" x 36'11" x 11"	5.86 x 11.25 x 0.28	709.2 (65.9)	681.5 (64.4)	7875 (3573)	45/140	4"-224"	12660	12660	23460
360x725	Multi/Bk	19'3" x 38'3" x 11"	5.86 x 11.65 x 0.28	734.2 (68.3)	705.8 (66.7)	8150 (3697)	45/145	4"-224"	13140	13140	24325
360x750	Multi/Bk	19'3" x 39'6" x 11"	5.86 x 12.04 x 0.28	759.2 (70.6)	730.1 (69.0)	8430 (3824)	45/150	4"-224"	13620	13620	25195
360x775	Multi/Bk	19'3" x 40'10" x 11"	5.86 x 12.44 x 0.28	784.2 (72.9)	754.5 (71.3)	8705 (3949)	45/155	4"-224"	14005	14005	25965
360x800	Multi/Bk	19'3" x 42'2" x 11"	5.86 x 12.84 x 0.28	809.2 (75.2)	778.8 (73.7)	8985 (4076)	45/160	4"-224"	14490	14490	26835
360x825	Multi/Bk	19'3" x 43'5" x 11"	5.86 x 13.23 x 0.28	834.1 (77.5)	803.1 (76.0)	9260 (4201)	45/165	4"-224"	14970	14970	27700

PIXELS HIGH (AAA)	PIXELS WIDE (BBB)	PIXEL SPACING (CC)
40	150	15.85mm
32	120	19.81mm
24	90	26.42mm

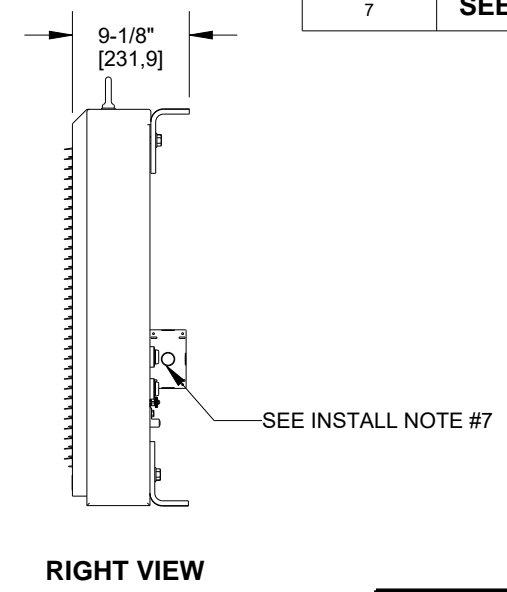
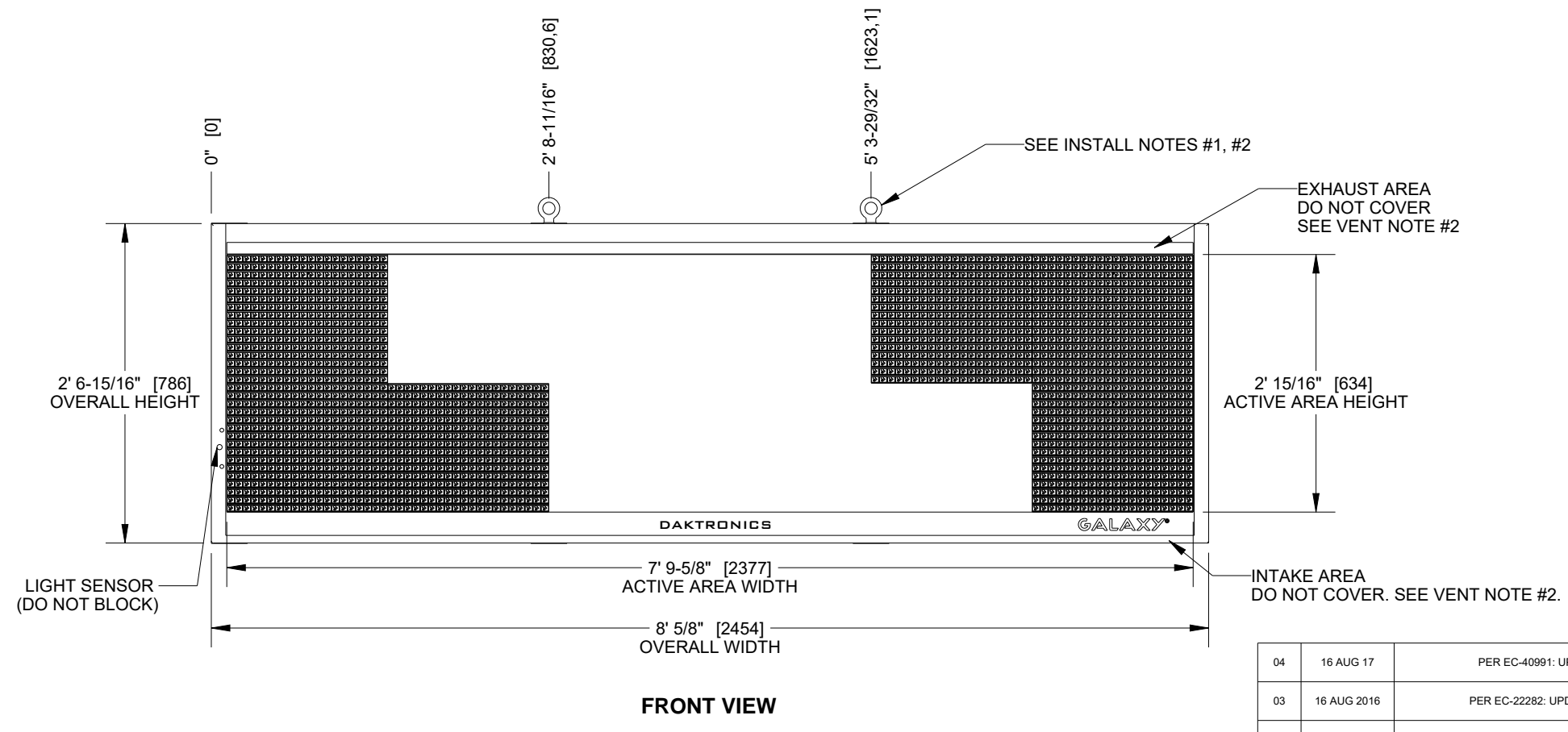
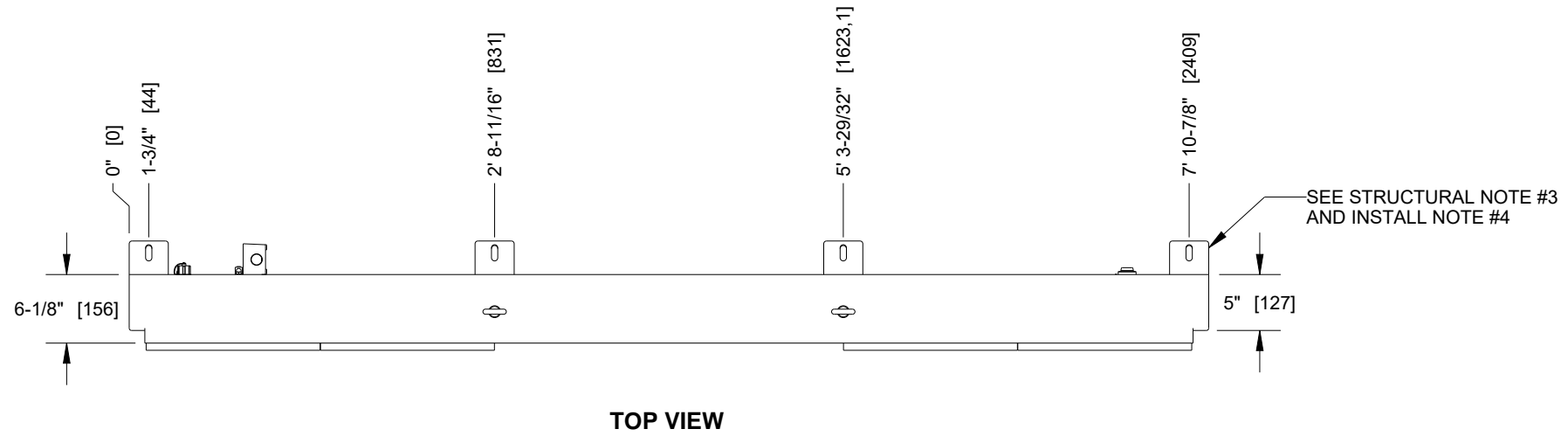
#	DETAIL	DESCRIPTION
1	DISPLAY	GS6 - AAxBBB-CC (SEE CHART ON TOP LEFT)
2	LED COLOR	RED, AMBER, OR RGB
3	ACTIVE AREA	2' 15/16" [634] X 7' 9-5/8" [2377]
4	OVERALL SIZE	2' 6-15/16" [786] X 8' 5/8" [2454]
5	CABINET	ALUMINUM & STEEL
6	VENTILATION	FRONT
7	ACCESS	SERVICE FROM FRONT OF DISPLAY
8	WEIGHT	150 LBS [69 KG] (APPROX)
9	SHIPPING	SHIPPED AS A SINGLE UNIT
10	DIMENSIONS	FEET AND INCHES [MILLIMETERS]
11	PAINTED	SEMI-GLOSS BLACK

STRUCTURAL RATING		
1	DESIGN WIND PRESSURE "P" (CASE A)	P<=:100 PSF (ASD)
2	STANDARD/CODE	IBC 2009/ASCE7-05, IBC 2012/ASCE7-10
3	ALL CLIP ANGLES MUST BE USED TO MOUNT DISPLAY	

POWER RATING PER SINGLE FACE: FOR SIZING ELEC.SERVICE MAX REQ'D SHOWN				
TECHNOLOGY	COLOR	MAX WATTS	120VAC 1PH 50/60Hz (2 WIRES + GND) DOMESTIC	240VAC 1PH 50Hz (2 WIRES + GND) INTERNATIONAL SPECIAL ORDER
			LINE 1 (AMPS)	LINE 1 (AMPS)
GS6	RED	434	3.62	1.81
	AMBER	434	3.62	1.81
	RGB	670	5.59	2.79

VENTILATION REQUIREMENTS	
1	DISPLAY RELIES ON VENTILATION TO FUNCTION PROPERLY. INTAKES, LOCATED AT THE FRONT OF THE DISPLAY, MUST BE ABLE TO DRAW IN AIR AT A TEMPERATURE NO GREATER THAN 120° F.
2	IN ORDER TO ENSURE AMBIENT TEMPERATURE AIRFLOW IS MAINTAINED, NO PORTION OF THE VENTILATION OPENINGS ALONG THE FRONT OF THE DISPLAY MAY BE COVERED OR OBSTRUCTED IN ANY WAY.

INSTALL NOTES	
1	IN ORDER TO PRESERVE THE STRUCTURAL INTEGRITY OF THE DISPLAY CABINET, THE 90° ANGLE BETWEEN THE CABINET AND THE LIFTEYE MUST BE MAINTAINED - USING A SPREADER BEAM IS SUGGESTED. ALL EYEBOLTS MUST BE USED WHEN LIFTING.
2	1/2" LIFTEYES TO ASSIST WITH DISPLAY INSTALLATION. LIFTEYES MAY NOT BE USED FOR PERMANENT INSTALLATION. LIFTEYES MAY BE REMOVED.
3	MECHANICAL AND SIGNAL CONNECTIONS OCCUR EXTERNAL TO DISPLAY.
4	CLIP ANGLE FOR MOUNTING. CLIP ANGLES CAN BE ADJUSTED VERTICALLY 1 - 3/16" AS NEEDED DURING INSTALLATION. CLIP ANGLE CAN BE WELDED OR BOLTED TO STRINGER. ALL CLIP ANGLE LOCATION MUST BE USED.
5	DAKTRONICS IS NOT RESPONSIBLE FOR THE MOUNTING HARDWARE OR THE INTEGRITY OF THE MOUNTING STRUCTURE.
6	DAKTRONICS IS NOT RESPONSIBLE FOR THE MAIN ELECTRICAL DISCONNECT. SEE POWER RATINGS ABOVE.
7	SEE DWG-03097583 FOR SIGNAL & MTG DETAILS



REV	DATE	BY:
04	16 AUG 17	RAB 18955
03	16 AUG 2016	DJO 18434
02	09 MAY 16	BAB 18436

		THE CONCEPTS EXPRESSED AND DETAILS SHOWN ON THIS DRAWING ARE CONFIDENTIAL AND PROPRIETARY. DO NOT REPRODUCE BY ANY MEANS WITHOUT THE EXPRESS WRITTEN CONSENT OF DAKTRONICS, INC. OR ITS WHOLLY OWNED SUBSIDIARIES. COPYRIGHT 2017 DAKTRONICS, INC. (USA)			
PROJECT: GALAXY GS6 SERIES					
TITLE: SHOP DWG, GS6-R, 2' 7"x8' 1" (2x6 MODS)					
DATE: 14-AUG-17		DIM UNITS: INCHES [MILLIMETERS]		SHEET 1 OF 1	
SCALE: 1/15		DO NOT SCALE DRAWING		REV 04	
DESIGN: TWHITEH		JOB NO. P1817		FUNC - TYPE - SIZE E - 07 - B	
DRAWN: DOSTRAA		3111193			